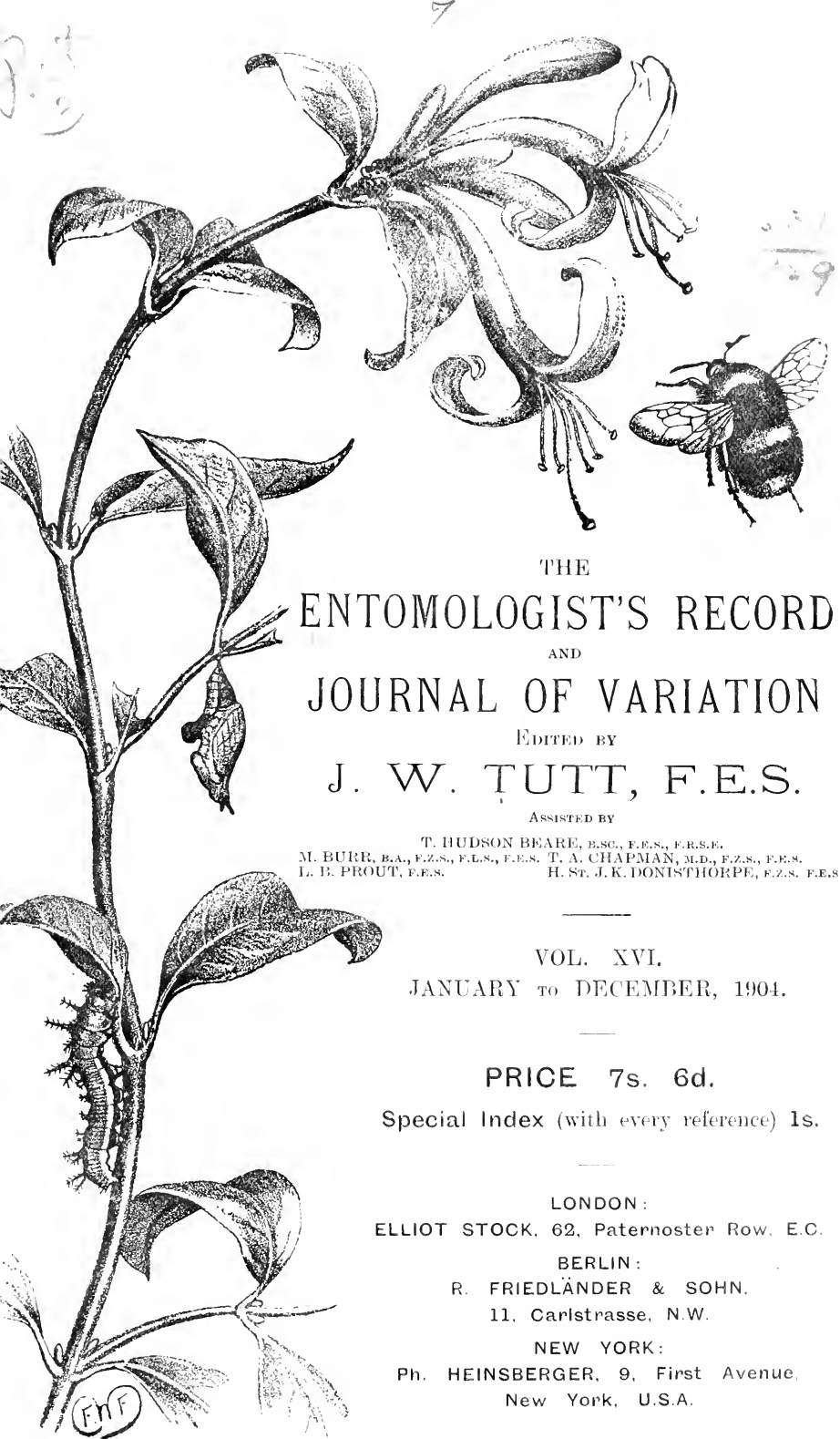

LIBRARY OF CONGRESS
1800



THE ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

EDITED BY

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

ASSISTED BY

T. HUDSON BEARE, B.SC., F.E.S., F.R.S.E.
M. BURR, B.A., F.Z.S., F.L.S., F.E.S. T. A. CHAPMAN, M.D., F.Z.S., F.E.S.
L. B. PROUT, F.E.S. H. ST. J. K. DONISTHORPE, F.Z.S. F.E.S.

VOL. XVI.
JANUARY TO DECEMBER, 1904.

PRICE 7s. 6d.

Special Index (with every reference) 1s.

LONDON:
ELLIOT STOCK, 62, Paternoster Row, E.C.

BERLIN:
R. FRIEDLÄNDER & SOHN.
11, Carlstrasse, N.W.

NEW YORK:
Ph. HEINSBERGER, 9, First Avenue,
New York, U.S.A.

PREFACE.

Another volume has been completed, and we tender our heartiest thanks to the subscribers, contributors, and everyone who has in any way helped towards the continued success of the magazine. An overflowing supply of most interesting material has always been on hand, and we apologise most heartily to those whose contributions have not yet been published, and hasten to assure them that arrears will be cleared off as quickly as possible. We were afraid at one time that the arid theme of synonymy and usage of names were about to overwhelm us, and, whilst not wishing to stifle such discussion altogether, on particular and essential difficult points and facts, we object to occupying valuable space with opinions, criticisms, and unimportant details, and prefer greatly to publish notes about the insects themselves, rather than about the names they do, or ought to, bear.

We have been again particularly indebted to Professor Beare and Mr. Donisthorpe for their share of the work in providing and editing a continuous supply of notes on the Coleoptera, and also to Mr. Burr, who has kept alive the interest in the Orthoptera. Few of our recruits appear to take up the less worked orders, Lepidoptera and Coleoptera, absorbing most of the work done.

For the General Index this year we have to thank our friend, the Rev. C. R. N. Burrows; and for the Special Index, Professor Beare, Mr. Burr, Mr. Routledge, and Mr. Turner. These gentleman, by sharing the work, have already completed the index. The idea was to publish it with this number, but it appears that this can scarcely be done without delaying publication for a few days, which is hardly desirable. It will be sent out if possible with the January number, so as to lessen as much as possible the delay in binding.

Our supply of plates this year has exceeded that of any previous volume. For help in producing these we are greatly indebted to Dr. T. A. Chapman, Mr. J. A. Clark, and Mr. J. C. Dollman. The three-colour photograph that was to have been published with no. 12 of the last volume, to illustrate Dr. Chapman's new Psychid, could not be completed until the publication of no. 3 of the current volume, with which it was published.

We propose to make no marked alteration in our conduct of the magazine during the coming year. We shall be glad to receive, at any time, from contributors, blocks to illustrate insects described, or localities worked. Our series of "Practical Hints" will be continued during the spring and summer months.

We particularly thank our subscribers for their kind response to our appeal as to the payment of subscriptions last year. Never before have the subscriptions been paid so promptly and with so little waste of effort. We trust that this satisfactory condition of affairs will be maintained with the coming volume.

The Entomologist's Record AND JOURNAL OF VARIATION.

Vol. XVI. No. 1. January 15th, 1904.

On a Second Generation of our Forres Triphæna comes, Hb. [melanozonias, Gmel.].

(cfr. *Ent. Record*, xv., pp. 217-222.)

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

With his usual alertness in seizing opportunities for advancing our knowledge of the workings of heredity in the lepidoptera, my friend Mr. Bacot tried for and obtained pairings in the brood which I have described in my previous article as brood A. On account of the difficulty of making sure of the sexes of the Triphænas when alive, he placed four specimens in a pot together, which, as the event showed, proved to include at least two females, the others both being *probably* males. All four were of the melanic (*curtisii*) series, but I cannot say what were the precise shades of colour. Two were observed *in cop.*, and from the ♀ of these—which were of course removed from the pot—ova were obtained, which yielded the brood that I shall describe as brood C. Ova were laid in the pot after this segregation, thus proving the presence of at least one other ♀. The parentage of the batches which I shall discuss as D, E, F and G, is not quite so certain, but Mr. Bacot believes it was different from that of C. Of course the grandparentage was identical in all cases.

The ova were laid in March, and resulted in imagines from June 25th to the first week in September, so that we completed our second generation in scarcely over the twelvemonth from the first egglaying. My notes are based on my own specimens (four only, bred June 25th to July 6th, belonging to brood C, some infectious disease most unfortunately carrying off the rest of my larvæ), Mr. Bacot's (73, also brood C, bred throughout July, and stragglers afterwards, the two latest—both very small specimens—not until the first week of September), Mr. J. E. Gardner's (24, bred July 12th to July 28th, from about 24 ova, which I call brood D; Mr. Gardner has no recollection of a single death in the larval or pupal state and there are no cripples), Mr. W. J. Kaye's (five only, brood E), Mr. A. W. Mera's (eleven, brood F, bred in July, a good many dying in pupa), and Mr. V. E. Shaw's (28, brood G, many ova did not hatch). The moths show no sign of degeneracy through inbreeding, being quite fully scaled, and well up to size. Mr. Bacot's extremes measure 43mm. (two dark) to 34mm. (two "typicals"), mine 40mm. (my brightest red) to 37mm. (my blackest), Mr. Gardner's 44mm. (four or five, all of the *curtisii—clarki* section) to 39mm. (two, one "typical," one *curtisii*). The average size of Mr.

Bacot's is not more than 38mm., but this is evidently a question of treatment; Mr. Kaye's of the first generation were smaller than this, whilst Mr. Gardner's of the *second* generation are at least as large as—perhaps larger on an average than—Mr. Bacot's and mine of the first. On the whole, as in the previous brood, the brighter red *clarki* average the largest.

Brood C.—Here, as in the parent brood (A), there are no true intermediates between the melanic and the non-melanic series; where there is any infuscation at all, it is well pronounced, and is participated in by both pairs of wings. The total number of moths is 77 (Bacot, 73; Prout, 4), of which 52 (Bacot, 50; Prout, 2) are melanic, and 25 (Bacot, 23; Prout, 2) non-melanic. Thus Mr. Bacot obtained 68·5% melanic, against 31·5% typical, while my unfortunate brood (too few to be of any use for generalisation) yielded half and half; resulting in a total percentage of roughly 67·53% melanics.

Of the melanic section, about seventeen are ab. *clarki*, six or seven being of the brighter phase (*Entom.*, xxii., pl. vi., fig. C1), the rest more mixed with black (reaching to Clark's fig. C2); two or three others have still a suggestion of a bright red ground-colour but are very strongly and handsomely marked with jet-black, leaving only the clear red in the costal area, with scattered red scales elsewhere. The remainder, as in the parent brood, shade off very gradually into ab. *nigrescens*, indeed, the gradations throughout the whole melanic section are very gentle. I am inclined to call about 20 or 21 intermediates (ab. *curtisii*, Newm., Prout restr. = *rufo-nigrescens*, Tutt), though some half-dozen might almost as well be placed with the extremer form; six or seven are to be referred to ab. *nigrescens**. The ab. *nigra* (with black hindwings) is still not entirely reached, though one of my two comes very near to it, having very glossy black forewings, with the markings nearly obliterated, and strongly black-powdered hindwings.

The "typical" series presents one or two features of considerable interest. Mr. Bacot's 23 consist of one with rather dark grey forewings (almost agreeing in this with Clark's fig. D2 = *consequa*, Adkin, *nec* Hb., yet certainly not "melanic" from my point of view)†, ten ab. *pallida* (of very much the prevailing tone of Clark's fig. A1 and A2, though two or three have less of the red tint and more of the greenish-grey) and twelve ab. *grisea* (without exception rather strongly tinged with pinkish, whereas less than half of the *grisea* of the parent brood took this peculiar hue). One of the last-mentioned dozen is decidedly darker and, at the same time, pinker than the others—a pretty and uncommon aberration. My two "typicals" are *utterly* different from any of Mr. Bacot's 23, one being a bright ab. *rufescens*, Tutt (Clark, fig. B1)‡, and the other being also distinctly referable to ab. *rufescens*, though somewhat duller and greyer. It is not a little remarkable that three out of my four (these two and the very black one mentioned above) should be different from any in Mr. Bacot's long series, and it

* A few (five) of Mr. Bacot's more or less melanic specimens, which were sacrificed for ova, are too much worn to classify with exactitude.

† Described (*infrâ*) as ab. *grisco-fusca*.

‡ I may take this occasion to remark that I have now, thanks to the courtesy of Mr. Gervase F. Mathew, seen a southern English example of this aberration. There is one, virtually as bright as the Scotch ones, among some interesting forms which he has sent me for inspection, taken in his own (the Harwich) district.

almost justifies the vague suspicion which I expressed that, contrary to my previous ideas on the subject, little differences in breeding conditions may tend to modify the resultant forms. The matter, at least, demands further investigation.*

Brood D.—As I have already stated, this brood (Mr. Gardner's) had probably different parents from brood C, but still it is a part of the offspring of brood A. The 17 "melanics" run from a fine crimison-red form (with so little black freckling on the hindwings that it is, perhaps, the *nearest* thing to an "intermediate" with which I have yet had to deal in these broods) to a dark *curtisii* (*rufo-nigrescens*) verging on *nigrescens*. Six or seven are tolerably bright red, four or five others more black-marked (all these go to ab. *clarki*); five of the form in which the red and black are thoroughly *blended* (cfr. *anteà*, xv., p. 219, lines 3-5); and one is the darker specimen making a transition from ab. *curtisii* to ab. *nigrescens*. It is noteworthy that the average is, therefore, distinctly brighter (redder) than in broods C, E and G, a higher percentage being of the lighter phase of *clarki* (approaching *rufa* in the forewings), whilst not one is *nigrescens*, and only one even closely approximates thereto. In Mr. Gardner's nine "typicals" there is nothing special to remark beyond one or two points which will be best dealt with under a final discussion of the whole material; on the average, the ground-colour is of the normal *pallida* tone, but one is more pinkish-grey, one more tinged with slate-colour and one pretty specimen is rather exceptionally light. The percentage of melanic forms in brood D, it will be noticed, is $70\frac{5}{6}\%$, thus just a trifle higher than in brood C, but not differing materially.

Brood E.—This batch (Mr. Kaye's five) all came out more or less of the darkest red forms, ab. *curtisii* (*rufo-nigrescens*), but they vary in intensity and the darkest almost, if not quite, reaches the true ab. *nigrescens*.

Brood F.—Mr. Mera's eleven (a large number, unfortunately, dried up in the pupal stage) consisted of seven "melanics" and four "typicals," or 63·6% against 36·3%. The former divide into three ab. *clarki* (two fine bright ones, the other a little darker), three ab. *curtisii* (two of the more variegated black-red type, the third the more "blended"), and one ab. *nigrescens*. The typicals are fairly normal, though one has a rather exceptionally light ground-colour, and all have well darkened stigmata.

Brood G.—Most of the eggs given to Mr. Shaw did not hatch, but he was very successful in rearing those which did. They proved an interesting lot, embracing a wide range of the forms, yet including few of ab. *clarki* (and these not very bright), a form which, as we have already seen, was well represented in Mr. Bacot's (17 out of 77), Mr. Gardner's (11 out of 24) and Mr. Mera's (3 out of 11). Mr. Shaw's 28 consist of nineteen melanic and nine non-melanic, or 67·8% of the former (virtually the same percentage as in brood C, which is 67·53); but the non-melanic are a more variable lot than Mr. Bacot's,

* It may be further noted in this connection, that the only other brood in which the ab. *nigrescens* has appeared is Mr. Shaw's (brood G), and that here three or four, out of a total of only 28, belong to it; the statistics given below will, perhaps, allow investigators to make other curious comparisons as to the dominance or otherwise of particular forms in particular batches, *e.g.*, the much higher percentage of bright-coloured *clarki* in brood D than in brood G, &c.

Mr. Gardner's, or Mr. Mera's. I should arrange the forms thus:—Of ab. *pallida*, five (two normal, three more reddish); ab. *rufescens*, three fine and a fourth approaching it; ab. *clarki*, three or four (none very bright); ab. *curtisii*, about ten, the black markings, on the whole, strong); ab. *nigrescens*, five (one or two very extreme, almost reaching ab. *nigra*). One cripple, and three sacrificed in attempts at pairing, have been included as *curtisii*, though the precise shade is not quite certain. Both stigmata, as in all our material in this generation, are always distinct.

Comparison of second generation with the parent brood.—In my summary of brood A (*antè*, pp. 220-221), I analysed the forms thus:—ab. *pallida*, Tutt (*sens. lat.*), 43; ab. *grisea*, Tutt (*sens. lat.*), 31; ab. *clarki*, mihi, 37; ab. *curtisii*, Newm. = *rufonigrescens*, Tutt, 37; ab. *nigrescens*, Tutt, 19; total, 167. Broods C to G, roughly classified, work out as follows:—ab. *pallida*, 24 (brood C, 10, broods D-G, 14); ab. *grisea*, 14 (brood C, 12, broods D-G, 2); ab. *grisco-fusca*, mihi, n. ab.*, 1 (brood C); ab. *rufescens*, 6 (brood C, 2, brood G, 4); ab. *clarki*, 34 (brood C, 17, broods D-G, 17); ab. *curtisii*, &c., 48 (brood C, 23, broods D-G, 25); ab. *nigrescens*, 13 (brood C, 7, broods D-G, 6); unclassified, being too worn—apparently *curtisii* or *nigrescens*, 5 (brood C); total, 145. To help the eye, the percentages may be roughly tabulated:—

	Brood A. (Generation 1).		Broods C-G. (Generation 2).
ab. *pallida*	25·74 per cent.	..	16·55 per cent.
ab. *grisea*	18·56 ,,	..	9·65 ,,
ab. *grisco-fusca*	—	..	·69 ,,
ab. *rufescens*	—	..	4·14 ,,
Total non-melanic	44·31 per cent.		31·03 per cent.
ab. *clarki*	22·15 per cent.	..	23·44 per cent.
ab. *curtisii*	22·15 ,,	..	33·10 ,,
ab. *nigrescens*	11·37 ,,	..	8·96 ,,
unclassed (melanic)	—	..	3·45 ,,
Total melanic	55·68 per cent.		68·96 per cent.

Thus the percentage of melanic, or partially melanic, specimens has advanced, although scarcely so much as might have been expected from the selection of melanic parents; and it is observable that there are not quite so many really blackish specimens as in the first, the increase being more in the redder and intermediate ones; yet the discrepancy in this particular is, perhaps, not so great as I have made it appear, for a considerable number of examples of brood C might almost as appropriately have been placed with *nigrescens* as with *curtisii*, and it would practically vanish if we assume most of Mr. Bacot's worn specimens in brood C to be true *nigrescens*. On the whole, the second generation

* Ab. *grisco-fusca*, n. ab. = *consequa*, Adkin (*pro parte*), *nec* Hb. Darker than ab. *grisea*, Tutt, forewings almost as in *Entom.*, xxii., pl. vi., fig. D2 (ab. *nigrescens*, Tutt, *pro parte*), hindwings not infuscated. This form appears *very occasionally* in the south of England, and is the darkest, so far as I yet know, which is here obtainable. There is no suggestion of red in its coloration, and I am inclined to agree with Mr. Adkin when he says of a similar, even if slightly more extreme, form, that it is "traceable downwards through varying shades of greys to a very pale grey type," whereas the true *curtisii* series is rather derived "through the reds" from "a light red type" (R. Adkin, in *Proc. Sth. Lond. Ent. Soc.*, 1890-91, p. 157).

is somewhat the more variable; and I have already commented upon the outcrop of the red and the dark grey forms (ab. *rufescens* and ab. *grisco-fusca*), which did not appear at all in the first generation, and also on the very appreciable increase of pinkish tinge in the series of ab. *grisea*.

There remains yet one point of interest to be noticed. In the parent brood, as I remarked, some 40 or 50 per cent. of the "typicals" had both stigmata filled in with a more or less darkened colour; this peculiarity has increased to 100 per cent., *i.e.*, in the second generation every non-melanic specimen, without exception, has well-marked dark stigmata. Usually they are more or less blackish, approaching the ground colour of ab. *curtisii* or ab. *nigrescens*, but not infrequently they have a brighter red tinge, exactly that of certain of the ab. *clarki*: it thus appears that the characteristic colours of Scotch *T. comes* were bound, as it were, to get a foothold somewhere, and when not permitted to encroach upon the ground colour of the wing, compensated themselves by occupying the stigmata.

Mr. Bacot made a gallant attempt to continue the brood for another generation, and obtained a few ova; but they were mostly infertile, and the few which produced larvæ (only 6 or 8) developed so slowly that he had given up expecting them and so they perished. Mr. Shaw also tried for ova but failed to obtain them.

The Revision of the Sphingides—Nomenclature, Classification, Geographical Distribution.*

(*Continued from Vol.* xv., p. 312.)

Whilst we fully agree with our authors in applying the law of priority with all strictness to specific names and to generic names in proper cases, we feel strongly that when an author does not state what species is the type of his genus, it is wrong to take the first species of the genus as the type, if this overrides any real work done in the interval. We make this protest in view of several cases in the "Revision," and may take one of the most glaring in illustration. The "Revision" makes *ocellata* the type of *Sphinx* because it was no. 1 in Linné's list. Now Linné had no idea of such a thing; indeed, there is a long tradition, having certainly pre-Linnean authority, that *ligustri* was the typical *Sphinx*, if there was such a thing. To name a species as the type of a new genus is a mere convention, justifiable by its convenience; but a genus has essentially reference of more than one species, and all that naming a type amounts to is a request by its author that if ever the genus be divided, his name remains with the division containing that species. If it amounts to more than that, it is scientifically absurd, and really consists in making the generic a specific, and not a generic, name. When Latreille divided the Linnean *Sphinx* by separating the Smerinthids under the new name *Smerinthus*, he made a distinct advance in classification; he gave not a different, but a restricted, meaning to *Sphinx* as a generic name, and his work still stands, and now, after

* *A Revision of the Lepidopterous Family Sphingidae.* By the Hon. Walter Rothschild, Ph.D., and Karl Jordan, M.A., Ph.D. Supplement to *Nov. Zool.*, vol. ix. Pp. cxxxx+972. Pl. 67. Tring, April, 1903.

being recorded by the constant use for a hundred years of the name he gave, to wipe it out altogether by the mistaken and pedantic application of an otherwise sound rule, is nothing less than an unpardonable piece of vandalism. If *Sphinx* is the genus of *ocellata*, how does the subfamily come to be *Ambulicinae* and that containing *ligustri*, *Sphingicae*. *Dilophonota* is the most characteristic name in the tribe of *Pseudosphingidae*. But the revision drops it as synonymic. How, then, does the tribe become *Dilophonoticae*? And if so, why may not the subfamily containing *ocellata*, if it be not *Sphinginae*, continue to be *Smerinthinae*? No doubt the Revision follows some law of priority herein, but in the varying contents of the groups and the varying values given to genera, the way in which it is applied seems more chaotic than luminous.

In so far as classification is a matter of nomenclature, we have sufficiently discussed this section of these volumes, and so far as it deals with questions of facts as to what are species and what are subspecies, etc., we see very little that has not been set out by our authors and others before. We must again demur to their statement that: "*Geographical variation leads to a multiplication of the species; non-geographical variation at the highest to polymorphism.*" When they say that isolation leads to divergence to specific rank, we agree thoroughly, and that it is impossible—or, at least, not proved to be possible—without; but there are many sorts of isolation besides the geographical. We are not prepared to assert without fear of contradiction that *Tephrosia crepuscularia* and *T. bistortata* are "good" species; but whether they are or not, they are becoming (or have become) so by an isolation that is not geographical. We entertain little doubt that *Amphidasys betularia* and *A. strataria* became distinct by a similar seasonal isolation, the tendency to seasonal divergence having, perhaps, been initiated by a food divergence. The genus *Anthrocera* (*Zygaena*) is difficult to understand in several directions, unless we assume the existence of seasonal subspecies. This is, of course, an important point; still it is small in comparison with the remainder of this portion of the essay.

As to the limits of species, they have some good remarks on "lumpers" and "splitters," finding good points in the methods of each, as well as something to object to. "It is the lack of discrimination which prevents either extremist from finding the right path. However, the work of the splitter has a great advantage over that of the lumper. The differences which he points out between the animals are there. In the statements of facts he is correct, but he errs in the interpretation of these differences. His sight is keen—his reasoning less so. The lumper, on the other hand, does not perceive these differences, or he perceives them only in a hazy way. He puts them down as insignificant and passes on, halting only if there is a conspicuous quantity of difference which impresses itself on his mind. His eye and reasoning are on the same level, and his work is generally scamped." Our authors are lumpers in their tendency to regard many forms as merely subspecies that are often accorded specific rank, whilst they display all the acumen and close observation of the splitter. A certain ambiguity certainly attends their declarations as to species and subspecies. A species can only be formed by geographical isolation, but geographical forms are merely subspecies, not distinct

species. We fully understand what they mean here, but they leave us without any definite criterion as to when forms come under the one or other of the declarations we have just placed together. They probably mean—but we should have liked them to have said—that it is but rarely that any decisive criterion can be applied, and that analogy only can decide, and the application of this may reasonably differ in the hands of different authorities whose education and experience have been amongst different sets of species.

In the remarks on genera and higher categories we may quote :— "To define genera and higher units is not always an easy matter. In order to render a definition precise, a close study is necessary of the forms which come under the unit defined, as well as of the forms of the allied units. The difficulties encountered have induced many authors, especially in ornithology and entomology, to propose names in genera, subfamilies, and families without attempting a definition. The naked names thus introduced are a fit *testimonium paupertatis* for their authors." "It has been our special endeavour to give a solid foundation to the genera, supplementing and rectifying the vague and faulty definition with which the workers in this group have contented themselves." "We have laid special stress upon the genera conceived by us, representing stages in the evolution of the *Sphingidae*."

The next section of the Introduction deals with the "Morphology of Sphingidae," running to over 50 pages. Much of this is of the nature of a summary, of which the details are to be found in the systematic portion of the work. It is the wealth of detail here accumulated in regard to the structure and anatomy of all the outer portions of the Sphingid imago, that marks this revision as something definitely beyond anything of the sort on the same scale that we have yet had on any family of lepidoptera. The care and minuteness, as well as accuracy of the observations, and the large number of species to which they relate, enforce one's admiration. This is difficult to illustrate without unduly long quotations. We may, however, refer to their most valuable observations on the labial palpi. "A character of the greatest importance in the classification of the Hawk moths is found at the base of the first segment. That is a patch of variable size of short (and doubtless sensory) hairs, which is always present in one section of the family, except a few reduced forms, and equally constantly absent from the other section. The trustworthiness of the distinctive character was discovered after we had separated the *Acherontiinae* (= *Acherontiicae* + *Sphingicae* + *Sphingulicae*) and *Ambulicinae* from the rest of the family on other grounds. This basal patch was found in butterflies and treated upon at some length by Reuter. It is of wide occurrence in moths." To mention all the subjects dealt with would be to give a catalogue of the parts of the external skeleton of Sphinges. "The singularly meagre success attained in the definition of genera of *Sphingidae* by the authors of the old school—meagre even from their point of view—was mainly due to the wings seldom offering in the neuration such obvious distinctions as are found in other families of lepidoptera."

The genital armature is described, not merely of the males, but also of the females. "The sexual apparatus is of great taxonomic value . . . . In a number of cases the apparatus is the only safe guide in the recognition of species. From this point of view the

Sphingidae can be divided according to the sexual armature into the following categories—

"1. Species that are not different from their relatives in these organs . . . ."

"2. Species which are different from their nearest relatives, but do not show any marked geographical variation in the sexual armature. Here belongs by far the greater proportion of the Hawk moths." With regard to the difference "there is every conceivable gradation . . . ."

"3. Species which differ from their allies and vary in themselves geographically. Geographical variation is most often met with, and is most conspicuous, in those forms which are sedentary in habits. Sluggish species with functionless mouthparts and reduced powers of flight, species of which the sole function as imagines is propagation, are especially liable to develop into geographical races, with differences in the sexual armature. The phenomenon occurs often in *Ambulicinae* (*Smerinthidae*, auct.). The geographical differences in these organs, which may or may not be accompanied by differences in external features, are occasionally surprisingly great . . . ."

In what follows many will disagree with our authors, but we fancy what they mean is identical with what we have always insisted upon, *viz.*, that the sexual armature is as liable to variation within the limits of a species as any other portion of the anatomy, and may vary to as extreme a degree; it only becomes of more value as a specific character than any other difference, if it can be shown that the divergence is great enough to render crossing *immediate* or *mediate* of the two forms impossible. That the armature presents more definite differences than other parts renders it more easy to consider, but not of more value as a specific character.

"It is quite erroneous to say that differences in the sexual armature are always of specific value. Geographical races may be different or not in these organs, and the difference may be minute or conspicuous. It is idle to maintain that geographical representatives are specifically distinct if the sexual armature shows obvious differences. What one investigator considers obvious in these organs (as well as in others) a second student does not think worth noticing. . . . There is no line of separation between conspicuous and inconspicuous differences. . . . . Therefore, to say which geographical differences are specific and which not, would be entirely dependent, not on the facts, but on the personal view of the investigator. . . . A view of specific distinction, making it dependent on personal opinion, must, therefore, necessarily be erroneous." All perfectly true specific distinctness is, no doubt, a matter of fact and not a matter of opinion, but as we can only imperfectly get at the facts, we are confined to giving a personal opinion about them in the great majority of debatable cases.

The armature is also of great value for generic characters, and the female armature often presents very striking characters. The asymmetry of these organs is very fully discussed, the armature of the penis-sheath (*aedoeagus*) is almost always asymmetrical. There is much more in this section that one would like to refer to, but we are already becoming too lengthy.

Out of the 67 plates no less than 51 are devoted to these morphological details; and as some of the plates contain nearly 60

figures, it will be evident that we are well within the limits of simple fact in regarding this portion of the work as a new departure, not so much in method as in the thorough application of it. No doubt the great majority of these plates are devoted to ♂ and ♀ genitalia, and genitalia have been very satisfactorily dealt with in various monographs, but the series of drawings of the armature of the aedoeagus (penis-sheath) are such as we have not seen in regard to any other group of lepidoptera. The drawings and their reproductions in these plates have no need to fear even the most jealous hypercriticism. The remaining 16 plates are of imagines, photographed of natural size—seven in colours, the remainder in black and white. Those in black and white, attributed by legend to S. G. Payne and Son, are of remarkable success.

Geographical distribution occupies the remaining 38 pages of general matter. As a geographical barrier, it is pointed out that there are not only oceans and mountains, but climatic differences that foodplant, competitive species, and other forces may be equally effective. The main portion of this section of the essay deals with detailed items not admitting of brief presentation. The temperate regions contain only one in seven of known species, and the tropical species still to be discovered will probably reduce the proportion to 1 in 9. Chili has only two species of hawk moths. The summary of the Palæarctic fauna is as under :—

7 genera and		52 species	are peculiar to the region.	
4	,, ,,	1 ,,	occur also in the New World.	
1 genus			is found in the Nearctic and Oriental regions.	
13 genera	,,	16 species	occur also in the Oriental region.	
6	,, ,,	3 ,,	,, ,, ,,	and Æthiopian regions.
		2 ,,	,, ,,	Æthiopian regions.
2	,, ,,	1 ,,	are cosmopolitan.	
33	,, ,,	75 species.		

The northward extension of southern forms is much more marked eastwards, as it is in the Nearctic region. The details of the several genera and species emphasise the *primâ facie* view that the *Sphingides* are not by any means native to the Palæarctic region, but have immigrated at various times from various directions, and one ends by being rather astonished that so many have succeeded in staying so long and becoming more or less peculiar to the region. The most peculiar item is that of the small remnant of the *Sphingulicae*, perhaps the nearest that remains to the primæval Sphingid, 6 species out of 11 should inhabit the eastern Palæarctic area.

We do not always find exact accordance between the table on p. cvii and the detailed tables, but they are near enough. It appears that the Neotropical fauna, in not far from its entirety, consists of species, and to a large extent genera, that are special to it. The *Sesiinae* are almost confined to the region, having 14 special genera, and seven others that extend to the Nearctic region, leaving only three outside it, which reach the eastern hemisphere, one of these being also Palæarctic. The *Choerocampinae* are in almost the opposite position, with 11 Old World genera, and only three reaching the Neotropical region, of which two are special; but these, though presumably immigrants, have thriven, and possess 53 species confined to the region, against 86 in the 11 eastern genera.

The Oriental region repeats this specialisation, but not quite so markedly. It is especially rich in *Philampelinae*, and less so in *Ambulicinae*, which equally predominate in the Æthiopian region. The *Acherontiinae* are more equally distributed. Nevertheless, we cannot satisfy ourselves that any of the groups certainly originated in any of the regions, though the case is certainly strong as regards the *Sesiinae* in the Neotropical region.

(*To be concluded.*)

Synopsis of the Orthoptera of Western Europe.

By MALCOLM BURR, B.A., F.L.S., F.Z.S., F.E.S.

(*Continued from Vol.* XV., p. 319.)

1. FORFICULA AURICULARIA, Linn.

Dark chestnut; head red; antennæ 13-15-segmentate; pronotum dark, sides paler; elytra testaceous, with posterior border straight; wings well-developed; feet testaceous; forceps reddish, black at tips, extremely variable in length; in the ♂, dilated and flattened and denticulated on inner margin at base, with a sharp tooth at end of denticulations, then suddenly slender, incurved gently into an oval or circle, according to the variable length of this organ; in the ♀, the branches are straight, unarmed, contiguous. Length of body, 10mm.-14mm., ♂, ♀; of forceps, 4·9mm. ♂, 3·5mm. ♀.

The common earwig is abundant throughout Europe; it occurs also in North Africa, Madeira, Asia Minor, and North America.

FORFICULA SILANA, A. Costa (=*targionii*, Brunner).

Distinguished from *F. auricularia* only by the absence of wings and rounded hinder border of elytra; the sides of the abdomen are more parallel. Length of body, 11mm.-17mm., ♂, ♀; of forceps, 4·6mm. ♂, 3·4mm. ♀.

Recorded from Sila Grande in Calabria.

FORFICULA APENNINA, A. Costa.

Closely resembles *Apterygida media*, but larger and stouter; branches of forceps of ♂ broadened slightly at base, in form of a triangular plate. Length of body, 13mm.-20mm., ♂, ♀; of forceps, 6·8mm. ♂, 4·4mm. ♀.

Recorded from Calabria and the Abruzzi.

FORFICULA PUBESCENS, Géné.

Small and pale; wings absent; antennæ 12-segmentate; forceps of ♂ contiguous at base, then almost contiguous down to the tooth; this dilated part occupies two-thirds of length of forceps; beyond tooth, branches simple, bent inwards; in ♀ simple, straight. Length of body, 6·7mm. ♂, ♀; of forceps, 3·4mm. ♂, 2mm. ♀.

This is a purely meridional species; it is found on plants and reeds in moist places; adult in summer and autumn. In France, it is common in the extreme south; in Italy, it has been taken at Pegli, and at Messina in the spring. It is found also in Corsica and Sardinia, and the Balearic Islands, and in Spain, where it is recorded from Barcelona and Granada.

FORFICULA LESNEI, Finot.

Resembles *F. pubescens*, but differs in the shape of the forceps of

the ♂ ; these have the dilated part occupying about half the total length, and the inner margins are contiguous throughout the dilated part ; the apex of the dilated part is terminated in a knob rather than in a blunt tooth, and the extremities of the branches do not meet, as they do in *F. pubescens*. Length of body, 6·8mm., ♂ , ♀ ; of forceps, 1·5mm.-3mm. ♂ , ♀ .

This species takes the place of *F. pubescens* in the north. In England, it has occurred at several localities in Kent, Surrey, Hants, Berkshire, Isle of Wight, and Dorset. In France it has been recorded from near Trouville ; it was first discovered by Lesne in the marsh of Villers-sur-Mer, in Calvados. In Spain it is recorded from Galicia.

Forficula smyrnensis, Serville.

This is easy to recognise by its bicolorous elytra, the only other European *Forficula* having such elytra being the very distinct *F. ruficollis:* the elytra are castaneous, with a large central testaceous spot ; the wings also have a white spot ; the dilation of the forceps is extremely short, the slender part being very long and slightly curved. Length of body, 14mm., ♂ , ♀ ; of forceps, 5·8mm. ♂ , 3·5mm. ♀ .

This is, strictly speaking, an Eastern species, but it is recorded from Corsica by Brunner. The female very closely resembles that of *Anechura bipunctata*, Fabr.

Forficula ruficollis, Fabricius.

Large and stout ; head black ; general colour dark chestnut ; pronotum transverse, castaneous, with disc reddish ; wings scarcely visible ; abdomen black ; feet red ; forceps ♂ stout, red, the base and apex black, dilated and crenulated at base, then slightly incurved. Length of body, 13mm.-17mm. ♂ , 14mm. ♀ ; of forceps, 4·9mm. ♂ , 3·4mm. ♀ .

This is an easily recognisable species from the figure of Rambur (*Faune de l'Andal.*, p. 6, tab. 1., figs. 6-8, 1838, as *F. baetica*). It is purely an Iberian species, recorded from Granada, Andalusia, and Portugal, but nowhere common.

Forficula decipiens, Géné.

In appearance very like *F. auricularia*, but has no wings ; the dilated part of the forceps hardly exceeds one-third of their length ; except the denticulations at the extreme base, the forceps are unarmed. Length of body, 7·13mm. ♂ , 8·12mm. ♀ ; of forceps, 3·6mm., ♂ and ♀ .

A meridional form. In France it is not uncommon in the south, though Finot records it as far north as Fontainebleau. It has been taken at Mt. Cenis, and at Genoa and Pegli in Italy. In Spain, it is recorded from Ona, Salamanca, Barcelona, and Sierra Nevada.

According to Brunner it occurs under stones, but Finot says it is found on flowers and plants, especially on *Compositae*.

Genus 5 : Anechura, Scudder.

This genus is characterised by the strongly bent and irregularly curved forceps of the male, which, in the only European species, are bent strongly downwards ; there are about fifteen species described.

Anechura bipunctata, Fabricius.

Dark reddish ; elytra spotted with paler ; forceps of ♂ bent downwards

and inwards. Length of body, 9mm.-14mm. ♂ and ♀; of forceps, 4·7mm. ♂, 3·5mm. ♀.

This is a mountain insect; it is common enough in summer and autumn at great elevations, even near glaciers. In France, it occurs in the Basses-Alpes, Mt. Cenis, the Cauterets in the Pyrenees. In Spain it has been taken at Panticosa in the Pyrenees. In Germany, it is found in Silesia, Thuringia; in Bohemia near Prag, and also at Mödling near Vienna, on the Lagerberg, near Krems, Baden, Gloggnitz.

Genus 6: Apterygida, Westwood.

This is an extensive genus, in which the females cannot be distinguished from those of *Forficula*: the males differ in having the forceps slender, separated at the base, neither flattened nor dilated there.

There are two European species, one native, the other introduced.

1. Body hairy; forceps toothed in middle .. .. .. 1. media, Hagenb.
1.1. Body glabrous; forceps toothed near apex .. .. 2. arachidis, Yers.

1. Apterygida media, Hagenbach (=*albipennis*, Megerle).

Small, testaceous, or reddish, forceps of ♂ slender, nearly straight, with a small tooth in the middle. Length of body, 6mm.-10mm. ♂, 8mm.-9mm. ♀; of forceps, 3·5mm. ♂, 2·5mm. ♀.

Common in central and southern Europe. Extremely rare in England (Ashford, Norwich). In France, it is common in the north but rarer in the south—Paris, Fontainebleau, Vosges, banks of the Seine near Valvin, Metz, Adentes, Lyon. In Belgium, Ronendorf in Luxembourg, Vieil-Salm, Calmpthout, Knocke, Lanaeken, Halloy, Rouge-Cloître, Virton, Mélreux, Fierforz, Ivoir, Montaigle, and in Holland it may be swept from shrubs and climbing plants, near water. Common in Upper and Lower Austria and in the Tyrol.

2. Apterygida arachidis, Yersin (=*nigripennis*, Motsch. =*wallacei*, Dohrn =*graridula*, Gerst.).

Closely resembles the last, but darker, not pilose; the forceps of ♂ toothed near the extremity. Length of body, 8mm., ♂ and ♀; of forceps, 1·2mm., ♂ and ♀.

This is a cosmopolitan exotic form, occurring in Europe under artificial conditions. In England, it is found in the chemical works at Queenboro'; in France, it was originally discovered among pea-nuts at Marseilles.

(*To be continued.*)

Two more seasons among the Swiss Butterflies.

By G. WHEELER, M.A.

(*Concluded from Vol.* xv., p. 320.)

The following week I started for a visit to the Simplon, going as far as Brig on July 7th. On the way I got out of the train at Sierre, and made an expedition to Nioue in search of *Melitaea maturna* var. *wolfensbergeri*, but again without success, the day being cloudy I took nothing but a few *M. phoebe*, *M. didyma* and *Satyrus hermione*, and even a walk through the Pfynwald to Loèche station produced nothing more exciting than a couple of *Melitaea athalia*. The following day I walked over the Simplon Pass from Bérisal to Simplon village, but the cold was intense, and at the top of the pass it was almost impossible to hold anything in one's hands, even after a two hours' walk up hill.

It was little better on the other side, and the next day, though rather warmer, was still cold and very windy, and very little was flying. The next day, Friday, the 10th, was less cold and windy, and there was a fair amount of sunshine, and I made my first expedition up the Laquinthal in search of *Erebia christi*. I knew I had the right locality, for I obtained it from its famous discoverer, Herr Rätzer, who was staying in the hotel, but on this occasion, I failed to find a single specimen. *E. ceto* var. *obscura* was in some numbers, but not so abundant, nor so dark, as in 1901; the other captures being *Lycaena arion* var. *obscura*, *Polyommatus pheretes*, ♂, *Rusticus argus* var. *alpina*, *Anthocharis simplonia*, a very fine *Leptosia sinapis* ab. *sartha*, and a specimen of *Parnassius apollo* without white centres to the red spots. This species is small and somewhat approaching *P. delius* in the Laquinthal, but though, during my visit, I netted a considerable number, I never found a single specimen of the latter species. The 11th was a glorious day, and I took my first *Erebia christi*. The banks where this species occurs are exceedingly steep, and practically the only way of securing specimens is to stand on the path and net those that cross it. Its habitat is so difficult of access, or, rather, it is so difficult to maintain a foothold on the slopes which it frequents, that there need be no fear of exterminating the species. Further up the valley, at the foot of the Laquinhorn, *Pieris napi* var. *bryoniae* and *A. simplonia* were very abundant, though not easy to take, and I did not find a single ♀ of the latter; there was, however, among a great number of typical mountain specimens, one example of the yellower form of the Rhone valley, var. *flaridior*. *Pararge hiera*, the ♂s much worn, the ♀s fairly good, was to be found on the *christi* ground, as well as *Brenthis euphrosyne*, *B. amathusia*, just emerging, etc. Sunday was fine in the morning, but wet and cloudy in the afternoon, but Monday, the 13th, was again a splendid day, and again I sought the Laquinthal. On this day I took three *Erebia christi* (rather rubbed), *E. euryale* var. *adyte*, *E. ceto* var. *obscura*; also *Chrysophanus hippothoë* var. *eurybia* (common, but very small), *C. virgaureae*, ♂s, (very large and with a splendid border of black spots on the hindwing), *C. dorilis* vars. *brunnea* and *subalpina* (chiefly the former), *Polyommatus pheretes*, ♀, *P. corydon*, *P. hylas*, *P. alexis*, and *Cupido minima* var. *alsoïdes*, of portentous size, my largest measuring about 29mm. In the evening our party was increased by the very welcome arrival of Mr. Lemann and Mr. A. H. Jones. Herr Rätzer, having broken his only net, had already departed, but Professor Reverdin, of Geneva, had previously been added to the entomological coterie at the Hôtel Fletschhorn. Just in passing I cannot help advising all entomologists who are making a round in Switzerland in July (or from the end of the 3rd week in June), to pass some days at least in this charming village and to be sure to go to this hotel. The insects of the Laquinthal and neighbourhood are most interesting, and the owners of the hotel will do anything in their power to make their visitors comfortable, one great advantage, from an entomological point of view, being, that meals can be had at whatever time one returns from the chase.

On Tuesday the 14th, a cloudy day, but improving as it went on, we again visited the *E. christi* ground and took several specimens, the best day, in this respect, that we had; I also took one *Erebia eriphyle* between the village and the entrance to the Laquinthal, and Mr.

Jones subsequently took one (or two) more. One ♀ *Polyommatus pheretes* was my only other take. On the 15th, leaving my companions on the look-out for *E. christi* (of which I got one specimen on the way), I went high up the valley in search of *E. glacialis*, but only took two very small *E. lappona*: lower down I came across the same species of the usual size, and took specimens of most of the species found on previous days, as well as *Hesperia cacaliae* and one specimen of *H. andromedae*, which unfortunately, though fresh, had lost a considerable part of one hindwing. Towards two o'clock the day had completely clouded over, and for the next four days we lived in thick clouds, only varied by cold rain.

On the fifth day, Monday 20th, we left Simplon for Bérisal, walking over the pass. Though the day was only moderate, it was not altogether unsuccessful; about a mile and a half above the village near the bridge over the Krumbach, Mr. Lemann took another *E. christi*, and at the top of the pass I obtained a good *H. andromedae*: other captures were *Brenthis pales* and var. *isis*, *Melitaea* var. *merope*, *Colias phicomone*, *Erebia gorge*, *Hesperia cacaliae*, &c. At Bérisal I found Mr. Sheldon, with whom I went up the Steinenalp next day, though it scarcely seemed worth while on such a bad day. Still, *Erebia ceto* and *Rusticus argus* var. *alpina* were obtained on the way, and, during an occasional gleam of sunshine in the late afternoon, one or two *Colias palaeno*, whilst from the flower-heads we took *Polyommatus orbitulus*, *P. eros* and *Pieris callidice*. The next day Mr. Lemann and Mr. Jones left us, and I walked over to Simplon with the hope of meeting Mr. Lowe and going with him up the Laquinthal. In this I was disappointed, but just above the 7th Refuge, on my way down, I took one *Erebia christi* at the side of the road, and at the entrance of the Laquinthal I met Chanoine Favre, who had taken a ♀. All those taken by the party at the "Fletschhorn" were ♂s, with two exceptions, one of which fell to the lot of Mr. Jones, the other to Dr. Reverdin. The only thing of importance that I saw in the Laquinthal that day was a ♀ *Polyommatus pheretes* laying eggs on a large yellow-flowered vetch (a great favourite with *V.* var. *alsoïdes* for egg-laying); this plant was unfortunately in a position in which I was unable to search it, though close enough to make the species of "blue" and the fact of oviposition quite unmistakable. The foodplant of *P. pheretes* being hitherto unknown, the matter is of some interest, but it was most annoying not to be able to obtain the eggs themselves. At the top of the pass I had taken the usual species, *Hesperia cacaliae*, *Brenthis pales* and var. *isis*, *Pieris callidice*, *Colias phicomone*, &c., and also *Lycaena alcon*, which was present in some numbers. The following day, Thursday 23rd, was not hopeful looking, but I went down to the 2nd Refuge, and though I was assured that *Rusticus lycidas* was quite over, I took two ♂s and two ♀s in perfect condition, though the other specimens I saw were very worn. *Polyommatus escheri*, *Satyrus cordula*, *S. hermione* and *Hipparchia semele* were all in good condition, but it was too cloudy for much of anything to fly. In spite of the cold wind I went up the Bortelalp the following day with Mr. Lowe, who had arrived the previous evening, but found nothing except *Rusticus argus* var. *alpina*, *Pieris callidice*, *Hesperia fritillum*, and, in the Ganterthal, *Thymelicus lineola*: the next day was, however, hot, and an expedition to the top of the pass produced, in addition to the species before mentioned,

Melitaea parthenie var. *varia* in great abundance, *M. aurinia* var. *merope*, unusually large and bright, *M. cynthia*, *Erebia gorge* and *E. lappona*; at the Kaltwasser Gallery on the way down, *Polyommatus optilete*, *P. eros* and *Parnassius delius*; on the slopes above, *E. mnestra* ♀ as well as ♂; below the 5th Refuge, *Chrysophanus virgaureae* and *Erebia goante*, the females of the latter being abundant; whilst just below the 4th Refuge I snapped up one *Polyommatus donzelii* as it was crossing the road. The following afternoon we went up the Steinenalp, but it turned very cold, and *Hesperia* var. *cirsii*, *P. orbitulus*, a single *P. optilete* and a few *Colias palaeno* were the only species found. The next day I went again to the top of the pass, and, joining Mr. Lowe there, went some distance up the Schönhorn in search of *E. glacialis*, but found only *E. gorge*, and this was flying so rapidly over broken ground that none were actually caught, which was a pity, as they seemed mostly to run towards var. *erinnys*. The 28th was marked by the departure of Mr. and Mrs. Lowe, but not by any captures, for it rained most of the day. On the 29th I returned to Simplon, walking over the pass, and on the way going to the moraine at the foot of the Kaltwasser Glacier, where, at last, I succeeded in taking *Erebia glacialis*; it was flying over stony, but fairly flat, ground, and very slowly, so that I took several specimens, but after 20 minutes the sun went in and not another insect was to be found. A last look at the Laquinthal on the 30th produced magnificent specimens of *Chrysophanus virgaureae*, some of which had three small black spots near the apex of the forewings upper side, but nothing else of interest, and the afternoon was again hopelessly wet. Starting in good time on the following morning, I returned to Bérisal, again looking for *E. glacialis*, but in vain, the clouds and biting wind keeping all insects at home. Below the 5th Refuge, however, I took one *Pieris callidice*, an unusually low elevation for this species. Taking the diligence at Bérisal, we descended to Brig, and thence took train to Sion, walking up the next morning to Vex, on the Evolena road. This was with a view to *Carcharodus althaeae* var. *boetica*, which I did not find, but the whole roadside was swarming with butterflies, *Polyommatus damon*, *P. corydon* and *P. astrarche* being most in evidence, *Epinephele jurtina*, the ♀s being principally abs. *grisea* and *violacea*, was also very abundant, and I took two ♂ *Polyommatus meleager*, a little worn, and a very fine large fresh ♀ of the *stereni* form, but larger than any I have seen in the Pfynwald. *Carcharodus lavaterae*, *E. lycaon* and *Limenitis camilla*, very fresh, were also on the wing.

The same evening saw our return to Lausanne, where I remained for a week without seeing a butterfly, and on the following Saturday I went to join Mr. Fison at Champéry. Clouds of *Polyommatus corydon* enlivened the road with a few small *Nomiades semiargus* and *Chrysophanus dorilis*, also very small; *Gonepteryx rhamni*, *Dryas paphia*, *Argynnis aglaia* *A. niobe* var. *eris*, and *Pamphila comma* were the only other insects to be seen. Sunday was cloudy and showery, and on Monday it rained from morning till night, but on Tuesday, August 11th, I took my long-expected walk to the Chalets of Anthémoz, on the slopes of the Dent du Midi, in company with Mr. Fison. Shortly after starting we came upon *Erebia ligea*, but, entering the pinewood, we saw nothing more till we emerged about an hour and a half later on the pastures just below Anthémoz. It was a

magnificent day and butterflies were abundant, especially Erebias; the first species to appear were *Coenonympha satyrion* with very small eye-spots, *Erebia manto*, rather small and sometimes verging towards ab. *caecilia*, *E. tyndarus*, very large and generally of the *dromus* form, though Mr. Fison took one very fine ab. *caecodromus*, *E. melampus*, very small, *E. eurvale* and ab. *ochracea*, and a single *E.* var. *pitho:* going on past Anthémoz (where excellent milk is very cheap), and rising for some considerable distance, *E. pharte*, generally very small, and ab. *phartina*, together with a form of *E. manto*, closely approaching, and sometimes actually reaching, var. *pyrrhula*, became very abundant, as also were *E. gorge*, with an occasional ab. *erinnys*, and *Brenthis pales*, generally var. *isis*, the ♀ s approaching ab. *napaea:* rising higher still and keeping to the right, *E. gorge* continued to be abundant, and here also a very small form of *E. epiphron*, approaching ab. *obsoleta* and *E. lappona*, were to be found, together with a few *Pieris callidice*, and, finally, on reaching a small bed of shale, some *E. glacialis* and ab. *pluto* were found, mostly rather worn, but I took a ♀ in very good condition with a white-pupilled eye-spot on the underside forewing. The other butterflies taken on the slopes were *Pieris rapae*, common even at a great height, *Aglais urticae*, *Vanessa io* and *Pyrameis cardui*, all unusually brilliant, *Gonepteryx rhamni*, *Argynnis aglaia* and one specimen each of *Hesperia cacaliae* and *H. alveus*. After this orgy I found it necessary to remain quiet till Friday, when I again accompanied Mr. Fison to Barmaz, the path to which passes a broad, steep, shaly grass slope, on which were a number of *Parnassius apollo*, the ♀ s very dark and some of the ♂ s being of the form *neradensis:* this I put down to wear and tear, as they were very old, but eventually Mr. Fison took one in good condition and quite yellow, though not so brilliant as a grand specimen which he took at Faido earlier in the season. On the same slope were *Argynnis aglaia* var. *nana*, in very good condition, *A. adippe*, including a beautiful ab. *virgata*, *A. niobe*, type, innumerable *Polyommatus corydon*, very small, *E. aethiops*, *E. goante*, &c.; at and above Barmaz we found nothing remarkable except that I took *E. ligea* and *E. tyndarus*, both quite typical, within a few feet of each other; *E. eurvale* and ab. *ochracea*, a few *E. manto*, and one specimen each of *E.* var. *pitho* and *E. gorge* were the only other Erebias seen.

Two days later, being for a few hours at Lavey, I looked round, but saw only one thing which struck me as remarkable, *viz.*, that while the ♂ s of *Enodia dryas* were very fresh, the ♀ s were mostly worn and torn. On the 17th I returned to Lausanne, but was unable to leave the house, the next fortnight being only enlivened by a visit from Mr. Tutt, on the 21st. The two or three expeditions I have since made to Charpigny and Martigny have produced nothing of interest beyond the fact that the few *Polyommatus alexis* I found at the former place were generally ab. *arcna*, and that *Epinephele jurtina* ♀, as at Sion, had mostly a tendency of the *grisea* and *violacea* forms.

A few of Mr. Fison's experiences this year are too interesting to be passed over. His capture of *Chrysophanus amphidamas* I have already mentioned, and amongst his other captures of this year the following seem to me specially worthy of note. On May 22nd, at Monte Salvatore, several specimens of *Brenthis euphrosyne*, very light on the upperside and washed with yellow beneath, almost as markedly as

Argynnis adippe var. *cleodoxa:* a melanic form of (I think) *Melitaea parthenie*, but possibly of *M. athalia*, from Monte Bré, on May 28th, and a beautiful ab. *nararina* of the latter from the Val Solda, on the 26th; two aberrations of *M. phoebe*, one approaching ab. *aetheria*, from Mendrisio, the other with the black marks of the central band underside hindwing much exaggerated, from Gordola, taken respectively on the 18th and 19th; two ♀ *Brenthis selene*, the upperside of which almost resembles *B. pales* ab. *napaea*, both of which he took in the Meienthal on July 3rd; a ♂ of the same species taken at Biasca on May 29th, which has the central band of black spots on the forewings upperside greatly enlarged, those beyond it being greatly diminished in size, and the colouring of the underside forewings being midway between that of *B. selene* and *B. euphrosyne:* a genuine *Epinephele jurtina* var. *hispulla* from the west of Champéry. He has also taken *M. berisalensis* at Varen* on June 6th, and *Pararge hiera* at Caux in the middle of the same month; further, he has had a great catch of *Brenthis thore* at Kupfernaseruns, and near the Thalalpsee, in the middle of July, and saw one specimen taken at Faido the previous week. The latter was much worn, but many of the Thalalp specimens were in excellent condition. But by far the most interesting of all is his rediscovery of *Heteropterus morpheus* near Reazzino station, not far from Locarno, at the end of the second week in July, the last recorded captures in Switzerland being Trapp's, in 1857, at Giubiasco. The specimens are in excellent condition, but as he was hurrying for a train they are few in number. I have lately heard from Mr. Crowfoot that he also took the species between Locarno and Mergoscia this year, and that it did not seem scarce there.

May I, in conclusion, take this opportunity of thanking my various friends and correspondents for the help they have given me in the preparation of my book, and also of requesting them (and others whom I have not yet the pleasure of including in either category) to send me occasional notes of their captures, &c., as I have already received so much information since its publication, that I foresee the probability of a supplement being necessary at some time, possibly even at no very distant date. Mr. Page, whose address is on every number of the *Entomologist's Record*, has, with his usual kindness, undertaken to forward me any such communications as are addressed to his care.

COLEOPTERA.

Coleoptera in the Peebles district in 1903.—Owing to pressure of business engagements, I am unable at the close of 1903 to prepare anything like a complete list of coleoptera taken by me in this district during the year, but the following notes on some of the better captures may be of interest. *Cychrus rostratus*, L., only one example of this Carabid was met with. It is by no means of frequent occurrence here, as far as my experience goes, generally turning up by single specimens once or twice yearly. *Bembidium schüppeli*, Dj., occurred in flood refuse in October, on Tweedside, where Professor Beare and I secured a few examples, *B. mannerheimi*, Sahl., and other more common species of the genus also occurred. Flood refuse also produced *Gymnusa variegata*, Kies., *Ocalea castanea*, Er., *O.*

* Mr. Sheldon's specimens from the same locality, which I have since seen, are also undoubtedly *M. berisalensis*.

latipennis, Shp., *Olophrum piceum*, Gyll., *Tachinus collaris*, Gr., and other Staphylinids, and several *Paramecosoma melanocephalum*, Hbst. Working moss in June, I got one specimen of *Otiorrhynchus maurus*, Gyll., *Coeliodes rubicundus*, Pk., *Cholera cisteloides*, Fröh., and *Myllaena brevicornis*, Mat., whilst in the autumn, from cut grass, *Stilicus affinis*, Er., was obtained in profusion. According to Fowler this is not common in Scotland, but it appears to be very abundant here, though I have not yet come across any others of the genus. *Elmis volkmari*, Pz., was obtained by sweeping grass on river-banks on a hot day in August, and numbers of *Cryptohypnus dermestoides*, Hbst., var. *4-guttatus*, Lap., under gravel by the riverside. A single *Pissodes pini* was taken in my house, in July. One of the most interesting local captures of the year was *Hydnobius punctatissimus*, Steph., of which I took two examples on Symington railway platform on 10th September; and in August, under loose bark, I got a *Notiophilus*, which appears to correspond to *N. pusillus*, Waterhouse, but has large testaceous spots near the apex of elytra. Of this I may have something more to say later on.—James E. Black, Nethercroft, Peebles. *December 16th*, 1903.

Lathrobium angusticolle, Lac., in South Wales.—This rare beetle seems to be so entirely a northern species, that it is worth while to record the capture of an example in South Wales. I took it a few years ago near Cardiff, in flood refuse brought down by the river Ely. —B. Tomlin, M.A., F.E.S., Chester.

Agathidium badium, Er.: a beetle new to Britain.

By GEORGE W. CHASTER, M.D.

Towards the end of September last I spent a pleasant week with friends at Palterdale, on Lake Ulleswater. The weather being on the whole fine, many excursions were arranged, and little systematic collecting was possible. Still, a fair number of interesting species was taken. The most notable—the subject of this note—was captured during a walk through the woods. A fallen tree was seen lying near the path, and on raising a bit of the bark, an *Agathidium* was found amongst the half-rotten *débris* underneath. This specimen was set and compared with Canon Fowler's descriptions of the British species, and with the specimens in my collection. It seemed peculiar in many ways. Dr. Sharp and Mr. Champion both very hesitatingly suggested that it might be a variety of *A. seminulum*, L. When I again carefully compared my specimen—a ♂—with the same sex of the species just named, I felt convinced that the structural differences detected were too great for specific identity to be possible.

Mr. Donisthorpe kindly undertook the task of identification, and, after much trouble, the specimen being eventually submitted to Herr Reitter, has succeeded in ascertaining that it is *A. badium*, Er. Mr. Donisthorpe has favoured me with a translation of Ganglbauer's description, which I give:—

"*Agathidium badium*, Er.—Very like *seminulum*, on the whole of a lighter red-brown, the groundwork of head and thorax shining, smooth, also under very strong magnification with a hardly perceptible network, the elytra with much weaker sutural striæ, very slight or extinct towards the middle, often only noticeable more or less towards the apex, the metasternum with less strong lateral lines, the hind femora of the ♂ with a very sharp-edged apical corner, forming a broad three-cornered tooth. The third joint of the antenna about half as long again

as the second, as long as or a little shorter than the following joints taken together. —Long. 2mm.-2·5mm., North and Middle Europe, common."

All these points of difference (except the metasternal lines) I had noted in my letter to Mr. Donisthorpe, as well as two others which the above description does not mention. The earlier joints of the antennæ are evidently more slender than in *A. seminulum*, and the club is pitchy instead of being unicolorous. The posterior femora are longer, so that their apices project beyond the margins of the elytra, and exhibit the characteristic tooth.

In conclusion, I desire to acknowledge my indebtedness to Mr. Donisthorpe for his courtesy and help.

NOTES ON LIFE-HISTORIES, LARVÆ, &c.

Notes on the early stages of Lampides theophrastus.—*Egg-laying* :—The ova are laid singly or in couples on the terminal buds of "Nabb" (*Zizyphus*, sp. ?) or under the younger leaves, generally near the midrib. *Larva* :—When young, pale green covered with white hairs. When two-thirds grown, of a slightly darker green with a yellow stripe down the back for from three-fourths to the whole of the length. When fullfed, a reddish streak appears within the dorsal stripe for from one-fourth to one-third of its length. *Pupa* :—Dark, nearly black below, the thorax and the upper half of the wing-cases greyish-ash colour, becoming iridescent violet before emergence of ♂s. The pupal stage lasts, as a rule, about a fortnight (in the summer). *Imago* :—The imagines occur near the foodplant and are locally common. *Time of appearance* :—Near Cairo, iii-iv end (probably in summer) and viii-x end. *Habits of imago* :—Pairing, as a rule, takes place on the branches of the foodplant after long preliminaries. *Larvæ and ants* :—The larvæ, which eat furrows, sometimes of an inch in length, on the underside of the leaf, are often attended by small red ants which do not apparently harm them. I believe the ants devour the excreta. *Seasonal broods* :—No difference (*pace* Spuler) is observable in the imago. At Aboukir (north coast) I took a few examples in the middle of May. A fresh generation appeared about June 11th, or a little earlier, and abounded till August.—Philip P. Graves, Turf Club, Cairo, Egypt. *November 16th*, 1903.

Ovum of Selidosema ericetaria.—Eggs laid by a ♀ *S. ericetaria* caught on August 17th, 1902, were oval in outline, bright green in colour when freshly laid, sculptured with rows of hexagonal cells, each cell with four minute raised, dark, olive-brown knobs at four corners of the hexagon. The eggs hatched on September 8th.—E. Buckell, Romsey. *November 2nd*, 1903.

PRACTICAL HINTS.

The moths on Clematis vitalba.—1. The newly-hatched larvæ of *Geometra vernaria* can be found on, or tapped from, the opened buds of *Clematis vitalba* in August and early September. They are extremely small and stand amongst the stamens of the flower upon which they feed, which they resemble almost exactly in size and colour. As the blossom dies, and falls, the young larvæ adjourn to the dark stems of the growth, and gradually turn dark in

colour until they are not to be readily distinguished from their support. This is the colour they affect for the winter, until the young growth returns on the bush in the spring, when they cast the dark skin and assume the vernal green colour which they retain until pupation. The darkening of the young larvæ when the blossom falls is not accomplished by what is known as a change of skin, but is a very gradual darkening of the existing cuticle, which commences about the thoracic segments and extends in both directions until the entire larva is in its winter colour.

2. The eggs of *Eupithecia coronata* can be found on, or at the base of, the buds of *Clematis vitalba* in August. The egg is oval in shape, cream-coloured, and is fairly conspicuous.

3. *Tryphaena interjecta* is very partial to flying round the blossoming bushes of *Clematis vitalba*, in the afternoon, at the end of August, which it will continue to do until dusk.

4. To secure a good bag of *Eupithecia isogrammaria*, collect all the unopened buds of *Clematis vitalba* which show a mark on the enclosing skin. It is not necessary to look for an open drill as many of the young larvæ obtain an entrance by the merest nibble. The larva grows quickly, if supplied with fresh unopened buds, and is no trouble to breed.

5. *Melanippe procellata*, *Phibalapteryx tersata* and *P. vitalbata* are three speecies of which the larvæ can all be found on *Clematis vitalba* in August. They are all three extremely easy to rear. Be careful that there is not the slightest loophole for escape from the breeding-cage, as the larvæ are all of a restless and inquisitive turn, and avail themselves of the smallest opportunity to get at liberty.—J. C. Dollman, F.E.S., Hove House, Newton Grove, Bedford Park, W. *December 1st*, 1903.

NOTES ON COLLECTING, Etc.

Lepidopterological Notes from the Tring district.—On two occasions this year, 1903, I cycled down to the Tring district in quest of lepidoptera, and met with very fair success. The first visit was on May 23rd, when *Nisoniades tages* was the butterfly most in evidence, while only a single *Syrichthus malvae* was seen. *Pieris napi*, *P. rapae*, *P. brassicae* and *Euchloë cardamines* were also noticed, and two *Callophrys rubi* netted. Of the Heterocera I took *Coremia ferrugata*, *Strenia clathrata*, *Xylopoda fabriciana* and *Eriopsela fractifasciana*. On my second visit (July 25th and 26th) I was accompanied by my friend, Mr. T. F. Furnival, and, considering the inclement weather, we did fairly well. To us the most interesting find was *Mimaeseoptilus phaeodactylus*, which was locally common among small patches of *Ononis spinosa*. This little moth seems seldom to take wing by day unless disturbed, and requires to be carefully sought amongst the shoots of the foodplant. *M. pterodactylus* was also taken amongst herbage, and flies more freely by day than the preceding. By beating and searching in hedges, &c., we obtained *Ephyra linearia* (*trilinearia*), *Larentia pectinataria* (*viridaria*), *Cidaria dotata* (*pyraliata*), *Eubolia bipunctaria*, *Botys hyalinalis*, *Scopula lutealis*, *Phibalocera quercana*, *Dichelia grotiana*, *Sericoris lacunana* (*herbana*), *Orthotaenia striana*, *Catoptria cana* and *Ypsomneuta plumbella*: whilst from a brick wall we took *Bryophila perla* and *Eupithecia subfulvata*. After dark we searched a large patch of

thistles with a lantern and boxed odd specimens of *Leucania impura*, *L. pallens*, *L. lithargyria* and *Caradrina morpheus*. On neither day were butterflies much in evidence, as during the greater part of the time it was wet and dull, but we took *Enodia hyperanthus*, *Epinephele janira* and *Polyommatus corydon*. *Pyrausta purpuralis* was common in one meadow late in the afternoon of the 26th when the sun made its appearance. *Hypaena proboscidalis* was also taken. Just before leaving we hunted round the stables at the Hotel and were rewarded with a number of very good *Aglossa pinguinalis*, one *Pyralis farinalis* and about half-a-dozen *Tinea tapetzella* (*tapetiella*) on an old horse-collar. — PHILIP J. BARRAUD, F.E.S., Bushey Heath, Herts. *November 25th*, 1903.

VARIATION IN THE FLIGHT OF APAMEA OPHIOGRAMMA.—Until this season I had always been under the impression that each insect had its own particular method of flight and that it always flew in the same manner. This year I found out that such was not the case, but that the weather appeared to bear a direct influence on the motions of some insects. On July 28th I went to a favourite hunting-ground of mine for *Apamea ophiogramma*. I arrived at dusk, and found the insect buzzing about in the usual way. The night was warm, still and cloudy. On July 29th I again went; this time it was a cold night, and a very bright moon shed its light upon the herbage. I found *A. ophiogramma* sitting quietly on the flower-heads of the betony, sucking the nectar. On July 31st I again visited the hunting-ground; this time it was warm, but very windy, and I found *A. ophiogramma* flying at a height of about nine feet, sometimes quite out of reach, dashing along with great rapidity, and looking very much like *Leucania pallens*. I found the season an exceptionally good one for a *A. ophiogramma*, my take in a week was over seventy.—E. CRISP, 31, Union Road, Cambridge. *November 29th*, 1903.

PYRAMEIS CARDUI AT SUDBURY, SUFFOLK.—During last September, *Pyrameis cardui* was very abundant here, and also in the Essex district of this neighbourhood. I saw this species here in the spring and early summer, so they probably breed in this locality.—EDWARD RANSOM, 16, Friars Street, Sudbury, Suffolk. *December 16th*, 1903.

XYLOPHASIA ZOLLIKOFERI AS A BRITISH INSECT.—With regard to the record of the capture of *Xylophasia zollikoferi* at Middlesborough, Mr. Lofthouse (*Nat.*, p. 456) makes the remarkable statement that Mr. Barrett says, "There is one certain previous British specimen in Mr. Doubleday's collection in Bethnal Green museum, and, it is said, one other." In *British Noctuae, etc.*, i., p. 71, there are full details of the two specimens hitherto recorded as British. The one in the Doubleday collection was caught by Harding, the well-known Deal professional; the other was caught by Mr. Tait, a well-known Aberdeenshire amateur, whom I had the pleasure of meeting at a mutual friend's house, that of the late Mr. W. H. Tugwell, about a dozen years ago. If any doubt is to be thrown on the *bona fides* of either of these captures, as one who knew the captors of both specimens personally, I state most emphatically that the one in the Doubleday collection is to be the more doubted. For myself, I have little doubt that both are genuine, and I think that Mr. Lofthouse should have looked up the literature of the subject—surely easily enough obtained—before publishing a doubt on the *bona fides* of Mr. Tait, even on the authority

of so eminent—although one suspects in this instance imperfectly-informed—a lepidopterist as Mr. Barrett.—J. W. Tutt.

Lepidoptera at Romsey in 1903.—The only butterfly that has been abundant here during 1903, is *Pieris brassicae*, and that has been much more numerous than usual. *Eugonia polychloros* I saw in the spring, but not one this autumn. No *Colias edusa*, a few *Pyrameis atalanta*, *Vanessa io* and *Pyrameis cardui*. The best thing I have obtained among the butterflies is *Lycaena arion*, a single rather worn specimen from Gloucestershire. At Lustleigh (Devon) I took a specimen of *Syrichthus malvae* ab. *taras*; here also *Arctia villica* was abundant, and eggs obtained on June 16th hatched on June 30th, I have now a number of larvæ feeding. Does *Acidalia remutata* usually hybernate as larva? Larvæ that hatched on June 25th evidently mean to hybernate. They have fed on knotgrass, I do not know their proper food. In September and October I had about a dozen larvæ of *Dianthoecia capsincola* feeding in *Lychnis* capsules, without any sign of silk, the rest spun a light cocoon under moss. One moth emerged after being in the pupal state about a fortnight. A batch of eggs of *Habrostola triplasia* hatched on September 25th, and the larvæ had all pupated before October 25th.—E. Buckell, M.D., Romsey. *November 2nd*, 1903.

Lepidoptera at York in 1903.—The weather has been as bad here as everywhere else since June, and collecting has been done in snatches, otherwise I fancy lepidoptera would have proved to have been fairly plentiful. Larvæ were certainly so up to August, and might have been obtained in numbers if it had been possible to have gone for them in comfort. As it was, some capital sugaring nights were enjoyed in the district I worked. Species came fairly to date in May, and, by the 23rd, *Euchloë cardamines*, *Nisoniades tages*, *Platyptery.r falcula*, etc., were common at Sandburn, whilst larvæ of *Phigalia pedaria*, *Hybernia defoliaria* and *Geometra papilionaria* were fullfed by the end of the month. I swept the first *Epione respertaria* larva on June 18th, and the last on June 27th, and, as they mostly pupated in a few days, they were up to the average time. I tried sugar at Askham Bog on July 3rd, in the hope of getting yellow examples of *Noctua rubi*, but I was unsuccessful, although I boxed *Acronicta leporina*, *Xylophasia sublustris*, *Leucania impudens*, *Pharetra rumicis*, etc. Geometrids were almost entirely absent, doubtless the ground fog which came on kept them at rest. As July 15th saw the appearance of the first *Epione respertaria* in my breeding-cages, I paid my first visit to the old ground on the 17th, in company with the Rev. Storrs Fox, and we did well up to 11.30 p.m., when a drizzling rain gave us a final check, and we retired for the night. We bagged altogether a score of males and a brace of females, all at rest, whilst *Acidalia inornata*, *A. emarginata*, *Lithosia mesomella*, *Geometra papilionaria*, etc., were netted. Sugar was attractive, but the species observed were common. On the evening of the 23rd, I was again at Sandburn, with Mr. T. A. Lofthouse who came over to take *E. respertaria*, and, as the night was a really good one, we did well, taking a good number of both sexes. At sugar we found *Dyschorista suspecta*, *Agrotis valligera*, *Leucania litharggria*, *Caradrina blanda*, *Triphaena comes*, *Noctua triangulum*, *Cymatophora duplaris*, with a host of *Triphaena pronuba*, and one *Cosmia paleacea*, the first I had ever taken, and new to the York

district I believe. It was not a stray visitor, as I boxed, on two subsequent visits, four more specimens in fine condition. A specimen of *Cuspidia menyanthidis* that emerged in the open on August 6th, from a larva that had pupated three weeks earlier, may be worthy of note.—S. WALKER, York. *November 15th*, 1903.

EUCNÆMIDOPHORUS RHODODACTYLUS AND ÆGERIA SPHEGIFORMIS IN ESSEX.—I was particularly pleased to find, between June 16th and 21st, near Thorndon Park, in this county, several larvæ of *Eucnaemidophorus rhododactylus*. I do not know whether my larvæ were ichneumoned or whether I treated them wrongly, but I only succeeded in getting one moth. In the same neighbourhood and at the same time there was plenty of evidence of the presence of *Ægeria sphegiformis* in the alders.—F. G. WHITTLE, 3, Marine Avenue, Southend. *November 13th*, 1903.

NOTE AS TO REARING CYMATOPHORA FLUCTUOSA.—Has anyone worked for larvæ of *Cymatophora fluctuosa* this year? I took some 50 examples late in September, not half-grown, and having no tree which could keep its leaves to sleeve them on, and green food for them being hard to get, I lost them all. Owing to the birch-leaves turning and falling so early in the district where I found them, I should imagine few, if any, would get through in nature.—B. W. ADKIN, F.E.S., Trenoweth, Hope Park, Bromley, Kent.

LEPIDOPTERA AT THE NEW FOREST AND AT BOSCOMBE IN 1903.—I must add my wail to that of the majority and complain of the badness of the season, especially the unattractiveness of sugar. I have put on dozens of pounds of treacle, and have not set more than a score of moths taken by that means. Larvæ were fairly common at intervals, but I found nothing like the numbers taken last year, which was also bad. The most noticeable larvæ, fairly common in some years, were almost entirely absent, *viz.*, *Nola strigula*, *Zephyrus quercus*, *Asphalia ridens*, *Sarrothripa undulanus* (*revayana*), *Drymonia chaonia*, *Cleora glabraria*, *C. lichenaria*, *Eugonia polychloros*, etc. Moths which are common at sugar most years, such as *Anchocelis lunosa*, *Epunda nigra*, *Agriopis aprilina*, etc., never put in an appearance at all. At ivy I took a few *Orrhodia ligula*, *Orthosia macilenta*, and one *Dasycampa rubiginea*. Sallow was no good at all, only a few *Taeniocampa stabilis* and *T. cruda* being taken. I turned up *Cidaria picata* and *Melanippe unangulata* in fair numbers, and got ova from both, although I had not previously seen either of these insects for years. *Pyrameis cardui* was common, but evidently immigrants. *Agrius convolvuli* was scarce, and also immigrant, and I do not think any which bred in this country were taken. I had two or three trips to Swanage, and found *Thymelicus actaeon* and *Melanargia galathea* commoner than usual. The river was too full to really work for larvæ of *Nonagria geminipuncta*, and most of the pupæ I did get were ichneumoned. I saw two or three *Colias edusa* in the New Forest, but none in this immediate neighbourhood. A spot where I used to get fine confluent *Anthrocera trifolii* was entirely wiped out this year owing to the flood. During October I collected several cones of Scotch fir with larvæ of *Dioryctria abietella* in them, and took two imagines in July and August.—R. B. ROBERTSON, Forest View, Southbourne Road, Boscombe. *November 26th*, 1903.

PYRAMEIS CARDUI IN ESSEX.—The only observation of importance

I made this autumn has been the number of *Pyrameis cardui* that occurred in Essex, during the latter part of September. There is little doubt that they were immigrants, as the specimens were all more or less worn. I saw a large number at Barking, in Essex, about September 26th, and they were to be seen in fewer numbers in my own neighbourhood. I believe the first immigrants were seen about September 19th over southeast Essex.—A. W. Mera, 79, Capel Road, Forest Gate, London. *November 13th*, 1903.

Plusia gamma at sugar.—In answer to Mr. Colthrup's enquiries (*antè*, p. 295), it would be quite safe to say that where I have taken *Plusia gamma* not uncommonly at sugar, there has been an absence of light, for I have never sugared in any spot where artificial light could possibly prove a counter-attraction. I do not, however, think that on such occasions there has been any absence of wild flowers. I quite agree with Mr. Colthrup that *P. gamma* does not, as a rule, come *freely*, in proportion to its numbers, to sugar, for although it has appeared at it more commonly in my experience than in his, I never remember to have seen it, as has Mr. Tutt (*vid. loc. cit.*), "in large numbers" at this bait on any one night, even in the seasons when it has been particularly abundant.—Eustace R. Bankes, M.A., F.E.S., Norden, Corfe Castle. *December 7th*, 1903.

Lepidoptera in the Norfolk Broads, &c., in 1903.—The season, generally, has been a very bad one for lepidoptera, and one could hardly expect anything else from the execrable weather that has prevailed throughout the summer. I spent a few days in the Norfolk Broads at the end of June last, when fine weather prevailed, but the collecting of insects generally was a failure, neither light nor sugar proving at all attractive, and, with the exception of a few *Spilosoma urticae*, I took none of the special fen insects I wanted, nor did I succeed in finding larvæ of *Tapinostola aeuirica*, *Nonagria cannae*, &c., but I have no doubt that it will take more than one odd visit to get into the way of finding these reed-feeding larvæ. *Papilio machaon* seemed to be fairly plentiful and it was a pleasure to see it in its native haunts. Sugar proved attractive enough at Middlesborough in July, but, as the only insect in numbers was *Triphaena pronuba*, which appeared in hundreds and was in grand variety, it could not be accounted satisfactory. However, I sugared in the garden throughout the autumn, with the result that, although autumn moths were very scarce, I captured on September 26th a large Noctuid, which has proved to be *Xylophasia zollikoferi*, particularly worthy of note as being taken at the time that large numbers of *Pyrameis cardui* were noticed all along the coast here from Redcar to Sunderland. This last species was particularly abundant at Redcar and Hartlepool, specimens also occurring in my garden, where I first noticed them on September 20th, it was also observed commonly at Redcar on September 21st, and at Ingleby Greenhow on the 28th.—T. A. Lofthouse, Middlesborough. *November 19th*, 1903.

Lepidoptera at Oxton.—Sugar and light have both been equally useless here since I returned at the end of August. The only insects I have turned up of any interest being *Sarrothripa undulanus*, which has been rather more plentiful than usual, and beaten, as is usual here, out of beech trees in September and October, and a few *Peronea sponsana*, *P. cristana* and *Coriscium sulphurellum*. From larvæ collected on apple in the same orchard as last year, on June 2nd, I bred

from July 1st-13th about 20 of the curious form of *Paedisca profundana*, which I have noted before, in this magazine, as in no case approaching any other form of *P. profundana*, and, contrary to last year's experience, three or four larvæ found on oak some distance from the orchard and entrusted to Mr. Bower produced ordinary forms. I do not know how many, but I think three or five larvæ were all I could find on June 3rd in a whole afternoon's searching on oak, whereas I got 44 of that of the variety on apple in about half-an-hour on the 2nd. This seems curious. At the present time *Asteroscopus sphinx* is coming fairly freely to light.—E. F. Studd, Oxton, Exeter. *November 25th*, 1903.

Lepidoptera at Knutsford.—With regard to the past season, there is no doubt that the autumn has been the worst for collecting we have had for many years, but I must say I found July and the first half of August fairly good for sugaring. On several evenings insects abounded, and, on one night especially, July 28th, I think I am well within the mark in saying there were at least 1000 moths at my sugar at one time. The round, moreover, was not an extensive one—not more than 50 trees—and I counted over 50 moths on one patch of treacle. The species were chiefly *Orthosia suspecta*, *Noctua baia*, *Apamea didyma*, *Noctua festiva* and that class of insect. The sugaring was not bad either in early July when I was in Dorset.—George O. Day, F.E.S., Knutsford. *October 27th*, 1903.

Cossus cossus at sugar.—I occasionally see a record of *Cossus cossus* being seen at sugar. I had a similar experience myself on August 1st last, at a place called Rudheath, a few miles from Knutsford. The moth which arrived after I had put the treacle on, was resting just above the patch. I could not see if it was attempting to imbibe the sweets or not. The curious part is that the wood consists principally of fir-trees.—George O. Day, Knutsford. *October* 27th, 1903.

Lepidoptera at Market Drayton, in the New Forest and Cornwall. —I think every one must allow that, on the whole, it has been a bad season. It began badly, for the sallows were all in bloom and spoiled before the moths emerged. Then the April frosts spoiled everything and rendered larva-hunting after Easter quite useless. In May, many species usually common here, were scarce, *e.g.*, *Macaria notata*, *Nola confusalis*, etc., even *Cidaria corylata* was comparatively rare. *Triphosa certata*, however, was unusually numerous, and, between the 20th and 30th, I once or twice netted 20 in a single evening, flying at dusk in a lane having many barberry bushes in the hedges. *Zonosoma pendularia* was very scarce, and the type this year was commoner than the variety. In early June, usually our best time here, the woods produced almost nothing, but, in my cages, a brood of *Notodonta trepida* emerged from the proceeds of a batch of ova obtained from a wild parent taken June 25th, 1902. About 80% of the pupæ produced imagines, the remainder lying over. I also hatched a large number of *Coccyx strobilana*, from spruce cones gathered in the New Forest in the previous October, in the vain hope of getting *Eupithecia togata* larvæ; curiously enough they are the first recorded specimens from that district. I say "curiously enough," because I am only a very chance collector of Tortricids. I also bred a very dark ♀ *Lasiocampa quercus* from a larva picked up here. The colour is a very dark chocolate-brown, not so red as the typical male. From June 15th to June 22nd I was in

the New Forest, but only sugared once, and got three *Hadena contigua* and one ♀ *Momia orion*. I kept the latter for ova but she died without laying. From June 22nd to July 12th I was in Cornwall, where I had the pleasure of seeing *Lycaena arion* flying for the first time. I got a fine series, but was told that it was not nearly so numerous as in some previous years. During this period the weather was fairly fine though some of the nights were very cold, and several times a fire was very comfortable, indeed almost necessary. Up to July sugar was fairly attractive, among the insects attracted being *Boarmia repandata* in numbers, and with them some fine ab. *conversaria*, one *Acronicta leporina*, a few *Agrotis cortica*, two or three *Erastria fuscula*, one *Heliothis marginatus*, *Thyatira batis*, *Gonophora derasa*, and other common insects. After July began, the attraction failed, and hardly anything came. Dusking produced two or three *Macaria alternata* and *Asthena sylvata*, and a good many *Emmelesia affinitata*. *Cymatophora duplaris* in its south county whitish form was very common. In butterflies, besides *Lycaena arion*, were a few *Argynnis adippe*, several *A. aglaia*, and a great number of *Hipparchia semele*, and *Melanargia galatea*. *Brenthis selene* was common. *Melitaea aurinia* and *Leptidia sinapis* very occasional. One or two very handsome *Syrichthus malvae* ab. *taras* were taken. On July 12th I returned to the New Forest and tried sugar once, about the 16th, on a warm, cloudy, nice-seeming night with a most disheartening result. The only insect that came to the sugar being one *Hydrocampa nymphaealis*—not a single Noctuid. Among the butterflies in the daytime, although the weather was very uncertain, things were better. *Plebeius aegon* and *Dryas paphia* swarmed. There were a good many *Limenitis sybilla* and *Argynnis adippe*, and plenty of *Epinephele tithonus*, *E. janira*, and *Enodia hyperanthus*, but except var. *valesina*, I saw no varieties or aberrations of any species, though keeping a very sharp look out. One day I saw three *Apatura iris*, one of which sat on the ground within two yards of me, but when I tried to catch it, it pleaded successfully a previous engagement. It was a female, but on another day I got a nice male which an old woman had caught in her hands sitting on a flower in her garden, and which, strange to say, she had but slightly damaged. Of moths I picked up only one black *Gnophos obscuraria*, one *Hyria muricata*, three or four *Eupisteria murinata* and *Pyrausta purpuralis*. At the end of July I returned here, and cannot say that I had such good fortune at sugar as Mr. Day describes. I sugared once or twice with very poor results, a few *Orthosia suspecta* and *Noctua dahlii* being the chief results. The commonest species were scarce, and many patches of sugar were without an occupant at all. Owing to the unsatisfactory weather towards the end of August, light was very unsuccessful, and there was always a gale blowing. Two *Luperina cespitis* and two *Charaeas graminis*, with about a dozen *Noctua umbrosa*, being the only result of several nights' work. Even *Neuronia popularis* was very scarce, and *Trichiura crataegi* did not appear. On September 1st I tried sugar in the woods; moths came to the sugar in great numbers, but all of one species, *Cosmia trapezina*, excepting three or four *Noctua dahlii*. *N. dahlii* was also attracted to the ling. I never saw so many *C. trapezina* here before. In most seasons an average of twenty in an evening would be unusually high, and what a date! a full month

after the time. *Cidaria truncata* or *C. immanata* (I do not know which) was common on the ling flowers, and *Triphosa dubitata* was present in smaller numbers. I tried beating for larvæ both in August and September, but in vain. An average of twelve larvæ per hour, all of the commonest species, is not good enough to make one go on long. Towards the end of September, however, I found *Chesias rufata* larvæ not uncommon, and there were a good many imagines of *C. spartiata* about. From October 15th-27th I sugared on a good many nights in the New Forest in spite of water above and below, with a result of fifteen *Xylena socia*, eighteen *X. ornithopus*, two *Calocampa exoleta*, two *Peridroma saucia*, one *Hadena protea*, one *Amphypra pyramidea*, and swarms of *Agriopis aprilina*, about 40 *Orthosia macilenta*, and half-a-dozen *O. lota*. Except of *X. socia*, these numbers represent about 20 per cent. of what I saw last year. *H. protea* was abundant last year, almost absent this. *Cidaria psittacata* appeared in small numbers this year, but was almost absent last year. This year I worked ten nights, last year fourteen nights, from October 2nd-18th, beginning a fortnight earlier and ending a week earlier than last year. I was told that beating in the forest for larvæ this autumn was an utter failure. For the second time I have tried forcing larvæ of *Arctia caia*, and again have bred about 100, all of which might almost have been marked with one stencil. The only attempt at variation has been that one has got a pinkish ground in the primaries instead of white.—F. C. Woodforde, B.A., Market Drayton. *October 30th*, 1903.

Tephrosia bistortata in Yorkshire.—With reference to my local form of *Tephrosia bistortata*, which Mr. Tutt says resembles the Perthshire specimens, I may mention that it was very scarce this year, three or four visits to its localities resulting in only about ten specimens, all of the dark aberration. The first two examples were taken at Kildale on May 16th, and, on May 23rd, at Eston, I took five or six. Last year, in the same localities, I could have taken the insect in numbers; larch and fir are the principal trees in the localities in which I take *T. bistortata*, and they are situated at an elevation of between 700ft.-800ft. above sea-level.—T. A. Lofthouse, Middlesborough. *November 19th*, 1903.

SCIENTIFIC NOTES AND OBSERVATIONS.

Proportion of males and females in a brood of reared butterflies.—I was somewhat surprised that, in a batch of eggs laid by *Mycalesis subdita*, there resulted 12 ♂ s.and 27 ♀ s. Can any one tell me what is usually the proportion of the sexes resulting from a batch of eggs laid by the same female butterfly? I shall also be glad of references to literature showing that a male butterfly can successfully impregnate a second female.—N. Manders (Major-Surgn.), 7, Salisbury Terrace, Stoke, Devonport. *December 6th*, 1903.

CURRENT NOTES.

At the meeting of the Entom. Soc. of London, held on November 18th, 1903, Professor Poulton said that, during the past summer, he

had been experimenting on the eyes of the larvæ of *Ennomos autumnaria*. In the attempt to ascertain the physiological significance of the eyes, some of these larvæ had been blinded with a photographic varnish rendered opaque with lamp-black. It seemed impossible to imagine a more innocent material, and, furthermore, the application was but of short duration, for the varnish did not adhere well to the smooth chitin, and it was soon rubbed off—probably an accidental result of the ordinary movements of the larvæ. Nevertheless, when the corresponding imagines emerged, the speaker was intensely surprised to find that they were entirely devoid of eyes, and that the antennæ were generally rudimentary. He could only suppose that something in the varnish, perhaps the spirit, penetrated the pores in the chitin and injured the subjacent tissues.

Owing to the large quantity of MSS. in hand at the present time, the twelve nos. of the current volume will appear as follows: January 15th, February 15th, March 1st, March 15th, April 15th, May 15th, June 15th, July 15th, September 15th, October 15th, November 15th, December 15th. This will throw the number hitherto printed on June 1st to March 1st, and so relieve us of some of the immediate pressure on our space.

The list of Officers and Council for the Entomological Society of London, for the ensuing year, is as follows:—President: Prof. Edward B. Poulton, M.A., D.Sc., F.R.S. Treasurer: Robert McLachlan, F.R.S. Secretaries: Herbert Goss, F.L.S., and Henry Rowland-Brown, M.A. Librarian: George C. Champion, F.Z.S. Council: Lieut.-Colonel Charles Bingham, F.Z.S., Dr. Thomas A. Chapman, M.D., F.Z.S., Arthur John Chitty, M.A., James Edward Collin, Dr. Frederick A. Dixey, M.A., M.D., Hamilton H. C. J. Druce, F.Z.S., William John Lucas, B.A., the Rev. Francis D. Morice, M.A., the Hon. N. Charles Rothschild, M.A., F.L.S., Dr. David Sharp, M.A., F.R.S., Colonel Charles Swinhoe, M.A., F.L.S., Colonel John W. Yerbury, R.A., F.Z.S.

CHRISTMAS MDCCCCIII.*

Forget the year, the faithless year,
That knew not warmth or sun:
Let it go hence without a tear:
Ah! well that it is done!

The March-buds promised fair. We cried,
On May-day we shall see
In hedgerow and by forest-ride
A-flower the Hawthorn-tree!

The swallow came, the cuckoo came,
And the shy bird of song:
But shame upon thee, Spring! and shame
Upon thee, Summer! Long,
How long we waited, and in vain!
The stricken days went by,
To ceaseless drip of rain on rain
From out the sodden sky.

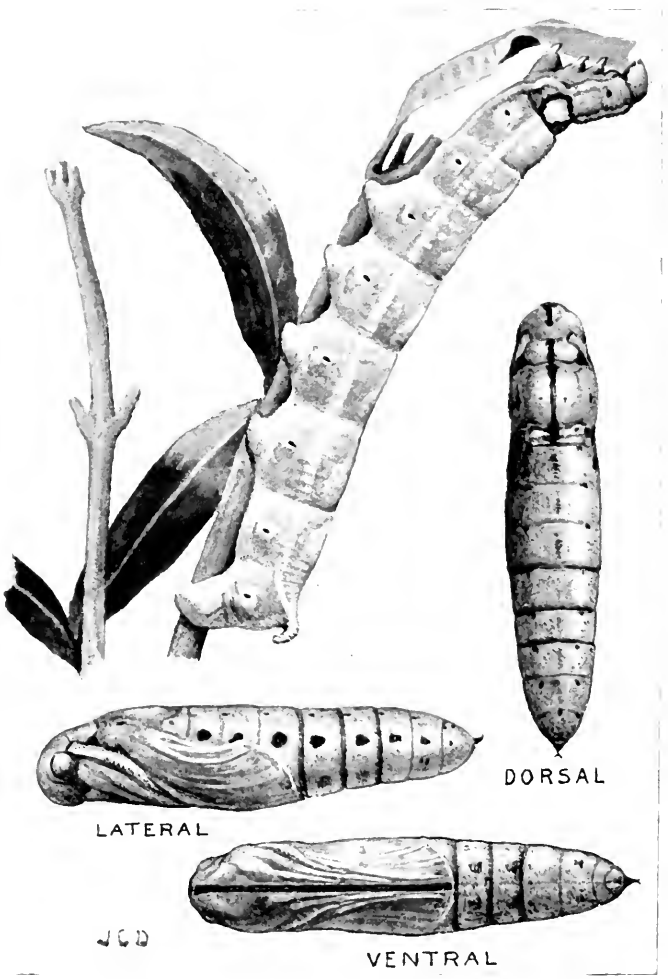
Ah! Autumn, it will mend our ill,
Prisoners of hope, we cried:
And Autumn came as poor and chill
As the Spring or Summer tide.

And now the barren Winter's here,
And now we know the end.
Go bury the false, fallen year,
Dying without a friend.

But still over all the Sun's i' the sky
And it's Life that shall still be sung;
For the sap yet stirs in the thicket dry,
And the old, old Earth is young!

SELWYN IMAGE, M.A.

* Published by kind permission of the author, who wrote this for private circulation among friends.—ED.



Daphnis nerii—Larva and Pupa.

Retrospect of a Coleopterist for 1903.

By Professor T. HUDSON-BEARE, B.Sc., F.R.S.E., F.E.S.

In the "Retrospect" for 1902 I was able to chronicle the addition of nine new species to our list, in addition to several previously unnoted varieties. The past year has been equally fertile, and when it is borne in mind that we have passed through one of the wettest seasons on record, it is certainly a rather striking fact that I am again able to chronicle nine new species, and these, too, not obscure insects, three of them being additions to our scanty list of longicorns, and another being new not only to our list but to science; I will deal with this latter first. *Scymnus limonii*, Donis., was taken by Mr. Donisthorpe in August last, in a saltmarsh at Yarmouth, Isle of Wight; a full account of the capture, and a description of the species, is given in the *Ent. Record*, vol. xv., p. 287. The fortunate discoverer, having had an opportunity of examining species of *Scymnus* in other collections, has found that it had been taken in similar localities elsewhere, but had hitherto been confused with *mulsanti*, or with *redtenbacheri*. The three new longicorns are all close allies of *Asemum striatum*, L. *Criocephalus polonicus*, Motsch., was found by Mr. Willoughby Ellis in the New Forest; the insects were all taken in the larval stage, feeding in Scots fir, and were bred out. There is little doubt, he says, judging from the conditions under which they were found, that the colony has been in existence for many years in the forest (*Ent. Record*, vol. xv., p. 259). In the same locality (New Forest) Dr. Sharp took *Tetropium fuscum*, Fabr., by sweeping between Brockenhurst and Denny (*Ent. Mo. Mag.*, vol. xxxix., p. 198); after the appearance of this record, Mr. E. Saunders (*loc. cit.*, p. 228), in a note, recorded a previous capture of this longicorn at Betchworth, Surrey, in July, 1901. The larvæ of this species are apparently also attached to the Scots fir, and, like *Asemum striatum*, this species has probably been introduced into the south of England in recent years, the extensive plantations of the fir forming a suitable home for it. The third longicorn, *Tetropium castaneum*, L., was taken by Mr. Bouskell in June last in a wood near Market Bosworth, Leicestershire (*Ent. Record*, vol. xv., p. 288); larvæ, pupæ and imagines were all taken in this case from one fir-tree. It is probable that *T. castaneum* and *T. fuscum* are really one species; they are both feeders in the larval stage under bark of pines and firs, and Mulsant is of opinion that *T. fuscum* is merely a variety of *T. castaneum*. The conditions under which at least two of these three longicorns have been captured, point to the fact that, whether they were originally introduced or not, they have now fairly established themselves in this country, and are as much entitled to be considered indigenous as several other of our longicorns upon whose claim to be British insects no one now throws any doubt.

Of the other novelties, *Oedemera virescens*, L., is recorded by Mr. J. Edwards (*Ent. Mo. Mag.*, vol. xxxix., p. 64) from central Norfolk; it is dull sage-green in colour like *lurida*, Marsh., but the males have "incrassate femora;" it appears from Mr. Edwards' note to be very local. Mr. Chitty (*Ent. Mo. Mag.*, vol. xxxix., p. 143) introduces *Hydroporus bilineatus*, Stm., which was taken at Deal, as far back as 1891, in ditches, and confused with *H. granularis*, L., to which insect it has an extremely close resemblance. Mr. Newbery contributed later to the *Ent. Mo.*

FEBRUARY 15TH, 1904.

Mag. a very interesting note (p. 223) on the characters by which *H. bilineatus* and *H. granularis* can be separated. Mr. Bouskell has the credit this year of adding also another new beetle to our list in *Aphodius sturmi*, Harold (*Ent. Record*, vol. xv., p. 92); the beetle was taken by Mr. Keys near Plymouth, and sent to Mr. Bouskell while he was working at the variation of the genus; it is superficially not unlike *nitidulus*, but is very much smaller. Mr. O. E. Janson records (*Ent. Record*, vol. xv., p. 128) *Pentaphyllus testaceus*, Hellwig, which he took in June, 1876, under a decaying *Boletus* in the hollow trunk of a partially decayed oak in a field at Hornsey. Lastly, Mr. Donisthorpe, who has also added two species to our list this year, was fortunate enough to take *Aphanisticus emarginatus*, F., in large numbers in Parkhurst Forest, Isle of Wight, in August last (*Ent. Record*, vol. xv., p. 265); it is a more elongate insect than *A. pusillus*, Ol., and more narrowed in the middle. Considering how rare the other British species of this genus, *A. pusillus*, is, it is interesting to note that the new species was found in large numbers.

In addition to the above new species, we have one new variety in *Othius fulvipennis* ab. *donisthorpei*, which was taken by Mr. Chitty in the New Forest, and has been described and named by him (*Ent. Record*, vol. xv., p. 151), and another in an unnamed variety of *Phytosus nigriventris*, Chevr., found by Mr. Keys at Whitsand Bay (*Ent. Mo. Mag.*, vol. xxxix., p. 19). It has three or four of the abdominal segments black. Mr. Keys (*Ent. Mo. Mag.*, vol. xxxix., p. 174) has also taken a quite black variety of *Carabus nemoralis*, Müll., on Dartmoor.

It may be mentioned here that a new *Ptinus*, which has been identified as *tectus*, Boildieu, has been taken freely in London by Mr. Pool, and previously (also in London) by Mr. Newbery, and by the writer at Strood. This, of course, has been introduced by commerce, but appears to be establishing itself in this country.

Many good species have been taken this season, in spite of the prolonged spells of heavy rain which ruined the summer and autumn months, but I only propose to mention a few of special interest. *Calosoma sycophanta*, L., has been taken both near Hastings and at Weymouth. Probably there was a small invasion of this species, as it is extremely unlikely that the two taken were the only ones which succeeded in effecting a landing on our shores. *Gynandropthalma affinis*, Hellwig, has been taken again in numbers in Wychwood Forest by its original captor, Mr. W. Holland, and I warmly congratulate him on his good fortune. *Lathridium bergrothi*, Reitt., has turned up at Chesham, Southampton, Oxford, and in Norfolk, in every case within doors. *Sitaris muralis*, Forst., after a long absence, makes its reappearance at Chobham; and *Corymbites castaneus*, L., at Sandown, and *Trechus rivularis*, Gyll., at Wicken Fen, are both interesting records, as it is many years since either was taken. I took what has hitherto been called in our catalogues *Lathrobium atripalpe* in numbers in flood refuse near Edinburgh in the spring, and at that time Mr. Donisthorpe submitted specimens of our species to M. Fauvel, with the result that he states the following change in our synonymy must be made—our *atripalpe* is *punctatum*, Zett., and what we have called *punctatum* is *forulum*, Steph. (*Ent. Record*, vol. xv., p. 180). It is worth mentioning here that *Harpalus fröhlichi*,

Sturm., which Mr. Morley rather prematurely pronounced to be extinct, has reappeared in its old locality. Of introduced species, we have a record of *Blaps gages*, L., taken by Mr. W. H. Tuck, at Bury St. Edmunds (*Ent. Mo. Mag.*, vol. xxxix., p. 174).

The Rev. W. F. Johnson (*Ent. Mo. Mag.*, vol. xxxix., p, 96) again discusses the much-vexed question as to whether *Silpha subrotundata*, Steph., which certainly appears to occur only in the Isle of Man and in Ireland, is entitled to specific rank; he evidently thinks that it is, and I must say I agree with him.

Two papers of interest to coleopterists have been contributed by Dr. Sharp to the *Ent. Mo. Mag.*, one on "New Coleoptera from the Chatham Islands and New Zealand" (p. 105), in which he discusses the necessity of taking steps to preserve the unique fauna of these islands, and the other on "Coleoptera from the Faroe Islands" (p. 249).

Though the number of papers on coleoptera published in the *Transactions of the Entomological Society of London* for 1903, is not great, they are, I am glad to say, memoirs of much interest, as we have now each year valuable papers treating of life-histories and of the development in the earlier stages, a welcome change from the purely descriptive papers which were for so long the only contributions to these *Transactions* by British coleopterists.

Mr. M. Jacoby, in continuation of a paper published in the *Transactions* for 1901, has (on p. 1) "A further contribution to our knowledge of African Phytophagous Coleoptera," in which he deals with the *Galerucinae* and *Halticinae*, and describes about fifty new species. Mr. Crawshay's paper (p. 39), on "The life-history of *Drilus flavescens*, Rossi," I commented on last year (see *antea*, vol. xv., p. 34), and, on a careful perusal, found it most interesting in every way. It is a fascinating record of painstaking observations, and I can only express the hope that we may soon have the life-history of some other of our parasitical beetles worked out on similar lines. Mr. Champion and Dr. Chapman contribute (p. 87) some notes on the habits of *Nanophyes durieui*, Lucas, which passes its metamorphosis in swellings on the stems of *Cotyledon horizontalis*. They found the galls in plenty at Bejar, central Spain, in 1902, and were able to breed out a considerable number of perfect specimens. Complete descriptions are given of larva and pupa, and an extremely beautiful plate accompanies the article. Mr. Champion contributes another paper (p. 165) on the trip he made to central Spain in 1902 with Dr. Chapman, with lists of the coleoptera and hemiptera-heteroptera found by them. Dr. Chapman, who had already contributed a paper to the *Transactions* on "The life-history of *Orina tristis*, Fabr.," and who has been working at the subject since that date, read another paper (p. 245) on this subject. His work enables him to say definitely that the eggs have always undergone some development prior to laying, and that the condition of development varies with the period of year at which the laying takes place; in other words, at one period, they are almost ordinary egg-laying insects, and at another period almost viviparous. The communication is one of uncommon interest. Mr. O. E. Janson contributes (p. 305) a brief memoir "On the genus *Theodosia* and its allies," and describes some new species.

On the whole, it has been a year of progress, and the small band

of British coleopterists have every reason to feel satisfied with the work done during the season now drawn to a close.

Further Notes on the Genus Coleophora.

By H. J. TURNER, F.E.S.

There seems to be considerable confusion with regard to the identification of the cases made by the larvæ of this interesting genus. In most instances, their shape, position, and structure, together with the plants upon which they occur, are quite sufficient to give almost absolutely correct determinations, at any rate, as far as our British species are concerned, whereas, to identify the imagines, especially when not perfectly fresh and indifferently set (as they often are), is always a matter over which a certain amount of doubt creeps in. When we come to the numerous, I had almost said innumerable, species, given in the works of various continental authors, we meet with a further difficulty which is practically, at present at any rate, insurmountable. It is that many names have been given, based on a few captured examples, or even only on a solitary individual, about the life-history of which nothing was known or has since been found out.

Some forty years ago, Herrich-Schäffer pointed out, in the *Correspondenzblatt für Sammler von Insecten*, that the position of the mouth relatively to the direction of the body of the case was a character of so much stability, that it might be largely depended upon to differentiate the species. He called attention to the fact that the mouths were either straight, *i.e.*, at right angles to the body of the cases (which would bring them perpendicular to their plane of attachment), or they were more or less oblique (which would cause the cases to be at some angle less than a right angle to their plane of attachment). In the extreme obliquity, he pointed out, the mouth was parallel with the body of the case, which, therefore, would be brought down to lie parallel to the plane of attachment. For these various positions he used numerals. By 1, he designated the extreme position when the case is so placed, that its body is normally parallel to the plane of attachment. Perhaps the most familiar example among our British Coleophorids is the case of *Coleophora paripennella*, which lies prone on the surface of the leaf. The opposite extreme is when the normal position of the case is perpendicular to the plane of attachment and the mouth is at right angles to the body of the case. This position he denoted by the figure 5. The nearest example of this, which occurs to me at the moment, is that of *C. hemerobiella*, whose case is usually referred to as 4-5. When the obliquity of the position of the case is midway between these two extremes, that is at 45° to the plane of attachment, he used the numeral 3. The intermediate positions he marked by the numerals 2 and 4. Thus there are five main positions, and any degree of obliquity not consonant with these five can easily be marked by the variation 4-5, 1-2, &c., as Heinemann has done in his *Kleinschmetterlinge Deutschland*. Of course, it must be borne in mind that individuals of the same species may differ, and hence it is necessary to base one's observations upon the general position of a number of individuals. I now append some notes made during 1903 on two of our British species :—

(1) Coleophora fuscedinella.—This year I had a considerable

number of living larvæ of this species from various localities, some taken by myself for comparison, and some sent to me by different correspondents as other species. On July 16th and 17th I noticed that several pairs of the imagines were *in copula*. The position was the usual anal end to anal end with the heads turned in diametrically opposite directions; the wings were overlapping, but which sex had the wings uppermost was not ascertained. When disturbed by opening the lids of the glass-topped tinned boxes in which they were bred, they were exceedingly active, but in no case did they easily separate. On July 17th, close investigation of fresh elm leaves, which had been placed in the boxes, showed that a number of ova had been laid, in all cases singly, and mainly on the larger ribs, both on the upper- and underside. The former position may, of course, not have been natural, as the cases are usually found on the lower side of a leaf, although one not infrequently meets with cases on the upperside. One ovum was at the apex of one of the indentations at the edge of the leaf. The females, when on the business of oviposition, ran about very actively with quivering wings, with the abdomen bent down almost at right angles, and with the ovipositor slightly exserted. When a position apparently suitable for the ovum to be deposited was found, the legs were firmly placed, the wings held parallel to the leaf-surface and the abdomen bent so that the ovipositor was perpendicular. The laying of the ovum was then only the matter of a moment. The ova are, as a rule, deposited either on the midrib or on one of the chief ribs, and are laid as upright eggs, although some are apparently placed on their sides from being attached in the angles between the ribs and the general leaf-surface. These ova stand on end among the very numerous hairs with which the leaf-surface is closely covered, and have apparently been thrust into their positions with some force, as they frequently have irregular depressions varying in length, shape and direction, caused no doubt when they were soft and more impressionable, just after being deposited.

The general shape of the eggs is ovoid, and they stand upon their smaller end, which is irregularly truncate. The upper and larger end is also somewhat truncate, but this is not so apparent as at the smaller end. The height of the ovum is ·37mm., the diameter at the largest part towards the upper end is ·27mm., that of the smaller end at the truncation ·2mm. The whole surface is wrinkled very coarsely and irregularly with strong projections and depressions. There appear to be curious large papillæ on the base of the ovum, at the truncation, which stand out very prominently under the microscope, when looked at laterally against the light. These must, of course, be great aids in securing the ovum on the rough surface of the leaf, so that one may almost suggest that the adherence may be mechanical; the irregular base of the ovum fitting the irregular surface of the leaf, and the hairs of the leaf, which are very irregular in direction, clasping the ovum in position. There seems to be little or no adhesive fluid on the ova, as, in the case of an ovum detached immediately after oviposition, I failed to make it stand on end on a glass slide in its natural position. Of course, the coldness of the glass may have solidified the extremely attenuated pellicle of adhesive fluid, which no doubt is more or less present on all ova at the time of exclusion. The micropyle is situated at the centre of the larger upper end. The depression is only slight. It

consists of one large circular ring composed of eight or nine ovoid cells. All the network lines are very decided. The colour is dirty white to pale orange. The shell appears very opaque. This then belongs to what is termed the "upright" egg group, and since this feature is characteristic generally of the higher lepidoptera rather than the lower, and the elaborate and strong wrinkling also suggests specialisation, we shall certainly group this family some distance up the lepidopterous ladder. There is no appearance whatever of ribs as in the much higher group of the Noctuids.

Dr. Chapman, in his epoch-making paper (*Trans. Ent. Soc. Lond.*, 1893, p. 118), places the Coleophorides amongst the Lepidoptera-Obtectæ, and the shape and position of the ovum here shown would tend to confirm his action, which was mainly based on observations made upon the pupæ.

(2) Coleophora limosipennella.—I have this year met with cases of this species in fair numbers on elm, when looking for cases of *C. badiipennella*. According to the experience of a number of entomologists, these species frequently occur together, and their cases are often found on the same leaves. At the younger stages of growth the cases are almost indistinguishable, although those of the latter species are, even in early life, somewhat darker. The irregular toothed keel on the back of the case is much alike in both species at first, but before pupation it becomes much more pronounced in *C. limosipennella*. The angle of attachment of the case in both species is much alike, but becomes more distinguishable at the later stages of growth, that of *C. limosipennella* may be designated by the numeral 1, or 1-2, according to Herrich-Schäffer's method, while that of *C. badiipennella* is measured by the numeral 2. But these similarities of the cases of the two species may be disregarded when the larvæ are fullfed or nearly so, for that of *C. limosipennella* is quite twice as long as that of *C. badiipennella*, it has a very prominent cock's-comb-like back keel, and is very considerably compressed at the sides, the two valves at the anal opening forming a sharp edge like the "point" of a dinner-knife. The cases of *C. limosipennella* are also found on birch, but, as I have only found isolated examples there, the above remarks must be considered as relating to those which occur only on elm leaves. As regards the odd specimens of the cases I have from birch, they appear to have a much less toothed keel, to be of thinner material and to be much more compressed. Perhaps these variations are to be expected, as the cases are made from pieces of the edge of the leaves, which, in birch, are less toothed than in elm, and are of thinner texture. Cases of both species which are found immediately after they have over-wintered, are then much more difficult to distinguish, especially in the London district, where they have become very much darkened from the action of the atmosphere, whilst the points of the serrated keels have disappeared.

The lepidoptera of Chamonix—Lavancher, Montanvert, Moraines of the Mer-de-Glace.

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

One would have expected that a complete list of the Chamonix lepidoptera had already been published, possibly one has, but if so I know nothing of it, and, in Kane's excellent *Handbook*, which I have

always hitherto carried in my trips abroad, Chamonix is only mentioned six times, *viz.*, as a locality for *Parnassius delius*, *P. mnemosyne*, *Pieris callidice*, *Anthocaris belia*, *Polyommatus optilete* and *Œneis aëllo*. I can confirm the locality for *P. delius*, *P. callidice* and *P. optilete*, but I doubt most strongly that *A. belia*, as such, and apart from *A. simplonia*, has ever occurred at Chamonix. The occurrence of *Œ. aëllo*, which is noticed as " pretty abundant in ' The Jardin,' " led me to wish to pay a visit to this interesting spot and the eternal snows, but weather did not permit me to do this. The experience of wandering for a few days in a district like this is hopeless from the point of view of making a list, but a dozen other lepidopterists, each with a few days' experience at different periods during the summer, would perhaps do something towards it. Butterflies will not fly in dull and wet weather, and we had more than a fair share during the time I was there in mid-August, 1902, and the few days at the same time in 1903 were worse. On the few days that the weather was fine I was more astonished at not finding certain species, than at anything I did find. On a slope by the Chapeau, a *Parnassius* was flying rather freely, in 1902, but I could not capture one. I assumed at the time that this was *P. delius*, as I took an example below, by the side of the main road through the valley, but I found, in 1903, *P. apollo* on this ground, so that both species possibly occur here in close proximity. This suggests that one ought to give those of our readers, who do not know Chamonix, some idea of the peculiar conditions, under which insects do occur here. One may walk for some miles along the Chamonix valley at an elevation of about 3400ft. above sea-level and, facing south, look upwards in an unbroken line with steep ascent, to the summit of Mont Blanc at 15785ft. elevation, the Aiguille du Goûter, the Aiguille du Midi, the Aiguille de Blaitière, the Aiguille du Plan, Aiguille de Charmoz, and the magnificent Aiguille du Drû, that is to the say, that an insect that flew out say half-a-mile in a horizontal line from an elevation of 7000ft.-8000ft., and then fluttered to the ground, would find itself suddenly transported from a subarctic home to one as different as would be that of arctic Norway from that of northern France at sealevel. That descents of considerable magnitude are sometimes made, is suggested by the occurrence of *Parnassius delius* and *Colias palaeno* in the valley near Lavancher, both of which must have come down from the slopes above the Châpeau or Montanvert, yet, strangely enough, *Anthrocera exulans*, which abounds on the slopes between the Montanvert and the foot of the Aiguille de Charmoz, maintains its elevation, and was never observed, even a single specimen, lower than at an altitude of about 6000ft. As details, it may be mentioned that *Aporia crataegi*, at Lavancher, on August 16th, 1902, appears to be late, although occurring a few days before at Mègeve. *Pieris rapae* and *P. napi* were the common whites, *Gonepteryx rhamni* was not seen, and strangely enough only a single *Colias phicomone* (on the Brévent) was noted.

Between Chamonix and Argentière there appears to be little entomological work to be done, and the most frequent species that crossed one's path in August, 1902, were *Colias edusa* and ab. *helice*, *Issoria lathonia*, *Pararge maera*, and the common *Pieris rapae*, but, beyond the village of Les Praz, insects began to become more abundant. Here, in a field by the wayside, one found *Anthrocera lonicerae* and *A. transalpina*, the only two burnets found in this part of the valley, with *Dryas paphia*,

Argynnis adippe and *Pamphila comma*, the latter in great numbers on the *Hieracium* flowers, *Syrichthus alveus*, *Epinephele ianira* (mostly worn), *Melitaea parthenie*, and a few other species that, however, became commoner a little further up the valley, where (on the right-hand side facing Argentière) there are some lovely sloping flower-clad banks that come down right to the edge of the rushing torrent of the Arve, and, above, lead up towards the village of Lavancher in a number of parallel flowery hollows divided by rough rocks and bushes. In these hollows I spent two or three delightful mornings from about 9 a.m. to 11.30 a.m., about August 14th, 15th, and 16th, 1902, and here I sampled the butterflies that evidently haunted this part of the Chamonix valley. They were mostly common species, and none plentiful except *Dryas paphia* and var. *valesina*, that were then getting rather worn, *Argynnis adippe* (the ♀s only good), *A. aglaia*, and some magnificent *A. niobe*, the ♀s of which were very dark. Here, too, I took a single example each of *Parnassius delius* and *Colias palaeno*, evidently wanderers from the higher levels, and *Enodia hyperanthus* in great abundance, though worn, whilst *Epinephele ianira* and *Brenthis amathusia* were in similar plight. *Pararge maera* and *P. megaera* were scarce, and *Leptidia sinapis* not common, whilst *Lycaena arion*, strangely enough, was represented by three or four examples in good condition, though small. Three Chrysophanid species occurred here, viz., *Chrysophanus virgaureae*, the commonest, *C.* var. *gordius*, and *C. hippothoë*, going over. Two or three freshly-emerged *Polygonia c-album*, several *Pyrameis cardui*, and a single *Eugonia polychloros*, were taken, whilst *Erebia melampus* was the only really common Erebiid. Typical *Erebia ligea* occurred with equally typical *E. eurydice*, whilst the blues were extremely disappointing. Single females of *Polyommatus hylas*, *P. baton*, and *Nomiades semiargus* alone kept the common *P. astrarche* in countenance, besides the *L. arion* already mentioned. A few specimens of *Melitaea parthenie* were netted from flowers, and occasionally a *Colias edusa* was brought down as it swung quickly up and down the slopes, and two or three specimens of *Aporia crataegi* sufficed to show that here this species had its habitat, whilst *Pieris napi* appeared to be the only common white.

One of the most delightful days of 1902 was August 17th, a perfect morning, when I started about 8 a.m. for the Montanvert inn. As everyone knows, the delightful ascent through the pinewoods is in shade in the early morning, and it is not until one comes out on the final slopes on which the hotel is situated that *Argynnis niobe* and *A. aglaia* show themselves. But I did little entomology that day. Once at the inn I took the little footpath that winds up to the base of the mighty rock of the Aiguille de Charmoz, among the rocks and shrubby masses of alpine rhododendron. A Parnassid was not uncommon here, but whether *P. apollo* or *P. delius*, I could not capture one to determine. *Anthrocera exulans* was in countless thousands, *Brenthis pales*, of a very tiny form, common, *Colias palaeno*, not rare, *Pygmaena fusca*, *Pamphila comma* and a few other things made up the whole of the lepidoptera observed. It was noon before I returned to the hotel to lunch, and then immediately after crossed the Mer-de-Glace, amongst the crowds of other visitors, and reached the other side, and stayed

some time on the lower slopes that lead up finally to that magnificent rock-mass, the Aiguille du Drû. The whole of the slopes between here and the Chapeau forms a by no means bad collecting-ground, although rough and difficult of access. Among the species that constituted my bag, I found *Coenonympha satyrion* not uncommon, *Syrichthus alveus*, fine large examples, *Melitaea aurinia* var. *merope*, *Chrysophanus hippothoë*, *Erebia melampus*, *E. goante*, *E. stygne*, *E. ceto*, *E. tyndarus*, *Thymelicus lineola*, *Polyommatus optilete*, &c., and, also, quite unexpectedly, a beautiful *Colias edusa* ab. *helice*, whilst among the moths, *Larentia ribicaria*, *L. caesiata*, and *Setina aurita*, with one or two species of Pyralids, were all I appear to have captured, but, as I stated before, it was a recognised holiday trip, and insects held quite second place.

Quite unexpectedly, for I had not at first intended to go to Chamonix in 1903, I found myself taking the same walk on almost the same day of August this year. Strangely enough, some of the insects observed last year were not seen, whilst others were more or less abundant. I crossed the Mer-de-Glace almost directly after my arrival, and spent a longer time on the slopes of the other side. This time I found *Erebia melampus* and *E. tyndarus* in abundance, some of the latter specimens with no fewer than four spots on each of the forewings, whilst *E. mnestra* and *E. manto* were in good condition—the latter not at all uncommon on the slopes directly at the commencement of the Mauvais Pas. On the other hand, only a single *E. epiphron* was observed. *Pamphila comma*, too, was in abundance, much more so than *Syrichthus alveus*, and *Coenonympha satyrion* was not uncommon, but rather badly worn. *Polyommatus corydon* was the only blue observed, but *Chrysophanus phlaeas* and *C. virgaureae* were both taken, as also were *Plusia interrogationis* and *Setina aurita*, whilst *Fidonia brunneata* was abundant among the alpine rhododendron. *Aglais urticae* and *Argynnis niobe* were abundant round the Chapeau, whilst directly below, *Erebia goante* was frequent and a single *Parnassius apollo* was taken, and two or three *Anthrocera purpuralis* and *A. transalpina* were added to the bag. Possibly the difference in the captures made was due largely to a difference in the season, for 1903 was cold, late, and unsatisfactory everywhere through the Alps during the last summer. At any rate, I feel convinced that the moraine slopes above the Mauvais Pas would prove in a good season to be quite one of the best lepidopterological localities in the famous Chamonix district.

A description of the larva and pupa of Daphnis nerii (*with plate*).

By J. C. DOLLMAN, F.E.S.

On October 9th, 1903, a fine larva of *Daphnis nerii* was kindly sent to me by Mr. H. Powell, of Hyères. It was not a larva of the typical green and yellow form, but of the scarce variety, which is mainly fawn and soft liver-coloured in appearance. When extended it was rather more than 4in. in length, lithe and slender of form, and of great grace and daintiness in construction. The head was small and oval, to be partly received into the prothoracic segment on occasion, which was just sufficiently large so to take it. The segments sharply increased in size to that of the first abdominal, and,

though partaking of the character of the "elephant" larvæ in the increase of girth at this point, the segment was not so dilated as is found in the British Eumorphid species. From this segment to the 8th abdominal the larva was full and fleshy in form, and the elevation, which there bore the caudal horn, was steep and emphatic. The transverse skinfolds upon the segments were firmly fashioned, but did not destroy the breadth and simplicity of form of the segments they traversed. The horn was small, and directed backwards and downwards. The prolegs were powerful nipple-shaped limbs, which carried the weighty larva with ease.

The colour of the larva was simple and delicate, though of extreme beauty, being a combination of quaker-like fawn and grey liver-colour. The head, which had a porcelain-like surface, was of a soft dove-coloured grey, and the main colours of the body were buff and fulvous, with the rather darker portions coloured by the soft liver-grey. A thin, well-defined, mediodorsal line of the liver-colour was traced from the crown of the head to the posterior edge of the metathoracic segment, where it terminated. At the lateral line was the boundary of the grey liver-colour which covered the lateral and ventral surfaces. The outline of this boundary was carried obliquely upwards and forwards to the anterior edge of each segment, after abdominal segment 1, almost to the dorsal centre, thus leaving a series of broad dorsal triangles, or rather pointed dome-shaped spaces, of the fawn-colour. Along the centre of these, the intestinal canal suggested a faintly darker mediodorsal line, particularly so at the segmental junctions. The liver-colour of the lateral surface encroached most freely upon the dorsal fawn-colour at abdominal segments 4 and 5, consequently making the dome-like triangles smaller there than at either end. On the spiracular region there was a series of blurred blotches of the fawn-colour, fulvous at the base, in some cases resembling in shape an inverted letter Z. There was one of these blotches on each segment, but, on the thoracic segments, they were fused, leaving a blurred top edging of the liver-colour, which here suggested a short lateral line, as the dorsal surface of the thoracic segments was of the fawn-colour. These Z-shaped blotches of fawn-colour bore the spiracles, which were tall, narrow, upright ovals. They were jet black in colour, with a very fine light lavender ring around them, and outside this a warm buff-coloured edging, which was suffused into the ground colour. The spiracles were slightly recessed from the body surface. Commencing at the posterior half of the metathoracic segment, and, starting from a large ocellated spot thereon, was a bright fawn-coloured lateral line, very suffused at the edges. At the second abdominal segment this lateral line became wider, and was of a suffused white, in which condition it continued to the centre of the 7th abdominal, where it abruptly ceased, to be almost at once continued, of a bright fawn-colour, upwards and backwards to the base of the caudal horn, where it terminated in a fine point. The whitish part of this lateral line was very suffused on its lowest edge, and it was strongly emphasised by a series of small pure white spots, set in vertical rows, in a broken manner, upon the segmental skinfolds. These spots were often encircled with a fine buff ring, and stood in colour relief against the ground tint as vividly as small white porcelain beads would have done. They were arranged

on each segment, in vertical lines, on the liver-coloured portions which enclosed the dorsal triangles of the fawn tint. Thus, the first line of dots on the 2nd abdominal segment consisted of five dots, one above the other, and nearly meeting the dots from the reverse side at the dorsal centre. The next line of dots on the same segment would be shorter, and also the following ones, but irregularly, until they were merged into the whitish lateral line. It will be understood from this that the ends of these lines of dots on each segment followed the shape of the dome-like marking on the dorsal area. This they did, but did not cross the boundary of the liver-colour. These dots were found vertically placed on the lateral line on each segment, from the 2nd abdominal to the 7th, but they gradually diminished in the altitude they reached on each succeeding segment posteriorly. For example, the first row on abdominal segment 2 consisted of five dots, on the next segment there were but four in the first row, in the next but three, the next two, and the remaining two segments that possessed dots had but one each on their first row, and only suggestions of others following in their last two segments. The true legs and the powerful prolegs were of the liver-colour of the lower portions of the larva, the prolegs having fulvous edges on the pedal formations. The true legs were not shiny, but had a dull gloss on their surface. The ventral surface was shiny, and of the soft liver-colour of the lateral coloration. There was also a slight indication of a very fine suffused lighter-coloured medioventral line. The caudal horn was small, and hung like the horn upon the larva of *Manduca atropos*. It was of a bright orange-sienna colour, and very shiny. Its surface was roughened by projecting excrescences, and it was irregularly marked with a few dark dots around its base. The end of the horn was not pointed, but finished bluntly. Allusion to the principal beauty of the larva has been kept to the last, so that what has been described of its general features, in their refined sobriety of colour, may give effect to the brilliancy of this particular detail. The larva was a sober-coloured creature of simple quaker-like tints, but at the commencement of the lateral line, on the metathoracic segment, was the most gorgeous single ocellated spot of electric bluish sheen that contrast could offer. This spot existed, of course, on each side of the segment, and suggested in colour the phosphorescent gleam of the glow-worm's light.

The larva was placed upon a young potted oleander plant on its arrival, and it at once made for the topmost leaves. Its hold upon the foodplant was tenacious, and it possessed a voracious appetite, evidently preferring the young growth on the plant to the fully expanded leaves. It fed freely and systematically, finishing each leaf in a workmanlike manner, with the exception of the larger leaves, which it either did not like so well, or else itwould not leave its hold upon the stem of the plant to work to their extremity. In fact, it never left its hold upon the stem. With the smaller leaves it would extend itself to the full and drag them back until they were bent nearly double, to be held by the legs, when it would commence feeding on one side at the tip, and then eat right across the leaf, including the midrib. They were bent backwards, with the upper- or underside uppermost, as was convenient. The larger leaves were attacked at about the centre of one side, and the larva would feed backwards from

thence, evenly, to the midrib, which it did not, however, attempt. When eaten away to the stem on the one side it would eat the other side of the leaf in the same way, leaving the leaf untouched, on both sides, forwards, from where it began feeding. When it had devoured the young leaves at the top of the plant, which it ate to the last morsel, and in some cases also the supporting shoot, it tried some of the larger and more matured leaves, and, after dealing with them in the manner described, it descended the main stem in search of the lateral shoots, which it ascended and stripped of the young growth, as it had done at the top of the plant. When moving on the foodplant in search of a fresh leaf, it had a peculiar action in progression. It would gently sway the head and segments forward, from the 2nd abdominal, and, at the same time, accompany this action with a movement of slow recoil and extension. Had this movement been a quick, instead of a very measured, one, it might have been described as a darting action. Whether the larva, when thus occupied, was searching by sight or scent for its next point of attack upon the foodplant can only be conjecture. It did not once leave the plant until the morning of the 13th of the month, when it was found on the floor of the cage that covered it, entirely changed in colour, contracted, and preparing for pupation. The change had been accomplished with a startling rapidity. At eleven o'clock the preceding night it was feeding as usual, and giving no sign of the coming change. At eight o'clock the next morning it was in the condition alluded to. This was a great disappointment, as it had been projected to take photographs of the larva for publication with this description. A drawing had, however, been made from it, and it must form the illustration in default of more accurate representation. The larva had greatly changed in appearance. The whole of the fawn-colour had turned to deep fulvous. The dorsal area from abdominal segment 2, extending to the caudal horn, and reaching down laterally just below the lateral line, had become a dark umber-brown. The dome-like triangles had disappeared entirely. The lunules of the head were of the same dark umber tint, as was the fine mediodorsal line on the prothoracic dorsal surface. Of the same colour had appeared a half-circular plate-like marking on the dorsal surface of the prothoracic segment, the straight side on the anterior edge, where there was a narrow fulvous edging between it and the head. The light fawn portions, as before-said, had turned to a deep fulvous, but the anal end and prolegs were the strongest of those parts in colour, being quite deep sienna in tint. The ocellated marks on the thorax had lost their beauty, for they were now suffused with black from the jet black of the bordering rings, and the only indication of the gleaming blue centres was a small core of dull purplish colour. Those portions of the larva which had been of the grey liver-colour were now of a dull coffee tint. The suffused white lateral line had almost vanished, but the transverse rows of small white spots showed in strong relief on the dark ground. The horn was of the same colour as before, but looked more brilliant by contrast with the dark dorsal development. Taken as a whole, the larva appeared more like the typical form in these changed colours than it did in those which preceded them. It was placed in a large flower-pot on soil composed of fibre, sand, and loam, but wandered round and round the pot in the familiar style until mid-day, when it

became quiescent and torpid. On the next morning, the 14th, as there were indications of spinning on the surface, some layers of flannel were placed on the soil. The larva had not altered much from its appearance of the day before, except that it was rather more contracted, and was getting horny and shiny-looking. On the morning of the 15th it was found to have spun up in the flannel.

During the days when it was feeding it would sometimes assume a posture that was sufficiently striking. Sustaining itself by the last three pairs of prolegs only, it would stretch out and bend over its thoracic segments until the head rested on the first pair of abdominal prolegs. This attitude brought into strong notice the two ocellated blue spots, which, stretched to their full extent on the dilated segment, resembled two staring eyes, while the pendent segments, and head below, looked like a long proboscis. More generally, the attitude of repose was that of quiet extension, with the thoracic segments contracted. On these occasions all that was visible of the ocellated spots was a slight suggestion of the posterior edging of their black circumscription, as the rest of their form was covered by the heavy enwrapping skinfold of the mesothoracic segment.

(To be concluded.)

Notes on Pyrameis cardui in Durham.

By J. W. H. HARRISON, B.Sc.

Perhaps a few notes on the recent influx of *Pyrameis cardui* from a more northern locality than any previously mentioned in the *Ent. Record*, may be interesting. It is necessary to mention that, for some years, this insect has been practically absent from this locality. The latest captures, here, were one in July 1902 and one in September 1901. About ten years ago it occurred in fair numbers. Its congener, *Pyrameis atalanta*, on the contrary, has been abundant, and was, in 1900, one of the commonest autumn butterflies, frequenting sunflowers. It occurred also, commonly in all stages, in 1901. *P. atalanta* did not occur last year (1902). In the early part of this year (1903), *P. cardui* did not appear, but, on July 31st, a very much worn female was taken by my friend Mr. Chas. Robson at Shotley Bridge, Durham. Thinking this to point to the fact that there had been immigrants there, I examined nettles, thistles and mallow, wherever possible, in the Wear, Team and Derwent valleys, for larvæ, but in no case did I find one. I saw no further trace of the insect until September 14th, when I found a single specimen on a thistle-head in the old stone quarry at Birtley. Its wings were in an awful state. In fact, those on the right side were almost gone. Having then my vacation, I spent the next few days around this place, but did not get another. On September 17th, however, one was taken at Vigo, about one mile south of this place. The Friday after this was unsuitable for collecting, so I did not get out. On September 19th, however, I was up the Derwent valley and almost the first butterfly to meet my gaze was *P. cardui* at Winlaton Mill. Here I saw about a dozen on thistle-heads. Proceeding further to a bed of *Picris hieracioides*, I was delighted to see the flowers alive with *P. cardui*. Hundreds were to be seen fighting for the flowers, accompanied by *Plusia gamma*. Wishing to see whether the females contained ova or not, Mr. Johnson of Gateshead, who was with me,

captured 30 and kept them alive. These were put in a cage with nettles. A few days later, we were pleased to find that a fair number of ova had been deposited on the upperside of the nettle leaves. A few were deposited at intervals till the first week in November, when the last female died. Up to this time, the eggs have not hatched. Perhaps some reader will give us details of his success in a similar experiment. To continue, however, with the occurrence at various localities at Durham. Proceeding further up the Derwent valley we found that they still were fairly plentiful but in decreasing numbers. On returning to Birtley, I went out two days later and found it in hundreds, in the old stone quarry mentioned above, and on the old slag heaps from the blast furnaces. In all cases the insects were at the heads of *Pieris* and were accompanied by *Plusia gamma*.

Struck by this unusual abundance, Mr. Johnson and myself suggested asking for reports from observers throughout Durham and Northumberland. With the kindly help of the Rev. W. J. Wingate, secretary of the Durham County Naturalists' Union, this was done with the following result:—

I. On the sea coast.—*North Durham.*—A few seen. *South Durham.*—Ryhope to Castle Eden, flowers alive with them; Trimdon Grange, scores seen; Hartlepool, very common. *North Yorks.*—Middlesborough, abundant; Redcar, numerous. The general remark accompanying the above records was that they were abundant and fresh.

II. Inland.—*Mid-Durham.*—Derwent valley, very abundant but worn; Gateshead, common even in the streets, worn; Birtley, abundant but very ragged; Durham, absent; Bishop Auckland, practically absent. *West Durham.*—Reports generally say that the insect was absent except at Burnhope, where one was taken, and at Bollihope where several were captured.

As our dates are a few days in advance of most other records, I would suggest that this migration had reached the Durham and Yorkshire coasts first. From Northumberland no specimens are mentioned. In Durham the insects seem to have reached the coast. Then they had travelled up the Tyne valley branching thence up the Team and Derwent valleys. I should like a suggestion as to why they were absolutely absent from the Wear valley.

Synopsis of the Orthoptera of Western Europe.

By MALCOLM BURR, B.A., F.L.S., F.Z.S., F.E.S.

(*Continued from* p. 10.)

Genus 7: Chelidura, Latreille.

This genus includes a number of mountain forms, apterous, with stout or slender forceps, separate at the base, and not dilated; in the males, the abdomen is more or less dilated from the middle to the roots of the forceps. In addition to the European forms, there is one American, one South African, and one Madeiran species.

1. Elytra free, longer than broad.
   2. Subanal plate ♂ produced beyond pygidium, with 2 points .. .. 1. analis, Rambur.
   2.2. Subanal plate ♂ not produced beyond pygidium.

3. Anal segment ♂ with hinder border swollen and bent down; forceps ♂ toothed at base 2. SINUATA, Germar.
3.3. Anal segment ♂ not swollen, with 2 tubercles; forceps ♂ toothed in middle .. 3. ORSINII, Géné.

1.1. Elytra not free, transverse.
2. Abdomen broadest in middle.
3. Pygidium ♂ vertically produced as a long blunt cylindrical lobe .. .. .. 4. ACANTHOPYGIA, Géné.
3.3. Pygidium ♂ hardly produced, and not vertically .. .. 5. MUTICA, Krauss.
2.2. Abdomen regularly dilated towards apex.
3. Small size; pygidium produced, with 3 points 6. BOLIVARI, Dubrony.
3.3. Size larger, stouter; pygidium not prominent.
4. Branches of forceps ♂ long, smooth, shining enclosing an oval space .. 7. APTERA, Megerle.
4.4. Forceps ♂ short, strongly bent in at an angle .. .. 8. PYRENAICA, Géné.

1. CHELIDURA ANALIS, Rambur.

Recognisable by its free elytra and subanal plate produced in the form of a triangle. It is one of the smaller species; the forceps of the ♂ are toothed on both sides, and curved in a semicircle or undulated oval. Length of body, 7mm.-9mm. ♂, 8mm.-9mm. ♀; of forceps, 1mm.-3·5mm. ♂, 1·5 mm. ♀.

Found under stones in the Sierra Nevada, and Granada.

2. CHELIDURA SINUATA, Germar (=*dufourii*, Serville).

Black; easily known by the end of the anal segment, which is produced and strongly bent vertically upwards. The forceps of the ♂ have a strong tooth on the inner margin near the base, and are then bent in a semicircle forming the var. *dufourii*; in the type form, they are elongate, and bent downwards as in *Anechura bipunctata*. Length of body, 8mm.-13mm. ♂, 7mm.-9mm. ♀; of forceps, 3·7mm. ♂, 2·5mm. ♀.

The two forms occur together under stones at a high elevation, or under moss lower down, in certain mountains of France and Spain, chiefly in the Pyrenees. In France—Pic du Midi de Bigorre, Cirque de Gavarnie, les Cauterets, Pic de Saulcy in Auvergne, Port de Venasque near Bagnères de Luchon, Tarbes. It occurs also in the Spanish Pyrenees, at Panticosa.

3. CHELIDURA ORSINII, Géné.

Elytra free, but subanal plate not produced; anal segment not strongly developed, with two tubercles. Forceps of ♂ toothed in middle. Length of body, 10mm.-12mm., ♂, ♀; of forceps, 4·5mm. ♂, 2·5mm. ♀.

An Italian species; Ascoli, Florence, Lower Abruzzi.

4. CHELIDURA ACANTHOPYGIA, Géné.

Easily recognisable by the subanal plate of the ♂ which is produced and bent strongly backwards and upwards; the forceps of the ♂ are slender, unarmed, enclosing an oval. Length of body, 6mm.-13mm. ♂, 9mm.-11mm. ♀; of forceps, 3·5mm. ♂, 2mm. ♀.

Found in the northern and mountainous regions of Central Europe. In France, near Paris, Fontainebleau, Marly, Vosges, Versailles, Meurthe-et-Moselle, Pic du Midi de Bigorre, Décines near Lyon. In Belgium it is recorded from Pépinster, Theux, Barisart near Spa, Grœnendael, Rouge-Clôitre, Waterloo, Tilff near Liège, and also in

Holland, and in Italy at Susa in Piedmont. Common in Upper and Lower Austria, and in Württemberg at Tübingen.

In the autumn it may be found on shrubs, and it passes the winter hybernating under bark.

5. Chelidura mutica, Krauss.

Resembles the preceding but is darker in colour, and the pygidium of the ♂ is short, not strongly produced, nor bent, more emarginate at the sides and hinder margin; the pygidium of the ♀ is broader emarginate laterally and posteriorly, visible as a small point. The forceps ♂ shorter, stouter, more strongly bent, with no tubercle at the base. Length of body, 10·5mm.-15·5mm., ♂ and ♀; of forceps, 3mm.-4·5mm. ♂, 2·2mm.-2·5mm. ♀.

South Tirol, Monte Baldo, and Valle Lagarina.

6. Chelidura bolivari, Dubrony.

In size resembles *C. analis*, but differs in having rudimentary elytra. Length of body, 9mm., ♂, 8·5mm., ♀; of forceps, 2mm.-2·5mm. ♂ and ♀.

Under stones in Central Spain, Sierra de Guaderrama, Escorial, Sierra de Peñalara, Serrania de Cuenca, under stones and moss in the mountains.

7. Chelidura aptera, Megerle (=*alpina*, Géné=*simplex*, Lafresnaye).

In this and the following species the elytra are entirely rudimentary; this species may be known by its large size, untoothed and shining forceps. Length of body, 10mm.-14mm., ♂ and ♀; of forceps 5mm.-10mm. ♂, 3·5mm. ♀.

This species lives on the highest mountains; it can be found under stones, bark, and dried cowdung; it is adult in autumn, and in winter buries itself deeply in the ground. It occurs in the southern Alps, especially on the northern slopes; from Simplon to the Little Saint Bernard; also Mt. Cenis, Larche, Le Lioran. Also in Piedmont and the South Tirol.

8. Chelidura pyrenaica, Géné (=*dilatata*, Lafresnaye).

Resembles the last, but has the forceps of the ♂ dull, compressed, and much shorter, sharply bent inwards at the centre; in the ♀ the branches are widely separated, and only meet at the apex. Length of body, 13mm., ♂ and ♀; of forceps, 5mm. ♂, 4mm. ♀.

A native of the upper regions of the Pyrenees, where it occurs at an elevation of 6000ft.-8000ft.; Camprodon.

(*To be continued.*)

The Revision of the Sphingides—Nomenclature, Classification, Geographical Distribution.*

(*Continued from* p. 10.)

We have already given more space than is properly available to questions of nomenclature and classification without fully elaborating what we have said, and without touching on many points, but we cannot refrain from expressing our amusement at the way in which the authors of the *Revision* have succeeded in deceiving themselves by a very childish device. They tell us (p. xlvi) of "a tendency amongst British lepidopterists to imitate some American leading

* *A Revision of the Lepidopterous Family Sphingidae.* By the Hon. Walter Rothschild, Ph.D., and Karl Jordan, M.A., Ph.D. Supplement to *Nov. Zool.*, vol. ix. Pp. cxxxx+972. Pl. 67. Tring, April, 1903.

spirits in lepidopterology in shifting the term "family" to a lower category than that to which it was originally applied. We do not see what good it serves, etc." They divide the *Sphingidae* into (A) *Sphingidae asemanophorae*, and (B) *Sphingidae semanophorae*. These are two most real and natural divisions, but they pretend to be neither subfamilies, families, nor superfamilies. By precisely the same device of giving it its full title, *Sphingidae-semanophorae-choerocampinae*, we may pretend to deprive the *Choerocampinae* of any right to be a subfamily, and call it B_2. That *Semanophorae* has not a recognised ending is a quibble. Really we have:—

Superfamily: SPHINGIDES.
Family: SEMANOPHORIDÆ.
Subfamily: CHŒROCAMPINÆ.

The systematic portion of the *Revision* is, of course, the largest and principal part of the work. We have already said that broadly we thoroughly agree with it, and where, in details, we do not, the points are such as to bear different interpretations, especially if approached from different aspects. In dealing with a somewhat isolated group like the Sphinges, and in endeavouring to arrange them phylogenetically, the temptation is strong to find earlier and later forms, and arrange them as if descended from one another in the manner in which genealogists arrange human pedigrees in a tree, without making proper allowance for the fact that, in the human trees, only the leaflets represent still existing forms. In a tree of the Sphinges, or other group, it is erroneous to take, say, an oak, and put some species as representing the trunk, others the branches, and others the twigs and leaves. All represent leaves. Better than an oak-tree would be a box, yew, or laurel, trimmed as we sometimes see them into plum-pudding form; each species is a leaf or twig on this. We realise on this more clearly the great difficulty there is in saying whether two twigs side by side are sprung from a single twig which was a leaf-bearing one last year, or whether we must follow each twig, perhaps to the main stem, before we find a common origin. The gardener's shears may represent the struggle for existence. Either of two species, as we now have it, is as far from the common ancestor (measured by generations) as the other, and, though we call it a more generalised form, because it has varied less or in fewer particulars, it is very probably, in some particulars, as specialised, or even more specialised, than that we regard as highly evolved. No species then, strictly speaking, represents the ancestor of another, all that can be said is that it preserves more simply some or other feature of that ancestor. All branches of the tree would be equally long, but some would only have one leaf at the end, others would be very bushy, but the leaves on it would all be terminal. That all present forms are of equal age is not quite true, to assume one generation a year would be correct for the Sphingides in the temperate regions, but in the warmer areas there may be several, and it also happens that, in the tropics, vitality is more abounding on the one hand and the environment more varied and varying on the other. We might, therefore, expect to find less specialised forms proportionally more numerous in the cooler areas. This seems in accord with the Palæarctic or Nearctic distribution of such forms as *Sphinqulus*, *Smerinthus*, *Ceratomia*, *Darapsa*, *Proserpinus*, and *Deidamia*. This is, as we shall revert to again,

quite contrary to the phylogenetic tables in the *Revision*, which regard all these forms as specialised by reduction. That, some of them certainly are, in several directions, but some things that the *Revision* regards as reductions are more probably ancestral, such as the pupal structure of these forms, their wing forms, their unspecialised last antennal joints, etc.

We have not been able to find anywhere in the volume any hint as to what the authors suppose to be the relations of the Sphinges amongst other families of insects, unless a reference or two to *Notodonta* may be so interpreted. But when we come to details of structure we find that they describe the ancestral Sphingid as a very highly evolved *Sphinx*. It had a very long proboscis, it had the tassel-end to the antennæ, it had the marginal abdominal scales fully developed, and so on. Similarly with regard to the pupa, the highly-evolved Sphingid pupa is regarded as ancestral, this is nowhere definitely said, but we gather it from various remarks here and there, such as that on p. 499, "The Chœrocampid pupa of *Nephelicae* may become reduced, assuming the aspect of Sesiinæ by losing the compressed projecting tongue-case. Such Sesiad pupæ appear frequently in genera with reduced head and tongue of the imago (*Deidamia*, *Darapsa*, etc.)."

Now *Acherontia* has unquestionably this reduction of tongue, and the pupa preserves the record of its having once been not only longer, but very long, yet the Sphingid pupa from which it is descended (Asemanophorid) never has the head thrown far back. The Semanophorids have the head thrown well back in the pupa, and a retreat from this would leave very obvious traces on the pupa. In *Deidamia* and *Darapsa* there is no trace whatever of this. These genera also have the more simple-ended antennæ, such as are common in Smerinthids (Ambulicines). The *Revision* treats these as specialised from the antenna with a tassel end. Almost certainly they are just the contrary, a survival of the pre-*Sphinx* antenna that was without the tassel. There are several other characters in these two genera that we regard from quite the opposite point of view from that taken by our authors, and, instead of regarding them as at the top of a division, we regard them as being very near the bottom of the Chœrocampids (*Semanophorae*).

We think the Sphinges evolved from something that was not a *Sphinx*. Doubtless our authors think the same, but some of their conclusions seem very difficult to draw except on the theory that Sphinges began with a well-developed typical Sphingid and thence varied in all directions.

The ancestral Sphingid began with quite a moderate proboscis. Looking to the fact that the Smerinthid pupa preserves in many ways the most ancestral characters, indisputably in the dorsal suture and in the ventral orientation of the eyes (*i.e.*, position of head), and that throughout the subfamily the proboscis-case reaches to where the wings meet in front, and that this meeting of the wings is practically without exception in the subfamily, there seems very little room to doubt that we have preserved in Smerinthids (Ambulicines) something very like the ancestral Sphingid pupa, with a short, but not very short, proboscis. It is quite arguable that, in the matter of proboscis and wing-cases, the Smerinthids have acquired a new character, *viz.*, the meeting of the wing-cases in front, a character met with commonly in

groups with short proboscids, such as the Lachneids (Lasiocampids), Attacids (Saturnians), etc., and probably rapidly gained, whilst less easy to get rid of. The ancestral Sphingid, in this case, would have a pupa more like that of *Ceratomia amyntor* or those of various Sesiads, so far as the proboscis is concerned, *i.e.*, reaching to the ends of the wing-cases and keeping them separate. Whatever form of ancestral tree may result therefrom, such pupæ as those of *Ceratomia*, *Darapsa*, many Sesiads, etc., may be ancestral to those in which the backward movement of the head exists, but cannot have them for ancestors.

Even as regards wing-form, we find the angled wings so frequently in the less evolved forms, and so rarely in the most so, that there is, we think, rather more ground for believing the primitive Sphingid to have had angled wings than that it had not. The angled wing has lent itself well to imitations of leaves, etc., but angulation is by no means necessary to such imitation, as we see in many other families, and even in the Sphingides themselves, so that its occurrence, in several different branches, requires some other explanation than such mimicry; and very especially needs it when these angled forms are placed at the summits of the pedigrees, as our authors place most of them.

(*To be concluded.*)

NOTES ON COLLECTING, Etc.

Hybernation of Platyptilia acanthodactyla, Hb., and Stenoptilia zophodactyla, Dup.—In answer to Mr. Tutt's queries about these species (*anteà*, vol. xv., p. 301), I have no doubt whatever, as the result of a close acquaintance with *Platyptilia acanthodactyla* extending over upwards of 20 years, in the course of which I must have bred and captured fully 600 specimens, that this insect hybernates in the imaginal state. Larvæ may be found near the south coast at any time from the latter part of July, till about mid-October; I have met with them on October 5th—the latest date on which I have searched for them—and they were then by no means almost fullfed. In my experience, these autumn-feeding larvæ invariably push on to reach the imaginal state before winter sets in, and the moths resulting from them show no inclination to oviposit, or die off. In 1892, from pupæ and larvæ collected in this district, August 15th to October 5th, the imagines continued to emerge from August 23rd till November 18th, whilst last year (1902) a series of moths was bred, October 2nd to 25th, from pupæ and larvæ met with in South Devon, September 25th to October 1st. In these instances, more especially in the latter, the last emergences would certainly have taken place somewhat later than was the case, had not the backward pupæ been kept in warm living rooms. In face of these facts and others of a similar nature, it does not at all surprise me to hear that a female captured by Mr. Tutt, in Piedmont, so early as August, should have laid some eggs whilst on the setting-board, for she doubtless knew there was time for another brood before the advent of winter.* I fully expect that the females that one meets with during

* Part of our doubt was due to the fact that the locality where the species was taken is situated among high mountains, fully 3500ft. above sea-level, where one expects that, by October, the ground is under snow, and a late brood somewhat improbable. Still there may, of course, be such.—Ed.

August, in England, generally oviposit at once, at any rate in the south; otherwise how can the larvæ that may be found throughout September, and in early October, be accounted for? I have not unfrequently netted, during the latter part of May, worn imagines, which have presumably hybernated as such. My acquaintance with *Stenoptilia zophodactyla* has not been so close, though, owing to the recent discovery of a good locality for it in this district, it is likely to improve in the near future. I have netted the moth in the middle of July, and have bred and taken it during August and September. The fact that captures have been made by myself so late as September 27th, and October 2nd, would, of itself, tempt one to suppose that the species hybernates in the imaginal state, and I would suggest that strong presumptive evidence that this supposition is correct is afforded by the additional fact that its foodplant, *Erythraea centaurium*, is an *annual*, and could not, therefore, be satisfactorily utilised by the insect in any way after it had once died away in the autumn. For this reason, Mr. Tutt's strong suspicion that *S. zophodactyla* hybernates as a small mining larva seems to me quite untenable.—Eustace R. Bankes, M.A., F.E.S., Norden, Corfe Castle. *December 7th*, 1903.

Plusia gamma at sugar.—I have taken *Plusia gamma* at sugar sparingly in most seasons here, never more than two or three in a night, and always in the autumn, when there were plenty of attractive garden flowers.—(Rev.) C. D. Ash, M.A., Skipwith Vicarage, Selby. *November 16th*, 1903.

A Probable double-brooded Erebia.—In Mr. Rowland-Brown's interesting review of the *Butterflies of Switzerland and Central Europe* by Mr. Wheeler, he remarks that the author must have been misled as to a possible second brood of *Erebia epistygne*, by my article on the "Butterflies of Digne." I wish to take this opportunity of stating that the error in my paper arose either from a slip of the pen, or a misprint. I never took *E. epistygne* at Digne when I was there in June and July, what I took was *Erebia stygne* not *E. epistygne*. I was told on the authority of a brother of the Cottes, that *E. epistygne* was to be had in June on the mountains near Barcelonette, much higher than those near Digne, where it is always over by the middle of May, but, to the best of my belief, it is never double-brooded. I think, however, that it is not so certain that no *Erebia* is double-brooded, and I can produce some sort of evidence that *E. stygne* may be so, though I am unable to prove it. In the summer of 1902, I spent the month of July in the Picos d'Europa, a rather singular district of northern Spain, consisting of a chain of high limestone mountains running east and west, parallel to, and about 25 miles from, the southern coast of the Bay of Biscay. This chain is cut sharply through by three considerable rivers, flowing from south to north, and forming the most tremendous gorges or cañons that I have ever seen, excepting the Tara gorge in the Balkans. These gorges rise in one sheer precipice from the growth of chestnut, oleander, and bay along the riverbank, right to the snow level, and a great variety of insect-life is produced by the rapidly varying climate and vegetation. I encamped, July 10th, at a height of nearly 5000ft., on the southern face of this chain, and found the mountain pastures, just above this level, swarming with *E. stygne*. Both sexes were out, and in good order, though some of the males were slightly worn. I caught a good many, and kept a few, they were quite

typical specimens, perhaps a trifle larger than those from Dauphiné and the Pyrenees. I remained in the high mountains till the 19th, by which time *E. stygne* was nearly over. I then turned westward and encamped much lower down and further west, near a village called Posada de Valdeon, in a beautiful well-wooded valley, still on the south side of the mountains. Here I remained four days, and saw no Erebias, though it was an excellent place for butterflies, it was too low down for most of that family. On July 22nd I started westward across low-wooded hills, forming spurs of the high mountains, to the gorge of the Sella. On this day's march, at a height of from 3000ft. to 3500ft., I saw several large Erebias, quite fresh out. I caught six or seven specimens, all males, and considered them to be *E. aethiops*, and therefore only kept a couple. But when I returned home and had them set, they turned out to be very large specimens of *E. stygne*. I now possess only one of these specimens, either Mr. Elwes or Dr. Chapman had the other. My specimen measures 2in. across the wings, and is very like *E. aethiops*, though, on examination, it is evidently a very large *E. stygne*. I greatly regret not having made the discovery when I took the insect, as it would be most interesting to possess a good series, and particularly some females, of which I never saw one, nor did I see the *Erebia* again on my return journey along the northern side of the range. Perhaps some enterprising entomologist may explore the Picos district this summer, and ascertain whether the big, low-country *E. stygne* which I took on July 22nd is a second brood or not.—Mary de la B. Nicholl, F.E.S., Merthyr Mawr, Bridgend. *December 29th*, 1903.

Habits of Eupithecia pygmæata.—This species is very local in Lincolnshire, but plentiful where it does occur. It flies along the tops of hedges about four feet from the ground in company with *Heliaca tenebrata*. Time of flight 4.45 p.m.-6 p.m., but most numerous between 5 p.m.-5.30 p.m. I have only found it along hedges bordering two fields, although the foodplant grows all over the neighbourhood. In 1900 I took 63 between June 7th and June 20th; in 1901, 79 between May 23rd and June 5th. I have only taken two specimens at mid-day flying in sunshine and settling on low flowers.—R. Cassal, M.D., Ballaugh, Isle of Man. *December 22nd*, 1903.

Nonagria neurica in Lincolnshire.—It may be well to record that I took one specimen of *Nonagria neurica* at Althorpe (Lincolnshire) on September 3rd, 1900. There were several flying about over reeds at dusk, but I could only secure this one, having no net with me, and I have not visited the locality since.—Ibid.

Ephippiphora grandævana in the Isle of Man.—I captured one specimen of this local species on the banks of the Santon River, somewhere between Santon station and Ballasalla, about midday on June 12th, 1902.—Ibid.

Amphidasys betularia var. doubledayaria in the Isle of Man.—I took this variety (a ♀) *in cop.* with an ordinary ♂ *A. betularia* on June 4th, 1902, in Laxey glen gardens. The ♀ started ovipositing on June 5th. The ova hatched June 29th. I can find no record of the date when the larvæ pupated, but I forced about 60 pupæ in February, 1903, and, of the imagines that emerged, about 12 were of the *doubledayaria* form and the rest typical *A. betularia*. There were no intermediate forms. I also took a ♂ just emerged in the same locality on June 12th, 1902, and another in Ballaugh Curragh at light on July 12th, 1902.—Ibid.

LEPIDOPTERA AT SKIPWITH AND THE NORFOLK BROADS.—With regard to general conditions, my experience has been pretty much the same as that of others—bad, worse, worst, about describes the season of 1903 as far as fieldwork goes. The autumn has been quite hopeless—30 rainy days in October, with 7·72in. of rain, in this dry district. Since May I have been out whenever possible, even on the bitter evenings in mid-June, when one's fingers were quite numb with the cold while watching for the moths which should have come to the flowers of rocket, etc. May was divided into two nearly equal parts—1st-17th, constant rain and very dull, followed by a spell of bright, rather scorching, weather, with persistent E. or N.E. wind and low night temperatures. Lepidoptera backward and very scarce—very few moths of any sort on the wing at dusk. *Cuspidia menyanthidis* was only just coming out at the end of the month; *Hadena glauca* more plentiful than usual. The most interesting event, however, was the occurrence of two specimens of *Coccyx cosmophorana* on the 30th, an addition to the local, and, I believe, to the county, list. Some pupæ of *Cucullia lychnitis* which had "gone over" also began to produce moths at the end of the month. They were from a batch of 21 larvæ reared in 1901, of which six moths emerged last year. Fourteen more came out this year, the last emerging on July 3rd. June was cold and ungenial for the first three weeks, and insects continued to be scarce. The first *Theretra porcellus* appeared at rhododendron flowers on the 4th, and only three more were seen altogether, and no *Eumorpha elpenor*. *Cuspidia menyanthidis* continued to appear till the 9th, after which none were found. A visit to Bishop's Wood on the 6th showed the larvæ of usually common species to be in profusion, *e.g.*, *Hybernia defoliaria*, *Cheimatobia brumata*, *Phigalia pedaria*, and *Oporabia dilutata*, but the only moths seen were *Cidaria suffumata* (fine), *Eupisteria obliterata* (a few, getting worn), *Acidalia remutata* (quite over), and a single specimen each of *Lomaspilis marginata*, *Ephyra punctaria*, and *Paedisca bilunana*. *Nemotois scammerdamella* was the only really abundant species. The inside of a week, from June 21st to 26th, was spent in the Norfolk broads with Messrs. Porritt and Lofthouse, but, though favoured with brilliant weather, collecting was a failure, nothing worth noting being taken, and no species except *Tortrix costana* being really plentiful, and many of the usual local things entirely absent. Personally I had the pleasure of making the acquaintance for the first time of *Papilio machaon* and *Hydrelia uncula* in their wild state. Light was singularly unproductive, though we had what appeared an ideal pitch for our lamps. On my return home at the end of the month, I went for *Acidalia straminata*, but the species did not put in an appearance till July 10th, and was not fully out till the 19th and 20th. During this time the weather was very showery, the delicate little moths soon got spoiled, and they were quite over by the 28th. I had the good fortune to take one specimen that, had it been quite fresh, would have been a most beautiful aberration; unfortunately the showery weather had stripped the wings of the greater part of the cilia and doubtless taken some of the freshness off the wings themselves. In this specimen the whole area between the last transverse line and the hind margin is suffused with light smoky-grey, the wing-rays being conspicuously darker and the mar-

ginal series of black spots being replaced by a continuous black line; there is a very dark band across the wings, making the moth look not unlike a very strongly-marked specimen in miniature of the banded form of *Acidalia aversata*. I made some notes as to the habits of *Acidalia straminata* which may perhaps be of interest. The moth generally flies just about dusk, and continues on the wing till it is dark enough for lamps to be needed, but, occasionally, it starts flying in broad daylight some time before sunset, with the sun shining full on the ground. On each occasion that it has done so this year the setting of the sun has been followed by the appearance of some ground-fog and the instant disappearance of *A. straminata*, and, though the fog cleared off at 8.30, and other species, such as *Lycophotia strigula* and *Scoparia ambigualis*, began to fly again freely, not a trace of *A. straminata* was to be seen either on the wing or at rest; it would seem that the approach of ground-fog is known to the insect, and its flight taken earlier in consequence. The only other incident worthy of note in July was the presence of a ♀ *Saturnia paronia* on the evening of the 17th busily engaged ovipositing on the heather. August, September, and October require little comment, and these notes are already overgrown. A pair of *Zeuzera pyrina* were brought to me in a matchbox on August 4th, but as they were, of course, useless as specimens, I liberated them; this species is another addition to our local list. The second brood of *Eupithecia indigata* was out on the 12th. *Agrotis agathina* first appeared on the 26th, but, though fairly plentiful from then to September 23rd, the rain which fell every day completely spoiled them, and very few good specimens were taken—wet weather ruins this species at once. *Tapinostola fulva* and *Luperina testacea* came freely to the moth trap during the first ten days of September, and a few *Luperina cespitis* also. In October, ivy-bloom yielded two perfectly fresh *Xylophasia monoglypha* on 5th, but nothing else except *Orrhodia vaccinii* and *O. spadicea*—the bloom was destroyed by rain almost as fast as it came out. Since the end of October I have done no field work.—(Rev.) C. D. Ash, B.A., Skipwith, Selby. *December 4th*, 1903.

VARIATION.

Notes on the variation of Lycæna (Polyommatus) lysimon, Hb.—It has occurred to me that the following notes might be interesting to the readers of the *Ent. Record*. Directions of Variation:—(*a*) *Size:* ♀ generally larger than ♂. One very bright blue ♂ from Aboukir only 15mm. Males average 21mm., ♀s 22mm., but I have specimens up to 24mm. (*b*) *Colour of upperside of the* ♀*:* The ♀s of this species fall into two types: (1) The commonest, on the whole, and certainly almost universal during March-April and October-December, has the fore- and hindwings suffused with bright dark blue scaling from the base to the discoidal spot and often further on the upperside forewings, and from base over discal field and to margin of fold for often half the area upperside hindwings. Outer and costal margins of both wings are always broadly dark. A ♀ in which the suffusion was reddish-purple was taken April 20th, 1903, some 20 miles southwest of Cairo in a desert waste. (2) In which the suffusion disappears but for traces on base and a few scales on discoidal field of both wings. Cairo, end July-October, Aboukir and Alexandria, June and July. This appears

to be a prevalent form in the dry season from May-August. For 1 which is (*teste* Spuler) *not* the typical ♀ form, might I suggest the name ab. *caeruleo-suffusa* if it has not been previously described. (*c*) *Tendency to increase or decrease in the number and size of spots on underside:* Taking as "type" the figure in Spuler's *Neue Schmetterlinge Europas**, we have :—(1) Decrease in spots, culminating in ♂ taken March 8th, 1903, which has on underside forewings only five spot in the band and trace of the basal spots. On the hindwings only two faint basal spots and the 1st spot of the band, which is nearest the costal margin present. I have transitional forms with obsolescent spots, and forms with wings on one side normal and on the other obsolete or obsolescent. (2) Increase in size of spots. One ♀ taken in April near Cairo has very large spots, a small spot on anal angle of hindwing, band spots of forewing pear-shaped†, produced towards discoidal field.—Philip P. Graves, Turf Club, Cairo, Egypt. *November 15th*, 1903.

A new aberration of Parnassius mnemosyne.—At Bérisal on the Simplon Pass on July 3rd, 1901, I took one ♀, and on July 11th, 1903, two ♂s and one ♀, of a form of *P. mnemosyne* that has not yet been described. The two black spots in the discoidal cell of the forewing are confluent, and joined together by a thick bar taking the shape of a dumbell. To this aberration I propose to give the name of *halteres* (ἁλτῆρες). Especially remarkable is one ♂. The semitransparent margin is of normal length and rather narrow, the ground colour no darker than in type. The upper of the two dumb-bell spots invades the spaces between II and II_3, and between III_1 and III_2. There is, in addition, a black spot in the centre of the hindwing discoidal cell. By way of contrast to this wealth of black spots, the spot outside the discoidal cell of the hindwing, is remarkably small, and fills only about half the space between III_1 and III_2.—P. A. H. Muschamp, 20, Chemin des Asters, Geneva. *December 20th*, 1903.

Irregularity of neuration in Parnassius mnemosyne.—I have a fair percentage of imagines of *P. mnemosyne* in which the nervures are very irregular. In comparing two insects A and B, I find that in A the termination of II is 8mm. from III_1, and III_1 is only 2mm. from III_2, whereas in B (fairly normal) II is 3mm. from III_1, and III_1 $3\frac{1}{2}$mm. from III_2. The nervures are often forked, thus, in one insect III_2 forewing terminates in a fork, and III_2 hindwing branches out into a fork, of which only one prong reaches the border.—Ibid.

* Spuler's figure is a little inaccurate in one respect. The rings round the black centres of each spot are yellowish-grey, not greyish-white.—P.P.G.

† In a very large proportion of specimens the two spots nearest the inner margin of the forewing in the band coalesce.—P.P.G.

NOTES ON LIFE-HISTORIES, LARVÆ, &c.

Oviposition of Parnassius mnemosyne.—At Bérisal, on July 11th, 1903, I caught between thumb and finger a ♀ of *Parnassius mnemosyne* that appeared to be ovipositing. On examination I found an ovum in the abdominal sac. I netted over 50 ♀s for examination, and finally found a second with an ovum in her sac. I afterwards found that 2 ♀s out of a large number I had left overnight in my collecting-box, had each dropped one ovum into her sac. In no case did the ovum adhere in

any way to the sac, but moved freely in it. In one case, the second, the ♀ netted by me was actually flying with the ovum already in her sac. Can it be that the female oviposits into her sac while on the flower-tops, and afterwards proceeds to deposit the egg at the foot of the foodplant? Can anyone offer a more satisfactory explanation?—P. A. H. Muschamp, 20, Chemin des Asters, Geneva. *December 20th*, 1903.

Egg of Spilosoma mendica compared with that of Phragmatobia fuliginosa.—To the naked eye the egg of *Spilosoma mendica* appears to be a larger egg than that of *Phragmatobia fuliginosa*. The eggs examined were laid on the sides of a glass-topped box in smaller and more regularly-sized patches than those of the latter species, in two instances a couple of eggs are laid singly a little distance apart from each other. The smallest regular patch contains 34 eggs, the largest 52, there are three other patches, which average about 40 ova each, the total number of eggs being about 200 to 220. They are not nearly so near hatching in appearance as those of *P. fuliginosa*, their colour being a pearly cream, very similar to the latest-laid ova of *P. fuliginosa* in this respect. The shape is less spherical than that of the egg of *P. fuliginosa*, and shows a tendency to become a tall dome, the vertical axis being larger in relation to the horizontal one, the base flatter and less depressed. Horizontal diameter is about ·75mm., vertical, almost exactly the same, perhaps a trifle less, ·7mm. to ·75mm. Surface smooth and shiny with a pearly lustre, the surface reticulation quite as faint, and less sharp, but clearer at the micropyle than that of *P. fuliginosa*. When placed on a glass slip together, the difference is abundantly distinct, the greater bulk of the egg of *S. mendica* being at once apparent. The cellular reticulations are also very different in the two ova, that of *P. fuliginosa* being very much sharper and smaller, and is clearly a surface structure, that of *S. mendica* is larger and consists of indentations rather than a network of walls, giving more the effect of the dents left by the hammer in beaten copper work. The eggs commenced to hatch three or four days later than those of *P. fuliginosa*. [Eggs of *S. mendica* received from Mr. Tutt, April 20th, 1903, laid April 11th and following days, by a ♀ caught flying in the Esterel, at Agay, on the morning of April 11th, 1903.]—A. W. Bacot, F.E.S., 154, Lower Clapton Road, N.E. *November 18th*, 1903.

Eggs of Lepidoptera.—*Ellopia fasciaria* var. *prasinaria*.—When first laid the egg looked at from above is roughly oval (inclining sometimes to circular) in outline, full and plump, without depressions of any kind, flattened at the micropylar end, which is fuller and broader than its nadir. The egg is green in colour, the surface somewhat shiny, and with the power at disposal appears to be minutely granulated or pitted, although, to the naked eye, it seems quite smooth. The length : breadth : thickness as about 9 : 7 : 6 at the micropylar end, the nadir of which is only about two-thirds of this in thickness. This description was made on August 20th, 1903, from a single egg laid by a ♀ captured on the evening of August 18th at light at Chamonix. On the evening of the 21st it was observed to be changing to a red colour, whilst on the 22nd another ♀ (which had been isolated for eggs) was observed to have laid several eggs in the box in which she was confined. Other eggs were laid on the 23rd, the ♀ dying during the night. On the 25th these eggs were carefully examined, when the following

notes were made :—The egg is roughly oval in outline, looked at from above, inclining somewhat to brick-shape, owing to the squareness of the ends, the flattening of the sides, and the distinct oval hollow that appears after a day or two on the upper face. The micropylar end is larger, bulkier, much thicker, and more flattened than its nadir, a character easily recognised when the egg is tilted on another, and that, perhaps, gives the upper face of the egg the appearance of sloping upwards from the nadir to the micropylar end more than it really does. Although of a beautiful green when first laid, these eggs rapidly become tinted with coral-colour, inclining later to crimson, and, in a short time, assume a definitely bright pink-red hue, these two colours being those which we associate with many pine-feeding larvæ and imagines resulting therefrom, and which, strangely enough, are the colours of the two forms of the imago of the species under consideration. The way in which the eggs are laid is very interesting. They are placed closely together (end to end) in almost straight lines from 6 to 12 in a line. Those most regularly laid are tilted up at an angle of about 60°, the first laid flat or only showing its natural slope, and then the thick micropylar end of each successive one resting on the base (nadir) of its predecessor in the series, although, in a few scattered examples, laid singly, a few of the eggs are almost perpendicular, whilst one or two are almost flat. [Forwarded to Dr. Chapman for further report on August 27th.]—J. W. Tutt.

Ennomos obfuscata.—The eggs, which are green in colour when first laid soon became dingy-brown to the naked eye. They are oval in outline, length to breadth about 5 : 4, with one of the long sides slightly depressed, and show all the characteristics of flat eggs, yet are laid as upright ones, the micropyle at the apex, the attachment being at its nadir. The sides are covered with a somewhat regular series of shallow, longitudinal ribs, crossed by transverse ones, forming a sort of ladder-like sculpture, reaching from the base to the sculpture, and becoming modified over the apical area into a reticulation composed of concentric series of cells surrounding the micropyle. After the egg has changed colour the raised sculpture becomes shining-grey, through which the reddish-purple tint of the egg shows, the apex being much redder than the rest of the egg. [Eggs laid August 22nd, 1903, by a ♀ taken at Chamonix on the preceding day, described August 28th.]—J. W. Tutt.

Cossus cossus (*ligniperda*).—These are laid in four rough masses, heaps or blobs of eggs, with a few scattered singly. They have apparently been laid between the folds of a piece of stiff paper, and are attached to one surface still. They are cemented together anyhow, side to side, end to end, end to side, etc., apparently in every possible position. When laid singly they are on the side, but if, as I surmise, they have been thrust into the crevices of folded paper, this does not go for much in deciding if they are flat or upright ova. The eggs are evidently laid soft and squeezed together, and are consequently somewhat irregular as to outline; but when not greatly compressed, they show an ovoid outline on the long diameter, and a circular or almost circular one on the shorter. The pointed end is the micropylar one; the blunter, the base. They are, I should say, upright or eggs of two diameters, and the position and character of the ribbing suggests this also. Length, 1·3mm., diameter, 1mm.,

opaque and strong in appearance, coarsely ribbed longitudinally, and with almost equally coarse cross-ribbing. Towards the base the longitudinal character fades out, and is replaced by a coarse and irregular cell-ribbing. The longitudinal character of ribbing is most pronounced on the upper two-thirds, the longitudinal structure being here aided by the way in which the dark-brown cement with which the egg is stained, is arranged. The ribbing, as before noted, is very coarse and rough, giving the egg the appearance of being constructed of basket-work. The colour is pale sepia-brown, stained and streaked irregularly, but chiefly at the micropylar end, with a dark brown, almost black, cement. The longitudinal ribs run in towards the micropyle, giving a distinctly Noctuid appearance to the top of egg. The cross-section in some instances is almost, if not quite, circular; in others it appears to have a slightly oval shape. As before stated, the egg appears to be a two-diametered egg, possibly slightly transitional, or, as I am inclined to think, slightly retrograde towards an earlier state. [Received from Mr. J. W. Tutt. Described July 4th, 1903.]—A. W. Bacot.

Laphygma exigua.— Mr. Gervase F. Mathew kindly forwarded me two batches of ova of this species and writes under date October 7th, 1903: "Two females and one male captured between September 22nd and 25th, have been kept together and fed ever since. The females commenced to lay on the 2nd inst., and a few eggs have been deposited on the muslin cover of their jar every night since. I find one or two batches of eggs deposited on paper, so I send you some of these, as they are covered with down from the parent's body; the down over those laid on the muslin has, in most cases, been rubbed off by the fluttering moths. I see the male is dead, but both the females are still alive, though one looks *in extremis*."]* The ova on the muslin are laid in a loose and somewhat irregular patch containing 23 eggs, many of the eggs are tilted and, in one instance, an egg almost entirely overlies another, but this I fancy owing to the lower egg having been thrust through the network of the leno. A few fine silk threads or hairs are scattered over this batch. The second batch is rather smaller and is laid on paper, this patch is so thickly covered by a loose felt of silk threads or very fine hairs, that the ova themselves are scarcely visible. In colour this felt is of a very pale wainscot-brown, and is of about the texture of fine cotton-wool. It reminds one of the silk that the Tephrosias use to cover their egg-masses (see Dr. Riding's paper *Ent. Record*, vol. ix., p. 118), but is, I think, less dense (unfortunately I have no material for comparison). I should imagine this wool to consist of silk threads rather than hairs, the fibres are so long, even, and pliant. The ova are bright yellow in colour and very shiny, and their appearance is rather unusual for a Noctuid egg, owing to the primitive style of sculpturing. Their shape is, however, fairly typical, though perhaps a trifle flat, the horizontal diameter being rather more than the vertical one. Horizontal diameter about ·4mm., height slightly less. The micropyle is neither raised nor depressed, and does not perceptibly break the contour, it is surrounded by an inner and an outer ring of coffin-shaped cell outlines, the inner ring being somewhat faint and looking not unlike the fringe of petals round some flat-topped

* The second female died October 14th.—G. F. Mathew.

flower in outline, the outer ring is much more strongly marked and coarser in appearance; beyond these central rings the egg is covered by a strongly marked and rather coarse network of irregularly-shaped cell outlines, for the most part oblong, but, in some instances, even triangular, but few, if any, perfect hexagons. The longitudinal dividing-walls are a little accentuated, giving just a hint of vertical ribbing. On the whole, the cell-pattern is bold and deep, and, though fainter at the micropyle, it is very sharply cut. Towards the base the cellular pattern becomes faint, and fades out at the base, which is by no means flat in a detached egg, but as this has been laid on leno, and is in other directions somewhat misshapen by detachment, this may not be the natural form. [Described October 8th, 1903.]

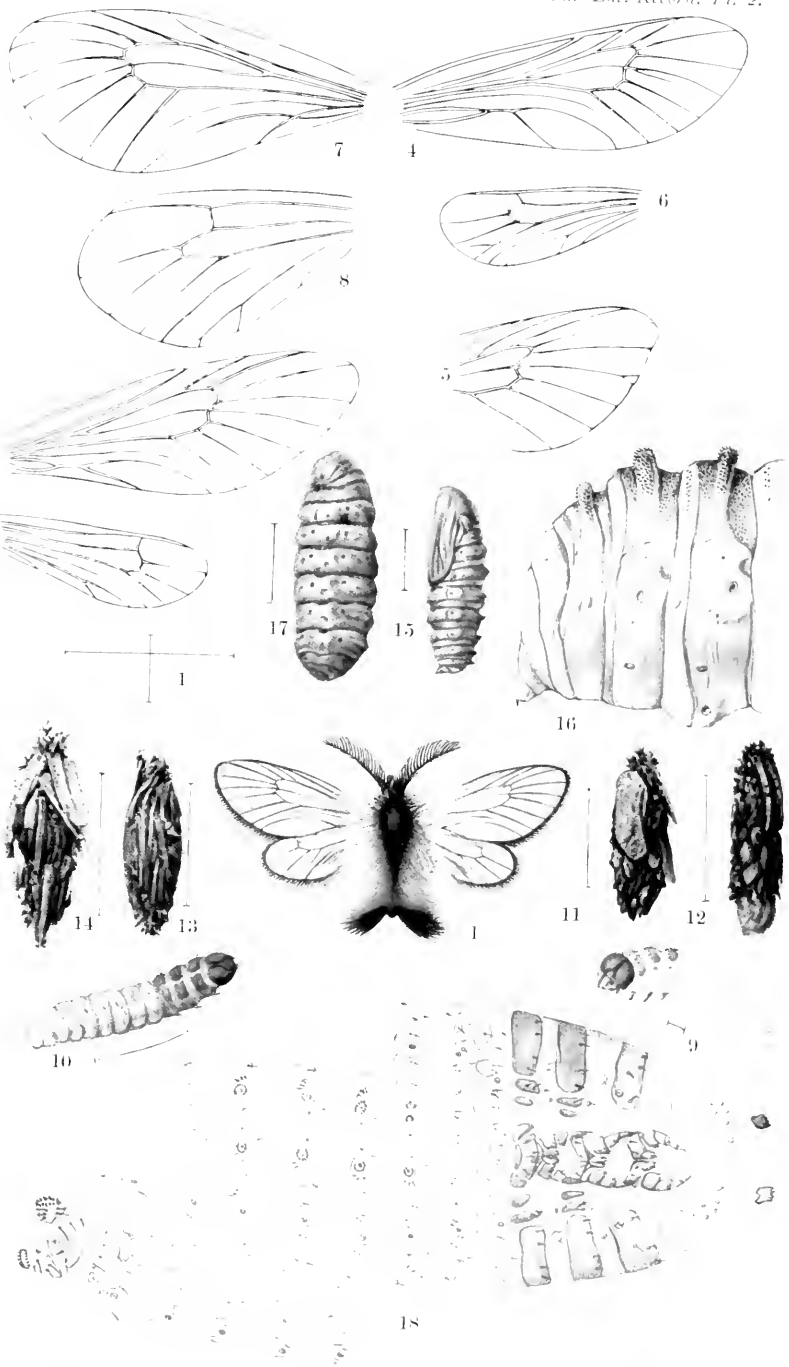
Anarta myrtilli.—About ·675mm. diameter and ·5mm. in height, roughly half a sphere, but the base is somewhat bulged. The egg is bright orange-yellow in colour; surface smooth and shiny with numerous, rather deeply cut, longitudinal ribs; these turn well under at base and join up above the shoulder in normal course; the cross-ribbing is very indistinct; there is a saucer-shaped depression at top, out of the centre of which rises a central cone bearing the micropyle at its summit. The ribs are about 50-55 in number. Only two eggs were laid. [Described June 13th, 1903.]

Pararge megaera.—Roughly speaking, the eggs are tub-shaped, having a flattened base with tapering sides that curve over to a much flattened top. Diameter at base about ·9mm. to 1mm., at top between ·7mm. and ·8mm.; height ·9mm. The shape is somewhat irregular and dented or depressed in places. *Sculpturing.*—The cellular pattern and ribbing is rather coarse, irregular, and poorly marked, but towards the micropyle the cells are reduced in size and are sharper and more clearly cut, forming a tolerably well-marked micropylar rosette. [Described July 1st, 1903. Eggs received from Mr. G. Sloper.]

Papilio machaon.—A flat-based, dome-topped egg. Viewed laterally the outline appears to be almost exactly ·75 of a sphere. The diameter is quite ·9mm. to 1mm.; height ·8mm. to ·9mm. The surface is tolerably smooth, no cell-pattern or ribbing visible. This and its shape gives it an appearance somewhat like the egg of a Notodont, but it differs in colour, being pale red-brown for the lower two-thirds, above this, dull green with a small patch of the red-brown hue at the top. This central patch is of irregular shape and is apparently composed of a mass of small spots. [Laid June 26th, 1903. Received from Mr. G. O. Sloper. Described July 1st, 1903.]—A. W. Bacot.

CURRENT NOTES.

The Officers and Council of the South London Entomological and Natural History Society for 1904 are:—President, Alfred Sich, F.E.S.; Vice-Presidents, H. Main, B.Sc., F.E.S., and E. Step, F.L.S.; Treasurer, T. W. Hall, F.E.S.; Librarian, A. W. Dodds; Curator, W. West (*Greenwich*); Hon. Secretaries, Stanley Edwards, F.L.S., &c. (*Corresponding*), and H. J. Turner, F.E.S. (*Report*). Council: R. Adkin, F.E.S.; F. Noad Clark, F. B. Carr, H. S. Fremlin, M.R.C.S., L.R.C.P., F.E.S.; W. J. Lucas, B.A., F.E.S.; H. A. Sauzé; and W. West (*Streatham*).



Horace Knight, del. Annan & Sleigh, Ltd.

Pyropsyche moncaunella. Chapm.

Retrospect of a Dipterist for 1903.

J. E. COLLIN, F.E.S.

Our list of British diptera has been increased during the year past by fourteen species, three of which were new to science. Dr. J. H. Wood has introduced *Agathomyia viduella*, Ztt., and described the male which was previously unknown (*Ent. Mo. Mag.*). Dr. Sharp, in the same magazine, has introduced *Chamaesyrphus lusitanicus*, Mik, *Pachygaster minutissima*, Ztt., *Phortica* (*Amiota*) *variegata*, Fln., and confirmed *Loxocera nigrifrons*, Mcq., from specimens taken in the New Forest. W. H. Imms has introduced *Clunio bicolor*, Kieff. (*Trans. Liverpool Biol. Soc.*). F. V. Theobald in the third volume of his *Monograph of the Culicidae*, has included the genus *Theobaldia*, described by Neveu-Lemaire in 1902, of which our *C. annulatus*, Schrk., is the type, and has founded the new genus *Grabhamia* for our species *dorsalis*, Mg., and *pulchripalpus*, Rnd.; he has raised his variety (*sylvae*) of *C. nigripes* to specific rank, and has described *Culex territi* from Kent. Rev. Wingate, in a "List of Durham Diptera" (*Naturalist*), includes two *Tachinidae* new to our list, *Exorista* (*Parexorista*) *fugax*, Rnd., and *E. grossa*, B. and B., identified by Mr. C. J. Wainwright, our authority on that family, and two new *Anthomyidae*, *Coenosia tricolor*, Ztt., and *Lispocephala alma*, Mg., identified by Herr P. Stein, of Genthin, Prussia. Mr. P. H. Grimshaw has continued publishing local lists of Scotch diptera (*Ann. Scot. N. Hist.*), adding *Sciara rufiventris*, Mcq., to our list. Hon. N. C. Rothschild has described two new species, and added two other species, to our list of *Pulicidae*. Mr. T. H. Taylor has given a note upon the larval habits of *Chironomus* (*Orthocladius*) *sordidellus*, Ztt. (*Trans. Ent. Soc. London*), and Dr. T. A. Chapman a note upon *Asphondylia ulicis*, Trail (*Entomologist*).

On the continent, Th. Becker has published a revision of the species of the genus *Mulio*, Ltr. (*Zeitschr. Hym. Dipt.*), and an elucidation of the types of v. Roser's *Muscidae acalypterae* (*Jahr. Württ. Ver.*); he has also concluded his work on the diptera of Egypt, the complete work consisting of 196 pages and five plates, forming a valuable addition to our knowledge of the Egyptian fauna of diptera. Several new fleas (*Pulicidae*), have been described by Hon. N. C. Rothschild from Egypt (*Ent. Mo. Mag.*) and from other parts of the world (*Novit. Zool.*); other writers upon the Aphaniptera include the names of Wagner (*Hor. Soc. Ent. Ross.*) and Wahlgren (*Arch. Zool.*). P. Stein has given a monograph of the genus *Hydrotaea* (*Verh. Ges. Wien.*), and a paper on *Arieia marmorata*, Ztt., and its allies (*Wien. Ent. Zeit.*). P. L. Czerny has published a revision of the *Heteroneuridae* and of the species of *Geomyza* (*Wien. Ent. Zeit.*), and F. Hendel has given various systematic notes on the *Muscidae acalypterae* in the same publication. M. Bezzi has described a new species of *Asarcina*, inhabiting Italy, giving a synopsis of the genus (*Bull. Soc. Ent. Ital.*), a note on *Callimyia auriantiaca* and *wankowiczki* (*Wien. Ent. Zeit.*), and an article upon diptera inhabiting caves (*Rir. Ital. Speleol.*). Villeneuve (*Bull. Soc. Ent. France*) has published various notes on diptera, including an elucidation of Meigen's types of the *Bombylidae*, and a contribution towards a catalogue of the diptera of France and Belgium (*Feuille de Jeun. Natural.*). Kertész, in collaboration with other dipterologists, has started to publish a *Catalogue of the Palaearctic Diptera* (Budapest).

March 1st, 1904.

Karl Börner has described a new genus of *Sciarinae*, the species of which are wingless in the female (*Zool. Anz.*). The study of galls and gall-makers is still continued in the Italian periodical *Marcellia*.

With regard to the fauna of North America, Kellogg has published a *Monograph of the Blepharoceridae* (*Proc. Cal. Ac. Soc.*), and Melander a *Monograph of the Empididae* (*Trans. Ent. Soc. Phil.*, 1902) of which latter family Coquillett has published an account of the genera (*Proc. Ent. Soc. Wash.*), in which he revives several old names, and he has also written various small articles in other different American magazines. Hine has written on the *Tabanidae* of Ohio, giving a list of the North American species (*Spec. Pap. Acad. Sc.*). Adams has described a number of new species (*Kans. Univ. Bull.*), and Johannsen has published a paper on "Aquatic Nematocerous Diptera" (*N. Y. State Bull.*). Various American authors have written upon *Culicidae*, which still continue to attract a great deal of attention; Theobald having published a third volume of his Monograph, and descriptions of a number of new species in different magazines, while Nuttall and Shipley have concluded their exhaustive studies on the "Structure and Anatomy of *Anopheles*" (*Journ. of Hygiene*).

F. W. Hutton has continued to add new species to the fauna of New Zealand (*Trans. N. Zeal. Inst.*, 1902). Grimshaw has produced a supplement to "Fauna Hawaiiensis," and a second supplement on the *Diptera pupipara* is the work of Speiser. Austen has published a *Monograph of the Tsetse flies* (*Glossina*)" (London, 319 pp., and numerous plates and figs.), and notes on the *Hippoboscidae* of the British Museum (*Ann. Mag. Nat. Hist.*). Other writers on exotic entomology include Bishof (*Berl. Ent. Zeit.* and *Wien. Ent. Zeit.*), and Kertész (*Termes Füzetek, etc.*).

Morphological and histological papers are very few in number, but special mention may be made of Iv. Trägardh's *Anatomie und Entwickelungsgeschichte der Larve von Ephydra riparia*, Fln. (*K. Vet. Ak. Stockholm*).

Notes on the habits, distribution and variation of Phragmatobia fuliginosa.

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

I am afraid my knowledge of this species hardly warrants a paper; my only excuse for bringing this before you is that, from some eggs I was fortunate enough to obtain in April last, Mr. Bacot has reared a considerable number of imagines, made somewhat extensive notes on the larvæ and pupæ, and I thought that his paper on these stages might very well be supplemented by a note or two on the distribution and variation of the species and on its imaginal habits, so far as I have observed them.

I first remember seeing *Phragmatobia fuliginosa* in the imaginal stage in June, 1874, when Mr. Ovenden and I captured a few males, flying in the morning sun, on some rough ground between Cuxton and Malling. A few were seen on the same ground in the following years, but the specimens we captured in those days appear largely to have disappeared into the limbo of the past; the one or two I have, show

* Paper read before the City of London Entomological Society, November 16th, 1903.

that they are of the well-scaled, brightly-coloured, central European type. Then, in the early "eighties," the Galashiels collectors sent me large supplies of larvæ, concerning which, I am ashamed to say, my only anxiety was to rear a "good series," and, having nursed the larvæ with care and taken every precaution with the pupæ, I murdered the imagines as they appeared with a light heart, set them carefully, stuck them into the cabinet without having made a single observation relating to them, duly filled my series, and thought with satisfaction what a clever scientific fellow I was. These, judging by individuals still in my possession, were almost uniformly of the small northern form. In the early "nineties"—August 1891 and 1892—I caught a fai number at light in Wicken Fen, mostly, but not entirely, ♂ s. These were of a more brightly-coloured form, similar to those taken usually in the Midlands, and which appears to be pretty generally distributed through northern Germany, the Baltic States, southern Scandinavia and South Finland, and, although showing some approach to the northern, is on the whole closer to the central, European form. In April, 1898, with Mr. Stanley Edwards, I took a few ♂ s from the lamps on the sea-promenade at Cannes. These were of rather different facies from our most southern British forms, the forewings were somewhat less dark, not so distinctly ruddy, the hindwings tending to pinkish rather than crimson, and dark markings on the hindwings more restricted, *i.e.*, of the type I have more recently learned to look upon as the south of France form. In the middle of August, 1901, again, I saw the males in hundreds under the electric lamps in the squares of Turin, mostly dead, though many living ones were clinging to the uprights carrying the lamps; these were distinctly paler, the hindwings more miniaceous, and extreme developments of the south European form. Lastly, in early April, 1903, whilst Dr. Chapman and I lingered by the banks of the streamlet that runs through the village of Pegomas, one day about noon, I snapped up a ♂ that hovered for a moment over the grass at my feet, missed another, whilst before I could box the first one, the doctor picked up a ♀ with which a third arrival had paired before we could prevent him, quickly as we tried. This ♂ and ♀ were, of course, the Cannes or south of France type, and were the parents of the specimens which Mr. Bacot has reared, and of which he will have something to tell you. Near the same place, at Auribeau, Dr. Chapman took a large ♀ as early as March 16th in 1899.

The ♀ was kept in a large glass-topped box, in which she laid considerably over 500 eggs. These were duly described under a hand-lens, and then forwarded to Mr. Bacot from the south of France, in order that he might work out the life-history in detail, for, even of the commonest species, although we have superficial descriptions of the fullgrown larvæ, we have rarely any comparative descriptions of the different larval stadia, and scarcely any detailed descriptions of the pupa.

A word as to the distribution of the species. It has a tremendous range; it encircles the world north of the subtropical zone; it stretches from the west coast of Ireland across Europe and Asia to Japan, extends again across North America from the Pacific to the Atlantic, and inhabits practically the whole of the Palæarctic and Nearctic areas. It reaches so far north that it touches the Arctic Circle, and appears to extend south until the warm temperate zone merges into

the subtropical. It does not fuss about its habitat—wind-swept moors, sun-baked chalkhills, steaming southern ditchsides, and northern snow-covered wastes appear to be equally suitable. With such a range of distribution and such a variety in its habitats, it may be supposed that the species would prove exceedingly variable, and so it is, but rather in the direction of forming local races than in developing polymorphic aberrations.

Another factor that comes into play here, is the remarkable way in which the habits of the species have accommodated themselves to its varying environments. In the north it is single-brooded, hybernating as a larva, possibly in its most northern habitats taking sometimes two years to pass the larval stage; in Scotland and northern England, in Scandinavia, and Russia at fairly high altitudes and latitudes, it is permanently single-brooded, with a very occasional rapidly-feeding larva producing an autumnal imago. In central Europe, including Ireland and midland and southern England, the species is largely double-brooded, but with "laggards" in every brood maintaining the single-brooded habit, and "forwards" attaining, or attempting to attain, a triple-brooded state. In southern Europe the triple-brooded condition appears to become normal, whilst in the most favoured parts of the Mediterranean area the species is continuously-brooded. The progeny of the Pegomas ♀, captured last April, has shown very markedly the southern habit, and has attempted to carry it into practice here, for, whilst Bacot bred a fine lot of imagines in late June and early July, from the eggs laid in April a certain number of the same brood insisted on not coming out until August to September (the double-brooded habit), whilst at this time, the imagines fromthe June to July laid eggs, had already commenced to appear as a third brood, large numbers emerging thus in September-October, whilst Ovenden, to whom a batch of July eggs was sent also reared at this time a large brood; from September eggs both these lepidopterists have larvæ feeding, some of which will possibly attempt to emerge as a fourth brood, whilst the rest will most likely pass a normal hybernation as larvæ, for such hybernation as there is, be the locality ever so extreme north or south, appears to be always passed in the larval stage.

You may ask whether this continuous-broodedness is usual in nature, and I am constrained to answer that by looking up the records of various collectors in southern localities, published in the various magazines, you are as well able to judge as I. The fact is, in spite of our calling ourselves naturalists, we know very little of nature. A stray fact or two, however, picked up from Mathew's observations (*Ent.*, xxxi., p. 83), give some sort of clue to the answer. He observes that, on December 31st, 1896, he took a full-grown larva of this species in Malta that produced a large dark ♀ on January 30th, 1897, that on March 8th, he took a ♀ sitting on a stone, on March 13th, another ♀ flying in the hot sun (the only note I have ever seen of day-flying habits observed in this sex). Evidently the knowledge of these early appearances in the Mediterranean district led Mathew to surmise (*op. cit.*, p. 114) that imagines captured by him on the Boschetto, near Trieste, between September 3rd-15th, were of a third brood. It may be observed that, although I have assumed a double-brooded habit in the south of England, a triple-brooded habit may be

not unusual along the south Devonshire coast, for Winn records (*Ent.*, xiii., p. 117) a fine pair captured at Torquay on April 13th, 1880, a date almost as early as that on which we obtained, at Pegomas, the parents of the specimens exhibited to-night, and which have shown themselves to possess all the continuous-brooded possibilities that one would naturally associate with the most suitable environmental conditions of food, season, climate and habitat to be found in southern Europe or northern Africa. As another instance of an early date, Blathwayt records that he took the imagines on April 10th, 1893, at Hereford. The larvæ are practically fullfed when they hybernate, and so are ready to pupate early if the spring months be warm and fine, and produce early imagines. The experiments detailed by Moss (*Ent. Rec.*, iv., pp. 113-114) hint strongly in the same direction. I may add that Lugger details (*Insect Life*, 1890, p. 237) how larvæ, frozen in the autumn and winter in Minnesota, U.S.A., pupate in March, imagines appearing in nature in early April, whilst wintering larvæ, brought into a warm room, will emerge in the first days of February.

One of the most remarkable facts concerning the naming of local races is the free-and-easy assumption, by many of those who are accustomed to the usual forms obtainable in central Europe, that these must be the typical race, and northern and southern forms varieties thereof. As a matter of fact, one would naturally suppose that, in the case of the Linnean species, especially those mentioned in the *Fauna Suecicae*, the original descriptions were made from northern examples, and that the northern race would, in these instances, represent the typical form, so far as the first-named type is concerned. Even Staudinger appears rarely to have referred to a Linnean description, and seems always to have acted on the assumption here enunciated, whilst to most of those who are describing varieties and aberrations at the present time on the continent, entomological literature appears almost entirely unknown. As an illustration of the point here complained of, Staudinger assumes (*Cat.*, 2nd ed., p. 59), without description, that the central European form is the type form of *P. fuliginosa*, and then describes the north European form from Scotland and north Scandinavia as var. *borealis*, and the south European form as var. *fervida*. The description of the former reads:—"Minor, obscurior, alis posticis nigris, exc. marginibus interioribus." If, now, we compare this description with the original description of Linné, we shall see that they are identical. Linné's description* (*Fauna Suecicae*, 2nd ed., p. 308) reads as follows:—

Phalaena Noctua fuliginosa spirilinguis lævis, alis deflexis rufo-fuliginosis; punctis duobus nigris, abdomine sanguineo. Uddm., *Diss.*, 76. Raj, *Ins.*, 228, n. 13. Roes., Ins., i., phal. 2, t. 43. Habitat in *Gramine*, *Rumice*. Descr.—Magnitudo Tabani. Alæ superiores rufo-fuscescentes; punctis duobus nigris in medio versus marginem crassiorem. Inferiores similes sed magis fuscescentes, lunula nigra, margineque postico sanguineo. Thorax brunneus. Abdomen sanguineum triplici ordine punctorum nigrorum.

There can be no doubt that this description refers to the northern form; none but this can be said to have "the hindwings similar to, but darker than, the forewings, black lunule, blood-red outer margin."

* I have taken this description in preference to that in the *Systema Naturae*, 10th ed., p. 509, as being that of the form that Linné would know in nature.

Zetterstedt would appear to have got both this and our var. *intermedia* in Lapland, for he writes (*Insecta Lapponica*, p. 930): "Specimina plerumque plus minus detrita et fusco rufescentia leguntur. Illæsa aut tota subrubra, aut thorace alisque anticis rufo-fuliginosa . . . . Alæ posticæ rubræ disco plus minus late fusco, puncto centrali obscuriori." His description of the Lapland form best known to him suggests our *intermedia-marginata*, for he describes it as:—

Alis anticis rufo-fuliginosis puncto in medio gemino fusco; posticis rubris puncto centrali fasciaque intramarginali fuscis. Long. al. exp. $1\frac{1}{4}$-$1\frac{3}{8}$ poll.

Strand, who has recently been paying atttention to the Scandinavian forms of certain lepidoptera, states (*Berichte des naturwiss. Ver. in Regens.*, vii.) that the var. *borealis* has been taken at Trömso, and that in most parts of Arctic Norway all the specimens are of the *borealis* form, with only the broader or narrower outer margin rose-red. Strand appears not to consult the original description of a species when dealing with varietal forms, and apparently accepts Staudinger's views without question. Lampa, too, does not refer to the Linnean descriptions, but says (*Ent. Tids.*, vi., p. 36): "The typical form with the hindwings mostly red seems to occur only in the southern parts of the Scandinavian region, *viz.*, in Denmark and possibly in southern Sweden and Norway, *e.g.*, Christiania. The var. *borealis*, with more thinly-scaled wings, the hindwings chiefly black, occurs throughout Sweden, Norway and Finland." It is remarkable that not one of these Scandinavian lepidopterists had ever referred to Linné's original description as to what really was the original type. The specimen in the Linnean collection is unset, but appears to be of the northern form and to accord with his description. The variation of the northern race (=Linné's type=var. *borealis*, Staudinger) is well-known to all of us, thanks to the generosity of our Scotch collectors who obtain the larvæ and breed the imagines in great numbers. The marked characters of this race, as we know it in Britain, may be noted as:—

(1) The similarity of the sexes. (2) The resemblance of the fore- and hind-wings in their uniform tint and marking. (3) The uniform dark coloration of the more or less semitransparent forewing with its twin-spots. (4) The uniformly coloured, more or less semitransparent, fuscous-black hindwings, with similar twin-spots to those of the forewings (occasionally joined by the darkened discoidal nervure so as to form a discoidal lunule), and with only a slender red line on inner margin from base to anal angle. (5) The fringes of the forewings of almost the same tint as the ground colour of these wings. (6) The red fringes of the hind-wings narrow and cut off sharply from the ground-colour of the wing by a strongly marked black outer-marginal line. (7) The narrowness of the wings compared with their length. (8) The much smaller average size of the specimens. Localities:—Inveran (1891), Pitcaple (1880-1890), Aberdeen (1880-1890), Perth (vi., 1888), Dundee (1883), Glasgow (1883), Galashiels (1880-1881), Morpeth (1892), Carlisle (v., 1892), St. Anne's-on-Sea (1892)=*fuliginosa*, Linn.

The variation within the limits of the race is not inconsiderable. Anderson records (*Ent.*, xiv., p. 136), that, on May 12th, 1881, he bred a specimen that had the cilia of the hindwings an intense black instead of the usual rosy-red=ab. *nigrociliata*, n. ab. We have an example from Galashiels in which the fringes are dark and inconspicuous, but not black as here described. Then, in some examples, instead of the forewings being of the smoky-red of the type, they are a bright deep red, approaching that of the more southern British forms=ab. *typica-rufa*, n. ab. The only other variable characters in this northern typical race, to which we need call attention, are (1) The very rare development in the hindwings of the ♀s (much rarer in the ♂s), of

an extension of the red line running along the inner margin (Galashiels, ♂ - ♀, Pitcaple, ♀, Carlisle, ♂). (2) The darkening of the outer margin compared with the centre of the hindwing (suggesting the origin of the marginal band in ab. *marginata*).

I am somewhat in doubt as to the real geographical line of separation in Britain between the northern form (*fuliginosa*, L. = *borealis*, Stdgr.) and our intermediate British form (=var. *intermedia*). Beadle states (*Ent. Rec.*, xiv., p. 205) that, in the Keswick district of Cumberland, where the species occurs both on the mountains and in the valleys, all are var. *borealis* or intermediates, none are quite so large or brown as the type.* Robson also says (*Nat. Hist. Trans. North. and Durham*, xii., pt. 1, p. 26) that the form found at Hartlepool approaches the var. *borealis*, the hindwings being much suffused with black, whilst at Seaton Snook, a small range of sandhills near the mouth of the Tees, surrounded by the sea at highwater, a dwarf form of this species is found with still less red on the hindwings. Hewett says (*Entom.*, xxv., p. 251) that the larvæ found around York produce only var. *borealis*. We suspect, from these records and our own knowledge, that St. Anne's-on-Sea, Carlisle and Morpeth, produce quite typical examples of the northern race = *fuliginosa*, Linn., whilst Lincoln and Warrington produce var. *intermedia*, that the separation line runs from near Fleetwood to the Peak, in the west, and from the Peak to Flamborough Hd., on the east, *i.e.*, that the type is to be found over the whole of the Pennine-Cumbrian mountain districts, with a strong tendency to var. *intermedia* in the most suitable spots along its southern boundaries.

The spread of the red colour from the inner margin towards the centre of the hindwings, noted (*supra*) as one of the aberrational characters of the northern race, points out the character that leads us to the consideration of the second of our British races. This may be said to show (compared with the northern race) the following characteristics :—

(1) A similarity of the sexes. (2) A greater difference between the fore- and hindwings in their tint and markings. (3) A distinct reddening of the forewings, with denser scaling, and well-separated twin-spots. (4) The hindwings less uniformly coloured, the twin-spots as in the forewings, the red inner marginal patch extending from the inner margin of the wing along the base of the discoidal cell, and the nervure that runs thereupon to the middle of the outer margin; and cutting back at the black inner marginal band to the anal angle, thus forming a roughly triangular red basal patch. (5) The fringes of the forewings usually markedly redder than the ground-colour of the forewings. (6) The red fringes of the hindwings usually sharply cut off from the dark hind marginal area. (7) The wings wider (squarer-looking) compared with their length. (8) The distinctly larger average size. Localities :—Lincoln, Wicken (vii-viii. 1891-1892), Warrington (1892), Swansea (1893), Reading (v. 1893), Newbury (viii. 1891) = var. *intermedia*, n. var.

This form is very characteristic of the midland counties of England, and occurs throughout Ireland; it is also so very generally distributed among the *approximata* form in the southern counties, as to lead one to look upon the latter, at least in Britain, rather as an aberration of the *intermedia* race than the dominant form in these counties, a conclusion probably erroneous, whilst I have already mentioned that *intermedia* occurs as a rare aberration among the typical northern

* I do not pretend to know what Beadle means by "the type," or what "type" description he is here referring to. It certainly cannot be the Linnean type.

race. The most marked variable characters in var. *intermedia* are (1) The tendency of the red coloration to spread over the costal and central areas of the hindwings (often only tinged with red, often quite red), leaving a distinct black hind marginal band. (2) The tendency for the red colour of the fringes to be carried forward upon the extreme hind margin of the wing, encroaching on the black externally, but not sufficiently to break up the continuity of the outer black band. This form, with a black outer marginal band on the otherwise red hindwings. appears to occur only as a rare aberration in the midlands, but to become a dominant form in the southern counties and to occur in Ireland. We have examples from Attadiawan, ♀ (1891), Isle of Man, ♀ (1892), Wicken, ♂, ♀ (viii. 1891-1892), Newbury, ♀ (viii. 1891), Warrington, ♀, one only (1892), Reading, ♀ (v. 1893).. Cuxton, ♂, ♀ (vi. 1874). Our present impression is that it is largely a ♀ aberration in Britain. We call it ab. *marginata*, n. ab.

It may be worth noting, here, that an occasional rare aberration of the *intermedia* race occurs in our Islands, in which the red of the hindwings is changed to yellow. Pitman records (*Ent. Rec.*, x., p. 48) that he bred two examples from eggs laid by a ♀ taken wild near Wisbech, in which the hindwings are "yellowish-buff" where they ought to be pink; Dillon records (*Ent.* xxvii., p. 90), one at Clonbrock; Pickard bred one at Wolsingham (*Nat. Hist. Trans. North. and Durham*, xii., pt. 1, p. 68). This form we call ab. *intermedia-flavida*, n. ab. The yellow aberration of the southern France form was named ab. *flavida*, by Oberthür, *Bull. Soc Ent. Fr.*, 1901, p. 274, from specimens obtained at light at Lourdes, on the evening of July 15th, 1901.

In the most favourable habitats of the species in our southern counties, the tendency for the hind-marginal band of ab. *marginata* to become broken into distinct spots is more marked. The features of this race compared with those of *intermedia* may be noted as:—

(1) A more marked sexual difference, the ♂s broader and squarer-winged than the ♀s. (2) An entire difference between the fore- and hindwings in their tint and markings. (3) Ruddy forewings, densely scaled. (4) The hindwing rose-red (the colour of the fringes), the black twin-spots large and well-developed, the red on the extreme hindmargin developed so as to narrow and break up the black hind-marginal band into a row of isolated marginal spots, the nervure forming the lower edge of the discoidal cell and its branches black. (5) The fringes of the forewings as in *intermedia*. (6) The red fringes of the hindwings uniform in tint with the ground colour of the wing. (7) The shape of the wings as in *intermedia*. (8) The size about the same as that of *intermedia* = var. *approximata*, n. var.

Except for the fact that this race maintains the peculiar ruddy forewing tint of our British, as compared with the south of France, examples, that the latter are on the whole larger and exhibit a sexual dimorphism of a most marked type (as may be observed in the large number of bred specimens exhibited), I should be loth to distinguish them by a separate name, although, in the mass, the difference between the south of England and the south of France races, is clearly manifest. The main features of the French race exhibited, compared with our south of England examples, are:—

♂ The forewings, though not of a lighter, are of a browner tint, the red fringes standing out in more marked contrast, with the duller ground colour of the wings in a manner rarely seen in British examples. The red colour of the hindwings a clearer pink, less tinged with black around the twin-spots (occasionally with a tendency to a salmon-coloured tint), the marginal spots usually fairly large and well-marked. ♀. Larger, the forewings very much darker, more densely scaled than the ♂. The hindwings and abdomen of a bright crimson-pink; the marginal spotting intensely black = var. *meridionalis*, n. var.

In no wise does this race, as a whole, satisfy Staudinger's description of *fervida*, as being "larger, paler, with the hindwings miniaceous with few spots;" on the contrary, the form is darker, the hindwings of the brightest rose-red, the spots well-developed and fairly numerous, and only as an occasional ♂ aberration does one observe the tendency to the vermilion-tinted hindwings. The brood which we have here described is that reared by Bacot in July, 1903, the parents of which were captured at Pegomas in April, 1903. A second brood, parents belonging to these July imagines, from ova laid in early July, was reared by Bacot in September and October. These larvæ were kept indoors until the second week of August, they were then placed out-of-doors until the second week in September. These produced some 70 imagines (exhibited) in September and October, and the influence of the month spent out-of-doors in our climate is apparent; the moths are much smaller, the sexes are very similar in size and tint, the scaling (of both sexes) much less dense (reminding one somewhat of the typical northern race), the spots on the hindwings (especially of the ♀ s) with a tendency to join together, the whole facies of the brood such that one might almost refer it bodily to our south British var. *approximata*. In the later-emerging examples of Bacot's first brood (August-October) there is also a tendency for the spots to unite into *marginata* form.

I have said that Staudinger described (*Cat.*, 2nd ed., p. 59) a south European form under the name of *fervida*. His description reads:—

Major, dilutior, alis anterioribus rufescentibus, alis posterioribus miniaceis, maculis paucis nigris.

The only specimens that I have ever taken of this form were those that I have already referred to as being captured in numbers in August, 1901, at the electric lamps in the city of Turin. These have the forewings distinctly paler (more orange in the ground colour), the hindwings markedly miniaceous (*i.e.*, weak vermilion or salmon-colour tint), with the hind marginal spots much reduced in number and size, and I have little doubt that Staudinger described *fervida* from similar specimens. Ovenden, who also reared a brood of imagines in September-October, from ova supplied by Bacot in July, and which are, therefore, cousins to Bacot's September-October brood, has sent 50 of the resultant imagines for exhibition, and these show markedly a general leaning to the *fervida* form; for, although like Bacot's September-October brood, smaller than the July brood, they appear on the whole to be slightly larger than their cousins, rather better scaled, have paler-coloured forewings, more miniaceous hindwings, smaller hind-marginal spots, and exhibit no tendency to assume the *marginata* or banded form. But it must be observed that, whilst Bacot's larvæ braved our out-of-doors climate for a month, the other brood was carefully nurtured in a greenhouse where the temperature was always pretty high, and this possibly is the cause of the difference between the two broods. I have two specimens of the Italian type sent me as natives of the Isle of Man. Mr. Raynor exhibited, at the last meeting, six fine examples from the "Briggs" collection, that came from Cooke, the dealer in Museum Street. I have no evidence to prove these specimens were not taken in the Isle of Man or Museum Street, but I suspect they had parents that lived south of the Alps of Central Europe.

Millière gives (*Annales des Sc. Nat. Soc. Cannes*, 1880, pp. 4-6), some details as to the variation of this species, and describes three forms, *placida*, Friv., *ferrida*, Staud., and *subnigra*, Mill. He avers that *placida*, Friv., from Turkey and Asia Minor, is, in spite of Staudinger's assertion to the contrary, simply a variety of *P. fuliginosa*, characterised by its larger size and by the presence of a small red point above the black cellular spot in the upper wings, and avers that he took a specimen at light on August 21st, 1880, at St. Martin Lantosque. He does not say whether his figure of *placida* (pl. viii., fig. 5) is or is not this French example, which looks to us a not very extraordinary specimen of *P. fuliginosa*. Of the var. *ferrida* he gives a characteristic figure (pl. viii., fig. 6), and states that it is not rare on the Mediterranean littoral, and in the mountains of the Alpes-Maritimes to about 1000 mètres elevation. In describing his *subnigra* he speaks of "the type," by which, no doubt, he means our var. *meridionalis*, of which *subnigra* is evidently a slight aberration, with somewhat pointed wings. He describes it as having its forewings very pointed at the apex, of a dark maroon-brown, and with the black band on the hindwings extremely narrow. The specimen he figures he took at light at Cannes: he adds that *subnigra* does not appear to occur at St. Martin Lantosque, but that it seems to be particularly abundant at Ariège and at Amélie-les-Bains, whence, in 1864, he reared it from the larval stage. In the latest edition of Staudinger's *Catalog* (3rd ed.), the author gives Transcaspia and southern Europe as the range of var. *ferrida*. He also gives Transcaspia as within the range of the central Asiatic form, which was described (*Mém. sur Lép.*, v., 84; vi., 14) by Alphéraky, under the name of var. *pulverulenta*. His description reads as follows:—

Alis anticis opacis, hirsute squamatis, grisescentibus, posticis pallidioribus, thorace abdomineque grisescentibus pallidioribus.

Alphéraky adds that this form was originally described from Lob-Noor and northeast Thibet, but was afterwards found to be widely distributed as an Asiatic form of *P. fuliginosa*. He notes that it is greyer and more opaque than the type,* the scales being placed more vertically; the forewings vary from yellow-grey to brown-grey; the hindwings are less rosy, paler and more transparent, the ♂s seem nearer to the *ferrida* form than the ♀s. Staudinger notes (*Cat.*, 3rd ed., p. 365) it as: "Pallidior alis anterioribus subdiaphanis, thorace abdomineque grisescentibus. Tura, Thian, Gobi."

Leech (*Trans. Ent. Soc. London*, 1899, p. 162) records *fuliginosa* from Amurland and Japan, but, with the exception of stating that "two examples of the form *borealis*, Staud., were in Pryer's collection," he gives us no information about the Japanese examples. Leech further sinks Alphéraky's var. *pulverulenta* into the type form, *fuliginosa*, a remarkable procedure, but not more so than many other strange things he does in this direction, and one would like to see Pryer's specimens that he refers to *borealis* before accepting them as such. The wide range of latitude over which Japan extends leads one to surmise that a wide range of variation in the specimens taken there would occur.

Of the American form I know nothing. According to Lugger

* One suspects that Alphéraky means the ordinary central European form.

(*Insect Life*, 1890, pp. 236-237, fig. 47), the form of the species occurring in Minnesota, in North America, has the forewings rusty-black, the hindwings of a similar colour but much lighter, and with a brick-red, ill-defined space at the posterior margin; the fringes of both fore- and hindwings pale red. Judged by the descriptions the eastern (Asiatic and American) races are less ruddy than the western. Lugger's figure appears to have the markings distributed as in our *intermedia* form. Doubtless, in America, there is as much tendency to form local races as in Europe.

A new Phalacropterygid species and genus from Spain—Pyropsyche moncaunella (*with plate*).

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

(*Concluded from Vol.* XV., p. 330.)

The Plate (in illustration of this species, vol. xv, pp. 324-330) having been delayed in production, the following explanation now appears with it.

EXPLANATION OF PLATE.

FIG. 1.—Imago ♂, *Pyropsyche moncaunella*, rather over twice natural size, the large specimen figured is 22·5mm. in expanse.

FIG. 2.—Neuration of forewing of *P. moncaunella* from camera drawing.

FIG. 3.—Neuration of hindwing of *P. moncaunella* from camera drawing.

FIGS. 4 and 5.—Neuration of forewings of *P. moncaunella* from camera drawings, from two specimens in which a missing vein is partially represented; Fig. 4 would indicate that the missing vein is vein 5.

FIG. 6.—A similar example from hindwing, the re-appearing vein is probably vein 3.

FIG. 7.—Forewing of *Phalacropteryx muscella* for comparison, there is practically no portion of 1*b* between its union with 1*a* and its bifurcation, this is, however, represented in some specimens (1*a* arising from 1*b*, as shown in figure, is a slip in copying).

FIG. 8.—Hindwing of a variation of neuration in *P. muscella*. 1*b* is usually simple: in this specimen it branches not only as in *P. moncaunella*, but a second time. On the other side of the same specimen it branches much as in *moncaunella*. These variations found in a few specimens illustrate the plasticity of the neuration in Psychids. [The wing form in *P. angustella* (which is hardly congeneric with—*atra*, Heyl.=*plumifera*, Ochs.) is nearest to *P. moncaunella* of any Oreopsychid, but the neuration is less close than that of *P. muscella*. It would possibly result from the plasticity referred to that a sufficiency of specimens would bridge over the differences.]

FIG. 9.—Newly-hatched larva ×13 diam.

FIG. 10.—Fullgrown larva ♂ ×rather more than 2.

FIG. 11.—Case of ♂ ×about $\frac{5}{2}$.

FIG. 12.—Case of ♂ ×$\frac{5}{2}$, pupa-case protruding.

FIGS. 13 and 14.—Two cases ♀ × about $\frac{5}{6}$.

FIG. 15.—Male pupa × 3. The dorsal ridges are perhaps a little exaggerated.

FIG. 16.—Male pupa, abdominal segments 6, 7, 8, 9, and 10, more magnified to show the mounting of dorsal armature on ridges. The reversed hooks of the intersegmental membrane are hardly large enough to show even with this magnification. The ridges end in a point instead of fading out, as shown.

FIG. 17.—Female pupa × 3.

FIG. 18.—Skin cast by ♀ larva on changing to pupa (from camera sketch). The specimen is unusually perfect and satisfactory, for one obtained in this way. The head is crushed, and the ventral aspects of 8th, 9th, and 10th abdominal segments are obscure, and there is a fold (on each side unfortunately) which makes the lower lateral plate of the 2nd thoracic doubtful; for the rest, the sketch gives all the tubercles of the larva, but to make them at all visible, the very minute secondary ones at anterior borders of segments and against spiracles are a little exaggerated.

Abnormal larva of Papilio alexanor.

By H. POWELL.

On July 12th last I found *Papilio alexanor* fairly abundant in the upper valley of the Var river, particularly near Dalius, Alpes-Maritimes, where it flew rather wildly over the steep stony slopes of the right bank. *P. alexanor* is hard to take under the most favourable conditions, but, in this district, an occasional stroke of the net as a specimen crossed the road was the only chance one got. I had not much time to spare and only managed to net three, all more or less the worse for wear.

It was not until August 19th that I had an opportunity to return to Dalius, so I was not surprised to find that many larvæ had already left the plants of *Seseli montanum*. In a couple of hours, however, I took thirteen larvæ in various stages on this plant. They appear to feed upon it exclusively, at any rate, in the Alpes-Maritimes. Four of the younger larvæ disappeared mysteriously from the breeding-cage within a few days. As they could not have escaped from the cage I suppose their elders ate them. The rest pupated normally before the end of August, with one exception. I had noticed one very fine specimen, and was expecting it to produce a large pupa, but, to my surprise, something very different happened.

On August 22nd this larva was resting on a stem after the fashion of those about to moult, but, as it was in the 5th stage, and quite fullfed, I supposed it would soon commence preparations for pupating. The next morning it was still in the same position, and I was astonished to see that it had developed a "stiff neck," its head being pushed forward and downward by a new head forming under the skin. More than this, it had not shrunk, neither had it spun a thread round the body, as would have been the case if a pupa had been forming.

I watched this larva very closely, and on the morning of August

24th I saw it change its skin for the 5th time, and appear in a 6th stage. It had no difficulty in freeing itself from the old skin, and, as far as I could see, it was perfectly formed. At first all the markings were pale, but as the larva dried, the black markings deepened, and the pale yellow marks turned orange, so that at length the colours and pattern were almost identical with those of the 5th stage, and very clear. The white ground occupied a greater area than before, however, the black markings being smaller. The skin did not look loose, as in the case of a larva which has just passed a normal moult. The head was very large, nearly double the size of that of a 5th stage larva. Markings the same, on a larger scale. True legs and prolegs also very large. For two days this monstrosity did not eat, but occasionally wandered clumsily about, more often resting quietly. It soon appeared that its mouth was not properly formed. I noticed that it frequently moved its jaws, but they did not close completely, and when, at length, it commenced to feed, it was easy to see that something was wrong. It had difficulty in keeping the food to its mouth, and in biting. In spite of this, however, it fed frequently, though not continuously as larvæ of *P. alexanor* do in the last stage. The meals were short and evidently painful to the caterpillar, for it seemed to get exasperated with its efforts after a while. Under these conditions, growth was very slow, although, by September 2nd, it was considerably more bulky than any *P. alexanor* larva I had ever seen. At this time, too, its movements were much less clumsy than at first. I had some hopes that it would complete this extra stage, and was looking forward to further interesting developments at the end of it, but after September 2nd the larva began to show signs of disease, often, when at rest, allowing the fore-part of the body to hang downwards at right angles, a kink existing between the 5th and 6th segments. It died about September 8th, evidently from malformation of the alimentary organs, and consequent starvation. I prepared it, but not with great success. I also kept the 5th skin. This case is quite unique in my experience. I have known larvæ to pupate one stage before their normal time, but have never known a larva go one step further than its natural limit until now. [See *Ent. Mo. Mag.*, 1896, p. 54. Ed.

A description of the larva and pupa of Daphnis nerii (*with plate*).

By J. C. DOLLMAN, F.E.S.

(*Concluded from* p. 41.)

On the evening of the 20th of the month, successful pupation was found to have been accomplished, the larva having improvised a pupal cell from the foldings of the flannel which had been laid upon the surface of the earth in the flower-pot. The edges and the ends of the material forming the chamber had been slightly connected with a few threads of web, and, by gently opening one end the pupa was visible. It had, apparently, but recently assumed the condition, and was very delicate and fresh in appearance. The fore part of the pupa, the head and thorax, was of a bright, light, greenish-grey, while the posterior portion was of a light butter-coloured yellow tint. The whole of the surface was translucent and shiny in effect, and the pupa seemed to be extremely lively and active, taking alarm at the least occasion. The

whole of the dark markings, hereafter described, were quite as pronounceed at this date as they were afterwards, but were warmer and more red in colour. The pupa was a rather slenderly formed and graceful object, and was $2\frac{3}{8}$in. in length exactly. The form of the head, antennæ, legs, and wings was to be traced under their separate sheathings. The wingcases were long, and, at the point where they terminated, the segment was sharply incised; the segments from the head to this point being full and firm in character. The body, posterior to the termination of the wingcases, was smaller in circumference, and tapered gradually to the anal segment, where it rounded off suddenly to the anal point. On the 25th of the month the pupa had deepened in colour to a rich light sienna, freely freckled, though minutely, with a deeper shade of the colour. The head and thorax were large and bold in form, and after a slight depression in the outline at the 1st and 2nd abdominal segments, the pupa swelled gradually to the posterior edge of the 4th abdominal. Here it was emphatically scored all round by the segmental division and marked with a deep sienna band. The following two segmental boundaries were also similarly accentuated. These three segments were much more heavily depressed, as well as coloured, at their posterior divisions, than the remainder; though all were distinctly and sharply defined. The anal end was the richest in colour of any part of the pupa, gradually becoming deeper in the sienna colour as it neared the anal point, which was about $\frac{1}{16}$in. long; projecting backwards and slightly upwards, finishing in two minute points, diverging laterally. This anal point was of a deep brown in colour, and not smooth or shiny in surface. On the head, in the extreme front between the eyes, was a short, broad, intensely dark line, suffused at the edges. This commenced immediately on the forehead between the eyes and travelled upwards, to stop when vertically over their centre. It was set in an edging of unfreckled sienna colour. This dark line commenced again behind the head on the junction of the thorax with the skull. It is here dilated into two rather diamond-shaped swellings, then traversed the thoracic covering as a mediodorsal line, to stop again, abruptly, on the posterior end of the thorax, where it again expanded into a diamond-shaped blotch. These markings, in dark brown line, were most vividly and decidedly drawn upon the pupa, and were thick and firm in character. From this point the mediodorsal line extended, in a broken and interrupted manner, to the anal segment, but was only faintly indicated upon the centre of the segments. On the anal segment there was a small but very distinct dorsal spot. There was a subdorsal series of small darkish marks on the anterior edge of each segment, beginning at the 1st abdominal; these were gradually more removed from the dorsal centre as the segments widened, and, as they decreased in size again, approached it more nearly. There were also two dark subdorsal dots on the thorax, each side of mediodorsal line—one on each side of the prothoracic segment, and one on each side at about the junction of the meso- and metathoracic; below these last was a small elongated dark mark. The bases of the antennal sheaths were also defined with a dark, thin, transverse line. The spiracular mark on the prothoracic segment was visible in the dorsal view, as was also a suggestion of that upon the 2nd abdominal segment. As these were shown in large intensely dark brown blotches, they were sufficiently evident.

The lateral view of the pupa was distinguished by two main characteristics, the long wingcases and the series of large and very dark blotches which marked the position of the spiracles. The first of these blotches was on the prothoracic segment, just above and behind the eye (which possessed a fine semicircular dark marking), and resting on the sheath of the antenna. On the 1st abdominal the dark blotch was not visible, or only very faintly suggested, so faintly, that it could hardly be recorded with certainty, for here the wingcases enwrapped it rather deeply. On the 2nd abdominal the spiracular blotch was uninterruptedly in view. On the 3rd, the lower half of the blotch was concealed by the angle of the wingcase. That on the 4th abdominal was the largest of the series, and was roundish in shape, though jagged and suffused at the edges. The remainder were all rather smaller and more elongated in form, inclining to a posterior tail-like point in the marking. On the 8th abdominal, just below the spiracular blotch, was a small dark marking consisting of two finely drawn vertical marks, side by side, and, on the anal segment, was a small round dark dot on the spiracular line. The wingcases were extremely thin and transparent, and while possessing the longitudinal sheathings for the nervures, distinctly showed the segmental divisions, with their local colour, through their transparent texture. The ventral view of the pupa was remarkable for a most distinctive feature. This was a broad strongly drawn, intensely dark medioventral line extending from the base of the proboscis on the head, but separated from the short dark mark on the forehead, to the termination of the wing sheathings on abdominal segment 4. The line was as firmly and sharply drawn as if it had been made with a J pen running along a ruler. In the centre of this dark line was an extremely fine light thread-like line. The packing of the proboscis, legs, antennæ, and wings was wonderfully neat, and the form of all could be fairly well discerned by their coverings.

On the abdominal segments which bore the prolegs there was a large brownish red blotch where each proleg had existed, except upon the anal segment, where there were no such marks visible. On the 7th abdominal segment there were three small dots on its anterior edge, a central one, and one aligned with it on either side. The two vertical subspiracular marks on abdominal segment 8, were also visible in the ventral view of the pupa. A faint suggestion of a medioventral line ran from the thick dark line's termination on the posterior edge of abdominal segment 4, to the anal point, broken only, just short of that, by the anal aperture and generative organ. A careful examination was made of the ventral view of the pupa to determine, if possible, the position of the legs belonging to the embryo insect, together with that of the antennæ and the undeveloped wings. The forms of these details could be fairly well made out by slowly moving the pupa so that the light was reflected upon the various prominences, but it was not easy to come to a decision concerning the smaller points, as the packing of the insect was so delicately arranged that the pupacase did not define with much exactness the limit of the limbs. The serrated sheath of the antenna started squarely from above the eye-covering, and descended downwards and backwards to be inserted just past the junction of abdominal segments 1 and 2, between the 2nd leg and the costal line of the wingcase. Leg 1 shows

its upper visible segment close behind and below the glazed eye, and between here and the maxillæ, on the upper edge of the prothoracic segment; from this point the next segment (the tibia) descends obliquely backwards, its lowest point being situated near the thick dark medioventral line before alluded to, at the junction of the meso- and metathoracic segments; whilst the last segment of the leg (the tarsus) terminates upon the 2nd abdominal segment, lying close against the broad dark medioventral line. The upper visible segment (the femur) of leg 2 commences at about the centre of the mesothoracic segment, against the tibia of leg 1. The junction of this segment of leg 2 with the tibia is not definitely visible through the pupacase, but the tibia terminates on the anterior edge of abdominal segment 1. From thence the tarsus extends, packed closely against the broad medioventral line, to the centre of abdominal segment 3, where it terminates. The detail of leg 3 could not be made out, as it was packed beneath and behind the wing-costa; but, as the pupa advanced towards the emergence of the insect, its lowest joint could be faintly discerned through the wings on the posterior portion of abdominal segment 2, from whence its last member doubtless lay beneath the wing-costa, but its termination could only be guessed at.

The wing-casing extended to the extreme posterior edge of abdominal segment 4, where it was carried slightly round the full edge of the segment almost to its deeply depressed division from the next segment. From here it ascended upwards and forwards in a graceful curve to an angle on the lateral centre of abdominal segment 3, the point of the angle impinging upon, and covering, the lower portion of the spiracular blotch there. It then was carried forward in a hollow curve to the shoulder on the thoracic region. The ridges covering the wing-nervures were well-defined, and were firmly, though delicately, traced upon the surface, and the marginal edging to the wingsheath was sharply and neatly incised. The lines upon the head and thorax marking the structural divisions of the casing were defined in thin brown lines, slightly, but sharply, depressed at their edges. The habit of the pupa became much quieter after its first week of existence, and it would seldom move or show signs of life when the covering of flannel was lifted to inspect it. It very gradually deepened in colour to an appearance of distinct sienna colour, especially on the dorsal surface, and by October 30th seemed to have reached its final stage in this direction. The ventral surface and the wing-sheathing remained fairly light and clear in colour, the latter possessing very little of the freckled appearance which was noticeable on the other portions of its surface, and which had now turned dark, almost to blackness, on the anterior part of the dorsal area of the segments.

On November 5th the pupa had changed somewhat in appearance, and had lost its transparent and shiny look. The whole of its surface was opaque in effect, and, while being warmer and more ochre-coloured than putty, it suggested the dull, dead surface of it. The ventral portion of the thorax containing the legs was lighter and rather greyer in colour than the rest of the pupal skin, but showed no tendency towards the colour markings of the imago yet. The darkening of the pupa from this time onwards was very gradual, and the first portions to turn in colour were the head and eyes. These parts

gradually deepened to a blackish-brown, and, by the 15th of the month, the antennæ and legs had asserted themselves darkly through the skin. The entire pupa had become strongly marked with minute dark freckling, on the dorsal region these freckles had taken the form of transverse lines, doubtless on the basis of the larval skinfolds. The ventral area and wingcases also developed a quantity of dark freckling, but it was not until November 20th that the pattern of the wings began to be visible through their casings. These quickly intensified, and, on the 23rd, were fully pronounced, and the wing-cases were almost covered with the markings in a dark olive-black. The dorsal region had also darkened to a like degree of the same colour, and the transverse series of freckled lines were almost lost in the general deepening of the olive-black tint. The pupa had for some three weeks led a most quiet existence, and would not move when touched, in marked contrast with its alertness in the earlier stage.

On the 25th of the month the pattern of the wings through their casings was most distinctly defined, and the ocellated spot on the metathoracic segment sharply visible. This is the marking which is found on the shoulder of the forewing in the imago. The entire pupa was now very dark, but the pupacase had a semitransparent appearance as if made of tracing-paper. It was still very quiet in its habit. On the morning of the next day, the 26th, at eight o'clock, the imago had emerged, a perfect male insect, and was fully formed, hanging from the top of the case, drying off. The date of pupation having been October 20th, it will be seen that the insect remained in that stage for 37 days. It was kept in the flannel, on earth, in a cage-covered flower-pot, which stood in a large bowl of water. This arrangement was placed by the side of a day-and-night burning stove giving a temperature, where the pot stood, upon an average of 70°F. The water in which the pot was placed kept the earth and flannel damp, though not wet, and the cage (of gauze on wire-framing), placed over the pot, permitted free circulation of air.

As the larva of this insect is not frequently seen, it may be of interest to have some quoted information from the records of published books upon it, especially as the individual example which forms the subject of this paper was of an abnormal type. The two main points where variation occurs, apart from the general coloration of the larva, are the shape and colour of the ocellated spot on the metathoracic segment, and the construction and position of the caudal horn. In Roesel's *Insecten*, vol. iii., pl. xv, are three illustrations of the larva of *D. nerii*. They are beautifully drawn, and were evidently studied from nature with a faithful observation and able hand. The first figure is that of the normal or green type of larva of the species. The head is green, the thoracic segments yellow, the dorsal and lateral surfaces green, with a suggestion of yellow, laterally, on the anal segment. The lateral line is white, with white spots in transverse rows. The ocellated spot is shown in the form of a double lobe, with a black line bordering it. The colour of the spot is blue, with two white cores. The horn is represented as a blunt and pendent object, and not pointed at the end, but terminating in a rounded manner. The second figure is evidently of the form with which this article deals. The head is grey, the thoracic segments and the whole body sienna-coloured, with greyish liver-coloured lateral markings, leaving the

dorsal dome-shaped spaces of the main ground colour. The lateral line is white, with the transverse rows of white spots. The ocellated spot is double-lobed in shape, blue in colour all over, with no light cores, and is surrounded with the usual deep black line. The horn is sienna-coloured and is pendent, finishing bluntly without a point. The third figure is another abnormal form. The head is dark grey, thoracic segments and anal segments reddish-brown. The dorsal and lateral surfaces are dark blackish-grey, and the lateral line and spots are pale drab, as are the spiracular line and claspers. The ocellated spot is double lobe-shaped, blue, with no light cores, and carries, outside, the thick black line. Horn reddish-brown, pendent, with blunt termination, as is shown in all three of these figures which were unmistakably drawn from nature. Kirby's *Butterflies and Moths of Europe* has a plate of the larva of the green type, with lavender-coloured markings on the lateral surface. The thoracic segments are yellow, the dorsal surface green, the lateral surface bears large confluent lavender-tinted markings, with white lateral line and spots. The ocellated spot is double lobe-shaped with white cores, and a black outer ring. Horn pendent, blunt at the end. Hofmann's *Tagfalter-raupen Papiliones* shows a figure of the larva of the green form. Head green, thoracic segments yellow, dorsal surface green, lateral surface lavender, lateral line and spots white. Ocellated spot single, round, blue with two small white spots, and black ring. Horn pendent, small, finishing sharply in a fine point. Kayser's *Deutschlands Schmetterlinge* figures a variety of the larva with a green head, thoracic segments and anal end; the dorsal and lateral surfaces are a very light bluish-white. The lateral line is dark green with a dove-coloured line below it, both crossed by the transverse rows of white spots. The ocellated spot shown in this plate is singular in character. It is of the double lobe-shaped type, but, instead of being placed horizontally, it is vertical in position, the one lobe above the other. It is blue, with two white cores, and the black line edging it as usual. The horn is pendent, and blunt at the end. Westwood's *British Moths* illustrates a larva of the ordinary green form. The ocellated spot is single. It is blue with two white cores, and surrounded by the black line. Horn pendent, terminating bluntly. Barrett's *Lepidoptera of the British Islands* has a plate of the same ordinary type of larva. The ocellated spot is a single circle of blue with a thin black line dividing it, vertically, in the middle. The surrounding ring is grey, outside which is a yellow ring. The horn is pendent, and terminates bluntly. Johnson's *Illustrations of British Hawk Moths and their Larvae* shows another example of the green larva. The ocellated spot is formed of two white ovals surrounded with blue rings, which touch each other. The horn is represented as pendent, but turned up at the end, as in the case of the larvæ of *Manduca atropos*, and finishing in a point. *Les Lépidoptères de l'Europe*, by Dubois, shows a similar figure, in which the ocellated spot consists of two white ovals surrounded with blue rings, which touch each other. The horn in this case is represented as springing upwards from the summit of the anal segment in a curve, and then inclining downwards. It is blunt at the end. The *Handbook on the Lepidoptera of Sweden, Norway, Denmark, and Finland*, by Aurivillius, has a plate of the larva of the more common type in which the ocellated spot is of the double lobe-shape.

It is blue, with white cores, and surrounded by a black line. The horn is pendent and is blunt at the end. It will thus be seen that the ocellated spot is of a very variable nature, and, by the fact that, of the eleven figures mentioned, only two represent the horn as terminating in a point, we may assume that the blunt ending of it is the normal type.

The Revision of the Sphingides—Nomenclature, Classification, Geographical Distribution.*

(*Concluded from* p. 47.)

A true classification must present us with a series of dichotomous (rarely trichotomous or more highly divided) divisions, of which the two portions are more likely than not very unequal.

In the Sphinges we have a decisive division into two branches, which the authors of the *Revision* tell us they recognised before they discovered a very valuable typical character in a sensory patch on the palpi, present in the Chœrocampids (*Semanophorae*) and absent in the Sphinges (*Asemanophorae*). These two branches are now represented by species distinguished in the larval state in the Chœrocampids by having a more primitive tuberculation when young, and an adult pattern of markings of longitudinal stripes and ocellated marks. The Sphinges have larvæ more advanced when newly-hatched, and leave the longitudinal markings behind in their early instars and assume the well-known oblique stripes. As pupæ, the primitive Sphinges retained earlier characters, which still remain in one section (the Smerinthids). In their further evolution both sections developed long tongues, and both tried to accommodate them in the pupa by throwing the head back, in a way that does not occur in any other long-tongued groups. In Sphinges this only progressed a certain length before the tongue-horn of the pupa developed and relieved the strain. In the Chœrocampids the head was pushed further and further back, until it became quite dorsal, and the tongue formed a long, flat, projecting keel round the front of the pupa, and only after this had become extreme did it take the form of a horn. This, in *Rhyncolaba acteus* is quite anterior, and not ventral as in Sphinges.

The Sphinges (*Asemanophorae*) again divided into Sphingines (*Acherontiinae*) and Smerinthines (*Ambulicinae*). The reality of these two branches is fully recognised in the *Revision*, but we are told that there is no single distinguishing chararacter applying to all species. This is more or less true at many points in most classifications of insects, and it is especially true in Sphingides. We have, for instance, broadly said above, that the Sphinges (*Asemanophorae*) have obliquely-striped larvæ, yet *Hyloicus pinastri* has the primitive longitudinal stripes when it is small, and also has much the same stripes when adult. These are, however, entirely comparatively recent adaptive modifications, the ancestor of *H. pinastri* was no doubt obliquely striped.

Now, it happens, that there is one good character separating the Sphingines from the Smerinthines, a character in which the

* *A Revision of the Lepidopterous Family Sphingidae.* By the Hon. Walter Rothschild, Ph.D., and Karl Jordan, M.A., Ph.D. Supplement to *Nov. Zool.*, vol. ix. Pp. cxxxx + 972. Pl. 67. Tring, April, 1903.

Smerinthines are more primitive than the Sphingines; the pupa of Smerinthines has a suture down the prothorax, that opens on emergence, but in all the rest of the Sphingids has become obsolete. The use of this character brings the *Sphingulicae* into the Smerinthines, a position to which we unhesitatingly assign them. In the *Revision* they are placed in the Sphingines, but with qualifying remarks to show that they would be about as well placed in the Smerinthines. So that we really are to no serious extent at issue with the *Revision* in so modifying their positions. Our ignorance of early stages is abundant enough to make it very possible for exceptions to this distinction, even large ones, being yet discovered; at present we do not know of any, but, if so, it would still be at the same level as nearly all other distinctive characters in the family. This position of the *Sphingulicae* had not been recognised, we believe, before the publication of the *Revision*. Our having independently arrived at the same conclusion, makes it tolerably certain that it is a sound one. It used to be regarded as closely related to *Hyloicus* or *Dolba*.

The *Revision* divides the Sphingines (*Acherontiinae*) into three tribes, *Acherontiicae*, *Sphingicae* and *Sphingulicae*. This last we have already referred to; we are equally in agreement with the *Revision* in refusing subfamily rank to *Acherontia*, but we think that, in separating it with a few other genera from *Sphingicae* as a separate subfamily, the authors are still affected by the traditional idea from which we freed ourselves by very slow gradations. We are still, indeed, so far dominated by it, as to think, that if *Acherontia* is of tribal value in the sense of the *Revision*, then *Acherontia* by itself is more separable from the others here associated with it under *Acherontiicae* than these are from many other *Sphingicae*. In short, if *Acherontia* is to be separated tribally, say from *Protoparce* or *Hyloicus*, then *Sphingicae* must be divided into a number of tribes. If this be not done, then *Acherontia* is merely a genus of *Sphingicae*, but one that might have a separate tribe to itself without much misrepresentation of its true position. To place *Herse* (*Agrius* [*convolvuli*]) in the same tribe with *Acherontia*, and leave out all the genera that follow in the *Revision* down to *Cocytius*, and even *Protoparce* and *Euryglottis*, on the ground of the very peculiar specialisation of the second palpal joint (why did not *Megacorma* have a tribe to itself by virtue of its first palpal joint), seems to us to do violence to the actual phylogenesis of the group, *Herse* appearing to be near the common ancestor of all these, and not a recent modification as *Acherontia* is. Many of the species in *Sphingicae* show traces of this peculiar cave and dome of the palpus, which are more likely to be recessions of the structure found in *Herse*, than examples of its earlier stages. Nevertheless, the interpretation of the facts that the *Revision* adopts, is perhaps more calculated than any other to call attention to the true place of *Acherontia*, which is as a derivation from the higher Sphinges after they were well elaborated, and not like the *Sphingulicae* and Smerinthines, a branch from a fairly basal position. The imago may suggest, the pupa almost proves, that a very recent ancestor of *Acherontia* had a proboscis quite comparable in length with that of *Cocytius* or *Herse*. It is curious that the shortening and thickening of the proboscis, which was probably the selective point, should be accompanied by a shortening and thickening of legs and other parts.

The Smerinthids are certainly the group retaining the largest number of ancestral characters. They have not gone forward with the others, but have retreated, especially in the matter of proboscis and wing power. They took the Sphinges with them in those characters which make both *Asemanophorae*. The Chœrocampids, however, are more primitive as larvæ, so far as having preserved early stages goes, less so in so far that one type of larva was early reached by the *Asemanophorae*, and was adhered to, whilst the Chœrocampids developed in various directions.

Darapsa, *Ceratomia*, *Smerinthus* are related together in characters that seem to us to be ancestral, but in the *Revision* are treated as highly evolved by recession. As regards the proboscis, it no doubt relies on these having shorter proboscids than we postulate for the ancestral *Sphinx*. Granted that these have receded in this matter, and we must go to sundry Sesiads to find genera in which neither recession nor advance has obviously occurred.

The abdominal spines also seem to us to have originated all over the surface of the segments, to have failed except at the margins, where they persisted in several rows, but as they got larger and stronger one row became sufficient. In this matter we think *Pseudosphinx tetrio* is probably at the highest stage of development. In this and other characters, to regard this species as ancestral in the subfamily *Sesianae* seems difficult to accept. *Haemorrhagia*, for instance, is in many points more primitive, highly specialised though it is in others. These spines are not, as the *Revision* says, altogether special to the Sphingides, but occur in some Noctuids and Geometrids (in *Nyssia hispidaria* they are rampant).

We fully agree with the sinking of all subfamily or tribal distinction between the Amorphid and Ambulicid sections of the *Smerinthinae* (*Ambulicinae*) unless a number of smaller divisions be made.

The *Semanophorae* (*Macroglossinae* and *Choerocampinae*, Auct.) include some 480 species. Amongst these they describe the subfamily *Choerocampina* as being sharply circumscribed. It includes 144 species. The majority of our British Chœrocampids (Auct.), belong to this subfamily—*elpenor*, *gallii*, *celerio*, etc. The genus *Xylophanes*, with 50 species, is confined to the western hemisphere. In the arrangement in the phylogenetic table, we believe, chiefly on larval characters, that *Pergesa* (*elpenor*, etc.) is wrongly placed with *Celerio* (*gallii*, etc.), and away from *Hippotion* and *Theretra* (*celerio*, etc.).

"The remaining groups of *Semanophorae* are not so obviously distinguished from one another in all their members owing to the preservation of generalised forms linking the groups together, and to the difference becoming obscured by the recurrence of similar structures in phylogenetically widely different genera." This is so true that it seems impossible to criticise the arrangements of these genera, any other being probably open to at least as much objection as those in the *Revision*, though there are one or two points, perhaps, worth considering.

The *Dilophonoticae* appear to be a well-defined group, and have such a Sphingid facies that they have usually been classed as Sphinges and not as Chœrocampids. The larvæ and pupæ are definitely Chœrocampine. Burmeister separated them as a distinct subfamily without distinctly stating their Chœrocampine affinities, which is first done, we believe, in the *Revision*.

The wide separation of *Sesia* (*Hemorrhagia* = Bee-hawk moths) from *Macroglossa* (Humming-bird) is unquestionably correct. The *Philampelinae* consists practically of the genus *Pholus* (= *Philampelus*, a name here sunk as a synonym, then why *Philampelinae* ?). *Pholus* would appear to be a derivation of *Daphnis* (*Deilephila*) hardly entitled to tribal rank. *Philampelinae* seems to us to be related to the Daphnid section of *Nephelicae*, in much the same way as the geographical subspecies are to each other, as say *Celerio lineata* is to *C. livornica*, so that to separate them as tribes seems at variance with uniting *lineata* and *livornica* as one species.

The remainder of the Chœrocampids (*Semanophorae*) are placed in the *Nephelicae*, which includes 199 species, rather a sort of dumping ground for the remainder. "The genera of this tribe are in more than one organ either similar to the *Sesiinae* or the *Choerocampinae*. Very often a genus inclines towards one subfamily in one stage, and towards the other subfamily in another stage. *Macroglossum* for instance is Sesiid in the imago and larva, but Chœrocampid in the pupa. *Ampelophaga* is Chœrocampid in the imago and larva, and Sesiid in the chrysalis. The imago of *Atemnora* is Sesiid in the strong flat spines, Chœrocampid in the large friction scales."

We approve, rather than otherwise, of merely recognising as subspecies certain allied forms, such, for instance, as the ten subspecies of *Celerio euphorbiae*, of which four or five at least have been held to be "good" species. We cannot, however, say positively, as we think the *Revision* does, that this is recognising a fact. In the present state of our knowledge, we think it merely a well-founded opinion.

In looking over our remarks, it seems to us that we have given adverse comment a full share of our space, and, in one instance, where our opinions are very decided, have indulged in somewhat strong language. This seems, however, necessary if we are to make any effort to deprive opinions, that do not appear to us to deserve it, of the prestige that must attach to them from being advanced in a work that marks not only an advance in the study of the Sphinges, but is a step forward in the systematic treatment of the lepidoptera, and must inevitably command the admiration of all who can appreciate it.

COLEOPTERA.

TROPIPHORUS OBTUSUS, BOISD.—The known range of this species has been appreciably extended since the publication of Fowler's *British Coleoptera*. It was then only known from Dumfries, but subsequent researches seem to be showing that its range is co-extensive with that of many other northern species in these islands. Messrs. Johnson and Halbert record it from four Irish counties—Derry, Armagh, Carlow and Kilkenny—in their admirable *List of the Beetles of Ireland*, and I can add a fifth, co. Antrim, as I took it in 1902 in White Park Bay. Mr. Kidson Taylor took one last year at Miller's Dale, in Derbyshire, and I detected it some time ago mixed with *T. tomentosus*, Marsh., and collected by Messrs. Day and Britten in the Carlisle district. *T. obtusus* has a duller, more abraded look than *T. tomentosus*, without any metallic reflection on the scales.—B. TOMLIN, Chester. *January 30th*, 1904.

NOTES ON WIGTOWNSHIRE COLEOPTERA.—The following notes are a

supplement to my list of Wigtownshire coleoptera, which appeared in the February number of the *Record* for 1903, and contain only species added since then. Professor T. Hudson Beare has most kindly examined almost all the specimens. In March, *Scydmaenus collaris*, Müll., and *Stenus paganus*, Er., were taken on stones in a field, while under stones *Micropeplus staphylinoides*, Marsh., *Tachyporus obtusus* var. *nitidicollis*, Steph., and *Quedius semiaeneus*, Steph., were not uncommon. In April, a single specimen of *Chrysomela fastuosa*, L., was captured under a stone in a field on the 5th, also *Tachyporus hypnorum*, F., a dark aberration; *Aphodius pusillus*, Herbst, plentiful in sheep-dung on the moors, and *Cytilus varius*, F., on a stone by the sea. The hotbed near the garden was again swarming with beetles, and produced a single *Hister bimaculatus*, L., on the 30th, besides *Falagria sulcata*, Grav., *Philonthus ventralis*, Grav., *Orytelus tetracarinatus*, Block., and *Cryptohypnus dermestoides*, Herbst. During May much more work was done, and several interesting species were taken. *Notiophilus aquaticus*, L., among flood refuse; *Leistus rufescens*, F., two under stones; *Anchomenus ericeti*, Pz., one on a dead bird on the moor on the 7th; *Staphylinus latebricola*, Grav., one under a stone on the shore of the White Loch, on the 18th; *Stenus tarsalis*, Ljun., *S. biforealatus*, Gyll., *S. nitidiusculus*, Steph., and *S. impressus*, Germ., swept in a damp meadow; *S. pubescens*, Steph., swept off rushes growing in a loch. On the 8th, a fine, bright, sunny day, *Subcoccinella* 24-*punctata*, L., was very plentiful on nettles, as many as six on one leaf, on the seashore near Kirkmaiden, in company with *Coccinella* 11-*punctata*, L., rather scarce, and *C.* 7-*punctata*, L., simply crawling on everything; *Melanopthalma gibbosa*, Herbst, on blackthorn; *Micrambe vini*, Pz., common on whins; *Parnus prolifericornis*, F., and *P. auriculatus*, Pz., under stones on the shores of lochs; *Aphodius putridus*, Cr., and *A. merdarius*, F., not uncommon in sheep-dung on the moors; *Helodes marginatus*, F., *Telephorus paludosus*, Fall., and *T. figuratus*, Mann., swept among rough herbage near the Malzie burn; *Malthodes misellus*, Kies, two swept near together on a flat moor; *Donacia obscura*, Gyll., one swept among reeds growing in deep water from a boat, Loch Chesney, on the 24th; *D. simplex*, F., *D. discolor*, Pz., and *Gastroides polygoni*, L., swept on reeds in wet places; *Hydrothassa aucta*, F., sitting on boards in the sun near Newton-Stuart, and *Galerucella nymphae*, L., common by sweeping plants in the middle of a ditch, and a single *Cassida equestris*, F., swept from rough herbage near the Malzie burn on the 31st. In June, the following turned up—*Hydroporus memnonius*, Nic., and *H. pubescens*, Gyll., were swept in a damp meadow; *H. tristis*, Pk. and *Gyrinus minutus*, F., in Loch Chesney; while *Orectochilus villosus*, Müll., haunted water-lily leaves in the burn. Sweeping rough herbage and grass in woods produced *Helophorus brevipalpis*, Grav., *Cryptophagus dentatus*, Herbst, *Corymbetes quercus*, Gyll., and var. *ochropterus*, Steph., *Agriotes pallidulus*, Ill., *Adrastus limbatus*, F., several; *Helodes minutus*, L., *Malthodes marginatus*, Lat., *M. flaveguttatus*, Kies, *Teleporus nigricans*, Müll., *Atomaria atricapillus*, Steph., and *Crepidodera ferruginea*, Scop.; a few *Crytocephalus labiatus*, L., on heather. Under sand-boxes on the golf course, at Glenluce, several *Heliopathes gibbus*, Marsh., on the 11th; while a single *Aphodius scybalarius*, F., new to the Solway, was found in cow-dung at the same place on the 28th; *Anthophagus testaceus*, Grav., *Athous haemorrhoidalis*,

F., and *Anaspis ruficollis*, F., by beating rowan trees. Under a stone below the Garheugh rocks, a single *Cistela murina*, L., black form, on the 12th; *Quedius maurorufus*, Grav., and *Stenus pallitarsus*, Steph., were swept from reeds in lochs, and another *Chrysomela fastuosa*, L., on the 18th, this time by sweeping in a hayfield near the White Loch. In July, collecting began to languish owing to the counter attractions of tennis, but *Dromius linearis*, Ol., was taken on the shore; *Longitarsus lacris*, Duft., swept on the moor; a couple of the rare *Aleochara ruficornis*, Grav., were swept from grass under trees, in a wood, on the 3rd. Sweeping herbage produced *Bolitobius pygmaeus*, F., *Microcara livida*, F., and *Phyllodecta vulgatissima*, L., and *Leistotrophus nebulosus*, F., was brought into a house in Newton-Stewart by a cat, and given to me alive and none the worse for its adventure. In August, *Anobium domesticum*, Fourc., turned up in the house, and *Aphodius rufescens*, F., was taken in cow-dung on the moor in September. The above insects were again mostly taken in the immediate neighbourhood of Corsemalzie. There are still a good many other captures to work out, and which I hope to record shortly.—J. G. Gordon, F.E.S., Corsemalzie, Whauphill, Wigtownshire. *January 30th*, 1904.

Remarks on M. Louis Bedel's "Coleopteres du Bassin de la Seine," Tome 5, Fas. 2.

By E. A. NEWBERY.

Although dated 1897-1901, this part has probably only recently been issued in a separate form, since I have not hitherto been able to obtain it. M. Bedel's work needs no commendation: like the former volumes, it represents a vast amount of original study of the insects described therein, and a comparison (where possible) with the original types. M. Bedel has been peculiarly fortunate in having access to the types of Allard, Foudras, and other writers on that difficult group, the *Halticidae*, and has been able to clear up many obscure points in the synonymy. British coleopterists may not be able to accept all his conclusions, but the general accuracy of his work cannot be doubted.

The short time that the book has been in my hands has rendered it impossible for me to do much more than call attention to certain changes in synonymy, to reproduce some of M. Bedel's distinctions where they appear to be new or useful, and to make a few miscellaneous remarks. For the purpose of comparison, I have taken the order of the genera and species from Sharp and Fowler's *Catalogue* of 1893. The analytical tables of this "fascicule" commence with *Luperus*, but the "Catalogue" which follows includes all the *Phytophaga*, the footnotes being by no means the least interesting part.

In what follows it must be observed that all names in the British catalogue referred to are omitted, in which no change takes place. So also, as a rule, are the names which accord with those in the last (1891) European catalogue, since it must be presumed that our catalogue-makers are cognisant of these changes, but have not thought fit to adopt them. Where, however, I have wished to emphasise these changes, believing that M. Bedel's investigations have given them an added value, I have inserted them. In the unfortunate genus *Donacia* we have the following alterations: *D. crassipes*, F., becomes *micans*, Hoppe(?*crassipes*, F.). *D. dentipes*, F. = *coccineo-fasciata*, Harrer. *D. limbata*,

Pz. = *marginata*, Hoppe. *D. simplex*, F., has the old name of *linearis*, Hoppe, restored. *D. sericea*, L. = *violacea*, Hoppe. Since many, if not all, of these alterations will probably appear in the next European catalogue, it is as well that we should be made acquainted with them. This continual change of names is nevertheless much to be deplored.

Lema, F., becomes *Clema*, Des Gozis (*nom. mut.*), *L. cyanella*, L. = *puncticollis*, Curt. *L. lichensis*, Voet. = *cyanella*, L., both the old names being restored. *L. septentrionis*, Weise, and *ericsoni*, Suffr., are clearly separated thus :—

Thorax black, elytra blue, elongate, with strial punctuation relatively large and deep *L. septentrionis*, Weise.

Thorax and elytra blue, less elongate, with the strial punctuation less large and deep *L. ericsoni*, Suffr.

England is mentioned in error as the locality for *septentrionis*. The species has hitherto only been found in Ireland, *ericsoni* being confined to the south of England.

Labidostomis and *Clythra* become subgenera of *Melolontha*, Müll., as also does the recently added *Gynandromorpha* (*Cyaniris*, Redt.) *affinis*, Hellw., an undesirable change. *Cryptocephalus primarius*, Har. (*nec* Laich) = *decemmaculatus*, Geoff. The var. *sanguinolentus*, Scop. (*lineola*, F.) of *bipunctatus*, L., seems not to occur in the Seine basin, and is probably a distinct species. *C. ochrostoma*, Har. and *punctiger*, Pk., do not appear to be taken in the Seine basin. *C. bothnicus*, L., is considered the type form of *decemmaculatus*, L., and the latter, the var. *exiguus* Suffr. (*nec* Schneid), has the old name of *Wasastjernai*, Gyll., restored.

Lamprosoma, Kirby, becomes *Oomorphus*, Curt. *Timarcha violacea-nigra*, De G. = *goettingensis*, L. *Chrysomela orichalcia*, Weise (*nec* Müll.) = *bulgarnensis*, Schrank. *C. goettingensis*, L. = *diversipes*, Bedel, Linné's insect being a *Timarcha*. *Melasoma aeneum*, L. = *M. hoemorrhoidale*, L. The green var. is said to be more common than the type form (black or violet). *Phytodecta pallida*, L., is wanting in the Seine basin. *Phaedon tumidulus*, Germ., is inserted upon a single specimen, and appears to be a mountain species in France. *P. armoraciae*, L. (*betulae*, auct.), is renamed *veronicae*, Bedel. *Phyllodecta cavifrons*, Th. = *laticollis*, Suffr. *P. hannoverana*, F., does not occur in the Seine basin.

Luperus, Geoff., becomes *Lyperus*, Müll. *L. nigrofasciatus*, Goeze = *circumfusus*, Marsh, the old name restored (*nigrofasciatus*, Goeze, being a *Thyamis*). *Galerucella sagittariae*, Gyll., is reduced to a var. of *nymphae*, L. *Adimonia*, Laich, becomes *Galeruca*, Müll., and a suggestion is made that the larvæ recorded by H. W. Kew (*Ent. Mo. Mag.*, xxiii., 107) as feeding on *Scabiosa succisa* may have been those of *pomonae*, Scop. This is surely an error, as this insect has never been regarded as British. *A. oelandica*, Boh., appears to be a var. of *interrupta*, Ol., but I am not quite sure that this is what M. Bedel means.

We come now to the difficult genus *Thyamis*, and I must again remind the reader of the exceptional advantages M. Bedel has had in having access to so many original types. The old generic name of *Thyamis* is restored. *T. echii*, Koch, is said in error to be British. *T. pulex*, Foud. = *obliterata*, Ros., and *atra*, F. = *parvula*, Pk., both old names restored. *T. absinthii*, Kuts., is not mentioned. *T. castanea*, Duft. = *brunnea*, Duft., *lurida*, Scop., and the *brunnea* of the catalogue being but one species. *T. fuscula*, Kuts., is not mentioned, but it is probably only a

small form of *lurida*, and will have to be deleted. This would leave us with but two species in this group, *i.e.*, *brunnea*, Duft., a marsh species with long apical setæ to the elytra, and the ubiquitous and protean *lurida*, Scop., in which they are inconspicuous. I am, however, at a loss to know what M. Bedel means in referring to *brunnea* (*castanea*, *Brit. Cat.*) as having "facies des *Crepidodera* roux." The var. *fuscicollis*, Steph., is raised to a species, and takes the place of *atricilla*, L., a name considered enigmatical; *patruelis*, All., is made a var. of *nigrofasciata*, Goeze, but possibly this is not the species we call *patruelis*. *T. melanocephala*, All., and *atriceps*, Kuts., become one species, *i.e.*, *melanocephala*, DeG. *T. distinguenda*, Rye, is said to be probably confined to Britain, and to be very close to the var. *patruelis* mentioned above. *T. abdominalis*, All. (Duft., of the *Brit. Cat.*)=*juncicola*, Foud. *T. waterhousei*, Kuts., and *ferruginea*, Foud. are not mentioned at all. M. Bedel regards *cerina*, British catalogue, as probably *menthae*, Bed. (n.s.), found abundantly in several places in France on *Mentha aquatica*. *T. flavicornis*, Steph.=*rubiginosa*, Foud. *T. femoralis*, Marsh.=*exoleta*, L., the old name restored. *T. pusilla*, Gyll.=*pratensis*, Pz., with which *medicaginis*, All., and *reichei*, All., are synonymous, the form with black thorax being the var. *collaris*, Steph. *T. gracilis*, Kuts., and the var. *poweri*, All. (the latter the most widely spread in France), is said to feed on *Tussilago farfara*. If this is so *poweri* is probably distinct, since, as remarked by Fowler, *gracilis* feeds on *Senecio jacobaea* here.

As we appear to have *Thyamis aeruginosa*, Foud., *pellucida*, Foud., and *succinea*, Foud. (=*laeris*, All., *nec* Duft.). I subjoin Bedel's diagnosis:—

1. Elytra not, or very shortly, ciliated at their apex, antennæ of normal length (1·5mm. to 2·8mm.). 2.

   Elytra with some rather long hairs towards apex, and one hair still more long and projecting at the sutural angle; antennæ with joints four to ten very elongate. Insect usually apterous, rarely (var. *luctator*, Weise) winged. On *Eupatorium cannabinum*, rather common. *T. aeruginosa*, Foud.

2. Elytra sub-depressed above, with shoulders usually well-marked and punctuation distinct. On *Convolvulus arvensis*, common. *T. pellucida*, Foud.

   Elytra regularly convex, shoulders nearly always effaced, and punctuation obsolete. On *Achillea millefolium*, *Leucanthemum vulgare*, *Artemisia campestris*, etc., common. *T. succinea*, Foud.

The *laeris* of Fowler, appears to be *aeruginosa*, a species I have taken abundantly on *Eupatorium*, both on the coast and inland. Fowler, however, gives the foodplants of *succinea* to his *laeris* (*Brit. Col.*, iv., 353).

Haltica tamaricis, Schr., is not found in the Seine basin and should be deleted also from the British list. *H. coryli* of the British catalogue = *brevicollis*, Foud. *H. palustris*, Weise, does not occur in the Seine basin. *H. pusilla*, All. (*nec* Duft.) is a synonym of *oleracea*, L. M. Bedel observes that all the "*pusilla*" taken in the Paris basin are *oleracea*, L., and that the true *pusilla*, Duft., is a mountain species. Whatever the var. *montana* of our collections may prove to be, most, if not all, of the "*pusilla*" ought probably to be referred to *oleracea*, L. *Phyllotreta punctulata*, Marsh, of the Cat.=*aerea*, All., and it appears likely that *diademata*, Foud., may also be British, since it is a very near ally, and mixed with it in many French collections. *P. cruciferae*, Goeze=*paeci-*

loceras, Com. The true *flexuosa*, Ill., is not found in the Seine basin.

Aphthona non-striata, Goeze, is not found on the Continent with dark legs and antennæ; with us it is the common form. *A. atratula*, of the Cat. and Fowler, becomes *atro-virens*, Först. Our insect certainly does not agree with Allard's description of *atratula*; it occurs here freely on thyme. The genus *Batophila* becomes *Glyptina*, Le Conte. *Sphaeroderma testaceum*, F., and *cardui*, Gyll., being considered synonymous, the *testaceum* of Fowler=*rubidum*, Graells. *Mantura matthewsi*, Curt., var. *aeraria*, Foud. (with blue elytra), is var. *dichroa*, Bed. (*nom. nov.*). *Ochrosis salicariae*, Pk., of the Cat.=*Lythraria salicariae*, Pk., Bedel having created a new genus to receive it. He follows Foudras and Weise in further subdividing the old genus *Crepidodera*; thus *C. ventralis*, Ill., becomes *Ochrosis ventralis*, Ill., and *C. rufipes*, L.=*Derocrepis rufipes*, L. The genus of the metallic species becomes *Chalcoides*, Foud., the specific names having the following alterations—*helxines*, L.=*aurea*, Geoff.; *chloris*, Foud.=*plutus*, Latr.; and *smaragdina*, Foud.=*fulricornis*, F. *Chaetocnema aridula*, Gyll., is said to be very common, but it is a rare species here. *C. hortensis* has the old name of *aridella*, Pk., restored. It seems doubtful if the *confusa*, Boh., of our collections is identical with Bedel's species, which is described as "blackish-bronze."

Dibolia cynoglossi, Koch, recently reinstated as British by Mr. H. Donisthorpe, is said to feed on *Stachys recta*, according to Kutschera. Neither *Psylliodes cyanoptera*, Ill., nor *P. luridipennis*, Kuts., appears to occur in the Seine basin. *P. cuprea*, of the catalogue=*herbacea*, Foud. *Cassida murraea*=*murrayi*, L., the green form being var. *maculata*, L. *C. sanguinolenta*, "F.," should be "Müll." *C. chloris*, Suffr.=*prasina*, Ill. *C. subferruginea*, Schr., appears to equal *ferruginea*, Goeze (*nec* L.). M. Bedel gives the following characters to separate *rittata*, Vill., from *nobilis*, L.:—

> Facial grooves forming a V, of which the branches commence at the insertion of the antennæ; thorax scarcely less shiny than the elytra, convex behind. *C. vittata*, Vill.
>
> Facial grooves almost in the form of a Y, their two branches in part united on the median line; thorax very dull, not convex behind. *C. nobilis*, L.

It would be premature to offer an opinion on a large number of these changes. The effect of them in modifying the British list may well form the subject of future enquiry.

NOTES ON COLLECTING, Etc.

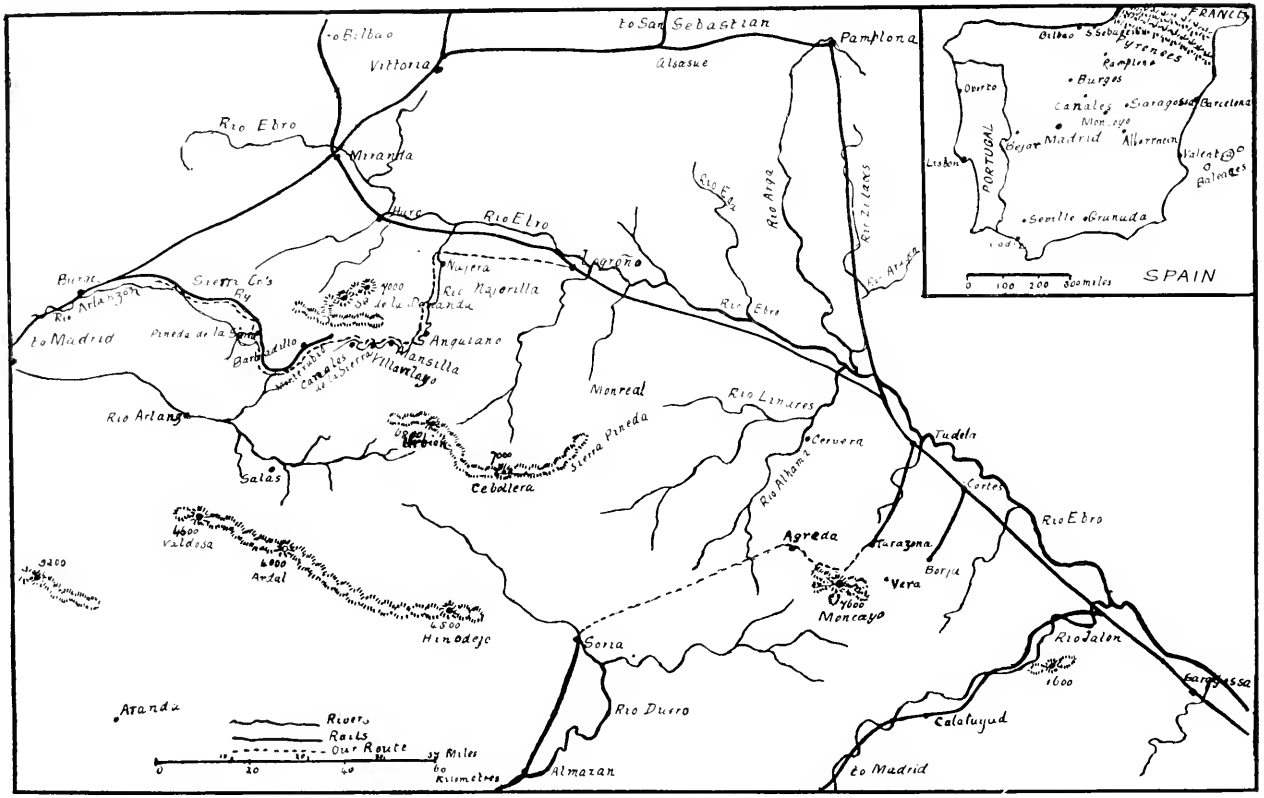
PYRAMEIS CARDUI IN 1903.—I think Mr. McLachlan (*Ent. Mo. Mag.*) is right about *Pyrameis cardui*. The butterflies were abundant about Vienna in the autumn of 1903. It is well known here, too, that it is a great migrant. A very large number of larvæ was collected, but they were nearly all ichneumoned. Probably next year the butterflies will be rare.—A. HIRSCHKE, Wien. *January 6th*, 1904.

BRITISH ALUCITIDES.—LIFE-HISTORIES AND HABITS.—Little by little our material on the British plumes is accumulating, but it is on a remarkably small number of species. Many of our lepidopterists will find *Pterophorus monodactyla* as soon as the sallows are out, probably before. Eggs are wanted badly; there is no description of which we know extant, and either the eggs, notes thereon, or living ♀s,

from which they could be dissected, would be most acceptable. Do ♂ s of this species go over the winter? Similarly eggs of *Amblyptilia acanthodactyla* and *A. punctidactyla* are required, and, if *Mimaeseoptilus zophodactylus* does hybernate, any scrap of information would be welcome, and eggs a gift from the gods. I have no doubt that, with their usual generosity and kindness, our lepidopterists will get us lots of material as soon as the plants are on the move. We want the tiniest possible larvæ, for it is the earliest larval stages that are practically unknown. One of our correspondents tells us that *Mimaeseoptilus pterodactylus* (*fuscus*) hybernates as an egg—a most remarkable fact. Still, we do not know where the larvæ of *Platyptilia ochrodactyla* (*Tanacetum* species), *P. bertrami* (*Achillea* species), *P. gonodactyla* (*Tussilago* species), *P. rhododactyla* (*Rosa* species), *P. isodactyla* (*Senecio* species), *P. tesseradactyla* (*Gnaphalium* species), *Alucita megadactyla* (*spilodactyla*) (*Marrubium* species), *A. pentadactyla* (*Convolvulus* species), etc., hybernate, nor have we the remotest knowledge of any of the Leioptilid or Mimæseoptilid species, except *Leioptilus lienigianus*, and *L. microdactyla*, whilst our knowledge of *Platyptilia zetterstedtii* (the Lynmouth and Folkestone species) is practically a blank. It is marvellous, when one comes to think of it, that not one of our keenest micro-lepidopterists has any knowledge whatever of the autumnal, winter, and early spring habits of more than two or three species of our plumes, and that the Continental lepidopterists possibly know less. The earliest and latest dates of capture—larvæ or imagines—should be carefully noted, and every locality chronicled. We may then, by our co-operative method, get the material for a book on British plumes before the end of the year, that shall be worthy of British entomology. Material should be sent to Mr. A. W. Bacot, 154, Lower Clapton Road, N.E., as Dr. Chapman expects to be abroad from mid-March to the end of May.—J. W. Tutt.

CURRENT NOTES.

The January meeting of the Entomological Club was held in The Entomological Salon of the Holborn Restaurant on Tuesday, January 19th, at 6.30 p.m., when Mr. G. H. Verrall was the host. Supper was served at 8.30 p.m., when a large number of guests sat down. Among others we noticed: Professors R. Meldola, E. B. Poulton (elected club member), Colonel C. T. Bingham, Colonel Yerbury, Rev. Canon W. W. Fowler, Revs. E. N. Bloomfield, F. D. Morice, and C. F. Thornewill, Drs. T. A. Chapman, F. A. Dixey, and J. Tathom, Messrs. F. C. Adams, R. Adkin (club member), H. W. Andrews, H. W. Barker, F. Bouskell, W. C. Boyd, H. Rowland-Brown, H. A. Bryden, M. Burr, A. Cant, J. T. Carrington, A. E. J. Carter, G. C. Champion, A. J. Chitty (elected club member), F. Noad Clark, J. E. Collin, H. Donisthorpe (club member), Stanley Edwards, C. Fenn, F. C. Frohawk, C. J. Gahan, H. Goss, T. W. Hall (club member), A. Harrison, M. Jacoby, O. E. Janson, F. Jenkinson, J. W. A. Jenner, F. B. Jennings, A. H. Jones, W. J. Kaye, O. H. Latter, R. W. Lloyd, W. J. Lucas, H. Main, Claude Morley, B. G. Nevinson, G. T. Porritt (club member), E. A. Smith, H. J. Turner, J. W. Tutt, W. A. Vice, C. J. Wainwright, E. A. Waterhouse. A most enjoyable evening was spent. Two charming violin solos were given by Mr. Jacoby, and a recitation by Professor Poulton. The toasts proposed were "The Entomological Club," by Mr. Verrall, and "Our host," by Professor E. B. Poulton.



Map showing Entomological Trip in Spain.

The Entom. Record, etc., 1904.

Notes (chiefly on lepidoptera) of a trip to the Sierra de la Demanda and Moncayo (Burgos and Soria) Spain (*with map and three plates*).

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

There is no doubt that Spain is a most fascinating country for the entomologist. Switzerland does, or did, exercise such a fascination, not only for the entomologist, but for many other classes of tourists and travellers. Spain is, however, for the entomologist, much more attractive, whether it will still be so, when it is as well known as Switzerland is, perhaps, another question. For the moment and for myself, I must admit I could not resist the temptation last summer to visit it again. There are many drawbacks, and, if you really mean to get to good localities, you must be prepared to submit to many inconveniences, to rough it a little, or even a good deal, and this has fewer attractions when one is on the downward, than when on the upward, grade. When there, one certainly says not unfrequently that one has had enough of it, but the disagreeables slip backwards in the memory, and the attractions ever assert themselves, and so it came about that Mr. Champion and myself found ourselves crossing the channel on June 22nd last, and on the following afternoon we arrived at Guéthary, a charming little watering-place, a few miles south of Biarritz and about as many short of the Spanish frontier. Here Mr. Champion found several of those curious submarine Staphylines, but I met with nothing of any importance, the only thing that interested me being *Herminia crinalis*, no rarity, but remarkable as possessing on its front legs a whole museum of those fans and brushes which are so frequent in the Deltoids. *Thymelicus actaeon* and *Melanargia galathea* were common, and I found a larva of *Euranessa antiopa* hung up for pupation on a rush in the middle of a swamp, having travelled some 20 yards from the tree on which it had fed.

On the 25th we moved on to Burgos, of which we formed a better opinion, entomologically, than we had done last year, realising that it had an elevation of 2800 feet. Though Mr. Champion got a good beetle or two, nothing, however, fell to my share here worth recording. Our stay was, in fact, too short for doing much. From Burgos we proceeded to Canales de la Sierra. By the kindness of the Sierra Company we travelled by their mineral railway to Barbadilla and proceeded to Canales by cart. In connection with this portion of our voyage, I must express our obligation to the courtesy of the officers of the company at Burgos, especially to Mr. E. B. Smith and Dr. Frankland Dent, not only in regard to our mere travelling, but for the information they gave us of the nature of the Sierra to which we were going, with some useful details as to accommodation and likely localities. The railway passes through much country that looked more or less tempting entomologically, but nowhere passed very near any of the higher Sierras, nor did there appear to be any available accommodation by the way. At Pineda de la Sierra there was some likely-looking ground, and a considerable elevation was here attained. At Barbadilla, the present terminus of the railway, we spent a few hours and met with *Lampides boetica* in abundance, *Vidonia famula* in some numbers, and a small Ægeriid (Sesiid) flying freely amongst sorrel and low plants.

At Canales our adventures in securing accommodation were rather amusing and threatened for a time to wreck the expedition. We

March 15th, 1904.

expected to obtain lodgings with a prosperous mercer, who had a good house and received guests. Unfortunately he had just been supplied with more than his complement by a large family which had, the previous day, returned from the Argentine, whither it seems many people go from this region, returning either for a vacation or permanently after having, I suppose, made their pile. We had then to inspect the "Posadas." The best of these was, from our point of view, quite impossible. After wasting some time in searches, inspections, and palavers, we were reluctantly coming to the conclusion that we must stay one night at the Posada and return next day, when a gentleman who had attended us throughout our researches, as is a common habit in these regions, all matters of negotiation and marketing being matters of great general interest, volunteered the information that he thought something could be done. In fact, he had the key of a vacant house, in which he thought we could put up, and his wife could look after our commissariat and other domestic affairs. We finally found ourselves installed in a large house with very good rooms, not entirely devoid of furniture, and, at a very belated hour, secured, not a sumptuous feast, but something to eat. Here we resided and got on very well during our stay at Canales. We found, unfortunately, that the house was not entirely uninhabited, but a little arrangement got over the difficulty. The Posada here, and our observations at the villages in the district, showed that the accommodation available in this region was much behind that that we met with in the Albarracin Sierra. Last year, at Bejar, Piedrahita, and Avila, we did not try the smaller villages, but fancy they also were not to be commended.

We did not ascertain the exact height of Canales de la Sierra, where we stayed from June 27th to July 9th, but it cannot be much over 2500 feet. It is a considerable distance below the Col between it and Barbadilla, and to that, one descends a good way from the highest point of the railway. Canales lies in a valley with a little stream, the Najarilla, that was quite dry a mile above the village, but a mile below was quite a little river. On the north there rises immediately, in somewhat steep slopes, a hill, the ridge of which runs east and west at a height of perhaps 5500 feet, certainly not more, passing round towards the northwest into a higher summit, which we took to be the Sierra de la Demanda, possibly about 7400 feet. This carried, during our stay, several considerable patches of snow. This appears to be the highest point in the group after Moncayo, which is, however, really distinct, the other summits are really parts of the same mass as the Demanda, and, though the maps say otherwise, we fancied the Urbion and Cebellera were a trifle higher than the Demanda, but then we viewed these from the north and so their snowy patches made a comparatively greater display. Opposite, to the south, was a lower hill, a little further off, ranging backwards to a long high ridge with much snow, the Sierra Campina. The top of this was some ten miles off, and we never got up courage to visit it. In fact, we could only have made a day's journey there and back, with no time to do anything when there. To the southeast, and some fifteen or twenty miles off, but over a very broken country, was the bold and precipitous summit of the Cebellera and the range of the Pico de Urbion. These we should much liked to have visited, but it would have been a full day's journey to get there, and we could hear of no accommodation

anywhere near the mountain. It was matter of much regret that we should be so near these tempting summits and yet find it practically impossible to visit them.

Our hunting-grounds were on the lower slopes and broken ground at the foot of the hills on the north, along the top of these, and towards the higher points of the Sierra de la Demanda, and on some rather bare hills opposite. A little valley parallel to the main one, and to the south of it, presented some good ground and led up to the Pinar, an area of pine-wood about 1200 feet above Canales, and five or six miles off.

The lowest slopes were usually rather bare, but had, in the little valleys between them, more or less blackthorn and *Genista*. Very soon a scrub of small oak-bushes of the woolly-leaved species was reached, and this continued more or less to a considerable elevation, in some places, very low down, was a good deal of heath, but this was not usually abundant till near the top of the oak-scrub. The oak-scrub reached behind Canales to the top of the ridge, on the other side of which was a thick beech forest. Elsewhere, where the true succession could be found, the beech followed on the oak at a higher level, and this happened at one higher portion of the ridge. It really also was seen on the north side of the ridge, where the oak was very low down. The difference between the two sides amounted to 1000 feet or so, occupied by oak on the southern aspect, being on the northern occupied by beech. The difference in climate on the two sides being thus something like 1000 to 1500 feet of elevation in favour of the southern aspect.

The impression I received during the first few days at Canales, was that I had got amongst precisely the same set of insects that I left on the wing in the Riviera twelve weeks before. *Polyommatus baton*, *Nomiades cyllarus*, *Syrichthus sao*, *Thais rumina*, *Colias edusa*, *C. hyale*, *Euchloë euphenoides*, *Nomiades melanops*, *Cyaniris argiolus*, *Brenthis euphrosyne*, *Erebia erias* (at Locarno eleven weeks before), *Adscita statices*, *Tanagra chaerophyllata*, *Fidonia atomaria*, etc. The species were not remarkable as occurring anywhere in the south, the curious feature was their association together so long as nearly three months later than they were seen in the south of France, so much further north. The inland situation had perhaps as much to do with the lateness at Canales, as the elevation, which, as I have said, was not very great.

On my first excursion on the slopes at Canales I met with a species of *Heteroggnis*, which appears to be specifically distinct, being attached to *Genista scorpius* and having a very different habit in spinning its cocoon from the other species. The larvæ of *Aglaope infausta* were extraordinarily abundant on bushes of blackthorn here, often stripping them quite bare and apparently rendering them suitable to the attacks of a large Buprestid, of the genus *Ptenodis*, that we often found basking on the bare branches.

The *Genista scorpius*, at Canales, afforded by beating, though beating so low, stiff, thorny a bush was rather difficult, except when it grew on a steep bank, larvæ of an *Orgyia*, which were at first very small, but as they grew older, seemed, as in fact proved to be the case, to be *Orgyia aurolimbata*, they were also beaten, though less freely, from the oak-scrub, whence also came one larva, which was not reared,

that must have been *O. antiqua*, though it may have been one of the *O. ericae* group, with whose larvæ I have no acquaintance; whatever it was, it seemed odd to get one, and one only. Larvæ of *Thecla ilicis* (and *spini* ?), and of *Oeneria rubea*, were also fairly common on the oak-scrub, as well as of *Malacosoma neustria*, whilst those of *Malacosoma franconica* was often met with in odd examples on low growing plants. A very handsome larva (possibly *Lachneis catax*) also occurred on the oak, and a larva and a cocoon of *Phorodesma pustulata* were taken.

The oak also afforded several larvæ, none of which were reared, which were most probably *Trichiura* (?) *ilicis*.

The most interesting species on the *Genista scorpius* was the *Heterogynis*, which has characters so far distinguishing it from the two recognised species of the genus, as to justify its claim to separate specific rank, though it is in many respects very close to *H. penella*. I propose to call it *canalensis* from its habitat. It is larger than *H. penella*, has shorter cilia, a different tint on upper and lower wings, and is especially different in the peculiar elaboration of the female cocoon, with a corresponding difference of habits. [See *Trans. Ent. Soc. Lond.*, 1904.]

Although we reached Canales from the west, we found that the more regular way of approach is from the northeast, *viz.*, by the valley of the Najerilla, in the upper valley of which Canales is. There is, in fact, a diligence service along this valley from Canales to Logroño, on the main railway line to Saragossa. This service is of a rather primitive and limited character from Canales to Mansilla, the first stage, and traverses a country very similar to that around Canales. Departing by this diligence, we were able the first day to reach Aguiano. Between Mansilla and Aguiano, the valley of the Najarilla, is one of the most picturesque defiles I have ever visited. The deep cutting the river has made serpentines interminably, and one often sees no way out in front, the banks are steep and broken by high and bold precipices, and varied by hanging woods, the dominant colour was derived from the great masses of the *Genista* (like *florida*) seen at Canales, which here abounded in great masses, but the colouring was very varied by the rocks and trees, and the yellow never became monotonous.

Aguiano is situated at a point where steep sharp ridges of rock nearly meet on each side of the stream, and with the high precipices they fall back into, and which follow the stream above and below, make a passage practically impassable till engineered, and no doubt most easily defended in times when that was a primary consideration.

Below Aguiano, whence we proceeded the following morning, the valley is more open, but still very picturesque at very many points. At Aguiano we saw *Lucanus cervus* somewhat freely on the wing, it seemed a spot where good collecting could be done, especially somewhat earlier in the season. The diligence left Aguiano at 4 a.m., and we had the pleasure of starting without breakfast. We got on the same day by train from Logroño to Tudela and Tarazona.

(*To be continued.*)

Some observations on the larvæ of Cossus ligniperda, with special reference to the Coleoptera haunting its burrows.

By NORMAN H. JOY, F.R.C.S., F.E.S.

Cossus ligniperda, Fb., is such a common moth in the Bradfield neighbourhood that I have had an exceptional opportunity of observing its depredations, although it is chiefly as a coleopterist that I have examined the trees it has attacked. These trees are in nearly all cases oaks, of which I know between 25 and 30. There are also two ash-trees in this neighbourhood, one quite killed, and one elm. In nearly every case about here the *Cossus*-infected trees are found in small groups of three or four close together; even in one large wood where there are a number of such trees they are arranged in four distinct groups. One often finds that one of the trees in a group is more severely attacked than the others, and is no doubt the original "source of infection." It is probable that, as a rule, the ♀ moth very seldom travels far before laying its eggs, generally laying them on the same tree it has been bred from, or at any rate on an adjacent tree. This would account for this grouping of infested trees. One also occasionally finds an old tree very much eaten, with no others in its vicinity. These solitary trees have obviously been attacked for many years by the moth, and it would be interesting to know if the tree is in all cases standing alone, *i.e.*, without a tree within a few hundred yards of it, or is only surrounded by young and healthy trees. In the few cases I know of, one of these conditions prevails.

I have noticed in every case that trees that have only recently been attacked have already got a large number of dead branches on them, and so no doubt are already on the down grade, and I have never yet seen a really healthy tree showing signs of attack. I believe that, as a rule, the moth lays its eggs on the tree from which it has itself bred, and here the young larvæ have a good chance of living under the already weakened bark, but that if the eggs are laid on a young and healthy tree the vitality of the bark resists the attack of the very young larvæ.

If a forester wishes to clear himself of this pest the quickest plan would be to cut down all the infested trees at the end of July. By this time all the ♀ moths would have laid their eggs, and the full-grown larvæ would not yet have left the tree, as one usually finds these wandering about in search of a place to hybernate at the middle or end of August. Of course, it would be necessary to keep a look-out during the next two years in case some eggs have been laid on a fresh tree. Besides this "radical cure," I believe good can be done in some cases by stripping off the dead and undermined bark in August and September: one thus often finds the larvæ in all stages just under the bark, and they are destroyed. In a few trees where I have done this while searching for beetles, I have found that the next year the sap no longer runs from the tree, the bare place left dries up, and the living bark heals perfectly round the edges.

The coleoptera that are found at the exuding sap and under the bark of *Cossus*-infected trees may be roughly divided into four groups: (1) The species that are exclusively found in such a situation or to which this sap is certainly a special attraction; (2) species usually found under bark or at sap, but which are not specially partial to the

Cossus trees; (3) species usually found in decaying vegetable matter and so are attracted by the fermenting sap; (4) the accidental visitors including several very common predaceous species.

The following belonging to the first group has occurred here: *Thamiaraea hospita*, Maerk., and *Thamiaraea cinnamomea*, Grav., abundant at most trees; *Philonthus fuscus*, Grav., six specimens under the loose bark of one tree; *Homalium planum*, Payk., rather common; *Epuraea decemgattata*, F., and *E. diffusa*, Bris. The former common this year but rare last, and the latter common last year but quite rare this. There can be no mistaking typical specimens of these two species or forms, but I have some, only a small proportion compared with the numbers of typical specimens I have taken, which are very puzzling and are evidently intermediate forms. *Soeronia punctatissima*, Ill., is very common; *S. grisea*, L., which I do not include in this group, I have only taken once. *Thalycra sericea*, Sturm, has turned up twice. *Cryptarcha strigata*, F., and *C. imperialis*, F., are both common at some trees. These pupate in the soft earth soaked in sap at the roots of the tree. Canon Fowler mentions *Silusa rubiginosa*, Er., as being specially attached to *Cossus* trees, but I have not yet identified it from here.

I have a list of eighteen of the bark-frequenting species that have been taken "at Cossus." Among the most interesting are—*Quedius ventralis*, Ar., which I have taken once; *Homalium planum*, Payk.; *H. punctipenne*, Thoms.; *Epuraea deleta*, Er., the last two being two of the commonest species found at the exuding sap. *Ips quadripunctata*, Herbst, is common in one small group of trees, but I have found it nowhere else. *Rhizophagus ferrugineus*, Payk., I take commonly at another group of trees. Besides these I have taken *Dryocoetes villosus*, F., and *Xyleborus dryographus*, Ratz., in the dead bark around the "wound" in the tree.

Among the species of the third group are the *Homalota*, sometimes very abundant, but which I have not yet identified. *Aleochara succicola*, Th., and *Tachinus rufipes*, L., are two of the most characteristic of this group. The accidental visitors include such common species as *Pterostichus madidus*, F., and *Tachyporus chrysomelinus*, L. *Dorcus parallelopipedus*, L., I have taken twice. Besides coleoptera the most conspicuous species of other orders which frequently visit the trees are *Eugonia polychlorus*, L., and *Vespa rufa*. Wasps have been specially common this year at the *Cossus*-infested trees, as there has been such a short supply of fruit for them. I have on several occasions found a tree only recently attacked by the *Cossus* larvæ, by noticing a conspicuous mass of wasps at the base of a tree, for it has been in every case, but perhaps one, that I have found the primary attack within a few inches of the ground. As the sap does not run from the trees until June, this is the earliest month one can expect to find the beetles, but the best months are August and September, when apparently the larvæ are particularly active, and the trees quite dry up again by the end of October.

Agabus (Eriglenus) unguicularis, Thoms., and A. (Gaurodytes) affinis, Payk.

By W. E. SHARP, F.E.S.

To sufficiently discriminate between these species has, I think, been a difficulty which I have shared with many other coleopterists, and for this reason I venture to record the result of my investigation

into the subject, although it is, perhaps, not quite as satisfactory as could have been desired. *A. affinis* was described by Paykull in 1798 (*Fn. Suec.*, p. 211), *A.* (*Eriglenus*) *unguicularis* by Thompson in 1860 (*Skand. Col.*, ix., p. 102). The latter is a not uncommon species in the British Isles, and I have been able to examine specimens from Cumberland, Armagh, Askham bog (Yorkshire), Norfolk, and Esher (Surrey). The form known in our cabinets as *A. affinis* was introduced by Dr. Sharp to the British list on specimens taken by himself and the late Mr. Lennon near Dumfries. I have also received it from Mr. Day, of Carlisle, and Mr. Britten, of Penrith, taken in North Cumberland. It has also been recorded by Mr. Edwards from Brandon, in Suffolk (*Ent. Mo. Mag.*, 1890. p. 64). These latter specimens I have, however, had no opportunity of seeing. In Dr. Sharp's great work on the *Dytiscidae* the two species are described as follows :—

Oblongo-ovalis, niger, vix supra subæneescens, antennis pedibusque rufis, femoribus picescentibus, sublævigatus, elytris guttula pone medium maculaque apiciali pallidis, $6\frac{1}{4} \times 3\frac{1}{4}$. *A. affinis.*

Ovalis sat convexus vix supra subæneescens, antennis pedibusque rufis, femoribus picescentibus, subtillisime reticulatus, nitidus, elytris guttula pone medium maculaque apiciale pallidis, elytris punctis subseriatis at apicialibus haud profundis, epipleuris basi rufescentibus, $6\frac{1}{4} \times 3\frac{1}{2}$. *A. unguicularis.*

Now it is obvious that the disparity here expressed is insufficient to separate satisfactorily the two species, and comparison between the Dumfries specimens and admitted *A. unguicularis* hardly confirms the slight difference in sculpture thus indicated. In Canon Fowler's work more stress is laid on the shape, colour of body, and difference in colour of the reflexed base of elytra—pitchy-red in *A. unguicularis* and black in *A. affinis*. An examination, however, of a number of specimens of obviously the same species from the same locality shows that this latter character varies considerably, and cannot be relied on as a specific character.

Thompson (*Skand. Col.*, ix., 102) says of *A. unguicularis*: "Gaurodyti affini simillimus, sed . . . . prothorace lateribus piceis, apicem versus magis angustato, capite minori, metasternique laciniis lateralibus angustioribus discedeus;" and of *A. affinis*: "Mas tarsis anticis unguiculis brevibus, anteriore infra medium subtus dente valido acuto armato," and, further, "In mare structura ab affinibus optime distinguendus." Bedel (*Col. du Bassin de la Seine*, i., 245) does not mention *A. unguicularis* at all, but says of *A. affinis*: "♂ Ongle interne des tarses antérieurs armé d'un fort dent aigué."

As there is probably no doubt but that the specimens on which both these species were originally described were Scandinavian, I was anxious to obtain authentic examples from that country. This, however, proved to be a matter of some difficulty, as *A. affinis* especially seems to be a rare species there. Finally, however, through the kindness of Prof. W. Y. Sjöstat, of Stockholm, I have had the opportunity of examining Swedish specimens both of *A. affinis* and *A. unguicularis*. The latter differs in no respect from British examples of the species, and, as the specimens of the former were females, I was unable to verify the male characteristics as given by Thompson. There are, however, slight differences observable between the Swedish form and the *A. affinis* as known from Dumfries. The

shape of the latter is distinctly more elongate and parallel-sided, the legs and antennæ a clear red instead of somewhat infuscate, and the occipital spots much more distinct and of a brighter colour. These differences do not, however, appear to me to be sufficient to justify the assumption that our Dumfries insect may not after all be the *A. affinis* of Thompson—in fact, careful examination of the males, both of these and the Carlisle specimens, reveals the male characteristics, which, I think, are undoubtedly specific, very distinctly. The much shorter anterior tarsal claws, the "dens validus et acutus" of the same claws mentioned by Thompson, and more especially, a character to which my attention was first drawn by Mr. H. J. Thouless, of Norwich—that is, the difference in the stridulatory file. In *A. affinis* the teeth of this file are deeper, set at wider intervals, and generally much more distinct; the edge, also, of the abdominal cavity which bears these teeth is more abrupt, so that the organ is probably a more effective instrument than it is in *A. unguicularis*. These, of course, are all male characteristics, but quite sufficient to discriminate specifically between the two insects. I must confess, however, that I find the females exceedingly difficult to separate. I do not think the colour of the reflexed edge of the elytra is at all constant in either species, and the shape of body and colour of legs and antennæ are certainly comparative and probably variable. As regards the relative shape and size of the wings of the metasternum, I can hardly detect much difference, certainly "not enough," as Canon Fowler says, "to warrant their being placed in two different genera, as is done by Thompson." The relationship between the two species seems closely comparable with that which exists between *A. guttatus*, Payk., and *A. biguttatus*, Ol., which, similarly, can only be separated with certainty by the male characteristics.

In conclusion, I would sum up the differences, as far as I have been able to detect them, as follows:—

Form more parallel, colour deeper black, legs and antennæ a clearer red, occipital spots more distinct. In male, anterior tarsal claws shorter, outer claw armed with a very distinct large sharp tooth which extends to middle of claw, teeth of stridulatory file deeper and more distinct, edge of stridulatory cavity more abrupt. *A. affinis.*

Form more oval, colour with a slight æneous cast, legs and antennæ more infuscate, occipital spots less distinct. In male, anterior tarsal claws larger, with an inconspicuous tooth at base, teeth of stridulatory file finer, closer together, and less distinct, edge of stridulatory cavity rounded off. *A. unguicularis.*

A. unguicularis seems fairly widely distributed over Great Britain and Ireland, but of the occurrence of *A. affinis* further south than Cumberland more evidence is required. Both species probably belong to the "Celtic" or northern group in our fauna.

The egg-laying habits of Polyommatus admetus var. ripartii, with description of its ovum.

By H. POWELL.

This butterfly was fairly abundant, though local, in the Entrevaux district (Basses-Alpes) towards the end of July, 1903. Like nearly all the other species, it was quite a fortnight behind the usual date of appearance. In 1901 males were flying in the same locality as early as June 29th. Its favourite habitat is a rather bare slope of ground

below the oak and beech woods of the Montagne de Gourdon, and about thirty minutes' walk above the Neigeas cascade. Lavender grows abundantly here, also many small leguminous plants, including at least two species of *Onobrychis*, one of which, *Onobrychis crista-galli*, I subsequently found to be the foodplant of *P.* var. *ripartii*. This is not the only locality for these insects. They are met with on some other lavender patches in the district, but I have found them nowhere so commonly as here. They are lively little butterflies, not over easy to take when the sun is shining strongly. After sundown, however, all one has to do is to bottle them from the lavender flowerheads as they sleep. I have seen as many as half-a-dozen on one clump.

On July 31st I observed several females evidently on the look-out for the foodplant. I followed one of these for an hour, and had the satisfaction of seeing her lay five eggs in that time. She flew about in a fluttering fashion amongst the low growing plants, settling occasionally on a dry twig, but it was some time before she found the plant she wanted. Several times she alighted upon another species of *Onobrychis* with a much smaller leaf, but never for long, and no eggs were laid upon this plant. Finding an *O. crista-galli* at last, she settled on the top of a fruit-bearing twig, both fruit and twig being perfectly dry. She made her way slowly downwards, feeling carefully for a likely spot with the end of her abdomen, her antenna being bent towards the stem. She was very particular about finding the right place, and visited three or four twigs before deciding to deposit the eggs, digging the end of her body into all angles formed by the peduncles, bracts, and hollow cells on the fruit. At length she was satisfied, depositing her egg carefully at the base of a bract, between it and the stem. As soon as the egg was laid she flew off to a short distance for a rest, opening her wings to the sun. In a few minutes she again commenced her search, and after awhile laid another egg, this time deep down between the fruit and the calyx. The rest of the eggs were deposited in similar well-protected positions, but never on the leaves or any growing part of the plant. In the intervals she frequently went to take her rest on a lavender flower, and so got a feed at the same time.

The egg when fresh laid is light green, but it dries very rapidly, becoming whitish to the naked eye. Under the hand lens it strikes one at once as being very like a spikeless, dried sea-urchin. I examined it the same day under a microscope, which the local physician, Dr. Liautand, very kindly placed at my service.

Diameter at equator as nearly as possible 0·6mm.; height, 0·2mm.; shape, circular around the equator, but very much flattened top and bottom, being somewhat button-like. There is a small rather shallow crater above, leading to the micropyle. The egg is a very beautiful object, being thickly studded with white towers or knobs, each one the centre of a stellate arrangement of thin white walls or ridges. These ridges run up to the bases of the towers, dividing the egg-surface into elongated cells. The towers are hollowed out at the top. They diminish considerably in size near the micropylar depression, which is covered with minute cells, apparently modified from the surrounding star-tower system. The ground colour of the egg is pale green. To the naked eye, as stated before, it appears white when dry, though green when freshly laid. This change is due to the thick studding of

knobs and ridges, which, at first transparent, become opaque and white on drying.

The ground colour also gradually changes. By August 8th it had become greyish-white, and remained so until the first week in November, when it turned a distinctly darker grey, the egg hatching on November 10th. The young larva made a circular hole in the upper part of the egg, and through this it passed. It did not eat the empty eggshell.

Synopsis of the Orthoptera of Western Europe.

By MALCOLM BURR, B.A. F.L.S., F.Z.S., F.E.S.

(*Continued from p.* 44.)

Section II: Dictyoptera.

Division: Blattodea.

European cockroaches, excluding accidental visitors, represent four families, which may be distinguished in the following manner:—

Table of Families.

1. All femora spined beneath. Claws of tarsi with a pad between.
   2. Subgenital lamina ♀ broad and flat; principal (radial) vein of elytra with simple branching.
      3. Supraanal plate ♂ and ♀ round, transverse and narrow; wings, when present, with a clear, veinless, folded triangular area at the apex; oothecæ arched, longitudinally keeled .. .. .. Fam. 1. Ectobiidæ.
      3.3. Supraanal plate ♂ and ♀ triangularly produced; wings, when present, with no unveined apical area; oothecæ smooth, compressed .. .. .. Fam. 2. Phyllodromiidæ.
   2.2. Subgenital lamina ♀ with a valve; principal (radial) vein of elytra with many branches Fam. 3. Blattidæ.
1.1. Femora not spined beneath. Claws of tarsi, in ♂, with a very small pad, in ♀ no pad; ♀s are wingless; ♂s have developed elytra and wings, former with a broad and wide ulnar area .. .. .. Fam. 4. Heterogamiidæ (= Polyphagidæ).

The important characters for classification may be gathered from the above table. The members of the *Heterogamiidae* are not likely to be confused with the others; they are purely meridional species; the female is convex and apterous, and burrows in sand; the males are active flyers, and often come to light.

The *Blattidae* are the exotic cockroaches that have become established in many European towns under artificial conditions, and, from their larger size alone, are unlikely to be confused with the remaining forms. The two European species of *Phyllodromiidae* are easily known; *Loboptera* is black and apterous, somewhat resembling a woodlouse in appearance, and *Phyllodromia germanica* is now a familiar insect; it can be recognised at once by the two long parallel black stripes on the pronotum.

The wild cockroaches occur under dried leaves, moss, and refuse, on flowers and shrubs. The best way to take them is by sweeping.

Family I: Ectobiidæ.

Table of Genera.

Elytra perfectly developed, with distinct veins, sometimes abbreviated, never rudimentary .. .. .. Ectobia.
1.1. Elytra horny, veins not apparent, or hardly so, or elytra entirely rudimentary. Wings absent .. .. Aphlebia.

Genus I: Ectobia, Westwood.

Table of Species.

1. Disc of pronotum dark or black, with pale borders.
   2. Side margins only of pronotum pale. (Elytra of ♀ shorter than those of ♂) .. .. 1. lapponica, Linn.
   2.2. Disc of pronotum very black, all borders pale.
      3. Margins of pronotum uniformly pale; elytra of ♀ short, wings absent .. .. 2. albicincta, Brunner.
      3.3. Margins of pronotum speckled with black; elytra and wings surpassing abdomen ♂ ♀ 3. nicæensis, Brisout.

1.1. Disc of pronotum testaceous, pellucid or striolated.
   2. Very small; colour grey; elytra short in ♀ .. .. 4. panzeri, Stephens.
   2.2. Larger; colour of straw, or pale; elytra long in both sexes.
      3. Pronotum and elytra with a few specks; abdomen varied with dark .. .. 5. livida, Fabricius.
      3.3. No specks on pronotum or elytra; abdomen ♂ uniform beneath, or longitudinally striped; in ♀ pale .. .. 6. vittiventris, Costa.

1. Ectobia lapponica, Linn.

Of the northern species, this resembles *E. lirida* in size, but *E. panzeri* in colour. It is very variable, and the black parts often change to reddish, so that it sometimes resembles *E. lirida*. The larvæ are entirely black, except the sides of the pronotum which are pale. A good distinguishing character is the dark pronotum, with a clear, pale border. Length of body, 8mm.-11mm. ♂, 8mm.-9·5mm. ♀; of elytra, 8mm.-10mm. ♂, 5mm.-6mm. ♀.

Widely distributed, and not uncommon in northern and central Europe, Lapland, Finland, Denmark, and northern Norway (where, according to Linné, it eats the dried fish of the Lapps); in England, it has been taken in several localities, from the Isle of Wight to Liverpool: it occurs in all France, though chiefly in the north. In Belgium, it is recorded from the Ardennes, from Condroz, Campan, and Brussels. It is common in upper and lower Austria. In southern Europe it is rarer, but occurs sometimes on mountains, as on Mount Etna. In Spain it is rare, but noted from Corunna, Lugo, Villa Rutis, and also from Lisbon.

The variety *pallida*, Stephens (*teste* de Selys), in which all the body is paler, and the pronotum reddish, has occurred in Belgium, at Ahin, near Huy, and it seems to be the commonest form in Spain.

2. Ectobia albicincta, Brunner.

Distinguished by the semicircular pronotum, with black centre, surrounded by a pale ring. Length of body, 7mm. ♂, 8mm. ♀; of elytra, 6mm. ♂, 4·5mm. ♀. A rare south-eastern species that has been taken in Tuscany.

3. Ectobia nicæensis, Brisout.

Differs from the former in the speckled pale border of the pronotum. Length of body, 6·2mm. ♂, 7mm. ♀; of elytra, 5mm. ♂, 6·8mm. ♀.

A rare species found near Nice, and at Digne, and St. Martin (Basses-Alpes).

4. Ectobia panzeri, Stephens (=*ericetorum*, Wesmael).

Known by its small size and speckled greyish colour. The northern specimens are usually darker, sometimes nearly black, and the southern

forms paler. The var. *nigripes*, Steph., is probably the same as *haeckeli*, Bol., which was formerly wrongly attributed to the former species. The general colour is black, with the black pronotum pale bordered. The var. *concolor*, Serv., is paler, of an uniform colour. Length of body, 7mm.-8mm. ♂, 6mm. ♀; of elytra, 6·5mm.-7·5mm. ♂, 8mm. ♀. [It will be observed that the elytra of the female are shortened.]

Common on the south coast of England, especially on the coast itself. In France it occurs chiefly in the north and centre. In Belgium it is common, especially on the coast, as on the dunes near Ostend, also at Lanaeken, Calmpthout, and Oostmarl. In Germany it is rarer, but occurs in the Buchenwald, and at Nürenberg; and in Switzerland, in Valais. The var. *haeckeli*, if it be really the same as *nigripes*, occurs on the English south coast: it is recorded from Ferrol. The var. *concolor*, which also occurs at Ferrol, is the common form of central and southern Spain; it occurs also on the north coast of Portugal, Lugo, Corunna, Espinho.

5. Ectobia livida, Fabricius.

The straw-colour, with a few specks, and entirely developed wings and elytra in both sexes, distinguish this species. Length of body, 9·5mm. ♂, 8mm. ♀; of elytra, 10mm. ♂, 6·5mm. ♀.

The larvæ are at first reddish, darker posteriorly; later they are entirely pale above, with a dark band between the eyes.

Common in central and southern Europe. In England it is widely distributed, but less common than the preceding species; it occurs in the New Forest. In France it is common from Hyères to Paris. In Belgium it is recorded from Rochefort, Colbeau, Brussels, Ahin, and Rouge Cloitre. It is also common in Upper and Lower Austria, where it is said by Krauss to cross with *E. lapponica*. It occurs also in nearly all the Iberian Peninsula: Barcelona, Valencia, Cartagena, Vergara, Monsagro, Ucles, El Sitio (Serrannia de Cuenca), Coimbra; In Italy, at Pegli and Voltaggio; also in Guernsey.

6. Ectobia vittiventris, Costa.

Distinguished from the preceding species by the entire absence of specks and the pale underside, sometimes banded with black. A poor species, that is, perhaps, only a variety of the preceding. Length of body, 8mm. ♂, 6mm.-7mm. ♀; of elytra, 9mm. ♂, 7mm.-8mm. ♀.

A meridional form; in France, at Montpellier and Var; in Switzerland, at Geneva; in Italy, at Voltaggio, Naples, Messina; and in Tuscany. It is noted from Spain by Brunner, and from Portugal by Fieber, but has not been found by Bolivar. It is found also in Algeria and South Africa.

(*To be continued.*)

Swiss butterflies in 1903.

By W. G. SHELDON.

My experience in late June and early July, 1902, had made it evident to me that, for collecting butterflies frequenting heights of 5000ft. and upwards, I was a fortnight too early for the very best time, accordingly, this year I timed my visit to the Rhone Valley and the surrounding mountains a little later. The morning of July 12th

found me, at Aigle, bound for the well remembered Sepey road, accompanied by Mr. Sloper, who had been staying at that village for some time, and my son. After one's recent English experience, several miles of tramping, a drenching, and half-a-dozen specimens on a good day, varied by the drenching and the tramping, without the specimens, on a bad day, the brilliant blue sky and wealth of insect life were indeed a welcome change.

As one walked up the zigzags, *Polyommatus damon*, both sexes, began to appear, together with plenty of *P. corydon* and some *P. hylas*, a belated specimen of *Lycaena arion* was netted; the large Argynnids, *Argynnis aglaia*, *A. adippe*, and *A. niobe* var. *eris*, were of course there, and I picked up my first *Epinephele lycaon*, a male, easily distinguished from *E. jurtina* when one knows the points of difference, but not otherwise; presently we came to the rocks and the species changed for the better, *Apatura iris* was not infrequent here and in good condition; owing to an unfortunate accident to my net, however, I only managed to get one "emperor." Small examples of *Limenitis sibylla* were frequent, and fine ones of *Satyrus hermione*, of both sexes, swarmed, with a few nice, and welcome, females of *S. cordula*. *Thecla ilicis* was in its customary abundance, together with a few *Zephyrus quercus*; whilst in the shady glades *Pararge achine* flew here and there. Skippers were not prominent, and I only noticed a few *Pyrgus sao*, and a single *Carcharodus althaeae*. I was much pleased to get some fine and varied females of *Melitaea didyma*, for I had only obtained one female the previous year. My son found a larva of *Papilio podalirius* feeding on a species of *Prunus*, this pupated in due course, but the imago has not yet emerged, and is evidently going over until next year (1904).

July 13th found me on the old ground, Martigny to Vernayaz, which, however, was not so prolific as last season, the wealth of Lycænids and Melitæas was represented by but few examples, evidently this is especially a June locality, the second broods were in, several emerging. On this and the following day I obtained *Gonepteryx rhamni*, just appearing; *Limenitis camilla*, in some numbers; *Vanessa io*, *Eugonia polychloros*, just emerged: *Melitaea phoebe*, almost over; *M. didyma*, females again, and very typical ones; a single *Melitaea athalia*, the only one seen in Switzerland by me this year; an odd *Brenthis amathusia*: a few *Argynnis daphne*, somewhat *passé*: *Argynnis aglaia*, *A. niobe*, type, and var. *eris*, *A. adippe*: and swarms of *Dryas paphia*, including one or two pale spotted forms. A few *Erebia stygne* still lingered, and there were plenty of *Satyrus hermione*, females of *Chrysophanus gordius*, were not uncommon, and were still in good condition, and with them I was much pleased to see the brilliant *C. virgaureae* for the first time. One's first sight of this species raises vivid fancies of what a gorgeous creature our lost *C. dispar* must have been; I also took a single female of *C. hippothoë*. *Polyommatus amanda* was almost over, but I managed to get one or two tolerable females, and some *Polyommatus hylas* and *P. eumedon*: a large blue netted proved, to my delight, to be a fine male *P. meleager*, and one other specimen escaped after being actually in a pillbox, an instance of injudicious curiosity on my part. *Cyaniris argiolus* was just appearing in the second brood, and my captures of it included a fine female with broad, dark borders, practically identical with our British summer form. I was pleased to get a few *Thecla spini* for the first time.

A morning spent on the banks of the Rhone was not unprolific, on the way I picked up a fine *Apatura ilia*, settled on the road, some *Cupido sebrus*, with plenty of *Rusticus argus* (*aegon*) and *R. argyrognomon*. A fine form of *Hipparchia semele*, approaching var. *aristaeus*, was plentiful. I was unlucky with *Lycaena iolas* once more, half-a-dozen specimens were netted, but they were all mere rags, and this species can get ragged. Evidently I was two or three weeks too late. An afternoon round the "Tour de la Batiaz" was chiefly notable for the number of female *Satyrus cordula* taken, including an aberration with four equal-sized white ocelli on each forewing, equidistant, in a line, and with black rings round, a very striking form.

July 16th and 17th were spent at the Col de la Forclaz, a very charming locality, on a breezy ridge of about 5000ft. elevation, half-way between Martigny and Chamonix, and reached from either by a good road. I have not seen a more promising locality in Switzerland, the country all round teems with butterflies, and one can get amongst them by easy walks in all directions; if one wants valley species, a walk down towards Martigny will give any amount, whilst if mountain species are required, the collector has a choice of half-a-dozen easy ascents, in addition to which, very many species are to be taken just outside the hotel, or on the walk to the Glacier de Trient. There is a very good and comfortable little hotel, whose proprietor is most obliging, his cuisine excellent, and his charges five francs per diem, what more can one wish for?

Of the two days I was able to spend here, one was wet, and unsuitable for collecting, consequently only the fringe was touched of the wealth of insects that abounded everywhere. In the meadows round the hotel, *Erebia tyndarus* swarmed, with many *E. melampus*, *E. ceto*, *E. stygne* and *Chrysophanus hippothoë* var. *eurybia* was abundant, including specimens very near the type; alongside the path leading to the Glacier de Trient, in the clearings amongst the larches, all the above species occurred, and with them were fine *Erebia ligea*, *Melitaea dictynna*, *Polyommatus corydon*, *Chrysophanus virgaureae*, *Brenthis amathusia*, *Chrysophanus dorilis*, and mingled with these were wanderers from the higher pastures, including *Colias phicomone*. Two fine male *Polyommatus optilete*, captured, made one wish we had allowed more time here, for doubtless it was plentiful 1000ft. higher up. I shall certainly hope to revisit the Col on my next holiday in Switzerland.

July 19th found us once more at Bérisal, where we found quite a gathering of lepidopterists. The Rev. C. Wheeler, Mr. A. H. Jones, and Mr. F. C. Lemann amongst them. Down by the 2nd Refuge *Rusticus* var. *lycidas* still lingered, with a few specimens worth catching. Along the Ganter Valley, *Polyommatus damon* swarmed, and amongst them I picked up a very fine underside male aberration, in which the whole of the spots on all wings, except the discoidals, were wanting; on the same day I also obtained a fine underside male aberration of *Polyommatus escheri*, with the whole of the spots, inside the peacock eyes, except two on the left forewing, and one on each of the other wings, missing.

Round the hotel *Erebia melampus* was abundant, and in good order, and specimens of *E. ceto* were still in evidence. *Argynnis niobe* ab. *eris*, *Melanargia galatea*, and other species, were frequent, *Epinephele lycaon* was not common; by the Ganter bridge the fine *Erebia goante* was not

infrequent, *Satyrus cordula* was apparently over, but there were plenty of *S. hermione*, *Hipparchia semele* and *Polyommatus corydon* abounded. Above the bridge the coppers, *Chrysophanus virgaureae* and *C. hippothoë* var. *eurybia* flashed in the sun like gems, *Polyommatus hylas* was not infrequent, and my son netted here the finest *Lycaena arion* var. *obscura* I have ever seen, large, in perfect condition, and with the bases of the wings light blue, the outer portions jet black, and the line of demarcation very pronounced. *Hesperia cacaliae* and *H. alveus* were abundant, and my captures of the latter species included two *H.* var. *cirsii*, *Pamphila comma* was not rare, and consisted chiefly of *P.* ab. *flava*. A day in the Steinenthal, principally with the object of completing my series of *Colias palaeno*, was not particularly successful from this point of view, *C. palaeno* was very abundant, but in bad order, and out of several dozens netted, only three or four were worth retaining, I, however, came across a perfect cloud of *Polyommatus orbitulus*, drinking at a runnel, and sweeping vigorously amongst them I obtained more than sufficient for my purpose, and the same netful produced a dozen *P. eros*; other species observed in the Steinenthal were *Parnassius mnemosyne*, *Aporia crataegi*, *Pieris callidice*, *Colias phicomone*, *Melitaea aurinia* var. *merope*, *M. parthenie* var. *varia*, *Erebia mnestra*, and *Lycaena alcon*. One day my son climbed high on the Bortelalp, and brought back, *Melitaea cynthia*, *Brenthis pales*, *Erebia lappona* and *Hesperia alveus*.

July 24th and 25th we stayed at the Hotel at the top of the pass, and collected there. Specimens here, though not so numerous as at Bérisal, were in far better condition; *Colias palaeno* and *C. phicomone* were not infrequent, and were in fine order, *Pieris callidice* were scarce and *passé*, *Melitaea aurinia* var. *merope* occurred generally in odd specimens. The only blues observed were *Polyommatus optilete*, some half-a-dozen, and *Lycaena alcon*, pretty abundant; *Brenthis euphrosyne* still occurred, and *B. pales* was in swarms.

We spent a very successful afternoon on the slopes above the fifth refuge, perhaps the best ground on the Simplon, where *Parnassius delius* was to the fore, and my series was soon completed. Much wanted females of *Colias phicomone* were depositing ova in the sheltered hollows in some numbers, *Erebia cassiope*, *E. mnestra* and *E. gorge*, flew here and there, and amongst the hosts of *Brenthis pales* I netted a very fine ab. *napaea*. On the morning of our departure, my son, on edelweiss intent, climbed to the foot of the Kaltwasser glacier, reporting, on his return, *Erebia glacialis* quite common, and he even caught one female with thumb and finger.

July 26th we moved on to the Simplon village; whilst here I had two mornings in the Laquinthal, my primary object being, of course, *Erebia christi*. I was unfortunately a fortnight too late for this species, and only obtained one imperfect female. The wealth of other species obtained here, however, well repaid me. *Brenthis amathusia* was in great profusion, and I obtained all I wanted in a few hours, including plenty of females. *Erebia melampus*, *E. tyndarus*, and a small form of *E. ligea*, were all abundant, and I netted here the only *Erebia aethiops* seen by me in Switzerland. *Chrysophanus hippothoë* var. *eurybia* occurred, also *C. dorilis* and swarms of *C. virgaureae*: *Melitaea dictynna* flew freely in the clearings, and a number of *Parnassius apollo* females were in evidence. My son obtained, in the meadows below the village,

a very fine underside aberration of *Lycaena arion*, the only good one I ever remembered seeing, in which the usual ocelli on the inferior wings are elongated into a series of streaks, the spots on the left forewing are almost obsolete, those on the right one normal. Unfortunately the specimen, like so many abnormal forms, is somewhat crippled. Other species taken were *Rusticus argus*, *R. argyronomon*, *Polyommatus astrarche*, *P. eumedon*, *P. hylas*, and *Nomiades semiargus*, all pretty frequent except the last named. Amongst the skippers we found *Thymelicus lineola*, *Pamphila comma* and *Hesperia alveus*, whilst *Coenonympha satyrion* was not infrequent. I could only get a few hours down the wonderful gorge of Gondo, but I much regretted afterwards that I did not spend more time there, for several very welcome and unexpected things turned up within a mile of the upper end of the gorge, including a fine specimen each of *Argynnis adippe* var. *cleodoxa* and *Melanargia galatea* var. *procida*. I believe but few specimens of these forms have ever been taken within the Swiss border. The latter specimen had a very striking appearance on the wing, very different from the typical *M. galatea*, and, until I had it in the net, I thought I was pursuing a *Limenitis*, or possibly *Neptis lucilla*. In addition to these two specimens, I obtained *Erebia goante*, commonly, *E. evryale*, *Polyommatus astrarche*, *Pyrgus sao*, and *Pararge moera*, strangely enough, for this late date, in fine condition.

On July 28th we returned north, *en route* for Zermatt. After spending the night at Brigue, I spent a few hours collecting under the cliffs by the Rhone; here, after two or three futile attempts at stalking, I managed to catch my first *Euranessa antiopa*, a fine large specimen in the pink of condition. One's first *antiopa* is an event for most of us, almost as exciting as the experience must have been to the old collectors at Camberwell, and my specimen is certainly a much finer one. I obtained another new species, to me, in the fine *Enodia dryas*, almost as large as *E. antiopa*, of a rich brown hue, and with lovely blue ocelli, certainly one of the handsomest of European Rhopalocera. Plenty of *Polyommatus corydon*, *P. baton*, *Colias edusa*, *Pyrgus sao*, and other things were flying about, and I obtained some fine *Thecla spini*.

From July 29th to August 3rd we stayed at the Riffelalp Hotel, above Zermatt, and were fortunate in having ideal weather whilst here. Collecting was not, however, the success one hoped for, the beautiful alpine flowers were almost gone, and, although certain butterflies were abundant, many of them were evidently past their best. This was to me rather surprising, considering the date, and that the ground collected was from 7500ft., the height of the hotel, to over 10000ft. We walked up to the Gornergrat, chiefly with the object of obtaining *Erebia glacialis:* on the way up we obtained a few *E. gorge*, but I did not see any signs of *E. glacialis*, and being insufficiently clad to face the keen breeze at this high altitude, over 10000ft., I soon had had enough of it, on the way down obtaining more *E. gorge*, some *E. cassiope*, *E. lappona*, plenty of *E. mnestra*, a few *Melitaea cynthia*, *Brenthis pales*, and *Argynnis niobe* var. *eris*. On my son's return I was suprised to find that he had obtained three specimens of *Erebia glacialis*.

The next day, however, we found a much better locality for this species amongst the rough boulders by the Findelen glacier. This is only at the same altitude as the hotel, and thus saves the fatiguing

climbing which is usually associated with the capture of this, the most alpine of all European butterflies. Apart from the awkward nature of the ground frequented—it is a steep loose slope, strewn with huge boulders, and on which a slip would probably mean a broken limb—and apart from the possibility, by no means remote, of starting one of the huge boulders down the slope upon one's self, *E. glacialis* is not difficult to negotiate, and we managed to get a dozen specimens in the afternoon, which I suppose is fairly good for this species, most of them would answer to the description of ab. *alecto*. *E. glacialis* is an interesting species to hunt and observe: the larva is said to feed upon grasses, but certainly neither grasses nor vegetation of any kind grow in the spots where I have seen it flying, these are loose sandy slopes strewn with boulders. The butterfly, which is unmistakable, on account of its large size, from all other Erebias occurring at these heights, is usually first seen moving with the slow flight peculiar to the genus, and occasionally sitting on the stones. Your best chance is to watch it down, and then stalk it, for it is next to impossible to progress at a sufficient rate on the difficult ground to overtake it in flight. Other species obtained on the Riffelberg were *Polyommatus optilete*, plentiful in both sexes, *P. eros*, *P. orbitulus*, *Cupido minimus*, and one or two *Pieris callidice*, *Colias palaeno*, and *C. phicomone* were frequent, and in good order, and I was able to complete my series of both species, *Melitaea aurinia* var. *merope*, and *M. parthenie* var. *varia* were plentiful; amongst the skippers I took *Hesperia cacaliae* and *Pamphila comma*; *Coenonympha satyrion* was not infrequent, and I saw one ragged specimen of *Chcis aello*, the only one observed this year; I also obtained a solitary female of *Issoria lathonia*.

From Zermatt we travelled straight to England, after spending a most enjoyable holiday. The weather was not invariably fine, but the rain generally fell during the night, and our collecting was not much interfered with by the elements, in fact, there was not a single day on which we did not get something, and the fact that we obtained, or observed, in all 118 species in 21 days' collecting, was fairly satisfactory, considering the extraordinary season that has just ended.

NOTES ON COLLECTING, Etc.

Lepidopterological notes from the Middlesex and Herts border for 1903.—The season of 1903 was the worst I have experienced, and very little of interest was met with, quite a number of species being conspicuous by their absence. As in 1902, I found that the only method of taking moths which was at all successful was by means of a light trap; but only two species (*viz.*, *Asphalia diluta*, September 23rd, and *Hadena thalassina*, June 3rd) of those taken in this way were new to my list for this particular locality. Of those which had occurred before, the following were the best; the dates following the species indicate the earliest appearance:—*Leiocampa dictaeoides* (July 19th), *Dipterygia scabriuscula* (*pinastri*) (June 30th), *Luperina cespitis* (August 30th), *Pachnobia rubricosa* (April 28th), *Conoptera libatrix* (March 21st), *Habrostola tripartita* (*urticae*) (June 12th), *Plusia chrysitis* (July 4th), *Zanclognatha tarsipennalis* (July 9th), *Epione apiciaria* (August 30th), *Pericallia syringaria* (July 16th), *Selenia lunaria* (June 6th), *Crambus perlellus* (July 9th), *Aphomia*

sociella (July 4th), *Tortrix forsterana* (June 29th), *Penthina ochroleucana* (July 9th), *P. cynosbana* (July 10th), *Spilonota rosaecolana* (July 4th), *S. roborana*, *Sciaphila nubilana* (July 7th), *Yponomeuta cognatella*. The sallows were out by March 7th, but the results of several evenings' work were a few each of *Taeniocampa stabilis*, *T. cruda*, and *T. munda*. At sugar about the same time I took *Asphalia flavicornis*, *Scopelosoma satellitia*, and *Cerastis vaccinii*. On March 21st I went out for *Brephos parthenias*, but found it was going over, most of those taken being worn. The best time of day to obtain this species is between three and four o'clock in the afternoon, when it generally flies low down, and may be easily netted. *Diurnea fagella* was first seen March 22nd. To obtain females, the birch trunks should be searched after dark with a lantern, when they will be found paired with the males about 4ft. from the ground. Sugaring during the summer months was practically useless; but, in September, a few species were taken, including *Catocala nupta*, *Citria fulvago*, *Hadena protea*, *Agrotis ypsilon*, and *Miselia oxyacanthae*. *Polia flavicincta*, which has been mentioned by some entomologists as being particularly plentiful last autumn, did not put in an appearance here. The ivy bloom was soon ruined by the persistent and heavy rains. The only specimens worth taking were a few *Orthosia macilenta*. Searching palings and tree-trunks in the spring produced the following:—*Anisopteryx aescularia* (first seen February 1st), *Hybernia rupicapraria* (February 7th), *H. marginaria* (*progemmaria*) (February 7th), *Tortricodes hyemana* (February 8th), *Hybernia leucophaearia* (February 10th), *Phigalia pilosaria* (February 20th), *Anticlea derivata* (May 9th), *Hemerophila abruptaria* (May 10th). *Larentia multistrigaria* was not observed at all. The following were also observed at odd times during the spring:—*Depressaria applana* (February 27th), *Taeniocampa instabilis* (at plum blossom April 19th), *Eriocrania subpurpurella* (May 8th), *Pieris brassicae* (April 11th), *Panagra petraria* (May 19th), *Odontopera bidentata* (May 19th), *Lophopteryx camelina* (May 21st), *Catoptria ulicetana* (May 24th). In June, *Triphaena fimbria* emerged, the larvae having been found here in early spring; and, in July, *Tethea subtusa* and *Nola cucullatella* were bred from larvae found here in May. In July, also, *Dictyopteryx loeflingiana*, *Sciaphila nubilana*, *Sericoris urticana*, and *Glyphipteryx fuscoviridella* were taken. The Vanessids, *Vanessa io*, *Pyrameis atalanta*, and *P. cardui*, were observed frequently in our garden in September, particularly the last named. *Depressaria ocellana* was also captured in that month. We secured a very good lot of *Hybernia aurantiaria* and *H. defoliaria*, males, in November, by searching birches after dark with a lantern. This seems by far the best way of getting *H. aurantiaria*. We only found two females of the latter, and one of *defoliaria*, but these have laid a number of eggs.—PHILIP J. BARRAUD, F.E.S., Bushey Heath, Herts. *February 11th*, 1904.

HABITS OF ORRHODIA VACCINII AND O. LIGULA.—Last autumn *Orrhodia vaccinii* was abundant in the New Forest, but no *O. ligula* appeared. Does this species ever occur in woods? I do not remember seeing it on sugar in a wood. I never take it in the woods here, though it is common at ivy in my garden, and sugaring in the fields and hedgerows produces plenty. On the other hand, I do not find *O. vaccinii* in my garden. I should be glad to know if any reader has shared my experience with these two species.—F. C. WOODFORDE, Market Drayton. *December 14th*, 1903.

Apropos of Mr. Woodforde's question *re* localities for *O. ligula* and *O. raccinii*, I take both at ivy in my garden. Here, as far as I know, *O. raccinii* larvæ feed on elms; I have bred it from pupæ found at the roots. Are there elms near Mr. Woodforde's garden?—W. S. RIDING, M.D., Buckerell Lodge, near Honiton. *January 8th*, 1904.

In answer to Mr. Woodforde's query, I have always taken *O. ligula* at sugar in the woods here. It is very scarce in this district, however, and I have never yet met with it at the sallow bloom, where *O. raccinii* is so often abundant.—S. WALKER, York. *January 18th*, 1904.

In reply to Mr. Woodforde, I get both *O. raccinii* and *O. ligula* here, the former usually in swarms and the latter sparingly. I get them both at ivy on the garden wall and on sugared trees at the edge of the wood. *O. raccinii* I also get commonly at light, but I find no record of *O. ligula* so occurring. *O. raccinii* here feeds on whitethorn, at least I have bred it from larvæ found on whitethorn hedges, although, of course, it may feed also on many other things for anything I know.—E. F. STUDD, Oxton. *January 30th*, 1904.

NOTES FROM HERTFORD.—On March 28th (1903) we found numbers of larvæ of *Callimorpha dominula* on a sunny bank under a hedge, with a ditch full of water below. The larvæ were feeding on all sorts of low plants, chiefly dandelion, groundsel, etc. Later on they feed voraciously on prickly comfrey, which grows there, but which, at this time, had not yet appeared. Those we took did very poorly in confinement; many died, possibly because of the change from wet food to dry.—(MRS.) M. E. COWL, Rhinefield, 89, Ware Road, Hertford. *February 18th*, 1904.

HATCHING OF EGGS OF POECILOCAMPA POPULI.—On April 13th last ova of *P. populi* (laid on November 25th) began to hatch, a few came out each day for about ten days.—IBID.

LEPIDOPTERA AT KING'S LYNN, IN 1903.—The last season was, I think, the worst I ever remember for lepidoptera, so far as this district is concerned. When the weather was fine enough to do a little field-work insects appeared to be scarce, and, more frequently than not, worn to such an extent that recognition of species was by no means easy. During the first few days of June and the end of May I tried beating the oaks, etc., for larvæ. I did not find larvæ very plentiful, but obtained a few *Phorodesma bajularia*, several *Hylophila quercana*, two or three *Poecilocampa populi*, and commoner species such as *Hadena protea*, *Himera pennaria*, *Cheimatobia brumata*, etc. The last week in June, when netting a few *Tenthredinidae*, I noticed an insect buzzing at the bloom of wild raspberry, growing beneath alder trees, and, netting it, found I had a beautiful specimen of *Aegeria sphegiformis*: this was my first acquaintance with the species in the living state, although I believe Stephens gives Norfolk for it. In July, a few visits to the chalk bordering on the Breck sands were productive of a few good species, but mostly in small numbers, such as *Acidalia rubiginata*, *Agrophila sulphuralis*, *Stigmonota orobana*, and a beautiful specimen of *Anticlea sinuata*. Both *A. sulphuralis* and *S. orobana* were met with by me for the first time. The latter flies rapidly in the brightest sunshine, and is exceedingly difficult to net. *Acidalia ornata* was fairly common, but small, and *Cupido minima* in profusion. I only saw one *Oxyptilus distans*, but *Stenoptilia bipunctidactyla* was by no means scarce. *Melanippe rivata* occurred also, but *Heliothis dipsacea* was con-

specious by its absence. Two or three specimens of *Eupoecilia degreyana* are perhaps worth noting; these occurred apparently amongst *Plantago lanceolata*, *Linaria vulgaris* being absent from the spot. My series of *E. degreyana* consists of some two dozen specimens bred from larvæ obtained in this district two or three years ago from flowering plants of *Linaria* in August. Moths emerged the following September—no doubt a second brood! Knowing that Mr. Warren once bred *E. degreyana* from *Plantago lanceolata* I visited the ground again later in the year, when I took the two or three specimens referred to in these notes, and brought home a good-sized bag of flowers and seeding tops of *Plantago*. I could not detect larvæ in them, nor have I seen any crawling about since. I am keeping these in a flower-pot outside, and shall in due time watch for imagines, although I fear negative results. It looks as if we have here two species. At the end of July I found *Coremia quadrifasciaria* rather commonly by beating the outside of woods, but two-thirds of the specimens were worn, it being too late in the year for this insect. *Agrotis agathina*, which usually occurs here, did not put in an appearance at all, or at least I failed to find it. One evening, on the coast, in August, I got six *Crambus alpinellus* and two or three *Crambus fascelinellus*. It may be interesting to those who are collecting micros to know that I have met with *Cataplectica farreni* here—these I obtained by sweeping. I have also to record the occurrence of *Coleophora tricolor*, Wlsm., in this district, and of *Gelechia celerella*, on our coast. But in spite of the capture of a few good insects, I regard the last season as the worst I have ever experienced.—E. A. Atmore, F.E.S., 18, High Street, King's Lynn, Norfolk. *January 7th*, 1904.

In what stage does Amblyptilia acanthodactyla hybernate?—Mr. Tutt asks (*Ent. Record*, xv): In what stage does *Amblyptilia acanthodactyla* hybernate? My experience of the species is limited, but I have never seen an imago during the first half of the year, and I have frequently taken the insects at ivy in October-November. I have not tried to breed the species *ab ovo*, but once I did try to breed its ally, *A. punctidactyla*, and the imagines died within a few weeks of confinement, without laying. From the size of the larvæ, taken early in August, I should think the ova probably hatch during the first half of July, or even earlier. In August I have always found the larvæ on the flowers and upper parts of *Stachys sylvatica*, and they generally pupate on the main stem. I have examined the leaves of *Stachys* late in the year, when searching for possible ova which I have never found, but have not noticed them mined.—W. S. Riding, M.D., Buckerell Lodge, Honiton. *January 8th*, 1904.

Butterflies in Switzerland towards the end of June and early in July, 1903.—The following are some brief notes of captures of butterflies in Switzerland towards the end of June and early in July, 1903. The season was a late one and the weather not very favourable. Hence the record does not include some species that we had specially hoped to secure in the localities that we visited; still it may be of interest to others working over the same ground. We reached Göschenen, on the St. Gothard Pass, on June 20th. On the two following days it rained almost incessantly. On June 23rd and 24th it was fine, but there was nothing like continuous sunshine. On both days I worked the St. Gothard between Göschenen and Wassen, and on the

second day my wife and my son worked some little way in the Göschenen Thal. There was no abundance of insects except at one spot, a little above Wassen, and in the Göschenen Thal. The most interesting captures were *Pieris napi* var. *bryoniae* and *Chrysophanus dorilis* var. *subalpina* (approaching *brunnea*). The only Argynnid that we saw was *Brenthis euphrosyne*, the only Melitæid was *Melitaea athalia*, and the only Erebiid was *Erebia stygne*. The blues were *Lycaena arion*, *Nomiades semiargus*, *Polyommatus alexis*, and *P. astrarche*. We also caught *Papilio machaon*, *Parnassius apollo*, *Euchloë cardamines*, *Aporia crataegi*, *Coenonympha arcania* var. *darwiniana*, *Carterocephalus palaemon*, *Nisoniades tages*, and some other common species. On the evening of June 24th we moved from Göschenen to Lucerne, and on the following day walked part of the way up Pilatus, starting from Hergiswyl. There were not nearly so many butterflies as when we took the same walk on August 8th, 1901. The sun was not, however, shining continuously. Amongst our captures were *Colias hyale*, *Cupido minima*, *C. sebrus*, *Chrysophanus dorilis* (type), and *Coenonympha pamphilus* var. *lyllus*. From June 26th to 29th, days which we spent at Engelberg, it was brilliantly fine. Between Engelberg and Schwand we caught *Callophrys rubi*, *Chrysophanus hippothoë*, *Polyommatus astrarche* var. *allous*, *P. hylas*, *P. bellargus*, *Argynnis aglaia*, *A. niobe* (type), *Nemeobius lucina*, and *Hesperia alveus*. In the Surenen Thal, on June 27th, *Papilio machaon* and *Pieris napi* var. *bryoniae* were fairly plentiful, and *Cupido minima* was extraordinarily abundant. There were sometimes nearly a hundred on a square foot of damp earth, and they seemed in their habits more like flies than butterflies. If disturbed they hovered round without flying away. Other captures in the Surenen Thal were *Polyommatus eumedon*, *Chrysophanus dorilis* var. *subalpina* (again approaching *brunnea*), and *Melitaea dictynna*. On June 29th we visited the Trubsee Alp, but were disappointed in finding it entomologically barren. We were no doubt too early. The only fresh captures on this day were *Rusticus argus* and *Pararge hiera*. On June 30th it rained heavily, and on July 1st, when we moved on to Meiringen, it was cloudy. On July 2nd, between Brunig and Meiringen our captures included *Polyommatus eumedon*, *P. corydon* (very fine and abundant), *P. hylas*, *Argynnis niobe* var. *eris*, *Melitaea parthenie*, *M. cinxia* (a single worn specimen), and *Melanargia galatea*. *Colias hyale* was abundant but difficult to capture. On July 3rd it was very fine up to 3 p.m., when a heavy thunderstorm came on. Between Meiringen and Rosenlaui we found the best hunting-ground to be near, and some little way above, the Upper Reichenbach Fall. The number of insects very much diminished as we got nearer to Rosenlaui. Our fresh captures were *Brenthis amathusia* (very fine and fresh specimens), *B. selene* (rather worn), *Erebia ligea* (one specimen, just emerged, was very beautiful), *E. melampus*, and *Coenonympha satyrion*. From Meiringen we went on to Mürren, where we stayed until July 9th, but during the whole of our time there we had not more than a few hours' sunshine. We made a few fresh captures, namely, *Polyommatus baton* (a single specimen only), *Erebia oeme* (specimens showing considerable variety), *E. euryale*, *E. aethiops*, and a species of *Syrichthus* which I have not yet identified. I judge that the country near Trachsellauenen would be a first-class hunting-ground in more favourable weather. We left Mürren on July 9th

with snow lying thick all around, a very wintry scene. On the whole the trip was, entomologically, a little disappointing. Altogether we caught 65 species, 24 of which we had not taken in August, 1901. One of the advantages of going early in the season was that, with few exceptions, our captures were beautifully fresh specimens.—J. N. KEYNES, M.A., D.Sc., Cambridge. *January 3rd*, 1904.

LEPIDOPTERA OF SOUTHEND IN 1903.—My first note during the past wretched season refers to the emergence of a series of *Hybernia marginaria* (quite an ordinary lot from a black ♀), which appeared between February 21st and March 24th. My next note refers to *Dasysoma salicella*, an example of which I found on my coat when crossing Thundersley common on March 15th. *Trochilium crabroniformis* (larva) and *Diplodoma herminata* (larva) occurred, the former in, the latter on, a willow-trunk at Prittlewell, on April 15th. The *D. herminata* larva did very well for a time on a larva of *T. crabroniformis* which I had unfortunately crushed when attempting its removal from a stump, but was later on devoured by Luffiid larvæ which I had introduced as food. Larvæ of *Enbolia cervinata* were seen on the mallows at Fobbing, on May 10th; *Emmelesia decolorata* commenced to emerge on the 16th; *Lithocolletis salicicolella* on the 19th; *Stigmonota internana* and *Fidonia atomaria* were flying at Thundersley on the 24th; *Zanclognatha griscalis* emerged on the 30th, and a large number of larvæ of *Sarrothripa cratægella* were found in a web on hawthorn at Thundersley on the 31st (the moths resulting from these commenced to emerge on July 9th). June was a dreadful month, but yielded some interesting additions to my list. *Lithocolletis schreberella* and *Bactra tetraquetrana* emerged on the 5th; larvæ of *Lecioptilus lienigianus* were common on mugwort at Shoeburyness on the 6th (moths commenced to emerge on July 4th); *Bryotropha desertella* and *Gelechia diffinis* were flying over the sandy edge of Shoebury common on the 7th, and the first example of a series of 67 *Eucosmia undulata* emerged on the 8th; *Enchæmidophorus rhododactylus* larvæ were found near Thorndon park on the 16th; *Macaria notata* and *Phoxopteryx uncana* in the same locality on the 17th; *Episteria heparata* emerged from a Thundersley larva on the 19th, and *Blabophanes ferruginella* on the 22nd. On this date near Thorndon park, empty pupa-cases of *Ægeria sphegiformis* were found in stumps of alder, and an empty case of *Diplodoma herminata* was found on an oak-trunk; *Elachista albifrontella* was boxed, and ova of *Pygæra bucephala* found on an alder leaf on the 24th; *Hadena contigua* emerged on the 25th; several larvæ were found in September on Thundersley Common; *Depressaria umbellana* tumbled out of furze on Thundersley on the 28th, and *Cabera pusaria* form *rotundaria* emerged on the 29th. The month of July was not a bit better than the month of June. *Diplodoma herminata* (one only) was netted flying along an elm hedge, and a handsome larva of *Pharetra rumicis* was found on *Trifolium pratense* at North Shoebury on the 5th; *Teleia vulgella* emerged from hawthorn on the 9th; *Parasia lappella* was netted at North Shoebury on the 13th; *Tinea trapezella* occurred on the 16th; *T. corticella* in Thorndon Park, and *Gelechia costella* bred from *Solanum dulcamara*, on the 19th; *Endotricha flammealis* and *Apamea didyma* emerged on the 20th; *Coleophora gryphipennella*, on the 22nd; *Bryotropha domestica* and *Halia wavaria* occurred on the 29th close to North Shoebury churchyard, where lies Christopher

Parsons, whose name will suggest to all Essex collectors thoughts of *Phorodesma smaragdaria*, *Malacosoma castrensis*, *Papilio machaon* and *Depressaria depressella*. August was a very poor month—*Ephippiphora foenella* (worn) occurred on the 2nd; *Sphaerocampa ictericana*, the largest I had ever seen, and *Argyrolepia badiana* the smallest example I had ever seen (5‴ from tip to tip) on the 8th, on a leaf of burdock at North Shoebury; *Hydroecia nictitans* on a head of knapweed, and *B. praeangusta* on a poplar trunk at Vange on the 16th. In September, larvæ of *Gracilaria omissella* were common in blistered leaves of mugwort at Shoeburyness; *B. angustiorana* emerged on the 18th; *Pyrameis cardui* and *Plusia gamma* were common, and larvæ of *Spilodes palealis* rather scarce at North Shoebury on the 20th; *Agrius convolvuli* was seen at the electric light in Southend on the 23rd, and larvæ of *Cucullia asteris* were quite common on aster near Shoeburyness on the 27th. In October *Pyrameis cardui* was very common, I noticed large numbers on the 7th between North Fambridge and Woodham Ferris; *S. fabriciana* was on nearly every flowerhead at Barting on the 8th; larvae of *Eupithecia succenturiata* were very scarce on mugwort at North Shoebury on the 10th; larvæ of *Ebulea sambucalis* on elder at North Shoebury on the 18th. November 15th, cases of *Coleophora troglodytella* (very like those of the insect I know as *maritimella* and obtained from sea-wormwood) on *Eupatorium*, and larvæ of *Leioptilus microdactylus* were not uncommon in stems of *Eupatorium* at North Shoebury. *Gracilaria syringella*, always common, was abundant during the past season.—F. G. Whittle, 3, Marine Avenue, Southend. *January 16th*, 1904.

Hydroecia paludis and H. nictitans.—As notes concerning these species from different localities may be useful, I may record that I get a small dark orange-red insect here in the woods, which I have always considered to be *H. nictitans*, and identical with an insect that I took at sugar near Southampton, some years ago, also in a wood, towards Eastleigh. I also take a considerably larger insect, which to my eye always appeared distinct, at sugar, in Dawlish Warren, and which exactly agrees with the *H. paludis* taken by Mr. Ovenden on the Medway marshes. I remember that on the first occasion on which I took this insect Mr. Bower was with me, and we were both much struck with it, but supposed that it must be a form of *H. nictitans*.—E. F. Studd, M.A., Oxton, Exeter. *January 20th*, 1904.

At Torquay I have taken specimens very similar to those captured at Wallasey, and on the "mosses," by Mr. Day, and probably the same species as that taken by Mr. Studd at Dawlish Warren. These insects vary a good deal in size, some of them being no larger than an insect I take here, and which I assume to be the typical *H. nictitans*. These occur occasionally in fields round my house, and as this country used to be entirely woodland, and is still very much wooded, this bears out Mr. Tutt's remarks that *H. nictitans* is essentially a wood, and *H. paludis* a marsh or coast, species. Looking at a row of the Torquay *H. paludis* side by side with a row of the insect I get here, there seems to be a striking difference between the two species, and Mr. Tutt's remark, that the reniform stigma is much more conspicuous in *H. nictitans* than in *H. paludis*, is certainly borne out in my specimens; on the other hand some of my Torquay specimens are of a decided red colour, although even then they have, I think, a more glossy appearance than *H. nictitans*. The specimens I take here are nearly all of one form.—(Rev.) E. C. Dobrée Fox, M.A., Castle Moreton, Tewkesbury. *February 2nd*, 1904.

VARIATION.

Variation in males of Pericallia syringaria, second-brood.—A number of eggs laid by a ♀ *Pericallia syringaria*, captured in Dorset, duly hatched in July, 1903, and the larvæ were fed on privet. Wishing to get a second brood I kept the larvæ at a fairly high temperature, but only five fed up, the remainder (a hundred or more) evidently having determined to hybernate. The five grew rapidly, soon turned to pupæ, from which two ♂s and three ♀s emerged on September 23rd and the following days. It struck me that both the full-fed larvæ and pupæ were rather smaller than some I had previously reared in the first brood, but the moths emerged much about the usual size. What I particularly want to note, however, is that the ♂s, instead of having the normal orange colouring of the first brood, follow the colouring of the ♀s. Larvæ, resulting from a pairing of examples of this partial second brood, fed up to the hybernation stage, and are now almost the same size as their uncles and aunts.—G. O. Day, F.E.S., Knutsford. *January 4th*, 1904.

NOTES ON LIFE-HISTORIES, LARVÆ, &c.

Hybernation of Acidalia remutata.—Dr. Buckell asks (*Ent. Record*, xv., p. 22) whether this species hybernates in the larval stage. I can vouch for its doing so, as I reared it from the egg in 1897-8. Larvæ resulting from eggs laid in June, 1897, hybernated when quite small, woke again in April, and, pupating in May, produced imagines in the first week of June, 1898. I believe *all* British Acidalias hybernate in the larval state. The only possible exception is *Acidalia perochraria*, the larvæ of which, according to Barrett, feed on grasses (especially *Festuca*) from July to September.* But I doubt whether this species has ever been reared in England, and its conduct on the European continent is no criterion of what it may (or might) do in our rigorous climate. I have found that most Acidaliid larvæ on awakening in spring, take very kindly to hawthorn leaves when just expanded, particularly relishing the tender foliage of the youngest shoots.—(Rev.) G. H. Raynor, M.A., Hazeleigh Rectory, Maldon. *January 27th*, 1904.

Egg of Polyommatus escheri.—[Two of the three ova received have partially collapsed; the third appears to be quite perfect.] The egg is flat and disc-shaped (about the proportion of a Dutch cream cheese), pure white, and most beautifully sculptured with raised knobs at the intersections of the ribs, slightly over ·6mm. in diameter, height about ·2mm.: the base is nearly flat, and covered by a cell pattern, but this is somewhat obscured by the cement: the sides are bulged, the top nearly flat, but sloping in slightly to the centre, where there is a small pit or crater, the bottom of which is covered with a much finer and more delicate cell-pattern than any other portion of the egg. In the centre of this micropylar crater-like depression one can just make

* [The right of *Acidalia perochraria* to be considered British is surely very questionable. In the neighbourhood of Aix-les-Bains, where the species swarms, the imagines are on the wing in August, eggs are laid then and hatch (if we remember rightly) within a few days, the larvæ most probably hybernating. The egg is described under the name of *A. ochrata* (corrected in "Index") in the *Ent. Record*, ix., p. 292, and as we have given eggs to friends two or three times perhaps someone has a note of the life-history of the species.—Ed.]

out, under a $\frac{1}{4}$in. objective, what appears to be a minute raised process. The top of the egg exterior to these micropylar structures is covered with a strongly-developed cell-pattern. Owing to the way in which the cell-walls sweep outwards in the arcs of circles from the centre in opposite directions, the cells are diamond-shaped. The walls are much raised with processes at their intersecting points, which get larger, as do the cells from the centre outwards; while on the edge the processes become enormously developed, and are the most marked feature of the egg. On the sides they are still detached, but, owing to their being arranged in vertical rows, they give the effect when viewed from above of very coarse ribs. One of the eggs has 45 of these rows, but they are somewhat irregular as regards size at different portions of the circumference, and differ somewhat in the other two eggs. [Received from Mr. H. Powell. Described July 12th, 1903.]—A. W. Bacot.

Comparison of the ova of Noctua triangulum and N. ditrapezium.—The egg of the last-named species is the smaller, its diameter being ·650mm., height ·4mm. to ·45mm., that of *N. triangulum*, by comparison only, is ·8mm. to ·9mm. in diameter, by about ·5mm. in height. The egg of *N. ditrapezium* forms a somewhat rounded dome, curving in slightly at base; it is delicately, but clearly, ribbed and cross-ribbed. There are about 30 vertical ribs, 14 or 15 of which are short, the remainder of which cross the shoulder and run in towards the micropyle. The micropylar rosette of cells covers a quite considerable area, the centre of which is but very slightly raised. Colour, a delicate pearly-white. The egg of *N. triangulum* is not quite so rounded a dome, having a tendency to be cone-shaped. The number of vertical ribs is about the same, 16 long ones crossing the shoulder, and 14 short ones, delicately but clearly cut, as in that of *N. ditrapezium*. The micropylar area differs somewhat, there being a slight depression with a central raised button. There is a quite startling difference in colour, however, in that the ovum of *N. ditrapezium* darkens to a dull dirty-grey hue before hatching, while that of *N. triangulum* undergoes practically no change, remaining of a pure white right up to the emergence of the larva, the dark colour of head and anal plate of the larva showing up as two dark spots. [I have to thank Mr. Newman for ova of *N. triangulum*. Comparison made July 4th, 1903.]—A. W. Bacot.

Egg-laying and egg of Epione parallelaria (vespertaria).—Although not a very complete description, the following notes on the egg of *Epione parallelaria* (*vespertaria*) may be of use. The pairing takes place soon after dark, and the female will commence laying her eggs during the same night. When first laid the egg is primrose-yellow in colour: oval in outline, but rather flat at one of the poles. It appears to be a large egg at this time for so small a moth, but contracts a good deal when the usual depression, characteristic of fertility, takes place. I have not the exact number of eggs laid by a female, but they will not much exceed a hundred. The egg is firmly attached to the foodplant, and changes colour during the second and third days, becoming a coral-red, and remaining like this through the winter. I made a note of the appearance of the egg (on April 14th, 1893) under a good microscope, but I have not the power by me. It appeared then to be dark blood-red, with brilliant silvery spots in groups of seven each, over the

surface. By April 27th the egg had changed to dark blue, and the young larva emerged shortly after this.—S. WALKER, York. *January 18th*, 1904.

CURRENT NOTES.

Mr. Claude Morley has done a great service to British entomology in publishing his treble-titled book, of which we choose the one on the top of the title-page, *Ichneumonologia Britannica**, neglecting the second one here, and that on the cover. The evolution of our knowledge of every group of insects seems to take a definite course—(1) Muddle. (2) A systematic book of descriptions of the imagines by means of which they can be more or less accurately named by collectors. (3) General references in the magazines to their capture and breeding by collectors. (4) The accumulation and sifting of the records. (5) A scientific treatise dealing with the biology and oecology of the animals dealt with. It is something to have departed from the age of "muddle" in dealing with the Ichneumons, if only in one subfamily. An average man has now a chance of finding out what he has bred or caught, and, as a result, can give details of the economy of the species he has reared in the one case and its habits in the other. Mr. Morley's glossary is interesting and ranges from the meaning of "abdomen," "head" and "thorax" to "badious," "cribrary" and "hypopygium," some of the definitions being rather specialised, *e.g.*, a seta is "a *long isolated* bristle," quadrate means "square," linear means "narrow and equilateral," etc. Some parts of the introduction make interesting reading, and the biological section appears to be taken from reliable sources, although the continued use of "areae" for "areas" reads stiltedly and looks strange. In the history of the study of the *Ichneumonidae*, the separation of the work of British authors from the consideration of that of those of "Pre-Linnean" and "Post-Linnean" times, not only gives us no idea of their work as brought into line with their contemporaries, but suggests, in some measure, to the present-day entomologist, that they must be a future race who will follow the "Post-Linnean" authors. The classification appears to follow that recently published by the American authors, although, in his choice of terminology, he follows the older German authors in the use of the terminal "ides" for tribes instead of "idi," in spite of the fact that the former has been in use for divisions of superfamily value for some three-quarters of a century. In spite of the excellence of the descriptions of the species that Mr. Morley refers to given names, he fails, in not quoting the "original descriptions," to give the clue to students as to whether his species really is the same as that before the original author, when the species was first described. It may be urged that many of the earliest descriptions would cover equally well a dozen species (this is a common statement made by coleopterists), but this is really beside the point, for, in a case like this, the student wants to know that at least the species now being described does not disagree with, or contradict, the original description. The generic synonymy is bald, and gives no clue to the history of the genus and its contained species,

* *Ichneumonologia Britannica, The Ichneumons of Britain*, etc., by Claude Morley, F.E.S. Demy 8vo., 315 pp.+1pp., 1 pl., many woodcuts, 1903. [Pubished by James H. Keys, Whimple Street, Plymouth. Price 25s. net.]

whilst that of the species is often wanting in dates (without reference to the list of authors to whom reference is made). Of the economy of most of the species nothing whatever is known, and where a species has been bred, reference is rarely given to the original record, and one has to take the author largely on trust, *e.g.*, when he says that *Hoplismenus perniciosus* "has been bred on the continent from the pupa of *Satyrus maera* and from *Aspilates strigillaria*," for there is nothing to guide one to the original records to which one would be glad to refer for details. That the book will have as wide a circulation as Stainton's *Manual* is hardly to be expected, but it will serve exactly the same purpose as did that book half-a-century ago; it will enable students to get a general grip of the more modern views of the classification of the *Ichneumonidae*, based on external structural characters of the imago, it will help them to name a species whose life-history they have probably followed up with care, and enable them to publish the facts under the name that the species bears, and, if the other volumes be rapidly completed, will be considered by the present-day collector as the finished scientific work of his life beyond which one need not go, and interference with which (by addition or correction) will be held a cardinal sin, reminding one of those dear old lepidopterological friends, who forget that they are growing old or regret it, who weep at the changes in the Doubleday "List," and at the variations from Stainton's *Manual*, and fail to see that only the dear old *List* and *Manual* have enabled the collectors of the last half-century to amass the material scattered through the magazines, all of which has so little scientific value until collected, sifted and rebuilt into a whole, that even the most blind must see marks progress, even though they fail to understand it. Morley's book is a pioneer book, a book to be backed and supported by all entomologists who wish to see English entomology hold its place in the advance that is taking place in knowledge all over the world, supported out of the public funds in America, dependent upon the generosity of the educated in Britain. To Mr. Ernest A. Elliott, who has, we understand, guaranteed the cost of publication, and who is prepared to allow Mr. Morley to carry to completion the remaining five (we believe) volumes, if only expenses be paid, the thanks of all entomologists are due, whilst Mr. Keys deserves a word of praise for the get up and printing of the book, which is, as might be supposed when printed by an entomologist, almost entirely without the ghastly printer's errors with which the most careful author's work is too frequently studded.

Mr. J. H. Turner has indexed Parts I and II of *Practical Hints for the Field Lepidopterist*, and offered it to us for publication. Its utility is undoubted, but it appears to be inadvisable to publish this alone, as the sale is so uncertain. If, however, 120 subscribers will send in their names for a Part III to be published during the current year, with an index to the three parts included, it would be worth while undertaking the matter. The unusually successful sale of Parts I and II leads one to suppose that this small section of our subscribers will guarantee the work. We should be glad of names, which we will publish from time to time until the number is obtained.

We understand that the Rev. C. R. N. Burrows (The Vicarage, Mucking, Essex) is finding some difficulty in obtaining from lepidopterists, detailed information of the minor variation of the imagines of

Geometra papilionaria. There must be dozens of lepidopterists who, if they knew his requirements, would be pleased to give the required information. He particularly wants to know of examples having a blue-green tint, and a summarised result of the variation in the number of transverse lines on the fore- and hindwings.

The Presidential address to the Fellows of the Entomological Society of London, delivered by Professor E. B. Poulton, on January 20th, at the 70th annual meeting, was largely devoted to the subject "What is a species?" What is there to fill the vacancy left by the disappearance of the Linnean conception, founded on "special creation"? He urged that, in many respects, it would be advantageous to abandon the word, or to use it solely with its original logical meaning of "kind," or, as zoologists would say, "form." This view was, however, regarded as a "counsel of perfection," impossible of attainment; and the attempt was made to show that the conception of a naturally and freely interbreeding (or syngamic) community lies behind the usual definitions; and that the barrier between species is not sterility, but simply cessation of interbreeding (or asyngamy).

Mr. W. S. Blatchley has laid orthopterists under a great obligation by the separate publication of his work *The Orthoptera of Indiana**. The work is excellently arranged and well printed, the descriptions are good as also are the keys to the various families and genera, whilst the first-hand observations of the author on the habits of many of the species form an excellent feature of the work. Altogether it is a work to be consulted by all interested in the systematic study of the orthoptera of North America, and also by those interested in the broader question of the habits of insects of this group.

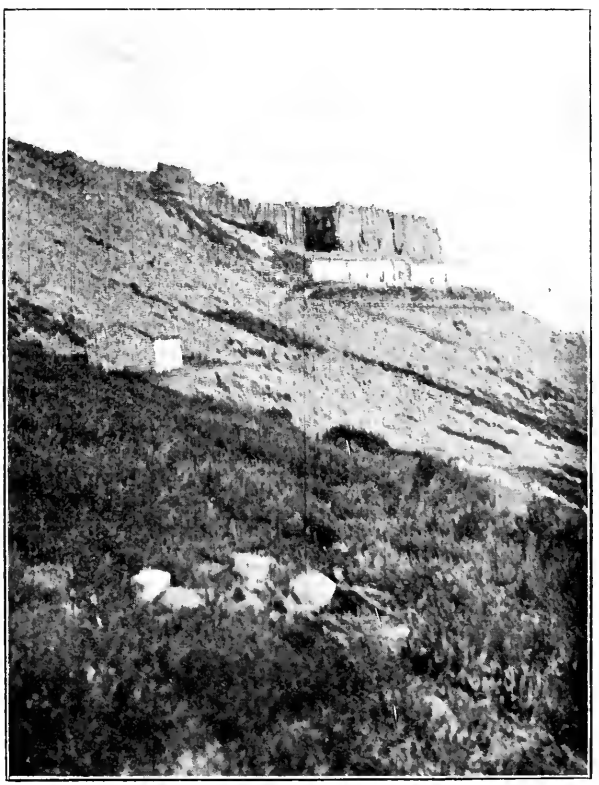
The Rev. E. Bloomfield (*Ent. Mo. Mag.*) adds three diptera to the British list:—(1) A Bibionid—*Dilophus tenuatus*, Lw., taken at Sherringham, near Cromer, in August, 1903. (2) A Psilid—*Chyliza vittata*, Mg., captured near Bungay, in June, 1902. (3) An Ortalid—*Tanypeza longimana*, Fln., from Tostock, in July, 1899.

We should be glad if any of our readers will supply us with monthly sets of "Practical Hints" for publication in our April, May, June, July, September, and October numbers of the magazine. First-hand observations and methods of work, however simple, are wanted. There are many field-workers and breeders of lepidoptera, whose modes of work (due to the entirely different character of country collected over) are exceedingly divergent, who ought to be able to help us with notes in this direction, and we trust will kindly volunteer to do so.

All lepidopterists who know the early stages of our plumes are kindly asked not only to get us living larvæ and pupæ of any species for description, but to be sure and drop one of each in glycerine to meet any accident that may happen to the living examples.

---

* *The Orthoptera of Indiana*, an illustrated descriptive catalogue of the species known to occur in the State, with bibliography, synonymy, and descriptions of new species, from *The 27th Annual Report of the Dept. of Geology and Natural Resources of Indiana*, 1902, pages 129-471 and ii-ix, figs. 1-122, 1 coloured plate, by W. S. Blatchley. [Published by The Dept. of Geology of the State of Indiana, Indianopolis, Indiana, U.S.A.]



Santuario de Moncayo
from the east.

Canales de la Sierra
from W.-N.-W.

Soria, from the Castle Hill, looking North.

Lepidoptera at Roche, near Aigle.

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

My summer holiday in 1903 was altogether an unknown quantity, until, on the evening of July 24th, I took a ticket for Lausanne, with no definite intentions, and willing to let Fate determine where I should settle for a few days here and there butterfly-hunting during the following month. I was in very indifferent health, climbing or long-distance walking was an impossibility, and only a vague wish to again see the lovely snow glaciers around Arolla, to breathe again the delicious air, to crawl about those lovely wild-flower gardens on the way to the Pas des Chèvres, served as a guide as to where my ultimate destination was to be. The Visp valley and the Val d'Anniviers were quite possible, but before I left Lausanne, where I stayed for a night, I had already determined that I would go up the Val d'Herens to Arolla.

The morning of the 27th was promising at Lausanne—large heavy cumuli tore across the sky, a flying remnant of the downpour of the previous afternoon and evening—so I posted my luggage and heavier collecting impedimenta, carried nothing but actual necessities for collecting, and, having settled to rest for a night at Sion, took a ticket to Territet, and then set out on a jaunt to Aigle. I knew nothing of this part of the shore of Lake Geneva, and Chillon (Veytaux) and Aigle were to me objects of interest. I did not work the byways for butterflies, and only saw a few *Pieris rapae*, *Cyaniris argiolus*, *Polyommatus icarus* and *Anthrocera filipendulae*, until I had passed Villeneuve, when *Leucophasia sinapis* and *Enodia hyperanthus* were frequent, the latter, indeed, exceedingly abundant by the ditches at the roadsides. *Colias hyale* was not uncommon, and delightfully fresh, and *Gonepteryx rhamni* frequently flew across the path. Near the roadway as yet, however, no possible locality for general collecting was observed until, between Roche and Yvonne, some rough, steep, flower-covered broken rocky slopes reached to the roadside. Here was a butterfly-corner indeed, almost hopeless from the profusion of insects. *Limenitis sybilla* was the first species taken, then one or two rather worn *Polygonia c-album* were disturbed from the bushes, on which also *Zephyrus quercus* was flitting freely, whilst several *Leucopha siasinapis* and *Issoria lathonia* were also netted, and then I clambered the rocks as a big black butterfly, followed by another, flew across the open space above. I had heard of the fine big eye-pupilled *Satyrus cordula* of this district, and I was soon intent on making a large bag, which the steep slippery slope alone prevented. The specimens were mostly in magnificent condition, except that, as usual, little oval pieces were torn clean out of the margins of some of the otherwise finest specimens, or a wicked split made a specially well-spotted example almost worthless. Flying with them was *Hipparchia alcyone*, but they were here almost unobtainable, and only two males and a female would come near enough to be captured, fine big specimens, I presume of the form that makes the local collectors think that this and *H. hermione* are one and the same species, two insects, in my opinion, as distinct as can possibly be. Another favourite, *Melitaea didyma*, flew freely, but at the end of an hour I had totalled up no more than 18 *S. cordula* and 8 *M. didyma* up to standard, and I also

had to be careful what specimens of other species I chose, as, having sent on my impedimenta, I had only two rather small zinc boxes to hold the catch of to-day and to-morrow, and the next day, and these might be fine days, for I did not expect to get to Arolla under that time. On the same slope *Colias hyale*, *Melanargia galathea*, *Issoria lathonia*, *Dryas paphia*, *Argynnis adippe* and *A. aglaia*, were all frequent, though the three last named were less abundant than they were at the thistle-flowers, which they frequented, with *Callimorpha hera*, some little distance further along the road. *Polyommatus corydon* was the common blue, and, with *P. icarus* and *Nomiades semiargus*, was in first-class condition. *Pamphila sylvanus*, *Epinephele ianira*, and a few other common species had to be passed without even taking a type, for want of room, although a splendid male *Lasiocampa quercûs* wa deposited safely in the lining of my hat. Between this spot and Aigle are one or two other delightful spots, where the same species were abundant, but which had, however, only scant attention as I passed along. At one spot, indeed, the attractions were great, but having been on the jaunt some five or six hours, in the full heat of the day, and having regard to space at disposal, I felt obliged to go on to Aigle, where, after lunch, about 3.30 p.m., I went on by train to Sion.

The rearing of Phragmatobia fuliginosa.

By J. C. DOLLMAN, F.E.S.

Some young larvæ hatched from eggs (laid by a ♀ bred by Mr. Bacot and referred to *antè*, pp. 58 *et seq.*) on October 12th, and were $\frac{1}{8}$in. long upon emergence. They were greenish-yellow-grey in appearance, like horn, and very shiny. The head was chestnut-coloured, with dark lunules, and brightly transparent and shiny. Each segment, from the 1st to the 8th abdominal, carried eight black warts, which formed a series of four longitudinal stripes on each side of the larvæ. The largest warts were those on the subdorsal line; the lateral and spiracular lines carried warts rather smaller, and the sub-spiracular had a line of smaller ones still. The meso- and meta-thoracic segments had but six warts, three on each side. All of these warts carried stiff tufts of dark hair. On the dorsal surface of the prothoracic segment was a dark plate-like marking, and no wart, except that of the spiracular line. The anal segment was dark, and the legs and claspers black, the first named very shiny. The larva was voracious and active, and, by October 19th, it was $\frac{1}{4}$in. in length, and greenish-grey in colour, with a yellow dorsal stripe. The head was now horn-colour, with dark lunules and jaws, and, on the dorsal surface of the prothorax, was a semicircular dark prothoracic plate, with the ends rather thickened and set towards the crown of the head. A row of large, dark subdorsal warts, one on each segment, ran from the mesothorax to the anal segment. Above each of these warts, on the edge of the yellow dorsal line, was a minute black spot, round in form. Below the subdorsal row of warts was a lateral row, one wart on each segment just below the subdorsal one; these were rather angular in form, some almost triangular. Again, below this row of lateral dark warts, from the 1st abdominal segment, was a spiracular row of the same form, and having a con-

necting yellow mark in each instance, with the lateral wart above. These warts were not found on the thoracic segments. Below this ran a subspiracular line of warts, rounder in form, from the prothorax to the anal segment, and again below them a line of minute warts, so that, on the thoracic segments, there were now four warts on each side of the dorsal line, the subdorsal ones on the prothorax being still united to form the semicircular, prothoracic plate, and, on the abdominal segments, to the 8th, there were five warts on each side, the anal segment only showing the subdorsal and spiracular examples. All these warts stood under each other on their respective segments, making a series of rings around the larva, which were striped longitudinally by the yellow dorsal line and the lateral line of markings of the same colour. The warts carried stiff, diverging, tufts of dark hair, those on the anal segment being the longest and most directed backward. On this segment, also, was a black anal plate. The legs and claspers were black. On October 30th the larva was rather over $\frac{1}{2}$in. long, and was now slaty-grey in the ground colour, with a distinct yellow dorsal line. The head was of a bright horn-colour, with dark brown lunules and jaws, and very shiny. The row of large, dark, subdorsal warts was very emphatic, but there was no connecting line between them now on the prothoracic segment. Each still possessed the minute dark dot above it, resting on the yellow dorsal line. Underneath the subdorsal warts was a row of light steel-grey markings, which commenced on the 1st abdominal segment and finished at the 8th. Below this line of markings was a lateral row of dark warts from the prothoracic to the 8th abdominal segment, and, from the 1st abdominal to the 8th, below these, was a line of yellow markings. Then occurred the spiracular line of dark warts from the prothoracic to the anal segment, and below these the subspiracular line of warts, having, on each segment, a minute wart beneath, the only warts on the anal segment, however, being the subdorsal and spiracular. All the warts carried the tufts of dark shiny hair, which was now longer, in proportion to the size of the larva, than hitherto. The anal plate was grey and shiny, the legs black, and the claspers slaty, dotted with black. By November 7th, the larva, $\frac{7}{8}$in. long, was smoky-grey in colour, with a strongly declared orange-yellow dorsal line, the yellow colour commencing on the mesothoracic segment and extending to the anal flap. This dorsal line was paler at the segmental incisions, and was not yellow on the prothoracic segment, but smoky-grey in colour. The line was also more extended in width on the centre of the segments, where the orange-yellow colour was strongest. The line of subdorsal dark warts was prominent, and, on the abdominal segments, each was surmounted by the smaller dark wart abutting on the dorsal line. These were wanting on the thoracic and anal segments. Below each subdorsal wart was a light grey marking, having, by its side, at the segmental division, a slighter and smaller repetition of itself. Below this grey marking was an elongated black wart, set rather obliquely upwards to the anterior direction. Adjoining this was a large yellow-orange blotch of the same colour as the dorsal stripe. This was again marked with another dark wart below, just above and slightly in front of which was the spiracle. The spiracle was light yellowish-white, set in a black ring. Below this last dark wart was situated another, and lastly, below this, almost on the ventral surface, another smaller one,

so that there were five lines of dark black warts along the larva from the prothoracic to the 8th abdominal segment, and a row of light grey markings, below which, divided from it by the row of warts found there, was a line of yellow-orange spots. These grey spots, and also the orange ones, were not found upon the anal segment, which carried, moreover, only the dorsal wart and the subspiracular. The coloured warts were also absent from the prothoracic segment, which only bore the dark dorsal wart and the two subspiraculars. The head was horn-coloured, with shiny jet-black lunules, and the anal flap was grey and shiny. The legs were black, while the claspers were grey, that pair on the anal segment having black warty markings on their joints. The larva was thickly covered with longish, bristly tufts of dark brown hair, each wart furnishing a tuft, those on the prothoracic segment projecting forwards over the head, and those at the anal end being directed backwards. These were the longest hairs on the larva. The larva on November 10th was greatly grown, and was 1¼in. long. It was now in the final skin, and was a handsome creature. The head was bright horn-colour, blotched with black, and shining. The body was dark, blackish-grey, with a very pronounced dorsal stripe, which was grey on the prothoracic segment, and then continued to the anal flap in a bright yellow, with an orange tendency on the crown of each segment. The dark subdorsal warts, with their smaller warts above them, could now be scarcely distinguished from the broad, dark subdorsal stripe in which they were set. The lateral line of grey markings was warmer in colour than heretofore, and the supraspiracular line of orange spots brighter and stronger in colour. The dark warts, which were arranged as before, were now suffused in colour, which was of a warm dark brown, and each had a core lighter in tint than the surrounding edging. The spiracles were bright whitish-yellow, in dark rings, and were much more obvious than they had been previously. The legs were black, and the claspers of the grey colour of the body. The larva was densely covered with stiff diverging tufts of bright sienna-coloured hair, short, and projecting over the head on the prothoracic segment, and gradually getting longer to the anal growth, where they were longer than on the other segments, and were projected backwards. The various markings and warts on the larva were difficult to make out through this dense covering of stiff sienna-coloured hair, but could be located from previous observation. The larva varied a good deal in the strength of colour in individual examples. Some were quite of a cinnamon colour, without any dark tendency at all, others were a warm sienna with rich brown stripes of warts, and a third variety almost blackish in stripes and hair, but with the dorsal and lateral light stripes strongly defined. In some cases the larva grew to a length of 1½in., when it remained inactive, and without feeding apparently, for some three days, doubtless preparing for pupation. The first one began to spin its cocoon on November 22nd.

Synopsis of the Orthoptera of Western Europe.

By MALCOLM BURR, B.A. F.L.S., F.Z.S., F.E.S.

(*Continued from p.* 96.)

Genus 2: Aphlebia, Brunner.

This genus resembles the last, but has no wings whatever, and the

elytra are strongly abbreviated, or rudimentary and lobiform; the veins are almost or entirely obsolete. The classification of this genus is difficult, since, as in many apterous genera, the characters are few and the species many.

TABLE OF SPECIES.

1. Elytra attaining or surpassing half the length of abdomen.
2. Elytra in both sexes attaining the apex of the abdomen, pointed, entirely bordered with white.. 1. MARGINATA, Schreb.
2.2. Elytra in ♀ not surpassing half the abdomen, truncated, testaceous or greyish, or else marked with a large spot.
3. Disc of pronotum unicolorous, usually black.
4. Elytra ♂ rounded at apex, testaceous.
5. Veins obsolete; elytra with a big spot; Spanish species .. .. 2. MACULATA, Schreb.
5.5. Veins visible; elytra pale, with no big spot; Spanish species .. .. .. 3. BAETICA, Bol.
4.4. Elytra pointed at apex, minutely speckled, with no big spot.
5. Elytra greyish, with minute black specks; hinder border of pronotum not banded with white; Austrian species .. .. 4. PUNCTATA, Meg.
5.5. Elytra testaceous, the disc dark, borders paler; Sardinian and Balearic species .. 5. SARDEA, Serv.
3.3. Disc of pronotum with three bands .. .. .. 6. TRIVITTATA, Serv.
1.1. Elytra of ♀ lobiform, lateral, squamæform.
2. Pronotum striated .. .. 7. VIRGULATA, Bol.
2.2. Pronotum unicolorous or marbled.
3. Disc of pronotum black, bordered with pale. Abdomen black above, the segments with hinder border pale .. .. .. 8. CARPETANA, Bol.
3.3. Pronotum with disc marbled. Abdomen greyish above, speckled and shaded with darker .. .. 9. SUBAPTERA, Ramb.

1. APHLEBIA MARGINATA, Schreber.

This is the only species of the genus in which the elytra reach the end of the abdomen in both sexes; it is easy to recognise by the white border to the black elytra. The ♂ has the feet all black, except the tarsi which are pale; the ♀ has yellow feet. The var. *erythronata* has the pronotum red instead of black. Length of body 6·5mm. ♂, 9mm. ♀; of elytra, 4·5mm. ♂, 5mm. ♀.

This is strictly speaking an east European species, but occurs in Italy at Naples, Messina, and in Sicily and Tuscany. The var. *erythronata* occurs with the type at Naples and Messina. The type form is found also in Corsica.

2. APHLEBIA MACULATA, Schreber.

Blackish; elytra testaceous, rounded at the apex, with a large dark spot; the elytra surpass the abdomen in the ♂, and are shorter and truncated in the ♀. The rare variety *schäfferi*, Fischer, has the elytra entirely black, testaceous only at the base; the feet are black in the ♂, with the spines and tarsi testaceous; in the ♀ they are testaceous, the tibiæ dark towards the apex. Length of body 6·5mm. ♂ ♀; of elytra, 5·5mm. ♂, 3mm. ♀.

Common in July under dead leaves throughout Germany, but does not occur south of the Alps, nor in the west (Belgium, France, etc.); in Austria, near Petersdorf, Mauer, Kalenderberge, Mödling, Bruhl.

near Baden, Ernstbrunn; Kirchdorf in Upper Austria and Bozen in the Tirol. The rare var. *schäfferi* is recorded from Regensburg.

3. Aphlebia baetica, Bolivar.

This is allied to the preceding; the elytra are roundly truncated and pale, with visible veins; the abdomen is black with transverse white lines. Length of body 6mm. ♂ ♀; of elytra, 2mm. ♂ ♀.

This species is peculiar to the Sierra Nevada, Lanjaron, Bacares, Alcaraz, Siles.

4. Aphlebia punctata, Megerle.

Black, shining; elytra greyish, speckled with black; pronotum semi-orbicular, the disc black, with a pellucid testaceous border, broad at the sides and in front, narrow behind. The larvæ are quite black. Length of body 6·5mm. ♂ ♀; of elytra, 4·5mm. ♂, 2·5mm. ♀.

Under dead leaves in May and June in the same regions as *A. maculata*, but rarer. It is fairly common near Vienna, at Kalksburg, Mauer, Mödling, Hainbach, and Bruck.

5. Aphlebia sardea, Serville.

Shining black, varied with testaceous; head red; disc of pronotum black, sometimes with two reddish spots, margins pellucid, testaceous, narrowly behind, and broadly in front and at sides; elytra greyish, specked with black, veins distinct. Elytra, ♂, pointed bluntly, not surpassing abdomen, which is black; ♀, elytra half length of abdomen; abdomen with dorsal segments white-bordered behind, and the ventral segments white-bordered at sides. Length of body 6·5mm. ♂ ♀; of elytra, 5mm. ♂.

A rare species from Sardinia and Minorca; occurs also in Algeria.

6. Aphlebia trivittata, Serville.

Reddish; easy to recognise by the three longitudinal dark brown stripes, running from the pronotum down the elytra and abdomen. Length of body 5·5mm. ♂, 6mm. to 7mm. ♀; of elytra, 3·5mm. ♂, 2mm. ♀.

Found under stones and in damp places in Sardinia, and a few localities in Spain, Moron, Seville; occurs also in Algeria. The species quoted under this name from central Spain by Bolivar in his Synopsis (1878) are referred to *E. panzeri*. It is found in September and October.

7. Aphlebia virgulata, Bolivar.

In this and the following species the elytra are entirely rudimentary, lateral, and lobiform. Yellowish, shining, with two longitudinal stripes; elytra pellucid, not striped. Length of body, 6mm. ♂ ♀.

Pedro do Cerro in Portugal.

8. Aphlebia carpetana, Bolivar.

Shining black, all the segments white-bordered; disc of pronotum black with a white border; elytra whitish. Length of body, 5mm. ♂, 7mm. ♀; of elytra, 1·3mm. ♂ ♀.

Under moss and dead plants in Portugal and central and northern Spain; Porto, Sierra do Gerez, Villalba, Escorial, Madrid, Ferrol, Brihuega in Guadalajara, Santander, Torri del Alto Galice.

9. Aphlebia subaptera, Rambur.

Resembles *A. virgulata*, but lacks the virgulated colouring; greyish, varied with darker; head black, the vertex whitish; disc of pronotum testaceous, with dark brown specks. the front and side borders white and pellucid; elytra hyaline. Length of body, 6mm. to 7mm. ♀; of elytra, 1mm. ♀.

A southern species; in Spain it occurs in the southern half of the peninsula, Madrid, Ucles, down to Gibraltar, in April and August; also Granada, Malaga, and in Corsica, and in Sicily at Syracuse. The male appears to be much rarer than the female, and disappears earlier.

Family II: Phyllodromiidæ.

Table of Genera.

1. Elytra lobiform, wings absent..	Loboptera, Brunner.
1.1. Elytra and wings fully developed	Phyllodromia, Serville.

Genus 1: Loboptera, Brunner.

This genus has a single European species which is oblong, apterous, shining black, bordered with whitish. In appearance it resembles some species of *Aphlebia*, but is distinguished by the form of the anal apparatus of the ♂, and of the ootheca, or egg-case, which is rounded and flattened, and not arched and keeled.

1. Loboptera decipiens, Germar (=*limbata*, Charpentier).

This species has the length of body, 8mm. ♂, 11mm. ♀.

Common under weeds and stones on the coast from Portugal to Asia Minor. In the south of France it is common all the year round, and occurs throughout the Iberian Peninsula.

Genus 2: Phyllodromia, Serville.

Elytra and wings fully developed; latter with no clear folded triangular area at the apex; seventh dorsal segment of abdomen depressed, hollowed; supraanal plate produced; subgenital lamina produced, emarginate on the left side, and furnished with a short style. In the ♀ the abdomen is much broader, the three last dorsal segments narrow, the subgenital plate ample and broad. The oothecæ are smooth, long, not keeled, but with rounded edges.

Phyllodromia germanica, Linn.

Easily known by its shining tawny colour, and with two longitudinal black stripes on the elytra. Length of body, 13mm. ♂, 11mm. ♀; of elytra, 12mm. ♂, 11mm. ♀.

This species is well known as a household pest; it occurs in houses, hotels, restaurants, in many towns in Europe. In Russia it is called the "Prussian," and in Prussia it is known as the "Russian." It seems to be commoner in eastern, than in western, Europe, but is now spreading everywhere. In America it is the pest known as the Croton Bug. It occurs in a wild state in north-eastern Europe, as far west as Thuringia and Saxony, the Hartz Mountains, and Westphalia, and also at Kloster Neuburg, near Vienna.

Family III: Blattidæ.

Distinguished by the anal parts; in the ♂ the supraanal plate is produced, transverse, sometimes bilobed; the cerci are long, and the

subgenital plate rounded, with two long styles; in the ♀ the supra-anal plate is triangular, the hinder border sometimes sinuate; the subgenital plate has a valve inserted with an articulation.

TABLE OF GENERA.

1. Elytra ♂ truncate at apex; female, rudimentary .. BLATTA, Linn.
1.1. Elytra perfectly developed in both sexes, rounded at the apex.. .. .. PERIPLANETA, Burm.

Genus 1: BLATTA, Linn.

BLATTA GERMANICA.

The only European species is familiar; it is deep claret-coloured; the ♀s are apterous, with minute flaps for elytra; the ♂s have the elytra and wings developed, but truncate at the apex. Length of body, 20mm. to 23mm. ♂, 19mm. to 23mm. ♀; of elytra, 12mm. to 13·5mm. ♂, 4·5mm. to 5mm. ♀.

A familiar pest in houses throughout Europe; not known in the wild state.

Genus 2: PERIPLANETA, Burmeister.

Larger reddish insects, with the elytra and wings well-developed in both sexes, rounded at the apex.

TABLE OF SPECIES.

1.1. Pronotum reddish, with the centre clouded; elytra uniform red .. .. 1. AMERICANA, Linn.
1.1. Pronotum with disc black, bordered with yellow; elytra blackish-red, with a yellow stripe on the costal margin .. .. 2. AUSTRALASIÆ, Fabricius.

1. PERIPLANETA AMERICANA, Linn.

Known by its large size, red colour, with clouded disc of pronotum. Length of body, 28mm.-32mm. ♂, 28mm.-31mm. ♀; of elytra, 28mm.-32mm. ♂, 26mm.-28mm. ♀.

A cosmopolitan species, established in many towns in Europe; in England, numerous at the Zoological Gardens and in several docks and wharves. It is abundant in similar circumstances in most large towns in Europe.

2. PERIPLANETA AUSTRALASIÆ, Fabricius.

Resembles above, but disc of pronotum black, bordered with yellow; elytra darker, with a yellow costal stripe.

Has occurred in Sweden, and in Great Britain at Kew Gardens, Belfast, and several hothouses and docks.

Family IV: POLYPHAGIDÆ.

Members of this family, and of the only European genus, are easily known by the characters given in the synoptical table.

Genus 1: POLYPHAGA, Brulle (= *Heterogamia*, Burmeister).

TABLE OF SPECIES.

1. ♂ dark chestnut, ♀ chestnut, hairless, except for the lateral bristles; larger size .. .. 1. ÆGYPTIACA, Linn.
1.1. ♂ yellowish livid, ♀ dark reddish; body holosericeous; size smaller .. .. 2. LIVIDA, Brunner.

1. POLYPHAGA ÆGYPTIACA, Linn.

Length of body, 20mm. ♂. 27mm.-38mm. ♀; of elytra, 24mm. ♂. 0mm. ♀.

Rare in western Europe; recorded from Calabria and Sicily.

2. POLYPHAGA LIVIDA, Brunner.

Length of body, 11mm. ♂. 16mm. ♀; of elytra, 17mm. ♂, 0mm. ♀.

A Levantine species, but taken in Spain by Sanchez Gomez at Cartagena, and by Bosca in the Isal Mayor del Mar menor. (Several allied species occur on the other parts of the coast of the Mediterranean.)

In addition to the forms enumerated above, a number of exotic cockroaches have occurred in Europe at various times, without actually becoming established. Several representatives of the *Panchloridae* have been recorded. In this family the femora are unarmed, and the tarsi have a pad between the claws. *Rhyparobia maderae*, Fabr., occurs fairly often in the London docks and at Covent Garden; it is also noted by Seoane from the arsenal at Ferrol. The allied *Leucophaea surinamensis*, L., is recorded from Andalusia, and also from Bognor. Species of the genus *Panchlora*, which contains a number of pale green medium-sized cockroaches, have straggled to Europe from South America on more than one occasion; indeed, they are fairly frequent at Liverpool. *P. exoleta* is recorded from Scotland and South Leverton. *Nauphoeta birittata*, Burm., is probably the insect recorded under the name of *Blatta gallica* from Paris by Fabricius. The *Blaberidae* have the femora unarmed, and no pad between the claws of the tarsi. They are extremely large insects, usually of pale straw-colour. Several species are known to have occurred in Europe, imported from South America and the West Indies. Other recorded exotic cockroaches are *Perisphaeria stylifera*, Burm., recorded by Fischer from Tuscany; *Paratropa elegans*, Burm., taken at Ferrol; and *Stylopyga decorata*, Brunner, taken at Worksop.

(To be continued.)

The generic separation of "Gnophos" obfuscata from glaucinaria.

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

I was interested in reading Mr. Tutt's notes on the eggs of these two species (*Ent. Rec.*, xv., pp. 238-239) and his deduction therefrom. I am unfortunately grossly ignorant of the early stages of the various members of the "genus" *Gnophos*, but I should like to point out that Mr. Tutt's conclusion is only what would be expected. Every systematist has made some separation of its species into genera, with the exception of a few of the most extreme "lumpers" (Lederer, etc.), and even they have divided the genus into sections; and whatever has been the exact basis of the erection of outlying genera, it has always happened that *obfuscata*, Schiff. (*myrtillata*, Thnb., Stgr. *Cat.*), has fallen into one of these, whilst *glaucinaria*, Hb., has fallen into another. Thus, Hübner (*circ.* 1825) erects *Catascia* for *obfuscata*, Schiff., *operaria*, Hb., and *dilucidaria*, Schiff., and *Hyposcotis* for *glaucinaria*, Hb., and *mucidaria*, Hb. Boisduval (1840) leaves *glaucinaria* in *Gnophos*, and makes *obfuscata* an aberrant *Elophos*—a

genus taken out of *Gnophos* for the reception of the species with the margins of the wings entire, the male antennæ pectinated, and the palpi somewhat longer, etc. The type of *Elophos* is *operaria*, this being the only species cited in Blanchard's *Hist. Nat.* in 1840 (*tom.* iii., p. 530), and in the present state of our knowledge the name lies dormant in the synonymy of *Catascia*, Hb., of which I believe the type is *obfuscata*. Guenée (1857) also leaves *glaucinaria* in *Gnophos*, and makes *obfuscata* an aberrant *Dasydia*, a genus characterised by its entire wings, the spurs of the hind tarsi, the strong sexual dimorphism, etc. (type *tenebraria*, Esp.). He justly points out that the male antennæ here cannot be relied on for generic purposes—compare the twin species *mucidaria* and *variegata*, the former with pectinated antennæ, the latter without. Lederer (1853), however, has been followed in limiting *Dasydia* to its original extent (*i.e.*, to *tenebraria* only), and it is worth while to mention his divisions of his "genus" *Gnophos*. Section A (*sterrenaria*, *dumetata*, and *furrata*) has "wings with pointed teeth; wing-form alike in both sexes." Section C (*obfuscata*, *zelleraria*, *cuculbaria*, and *operaria*) has "wing-margins entire," and the females showing a series of transitions to almost entire winglessness. Section B (the rest) has "wings, or at least the hind, gently waved at the margin; wing-form alike in both sexes." Allowing these divisions as sufficient for present purposes, we ought to confine *Sciadium*, Hb. = *Gnophos*, Tr. (type *furrata*) to Section A; to use *Catascia*, Hb., for Section C (as Mr. Warren has done in our national collection); and to call Section B (*obscurata*, *glaucinaria*, etc.) *Hyposcotis*, Hb. (type *mucidaria* Meyr., 1892) = *Charissa*, Curt. (type *obscurata*).

Notes (chiefly on lepidoptera) of a trip to the Sierra de la Demanda and Moncayo (Burgos and Soria) Spain (*with map and three plates*).

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

(*Continued from p.* 88.)

We spent the next day at Tarazona, where it was rather hot, and where to the south the isolated mass of Moncayo was prominent. We left Tarazona at 4 a.m. on the 12th, on donkey back, for Moncayo, reaching the Santuario at 9.15. The road passes along rather dry rising ground, in places deeply cut by the little streams, but though sloping gently upwards, only a few hundred feet are gained before the foot of the mountain is reached, and then the slope becomes very steep and the mule-track zigzags very much to enable it to have a tolerable gradient. The foot of the mountain, it is the north side, is occupied by oak-scrub, which gives way to a beech forest as soon as the steepest portion begins, and this extends upwards to the Santuario. Above the Santuario are only here and there an odd tree or two, that maintains a starved existence. The height of the Santuario is said to be 1634 mètres or about 5400ft. Two authorities give the height of the mountain as 2315 mètres and 2346 mètres, or about 7500ft. and 7640ft (Baedeker gives 7600ft.), so that the Santuario is much more than half-way between the plain below and the summit above. Tarazona cannot be much over 1500ft., but I do not know its exact elevation. Moncayo is the highest point, I believe, in the whole of the mass of Sierra between Burgos and Saragossa, but it is much more than this,

as it is remarkably isolated. North, south and east, there is no high ground nearer than the Pyrenees to the north, perhaps 80 miles, and the Albarracin Sierra, 100 miles to the south, to the west there is very little over 3000ft. till we reach about 40 miles off the Sierra Cebollera and Pico de Urbion, and other summits around Canales. From north to south the ridge is narrow, from east to west it is not much more than six or seven miles, perhaps twice as much if one measures to the actual plain. It is, therefore, an exceedingly isolated mass to have such an elevation.

The Santuario is an old monastery, a long solid range of buildings sheltered under the east side of a remarkable mass of rock standing out from the mountain-side, nearly square, and precipitous on all sides, except a narrow neck connecting it with the face of the mountain above. I believe it does not require more than half the fingers of one hand to count the other places in Spain, where an old monastery or other building affords passable shelter at such an elevation. It is one of the difficulties we met with everywhere in Spain, to find accommodation, except at low elevations and a long way from the higher ground.

The Santuario is divided into two establishments, one forms summer-quarters for the students of an ecclesiastical college, some 20 being in residence during our stay, the other is to all intents and purposes an inn, but maintained by the authorities of the church, and run at a loss, for the benefit of people from the country below, who crowd there during August. During our stay there, from July 12th to July 24th, we had the place very much to ourselves, no one staying there for the night till the last few days, we succeeded in making ourselves fairly comfortable there, and the bill was very moderate. Our grateful acknowledgments are due to Professor Señor Don José Ma. Sanz Artibucilla, who represented the authorities during our stay, for his kindness, hospitality, and the genial interest he took in our welfare. Mr. Champion would no doubt describe him as a pleasant companion, which only my ignorance of Spanish prevented my fully realising.

As well as the direct footpaths and steep mule-tracks, there is a cartway (*carretera*) very little used, that goes up to the Santuario in long windings, the chief use we found for this was as a very level path on which collecting was often easier than on the very rough ground which formed the greater part of the hillside. From the Santuario there are various other paths, one of which goes to the summit of the mountain, and another, a very broad one, goes directly east along the mountain-side for about a mile, and was apparently constructed as a walk for exercising when the Santuario was a monastery. The Santuario possesses a somewhat celebrated image of the Virgin, and is, in fact, called the Santuario de Nuestra Senora de la Peña Negra hoy de Moncayo, but this, with other interesting details, must be passed by as being hardly natural history.

The upper part of the mountain is very rough and stony, it is clothed here and there with heath (*Erica arborea*) and *Genista purgans*, but has no other shrubby growth. On the summit grass is more abundant than anything else. The snow, of which there were several large patches when we arrived, had nearly disappeared when we left.

There is a great hollow directly above the monastery, reaching to the summit, and ending below, some 500ft. or more above the Santuario, in a chaos of ancient moraines. We left the Santuario by

walking (our impedimenta on a donkey) eastward and downward along the north slope, and over some low hills to Agreda. On this walk, which was to some extent done against time, in order to catch the diligence for Soria, we met with several insects that reminded me more of the Albarracin fauna than any we met elsewhere—*Argynnis chlorodippe*, *Polyommatus corydon* var. *hispana*, *P. hylas* var. *nivescens*, and others. The ground nearing Agreda being dry limestone hills, with aromatic, sparse herbage, much like that of Cuenca or Albarracin. I should have liked to collect here for a day or two, but it did not fall into our programme, though the accommodation at Agreda seemed to be fairly good, as tested by our lunching there both going and returning.

The diligence journey from Agreda to Soria was long and rather monotonous. Moncayo stood as a great landmark for most of the way. At a good many portions of the road it was bordered for a mile or so by a row of poplar-trees on each side, and the swarms of *Liparis salicis* which these afforded were certainly a feature of the route. No tree-trunk was without them, and many a stem presented several dozen white spots, which were either moths or batches of eggs, and now and then the dead moths lay on the ground, three or four to the yard, and they were frequently on the wing, though it was little after midday. With Soria we were a little disappointed: it was very dry and burnt up, and we felt we were rather late: the one or two excursions we made afforded little to tempt us further afield; it was very hot, and one easily got out of sorts when there were no special attractions. The Spanish form of *Satyrus briseis*, *P. corydon* var. *hispana*, a nice form of *Melitaea didyma*, *Satyrus circe*, none very abundant, formed the prominent part of our bag.

Soria would, however, be probably more remunerative earlier in the season, and unquestionably it would make a starting point for some good excursions in the Sierra, of which one high ridge did not seem very distant, and also somewhere, apparently to the west, towards Salas, must be some promising ground, as we noticed the telegraph poles for a long distance to be of the same savin trees that marked the best ground at Albarracin, and probably do so here; and we were told they came from a Pinar some 20 miles westward. There should also be some good ground by the Duero, which is here quite a river. We put Soria into our programme because it is accessible by rail, but we reached it by diligence, and left it by the same means, as being both the shorter and quicker way. We left at 8 a.m., and travelled via Agreda, Tarazona, Tudela, and Logroño to Pamplona, which we reached the same evening. I made no entomological notes at Pamplona, but we attended a grand memorial service to the late Pope in the cathedral. I was struck here by the general small stature of the men; any one 5ft. 8in. seemed tall, and 5ft. 10in. or 6ft. gigantic.

Amongst the butterflies met with, *Erebia erias* and *E. stygne* must take a first place. It would not be quite true to say these were met with everywhere. At Canales, between 4500ft. and 6000ft., it would be very nearly true, as well as at Moncayo as regards *E. erias*. *E. erias* was rare at Moncayo, and I took no *E. stygne* there; but at Canales one never took the one species without soon meeting with the other.

Their headquarters were certainly on the ridge behind Canales.

The north slope of this long ridge was covered by dense beech forest, up to a short distance from the rounded top. But for this short distance there was a grassy slope, with only a few scattered trees between the open top above and the dense forest below. This strip was narrow, often less than 100 yards across (N. to S.), but extended for several miles from east to west. This little strip occasionally presented half-a-dozen Erebias on the wing at once, and was prolific in other things. It was here that the black larva of *Argynnis aglaia* was most frequently seen. Several common Pyralids flew freely. Here, too, occurred *Pyrausta alboricilalis* (if it be that), a species new to western Europe, was fairly frequent, but very difficult to see, and still more to catch, flying in the hot sun, twinkling amongst the taller herbage, and disappearing instantly if disturbed, so that to follow up and catch a specimen was really difficult. We met with it also on the hill on the other side from Canales, right out on the open hill-top above the thickets of heath; the weather was not propitious, and only one was captured at this locality.

When we met with the Erebias here on July 3rd, *E. erias* was seen freely, but only one or two *E. stygne* occurred. The following day *E. stygne* was seen more freely, generally in very fresh condition, the *E. erias* being in most cases somewhat worn. The interest of these two species is, in their occurring together, but not merely so. In occurring together each species has varied so far as to resemble the other in size, general facies and arrangement of spots, to a degree that no two races from any other part of Europe, so far as I know, would do, though no doubt individual specimens from many localities might be got that quite match them. Some Basses-Alpes *E. stygne* are not very different from these. The *E. stygne*, in approaching *E. erias*, are larger than most European specimens (if I may say European as distinguished from Spanish), and are much darker beneath. They do not attempt to approach *E. erias* by developing the third apical spot, differing in this from the form *bejarensis* taken last year, in which the tendency is to a good development of this spot. In the matter of this apical spot (or eye) the movement is left to *E. erias*: in European specimens this eye is usually well-developed, generally, indeed, of nearly, if not quite, the same size of the other two. In these Spanish ones the apical eye is much reduced in all except a few specimens, and in rare instances is absent. The size of these *E. erias* is much the same as that of the *E. stygne*: indeed, it averages rather smaller, instead of much larger, as is the European rule. There is also the curious fact that a few specimens are smaller, with the rusty patches yellower and narrowed downwards, the eye spots being diminished, so that there is a very appreciable approach in general facies to *Erebia zapateri*, a Spanish species occurring about 100 miles further south than these specimens came from. I do not know that the two species ever occur on the same ground, but if they do *E. zapateri* appears at least a month later.

These may be taken to be the (for the present) extreme forms to which Spanish *E. erias* is tending to vary. Why does it do so? As a rule, Spanish forms are larger than European. In *E. erias* they are smaller, they are also paler, with which tendency these *E. erias* conform. The small *E. stygne* are larger than European types, and culminate in the very fine form *bejarensis*, which it is at first difficult to believe is

the same species as some of the small European races. *E. zapateri* itself, though gone so far as to be specifically distinct, is nevertheless closely related to *E. neoridas*, than which it is smaller and paler. The forces, therefore, which derived *E. zapateri* from *E. neoridas* must have been similar to those producing these small *E. zapateri*-like forms of *E. erias*. Since their times of appearance keep *E. erias* and *E. neoridas* apart in the same way and as firmly as are *E. erias* and *E. zapateri*, it seems necessary to believe that each of the two species was separately dealt with. Have *E. erias* and *E. stygne* also been separately dealt with, and is the association between them at Canales purely accidental? Or, may we entertain the idea that there is a mimetic attraction between the two species, beyond a merely similar environment? There are certainly not unfrequently found in the Alps similar pairs of Erebias. It is very common for *E. eriphyle* to occur with *E. pharte*, and to closely resemble it, differing a good deal from its aspect when, as in Carinthia, we found it by itself, although *E. pharte* occurred in the immediate surroundings, and the two did occur together. There is also the curious case of *E. pharte* and *E. manto* at Guarda (Lower Engadine, Val Tuoi), where the two species presented many specimens of identical facies, flying together in fairly equal numbers.

At Moncayo, the Santuario was at about the highest level at which copious springs arose. These going down made wet overgrown hollows in which various butterflies were abundant. Amongst these *Chrysophanus virgaureae* var. *miegii* was one of the most interesting; *C. gordius* and *C. hippothoe* also occurring, the former in a very large and brilliant form. *Melitaea athalia*, *Melanargia lachesis*, *Aporia crataegi*, and many other generally distributed species occurred, but for numbers *Satyrus semele* beat any show of that species I ever saw; ten or a dozen, twenty or thirty, or even, rarely, forty or fifty specimens would fly off from their resting-places on a stone or tree-trunk as one approached; the larger numbers no doubt usually resulting from their having been herded in front as one progressed. They occurred also, however, very freely in all the openings in the beechwood, but nowhere as they did by parts of these steep, boggy streams; whether they bred there, or were attracted there by the water, I do not know. I took a few, which nearly all turned out to be females, due, perhaps, to their being more conspicuous, but mostly to their having less active habits. I hardly thought them worth catching, still believed I ought to bring one or two home; but over and over again slashing my net "through the brown" as they flew off, instead of taking half-a-dozen as I half expected, resulted in absolute blank. To get any, it was necessary to spot a particular specimen and go for it only.

On the level of the Santuario, *Melitaea athalia* flew freely, where, also, all the *Chrysophani* (*hippothoe*, *virgaureae*, *gordius*, and *phlaeas*) met with occurred, but not freely. A very ordinary alpine form of *Parnassius apollo* was common, and three larvæ were taken at the same time higher up. There were, however, two moths that interested me more than any others; one of these was a new species of Psychid, which I have called *Pyropsyche moncaunella*. It is a very handsome addition to the European species of that group (see *Ent. Rec.*, xv., pp. 324-330; xvi., pl. ii). The other was *Orgyia splendida*, which will deserve separate notice.

(To be concluded.)

SCIENTIFIC NOTES AND OBSERVATIONS.

THE PREFERENCE OF BUTTERFLIES FOR SUNLIGHT.—I have been reading in the *Transactions of the Entomological Society of London* the brilliant and stimulating paper by Mr. Thayer, and the more cautious, if more subtle, summing up by Professor Poulton, on "Protective Coloration in its relation to Mimicry," etc. Although I have neither the scientific nor artistic knowledge and experience that is necessary for its adequate discussion, still, I feel as rashly compelled to offer a few remarks as I did when, without any first-hand experience of the tropics or living exotic Sphingids, I ventured to object to the use of such structural details as the size and position of the eyes, length of tongue, cut of wings, and shape of the abdomen, as generic characters, pointing out that differences of environment, such as lack of twilight and the large size of tropical flowers, together with the position of these latter above instead of below the insect's plane of flight, etc., were quite sufficient to account for, and in all probability had produced, the difference between the European specimens of *Hyles euphorbiae* and its Indian relative *H. lathyrus*, Walk., in regard to which, even if authorities had joined issue as to its right to rank as a species, none cared to press its claim to generic rank. My rashness in the present instance will, however, be seen to be even greater, when I confess that I have never been out of Britain, and that my opportunities of observing butterflies, even under our cool grey skies, have been all but a negligible quantity of late years. But the fact that I have been present at entomological meetings off and on for the past twelve years, and have never yet to my memory heard the question asked or the point discussed, emboldens me to ask the question, "Why do the Rhopalocera only fly when the sun shines?" Here a doubt arises; perhaps they do not do so abroad, and the few English exceptions become the rule under tropical skies. In spite of my expectations, I found to my surprise that Mr. Thayer did not discuss the point, nor did Professor Poulton refer to it; so, at the risk of attempting to explain the obvious, I would suggest it is not alone the need of greater heat, nor yet because their sight is defective that they therefore require more light than the Heterocera. The bulk of the last-named group are twilight or night flyers, and the exceptions to this rule have for the most part either a rapid or buzzing flight, or are species that feed whilst hovering, or closely fold their wings and settle; or if they have ample wings and fly at a moderate pace, they are brightly if not brilliantly coloured. There is undoubtedly a connection between brilliant coloration and vivid light, as Eimer pointed out, although his explanation breaks down under the most cursory examination. Does this not greatly support Mr. Thayer's case? After a perusal of his paper, we see why it is necessary, or at any rate politic, for the butterfly to settle and close its wings at the passing of every cloud. It is not due to a whimsical distaste to dullness or fear of the slightest chill, but to the danger it experiences in the absence of the brilliant illumination that safeguards it by producing its effacement, according to Mr. Thayer's theory. The marked disfavour with which most butterflies seem to regard the afternoon sun, may also be partly due to the difference in value of its lighting capacity as well as to the more commonly given reasons of dry heat and insufficient moisture. That the strength of the lighting is an important factor in the protective

scheme of lepidopterous larvæ, I called attention to long ago in a paper on "The genus Smerinthus" (*Ent. Record*, vol. vi., p. 175); and I have always considered that the coloration of black day-flying species such as *Gnophria rubricollis* and *Tanagra atrata*, was probably due to their obtaining protection owing to the strong contrasts between lights and shadows in our woods at the period when they are on the wing, although my opportunities of observing these species have been so few that I mention this with considerable diffidence. If my suggestion in regard to the butterfly's preference for sunlight is borne out by the facts of the case, it should afford a test as to whether the coloration of any particular species is of a cryptic or warning character, as the latter forms should show a certain disregard to passing clouds (if such things ever happen in the tropics), in contrast with the former.—A. W. Bacot, F.E.S., 154, Lower Clapton Road, N.E. *January 27th*, 1904.

"Types" in Natural History.—I am pleased to see that Dr. Chapman, in his notice of "The Revision of the Sphingides," has dwelt (*Ent. Record*, xv., pp. 310-11) on the meaning of the word "type," and has attacked the utterly unscientific position of those who hold that the type of a species is "the form which is *supposed* to be the commonest, the most widely spread, or the most ancient, etc." The italics are mine. Is it conceivable that any thoughtful entomologist has really imagined a "type" form exists in nature, apart from the subjectivity of the individual student? If so, I should much like to be enlightened as to what it is, and how a stable nomenclature can possibly be based upon it. The words which I have just quoted are pregnant with suggestion, and embody a good deal of the matter which has been prominently in my mind for some weeks past, as the result of a conversation which I had with another entomologist on the subject. The only fault in Dr. Chapman's clear and valuable paragraph is at the very end, where he speaks of the "confusion of *two* different meanings, etc." The word "two" should have been left out, for certainly many more than two distinct meanings are possible when we begin to attach some pseudo-philosophical, or pseudo-biological significance to the word. Several have occurred to me, and there must be many others which I have not thought of, or which I have not clearly differentiated in thought from those which I shall mention. Firstly there is the *numerical* type, which is apparently what the author quoted by Dr. Chapman means—or thinks he means—by "the true type," *i.e.*, the form of which the largest number of examples exists on the face of the globe. But this is manifestly undiscoverable, and even if we could become omniscient in this respect, we should, with many species, have to re-model our conceptions every day, or every year, according to the numerical fluctuations, to say nothing of the "personal equation," for which there would be plenty of room in the assigning of hosts of slightly aberrant forms, either to the type or to an aberration. Secondly, there is the *phylogenetic* type, or the form which is the most ancient still surviving. But here, again, we are absolutely without knowledge, and should have to rest on speculation—with what results to nomenclature can be better imagined than described. Thirdly, there is the *local* type, or the form dominant in a particular locality. This is probably what our friends really want us to acknowledge as the type, if we give the word "locality" a rather wide

significance, so that it may cover perhaps a country, or a mountain range, where the species in question has been particularly well studied. But, as Dr. Chapman points out, increased knowledge, or the altered *locale* of the most energetic collectors, would very frequently upset our results, and alter our nomenclature. Fourthly, there is (theoretically) the *average* type, or the one deducible from the laws of averages. This, like the first, would require omniscience as to the present condition, if not also as to the past evolution, of the species, but the deductions would be differently worked out. The type would not necessarily be the form which preponderated in point of numbers, but the one possessing most of the characters common to. or normal in, the species, and therefore serving as a central point, round which it was conceived to revolve. Add to all this that there is nothing philosophical or scientific in applying any of these tests to wing-markings alone, but that they ought to take into account the entire physiology and anatomy of the creature, and I think it will seen that our friends who ask for a "type" in nature are not only asking for that which no mortal can find for them, but also placing themselves in a hopelessly unscientific position by not even attempting approximately to define their conception. My own conception is that nothing more nor less is understood by "type" than that form or phase of the species from which the individual student takes his idea of it, and unless we consent to some arbitrary, but practically automatic, principle whereby we are to be governed, we might as well give up all hopes of any stability or permanence in specific nomenclature. Looking at our palæarctic butterflies alone, I wonder whether the advocates of *Alexis* versus *Icarus* really think that by a miracle of good luck all the other species happened to be first described from specimens conforming to their ideas of a "type," or, if not, whether they intend to be logical enough to inundate us with further changes. I wonder, too, what they propose to do with dimorphic species which were described from one sex only. The "meadow brown" cannot be called *jurtina*, for males of that form are, so far as I am aware, unknown; nor can it be called *janira*, for this will not fit the female. Similarly the type description and figure of *Papilio flava*, Brünn. (*Adopaea thaumas*, Stgr. *Cat.*) do not give the linear mark which characterises the male, and, therefore, the name is invalid! For, after all, we have heard no argument against the typical character of the *male* of *Papilio icarus*, Rott., and yet the name has had to be rejected. Credat Judæus Apella! For myself, I am content to know what is the type of a *name*, and to call all individuals of a species by the first name given to any member of it.—L. B. Prout. *December 23rd*, 1903.

VARIATION.

Variation in males of Pericallia syringaria second brood.—A number of eggs laid by a ♀ *Pericallia syringaria* captured in Dorset, duly hatched in July, 1903, and the larvæ were fed on privet. Wishing to get a second-brood I kept the larvæ at a fairly high temperature, but only five fed up, the remainder (a hundred or more) evidently having determined to hybernate. The five grew rapidly, soon turned to pupæ, from which two ♂ s and three ♀ s emerged on September 23rd and the following days. It struck me that both the full-fed larvæ were rather

smaller than some I had previously reared in the first brood, but the moths emerged much about the usual size. What I particularly want to note, however, is that the ♂s, instead of having the normal orange colouring of the first brood, follow the colouring of the ♀s. Larvæ, resulting from a pairing of examples of this partial second-brood, fed up to the hybernation stage and are now of almost the same size as their uncles and aunts.—G. O. Day, F.E.S., Knutsford. *January 4th*, 1904.

PRACTICAL HINTS.*

Field work for May.

By ALFRED SICH, F.E.S.

The Meadow.—1.—In the latter half of May an afternoon can profitably be spent in a meadow, especially if *Luzula* and *Achillea* be among the "weeds" growing there. While the sun is up we may net a good series of *Dicrorampha plumbagana* and *Glyphipteryx fuscoviridella*, both species flying over the herbage, though the Tortricid has much more dash in its flight than the Glyphipterygid. The latter frequently settling across a bent and "fanning" its wings.

2.—As the sun gets low a pale, narrow-winged Tineid may be seen softly flying from one grass bent to another, often settling on the *Luzula*. This will be *Coleophora murinipennella*.

3.—If we look closely into the herbage among *Achillea*, we may see miniatures of the Coleophorid, minute pale Tineids, *Bucculatrix cristatella*. While boxing these we catch sight of a small, compact Tineid sitting on a blade of grass, it looks black and white, and, if nimble enough, we may box *Elachista obscurella* ♀.

4.—As we continue our search almost among the roots of the grass, we notice one or two little white moths crawling on the lowest portion of the grass stems. These will be early specimens of *Elachista cygnipennella*. As we leave the meadow, we notice several pale Tineids flying along just above the herbage under the hedge; these will be *Elachista rufocinerea*.

5.—We know that *Pamene rhediella* flies over the hawthorn bushes at noon in the sunshine, and so does *Spuleria* (*Chrysoclista*) *aurifrontella*, about a fortnight later than the Tortricid.

By H. J. TURNER, F.E.S.

1.—The cases of *Coleophora caespititiella*, are now to be obtained in quantity, on almost any clump of rushes in damp situations. The larvæ will be practically fullfed. A bunch of the seed-heads of the rush should be placed in an inverted glass-bottle, the bottom of which has been cut off, the stems being passed through the neck and standing in a jar with moist sand or water. The living cases can then be placed on the top of the rush-heads, and muslin tied over the bottle. In this way, if the apparatus be placed out-of-doors, abundance of imagines may be obtained. This method is a very convenient and successful one for the breeding of many of our Coleophorids.

2.—In many places, if the plants of *Ballota nigra* growing

* "Practical Hints for the Field Lepidopterist." Pts. I and II each contains some 1250 practical hints similar to these, but relating largely to the Macro-lepidoptera. Interleaved for collector's own notes. Price 6s. each part.

luxuriantly by the roadsides (even very dusty ones) be examined, one may frequently find the leaves, with large white membranous blotches. Upon looking on their lower surfaces, large nearly upright, side-flattened bunches of leaf-fragments are seen. These are the cases of the larvæ of *Coleophora lineolea*, and where they are found, it is generally in abundance, but always considerably sheltered by a thick hedge.

3.—The larvæ of two species, *Coleophora solitariella* and *C. olivaceella*, are now to be met with on *Stellaria holostea*, that brilliant little hedgerow star, which is so conspicuous at this time of the year. The former is always in much greater numbers than the latter, indeed to get a respectable number of them is difficult. The cases are attached to the grass-like leaves of the foodplant, and the larvæ make conspicuous blotches. *C. olivaceella* is easily distinguished from that of *C. solitariella* by its darker case and slightly different angle of attachment to the leaf. These species also feed under some sheltering hedge or bush.

4.—On bright afternoons in the middle and end of May the imagines of *Coleophora murinipennella* may be swept in numbers, flying low down in the fields near woods, where the wood-rush (*Luzula*) grows.

5.—On most of our large heaths, assiduous sweeping near the shelter of trees and bushes, will produce a quantity of cases of *Coleophora juncicolella* and *C. pyrrhulipennella*. The former is our smallest species of the genus, and the cases are most difficult to find. The best way is to save all the sweepings in a bag and examine each day to see if any larvæ have crawled out. In the course of a week or ten days, no doubt a number will be obtained. The cases of the latter species are more conspicuous, and may easily be found by searching the sweep-net. To breed these species, one needs to have established plants of heath in pots and cover with muslin. Of course the plants must be kept out-of-doors.

6.—The broom should now be searched and beaten for the cases of *Coleophora saturatella*. They are large and rubbishy-looking cases, and the larvæ should not require much more feeding before they pupate.

7.—A visit to the saltings, where the seawormwood grows in abundance, may perchance produce the cases of *Coleophora artemisiella* and *C. maritima*. It is best to place a sweep-net under the base of the stems of the bunches of *Artemisia*, and beat the plants and the basal rubbish into it for examination. This is a tedious process, but otherwise very few larvæ will be obtained. The imagines can be bred by placing the larvæ on the garden *Artemisia*, "old man."

8.—The cases of a species, which seems known to but very few collectors, *viz.*, *Coleophora ardeaepennella* are now obtainable on birch. They are often mistaken for the cases of *C. ibipennella* among which they are usually found, both species often feeding on the same leaf. The cases of the latter species are almost prostrate, while those of the former are more upright in their attachment.

9.—Young larch plantations should be searched for the presence of *Coleophora laricella*. The needles will be extensively browned by the depredations of the nearly fullfed larvæ if present, and large numbers of the cases may be obtained. As pine is an easy foodplant to keep, there will be little difficulty in breeding the imagines.

10.—Many elms we have been told in previous "Hints" will pro-

duce abundance of *Coleophora fuscedinella*. Among them a careful search will produce the cases of two other species, the much darker, less bulky, case of *C. badiipennella*, and the longer, more compressed case of *C. limosipennella*. The case of the last species can never be mistaken for that of either of the others as its anal opening is two-valved and not three- as they are. This species also occurs on birch, but its case is then much more slender and fragile.

11.—If one meets with patches of *Eupatorium cannabinum*, they are worth going over to ascertain if *Coleophora troglydotella* is feeding on the leaves. The plants are found under the shelter of the cliffs in some coast localities.

NOTES ON COLLECTING, Etc.

NOTES ON PLUSIA MONETA.—Towards the end of April, 1903, I noticed that a large plant of *Delphinium* had several of the terminal buds drawn together, and, upon parting them, found in each two or three small larvæ, green in colour with brown heads, and on each segment three or four brown tubercles emitting hairs; thinking from this and their wriggling habits that they were the larvæ of some Micro-lepidopteron, I took away only two or three, with two larger larvæ that were very different in appearance, and that I hoped were those of *Plusia moneta*. After keeping them about a week or ten days I was surprised to see that the smaller larvæ had become identical in appearance with the larger ones. I consequently commenced to search in earnest for the larvæ, taking all I found, both small and large. Having access to a nursery (containing a large bed of delphiniums), and several large flower-gardens, I was able to obtain in all from thirty to forty larvæ, which fed up in my breeding-cage. For that purpose I use a horticultural bell-glass, inverted and fixed with plaster-of-Paris in a wooden stand, the top being covered with mineralised tiffany. I reared all the larvæ in one cage, as I found that the larvæ emerged from the ova continuously over a considerable period and not all at the same time. I found my first full-grown larvæ on May 1st, the first pupation took place on May 16th, and on June 16th the first emergence. The full-grown larva is about an inch long, the head, pro- and meso-thoracic segments being retractile, the colour light green excepting for a white lateral stripe. When ready to pupate the larva spins a shuttle-shaped cocoon on the underside of a leaf; in confinement the larvæ often used the sides of the cage and the tiffany, in many instances several being joined and somewhat overcrowding one another. The cocoon when first spun is pure white, the larva after completion lining it with a golden colour, sometimes very pale, sometimes almost orange. In a state of nature my experience points to the interesting fact that, while the larva before it casts off its micro-like appearance lives gregariously in a net, drawing together the terminal bud of the foodplant, it afterwards feeds singly, and, as it grows, descends from the plant, finally pupating under the lower leaves. The habit seems connected with a certain amount of protection, for, as the delphinium grows taller, its lower leaves turn deep yellow and die, hence one meets great difficulty in finding the cocoons, owing to their colour being identical with the dying leaf; out of twelve or fourteen cocoons found, only, I think, two were on an upper or green leaf. On June 16th the first imago appeared.

and others followed in quick succession nearly every day, one, and sometimes five or six, on one day. The larvæ were very easily reared, giving no trouble, though eating very voraciously. The pupa is intensely black on the dorsal surface ; the ventral surface, legs and antennæ-cases are pale green at first, soon intensifying to a dull yellow, and one pupa had the usual green parts of a pure white ; this I kept separately in hopes of an aberration, but the imago was quite normal. After emergence the moth clings with the two forelegs stretched out in front, holding on, apparently, by the small hooks or spurs, the other legs hanging beneath the body, which is held out as far from the surface on which it is resting as possible, the wings being placed flat against its sides, tent fashion. The emergence takes place early in the day, the moths remaining quite motionless until dusk. I was not successful in getting any to pair. I recommend all who wish to rear this interesting insect to search all delphiniums to which they can gain access; the drawn-up bud or eaten leaf will of course lead one to the small or large larva, and as delphinium seems to be the foodplant of so few British insects one can rely upon one's captures being likely to turn out the desired species. The perfect insect may be captured at dusk, hovering over, or feeding on, the flowers of the foodplant.—HAROLD E. WINSER, Kent House, Cranleigh, Surrey. *March 12th*, 1904.

CURRENT NOTES.

At the meeting of the Entomological Society of London, held on March 2nd, a discussion took place on "What is a species?" We are informed that the discussion did not clear the ground very greatly, and that only theological terms seemed to fit the case. One gathered that a species is an invisible and incomprehensible entity inherent in a group of organisms, that may or may not differ visibly, either internally or externally, from those of another coequal and equally incomprehensible group, and which may also differ either internally or externally among themselves to such an extent as to deceive the experienced into the belief that they are each, separately and severally, the external signs of internal and invisible differences of the . . . . . entities (to wit, different species), but yet, are, in reality, only the outward and visible appearances of different phases of one and the same entity, entitled a species.

As to who is to separate species, one was left with the comfortable feeling that no man or woman is entitled to decide as to what is or is not a species (as defined *supra*) until he or she has acquired great experience in distinguishing the same, and that the greater the experience the less the possibility of any such qualified person arriving at any definite conclusion.

The meeting of the Entomological Club, held on March 15th, at "Wellfield," Lewisham, at 6.30 p.m., was a great success. The host and hostess, Mr. and Mrs. R. Adkin, received the members and guests, and there was a strong muster present. Among the guests were Professor Armstrong, Colonel Swinhoe, Messrs. Armstrong, jun., Collin, Distant, A. H. Jones, Lucas, South and Tutt, whilst it was quite a record meeting as far as members were concerned, for every available member was present, *viz.*, Messrs. R. Adkin, Chitty, Donisthorpe,

Hall, Porritt, Verrall and Professor Poulton. The only absentee was Mr. Lowne, who has long since ceased to be present at these pleasant social gatherings. The number of full members is limited to eight, and the Club is to be congratulated on its strength and activity, and deserves the thanks of all entomologists in promoting, by means of these social meetings, a cordial feeling between the representatives of all branches of entomology, whose lines of thought are frequently most diverse, and who, the best of friends personally, often appear on paper to be at loggerheads, owing to their adoption of diametrically opposed views in the consideration of critical questions of opinion growing out of their work.

The next few weeks will determine whether, during the current year, the knowledge of the life-histories of our British plume moths is to receive a push forward. The eggs and young larvæ of most species are unknown, and of the structure of many of the mature larvæ we are supremely ignorant. Eggs of *Pterophorus monodactyla*, *Amblyptilia punctidactyla*, and *A. acanthodactyla* have not yet been obtained, although the hybernators should now be on the wing. In six weeks' time ova of *Leioptilus microdactyla* should be available, whilst all the spring-feeding larvæ should be obtainable. All help will be gratefully acknowledged.

Another meeting of the Entomological Club was held on March 23rd, 1904, at 58, Kensington Mansions, Earl's Court, at 6.30 p.m., when the members and friends were received by Mr. and Mrs. Donisthorpe, the host and hostess on this occasion. After tea had been served, an adjournment was made to Mr. Donisthorpe's museum, where a considerable time was spent, a return being made at 8.15 p.m., an excellent supper being served at 8.30 p.m. An innovation at the last two meetings has been the introduction of a dainty menu card, showing considerable taste. Among the members and friends present on this occasion were Messrs. R. Adkin, J. Collin, Chitty, Druce, Ellis, Hall, Kaye, South, Tutt, Verrall, Waterhouse, J. Walker, Colonel Swinhoe and the Rev. Theodore Wood. A most enjoyable evening was spent. Rarely, one suspects, have entomologists had such a chance of knowing each other personally as of late; the many social gatherings, due to the initiative of the Entomological Club, bringing into close contact many who would otherwise remain comparative strangers.

The Rev. C. R. N. Burrows (The Vicarage, Mucking, Essex) will be very thankful for eggs of *Ticometra ternaria*, *Nemoria viridata*, *Iodis lactearia*, *Pseudoterpna pruinata*, and any of their near neighbours, especially *Aplasta ononaria*. Also for details and notes concerning the varieties and aberrations of *Hemithea strigata*.

We are in receipt of Mr. G. T. Porritt's *Supplement to the List of Yorkshire Lepidoptera*.* His original list was published some 20 years ago, and was, in a way, the model on which many of the best local lists have since been planned. This addition is continued on the same lines. A large number of species have since been added to the list, some of which, however, are included on the strength of single specimens, and can hardly, in the strict sense, be considered as belonging to the county fauna. A few included in the former list are dropped as having been originally added in error, whilst the long list of addi-

* Published by A. Brown and Sons, Limited, Savile Street, Hull. Price 2s. 6d.

tional localities for many of the local species, testifies to the excellent work done in recent years by the Yorkshire lepidopterists. The number of species now recorded for Yorkshire is 1379, *i.e.* 64·4 per cent. of the British fauna. We congratulate the author on so useful a piece of work.

Mr. Champion separates *Catops sericeus*, Panz., from *C. sericatus*, Chaud., and states that both occur in Britain. The same coleopterist asserts that *Rhynchites sericeus*, Herbst, is not British.

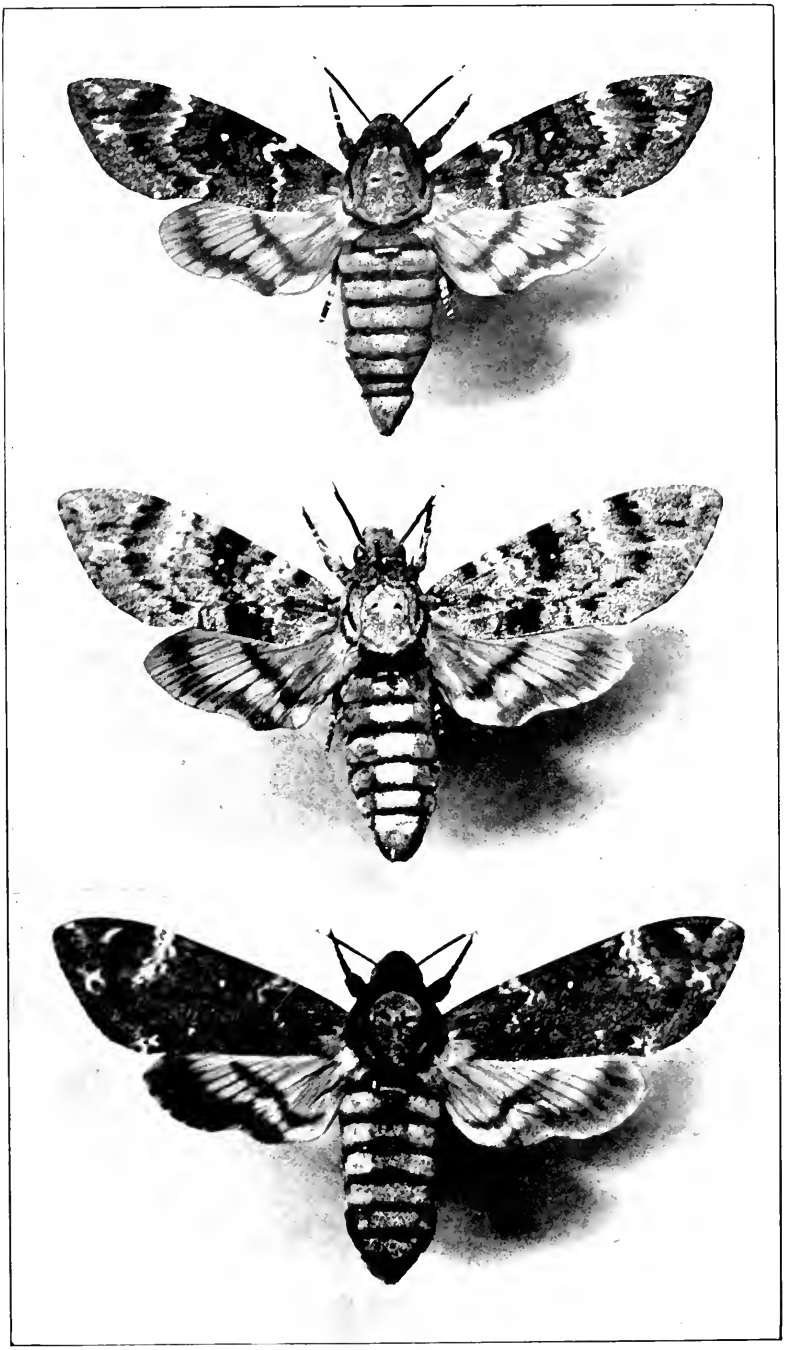
Will any lepidopterists who are rearing any British species of Alucitids, Hepialids, Cossids, Zeuzerids, Nolids, Liparids, Notodontids (common as well as rare), send us notes (for use in our work *British Lepidoptera*) on the following points:—Ovum: When laid—where laid—when hatched. Measurements of axes (2 in upright, 3 in flat eggs). Appearance—shape—colour—sculpturing, near base, at centre of egg, round micropyle—character of micropyle. Colour changes. Larva: (*a*) When hatched (*1st instar*)—naked eye appearance—markings—subsegments—colour—pattern. (*b*) Measurements and structural characters—particular notice of head structure—of thoracic segments—of 8th abdominal—fusion of 9th and 10th abdominals—prolegs. Date of moulting (*2nd instar*)—*a* and *b* as above. Date of moulting (*3rd instar*)—*a* and *b* as above. Date of moulting (*4th instar*)—*a* and *b* as above, etc. Puparium: Position—structure—measurements. Attachment of pupa. Date of pupation. Appearance of newly-formed pupa. Changes in appearance till mature pupal colour is reached. Eggs, larvæ, and pupæ for description are badly needed, and should be sent to Mr. A. W. Bacot, 154, Lower Clapton Road, London, N.E.

COLEOPTERA.

Coleoptera in Cumberland in 1903.—In working through the fairly numerous species taken in this county last year, not a few turn out to be additions to our steadily increasing fauna; and although the weather could not well have been much worse for field work I invariably found that beetles were by no means uncommon, and, indeed, upon one or two occasions, my captures were more than I could conveniently set. To run briefly through the list, I may mention that at the height of summer *Carabus glabratus*, Payk., was exceptionally common in a particular part of the Scawfell district, and I found that there was nothing like a good soaking rain to bring this beetle out of its hiding-places. On such an occasion thirty fine specimens were taken in an hour or so. Of course, it is the slugs which the rain brings out, that the beetles are after, and several times I saw a *glabratus* carrying off a black *Arion* much bigger than itself. On the Solway marshes *Dyschirius nitidus*, Dej., again occurred sparingly, and on the Pennine uplands *Bradycellus cognatus*, Gyll., *B. collaris*, Payk., and the other usual mountain Geodephaga. *Harpalus rubripes*, Duft., I took for the first time at Silloth, a single specimen. I also took a single *Anisodactylus binotatus*, F., var. *spurcaticornis*, Dej., with the typical form. Another single capture was *Pterostichus minor*, Gyll., a new county record. *Anchomenus micans*, Nic., was also a new record. It occurred not uncommonly in flood-refuse and muddy places. *Hydroporus obsoletus*, Aubé, was found in two different parts of the Eden

valley, but sparingly. *Calodera aethiops*, Grav., came from sandhills, *Microglossa pulla*, Gyll., was beaten; *Oedica latipennis*, Sharp, occurred by stream-sides; whilst among a multitude of *Homalotae*, *H. divisa*, Märk., from carrion, *H. eremita*, Rye, from mountain-moss, *H. boletobia*, Thoms., *H. triangulum*, Kr., and *H. sericea*, Muls., from fungi, and *H. halobrectha*, Sharp, from mudbanks, may be mentioned. *Gyrophaena manca*, Er., abounded in fungi in summer with others of the genus. *Conosoma immaculatum*, Steph., was beaten from Scotch fir, and *Oxypus fuscatus*, Grav., and *O. similis*, F., were obtained by stone-turning. The genus *Philonthus* was represented by about twenty species, of which *P. cernalis*, Grav., and *P. debilis*, Grav., may be referred to as additions to the county list. *P. corvinus*, Er., from flood-refuse was also interesting. On the sandy banks of the Gelt stream, *Scopaeus sulcicollis*, Steph., turned up sparingly as the result of close searching on hands and knees. *Oxytelus complanatus*, Er., I took freely on bones in my back-yard, which is my only acquaintance with it in Cumberland. Both species of *Anergophorus*, Kr., and several of *Trogophloeus*, Mann. were taken in flood-refuse. *Anthophagus testaceus*, Grav., was fairly common on birches in August. Another nice find in the Gelt Valley was *Geodromicus nigrita*, Müll., which I took within a yard or two of where I captured a specimen in 1902, both captures being in August. *Homalium iopterum*, Steph., and *Megarthrus denticollis*, Beck., were obtained from fungi with many of their allies. From flowers in August *Epurea mellina*, Er., was captured, *E. florea*, Er., occurring at sap, and *E. deleta*, Er., in abundance in fungi in company with *Triphyllus suturalis*, F., and *Mycetophagus multipunctatus*, Hellw. Under fir-bark *Pityophagus ferrugineus*, F., was occasionally met with. *Elmis volkmari*, Panz., was swept, and so was *Aspidiphorus orbiculatus*, Gyll. *Aphodius lapponum*, Gyll., and *A. erraticus*, L., were the best of the genus to occur. In July, *Geotrupes cernalis*, L., was abundant on the side of Great Gable where the path from Sty Head Pass descends into Wastdale. It was curiously local, as on the Scathwaite side of the Pass not one was to be seen. *Corymbites pectinicornis*, L., turned up again after a few years' absence, but sparingly. *Malthodes dispar*, Germ., with others of the genus, was beaten and swept in summer. *Grammoptera tabacicolor*, De G., was common on the flowers of raspberry with an occasional *Pachyta cerambyciformis*, Schr. A second brood of *Hydrothassa hannoverana*, F., appeared in July in sufficient numbers to satisfy any coleopterist. *Apteropeda globosa*, Ill., was swept in the summer and taken later in flood-refuse. *Tribolium confusum*, Duv., was brought to me from a flour-mill: *Omias mollinus*, Boh., occurred in moss; *Tropiphorus obtusus*, Bonsd., in flood-refuse; *Barynotus schönherri*, Zett., on roads; *Grypidius equiseti*, F., on river-banks; *Orchestes avellanae*, Don., by beating; *Ceuthorrhynchus marginatus*, Payk., by sweeping; and many more weevils, too numerous to mention in a short note like this.—FRANK H. DAY, F.E.S., 27, Currock Terrace, Carlisle. *March 25th*, 1904.

THE BRITISH SPECIES OF BAGOUS.—A CORRECTION. In my paper on the above subject (*Ent. Rec.*, vol. xiv.) there is an omission which obscures the sense. The second line of the "Table of the Species," page 151, should read thus: —Club indistinctly articulated, with first joint as long as the following joints united. The words "with first joint" being those omitted.—E. A. NEWBERY, 12, Churchill Road, Dartmouth Park, N.W. *January 4th*, 1904.



Aberrations of Manduca atropos.

Some unusual forms of Manduca atropos (with plate).

By (Rev.) C. R. N. BURROWS.

I have always regarded this species, of which I have from time to time reared a considerable number, as being little liable to variation. I had, however, an indistinct recollection of having seen or heard of strange forms which good fortune had brought to other collectors, and I was very much surprised when I found that the account of such interesting aberrations did not turn up in response to Mr. Tutt's request for particulars, as material for his forthcoming vol. iv of *British Lepidoptera*, so I took upon myself a search in likely directions, and I hope that the result will prove interesting to readers of the *Ent. Record*.

Everybody knows the ordinary forms of this fine insect well enough. There is a certain amount of difference in the area of the pale patch towards the apex of the forewing, and some variation in the development of the transverse yellow or white lines. But Linné's type is practically unicolorous. Beginning with this I will proceed to give an account of my discoveries, some of which, in response to my urgent request, have now been exhibited in London.

(1) *The type*.—I have in my own cabinet a ♀ bred at Rainham, in 1896, which well represents this form. The upperwings are almost without markings, except for the discoidal spot, which, in this specimen is quite tiny, and some short whitish streaks from the inner margin, four on the left upperwing and two on the right. Unfortunately, as is often the case with forced specimens, this one is not quite fully scaled towards the tips of the forewings, and there was a small aneurism towards the extremity of the right forewing.

(2) In the cabinet of Mr. J. A. Clark I found a female specimen, which appears to be a very good illustration of what the late Mr. J. Jenner-Weir called "phæism," *i.e.*, incomplete melanism or duskiness. Here the whole insect, a fine specimen of the form which has more extensive pale markings upon the upperwings, is entirely suffused. This does not strike one so much on the upperwings, but is most noticeable when it obscures, but by no means hides, the yellow of the underwings, thorax, and abdomen. This specimen was bred by Mr. Clark from a Cambridgeshire pupa, on October 15th, 1892, and was exhibited by him at the meeting of the City of London Entomological Society, on November 17th, 1903.

(3) Mr. W. Brooks, of Grange Hall, near Rotherham, possesses a most striking specimen (I think a ♀, but it is difficult to be certain from a photograph), which he tells me has never been described or exhibited until he brought it to the meeting of the City of London Entomological Society, on November 3rd, 1903. This insect has the upperwings much more suffused with yellow and white than any I have seen before. So much is this the case, that the dark coloration which one is inclined to consider as the ground colour in other examples of the species, is here reduced, until it forms two transverse bands, which (in the set specimen, whose portrait is before me), continue the two black bands of the lower wings. This in itself constitutes, as far as my experience goes, not only a curious, but probably almost unique, variation, yet it is further intensified by the extraordinary increase in the number of white scales, which, though not

rare in some specimens, are, in this instance, so numerous that they cover the whole of the upperwings, thorax, and abdomen. The effect of this is that when the insect is looked at sideways it appears to be perfectly white. Another strange point about this particular specimen is that the blackened nervures on the hindwings are continued to the base. This specimen was bred by Mr. Brooks, in 1900, the pupa coming from Long Sutton, Lincolnshire. Mr. Brooks tells me that he has reared large numbers of specimens from the same district, and this intensification of the white scaling and development of bands and streaks, appear to be marked in several of his other specimens, but in none so greatly as in that described above. He has a somewhat similar, but smaller and less marked, specimen which he also reared in October 1900. Several of his earlier aberrations, with white scaling, and more or less banded and streaked, were exhibited by him at the South London Entomological Society, on November 8th, 1900. I have spoken of the particular aberration described above as being probably almost unique. There is an indistinct recollection which haunts my mind, that some years since I saw in London two very gray specimens. As Mr. Brooks' best have never been south before, I am puzzled as to whether I have not dreamed. I hope, however, that these notes of mine may induce the owner of these phantom specimens to exhibit them again, if they exist, that those who are interested may compare them with Mr. Brooks' (*see* note *postea*.—Ed.).

(4) In Mr. Clark's collection I noticed another specimen, a very fine large ♀, quite pale and faded looking, yet perfectly scaled and in good condition.

(5) I have in my cabinet a ♀ which has the inner line on both hindwings almost obliterated. I have seen this form nowhere else, but Mr. Clark, Mr. Brooks, and I have each a specimen with the line all but obliterated on one hindwing, and curiously enough in every case it is the left side.

Freaks.—(1) Mr. Clark has a ♀ in which the inner band on the left hindwing, ends towards the abdomen, in a large black blotch, extending and enlarged towards the base of the wing, and also extending, but narrowing, across the yellow space, through the outer band and into the fringe. This insect was exhibited by Mr. Clark at the meeting of the City of London Entomological Society, November 17th, 1903.

(2) Mr. Brooks has a specimen in which the upperwing on the left side is divided from near the centre of the costa, to within one-third of the base on the inner margin, the basal portion being quite normal, but the outer and larger area yellow.

[For the purpose of illustrating certain forms of this species in *The Natural History of the British Lepidoptera*, vol. iv., I have reproduced three of the examples in Mr. Brooks' collection, and a copy of this plate is being published with this article. These I have named respectively :—(1) ab. *virgata*, in which the pale and dark areas of the forewings take on a distinctly banded form ; (2) ab. *variegata*, in which the pale markings are so enlarged as to give the specimens a distinctly variegated and unusual appearance. This form is referred to at length by Mr. Burrows above, and is no doubt that exhibited by Mr. Brooks, at the meeting of the South London Entomological Society, November 8th, 1900, as I remember the exhibit well, and

believe I made some remarks on the specimens (there were two) at the time, although the exhibition appears to have passed out of Mr. Brooks' mind just at present; (3) ab. *extensa*, in which the outer band of the hindwing reaches to the hindmargin. In the actual specimen figured, both wings are of the same tint, the difference in the plate being merely due to the photography. I would here thank Mr. Brooks and Mr. Burrows, the former for the use of the photographs for the plate, the latter for his energy in obtaining for me the sight of an exceptionally fine lot of aberrations of this species, which I have dealt with at length in *British Lepidoptera*, vol. iv. Perhaps some day Mr. Brooks will give us a detailed paper on his work with this species, illustrating it with the other interesting photographs he has relating to various stages of this species.—J. W. Tutt.]

Notes (chiefly on lepidoptera) of a trip to the Sierra de la Demanda and Moncayo (Burgos and Soria) Spain (*with map and three plates*).

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

(*Concluded from* p. 126.)

It is still supposed by many entomologists that female moths, and especially some butterflies, are much fewer in number than the males. I need not say, perhaps, as I have said it before, that I find it impossible to believe that the facts on which this belief rests at all justify it. It is very common at the beginning of the season of a species to see an overwhelming preponderance of males, but, later, it is not uncommon to see hardly any specimens but females. One or two observations bear on this subject. Near Canales, *Aporia crataegi* was by no means rare in places, but the insects on the wing were nearly all males. On two occasions I found pairs, *in cop.*, well hidden away amongst the foliage of blackthorn-bushes, and in one of these cases the wings of the female were barely fully expanded, and her empty pupa-case was close by. Various Satyrids, and especially *Epinephele pasiphae*, were observed to be common in places, at first few females were seen, but the males of *E. pasiphae* were always dodging in and out amongst the herbage, often hardly coming out at all from under the shelter of bushes of *Genista scorpius* or blackthorn, which protected the low plants from being grazed down. So much was this the case that it was rarely easy to net a specimen if desired; and it fully explained how this somewhat delicate fly was so commonly worn and injured. One could not doubt that these butterflies were in search of the females, which remained hidden in such places, and did not fly till oviposition made this a necessity. Females were certainly rare at this period, but later were commoner than males. A very similar procedure was noted in *E. ida*, *Epinephele tithonus*, and *Pararge egeria*.

Papilio podalirius was not uncommon at Canales, and I saw there two exceedingly dark specimens, and was vexed at being unable to capture either of them, and satisfied myself with the paler form, of which I brought home only one specimen, this one proves to be really a very dark specimen, which makes me the more regret the escape of the dark ones. The *Aporia crataegi*, which were common at Canales, usually presented a good dark line along the discoidal nervure, and one ♀, notwithstanding her translucency, has this very large and repeated on the hindwing, the underside of which has the light scales of a deep

orange instead of the usual yellowish-white, and the dark scales are abundant. At Canales the larva of *Eugonia polychloros* was seen abundantly on aspen-trees, planted by the wayside for shade. The larva of *Argynnis aglaia* was picked up frequently on high ground near Canales, but I must admit that I did not recognise it until it pupated. One very fine ♀ and one cripple were reared. The larva differed from those I have seen, and seen figured, in being absolutely black, except the red lateral spots. No trace of paler dorsal lines or other markings. Comparing this with Buckler's figure and description, the difference is very great. As we picked up six or eight, all absolutely agreeing, it was obviously no mere aberration, but a fixed variety. They were found marching at a great pace over grass or bare patches of soil.

One of our excursions from Moncayo (July 18th) was across a shoulder of the mountain, then, descending the southwest aspect of the mass, we reached the low ground at a village called La Cueva de Agreda, because situated close to a long limestone cavern, which was the object of this raid—unfortunately no special cave-beetles were discovered; a ♀ *Arctia fasciata* was picked up here that laid a good batch of eggs. Near here two specimens of *Melanargia lachesis* var. *cataleuca* were taken amongst swarms of that species. *Thecla ilicis* was common amongst scrub-oak, along with var. *cerri*. *Chrysophanus gordius* was common, and *Plusia moneta* had left many traces in the aconite which abounded—one pupa was picked up. On some damp open ground, with oak-scrub, there were plenty of butterflies, but none of particular interest, *M. lachesis* and *T. ilicis* being the most numerous. The tramp across the mountain, in a direction we did not otherwise traverse, might have given something worth catching, had it not been made during the outward journey through more or less dense fog.

The Lycænids were more numerous in species than on our previous excursions, but not, I think, so interesting. Twentytwo species were captured; the few *Polyommatus corydon* taken were of the form *hispana*, but perhaps *Everes argiades* is of the most interest, as both Kane and Staudinger say it does not occur in Spain, Rühl, however, reports it from Bilbao. I took a specimen at Canales and another at Moncayo. *Cupido sebrus* was apparently common, but I took few, usually passing them by as *Nomiades semiargus*. Imagines of *Cyaniris argiolus* were frequently seen; at Moncayo the larva was abundant on heath (I fancy *Erica arborea*). This larva was dove-colour, with brown markings, and had no trace of green, and it puzzled me a good deal to determine what it could be. Rühl quotes *Erica vulgaris* as a foodplant; Kane gives holly and ivy, which accords with our British ideas; Hofmann says *Rhamnus* and *Calluna*. The colour of my larvæ is, therefore, more worthy of remark than the foodplant. We took several other Lycænid larvæ, but *Thecla ilicis* was the only other one I was able to verify.

From one of several larvæ taken on *Genista scorpius* at Canales, I bred a specimen of *Pseudoterpna coronillaria*. The larva I believed to be one of *Pseudoterpna pruinata* (*cytisaria*). I believe so still. At the same time I quite agree that further evidence is necessary before it can be taken as proved that *P. coronillaria* is merely a southern form of *P. pruinata*. I have not had the two larvæ side by side, but my mental picture of the larva of *P. coronillaria* absolutely agreed with it.

The fact that *P. pruinata* has a grey form in the south of France, and that Millière succeeded in muddling them up, goes a long way to support my idea. In vol. iii., p. 463, of the *Iconographie*, Millière says that he has figured *P. coronillaria* when presenting a grey var. of *P. cytisaria*, implying that there is no grey var. of *P. cytisaria*, but, in vol. ii, he says that the larvæ of *P. cytisaria* yield about an eighth of the imagines of a grey colour, and one of them it is he figures, and refers to it in vol. iii. as being *P. coronillaria*, an opinion accepted by Staudinger (*Cat.*, 1901, part i. 2861). His explanation leaves it to appear that *P. cytisaria* has an eighth part of grey forms, but instead of figuring one of these he inadvertently figured *P. coronillaria*. In any case he confounded the two, and in his correction left so much confusion that one concludes he was still unable to distinguish grey *P. pruinata* from *P. coronillaria*. Rambur's *P. corsicaria* would seem to be abundantly distinct, and the real ground, so far as I know, for regarding *P. coronillaria* and *P. pruinata* (*cytisaria*) as distinct from each other, is that Rambur was clearly of opinion that they were so, and I am quite willing to allow that I am probably more likely to make an error in such a matter than Rambur, whose powers of observation and judgment in such matters command my greatest respect, more than do those of many more widely-known authorities, but I am not aware of any definite attempt to prove or disprove their identity since the time of Rambur and Millière. I have handed the Geometrids taken to Mr. Prout, who has examined them. One of his observations on them is that they contain a smaller proportion of characteristically Spanish species than those taken in previous years further south. This accords with my general impression in collecting that the species of general European aspect were proportionally preponderant to a degree, that suggested one was working in, perhaps, southern France rather than Spain—that is, as compared with my impressions in 1901 and 1902. *Eurranthis pennigeraria* was certainly the most notable, and perhaps abundant, Geometrid we saw. We first found it near Canales at a low level, large specimens, but rather rare and all worn. Later we met with it in immense numbers on the ridge to the north of Canales, or rather just below the ridge on the south slope amongst *Erica arborea*, where the heath was rampant and the scrub-oak disappearing. Here it was not too easy to catch, though its abundance left no difficulty in the way of taking a fair series. It occurred less freely in a good many other places, and was seen on Moncayo. We met with no larvæ of either *Oenogyna zoraida* or *Arctia latreillii*; they do not probably occur in these sierras.

The Asilids were not seen in any numbers on this excursion, being less abundant here than in the drier and hotter regions further south. Several were, however, noted with beetles and other insects on their proboscids. Another experience, however, with diptera reminded me of M. Graslin's account (*Annales de la Soc. Ent. de France*, 1836, p. 556) of how Asilids would pounce on moths the moment he disturbed them from the grass and left him grievously disappointed of his prey. My fate was the same, but in a somewhat different manner, on no less than three occasions at Moncayo. Just as I was about to box a small moth at rest on a stone, a small housefly-like dipteron pounced on to my quarry and started it off. It was difficult to avoid believing that the fly (could he have spoken) would have said, and did in effect say,

"Look here, friend, wake up and be off as quickly as ever you can, or a fearful beast of prey will have you in a moment," and the moth certainly followed the advice with success. The truth probably was that flies, which were abundant enough, often select little prominences for settling on, and these happened to think the moths were such favourable resting-places, and the flight of the moth probably startled them as much as it annoyed me.

On our way home at Guéthary (France) we met with a most striking case of what appeared to be homœochromatism, whether it be explained as a case of Müllerian resemblance or otherwise. The facts must be well known, but I do not know that any attention has been called to them from this or any other points of view. The three butterflies involved are *Satyrus dryas*, *Coenonympha oedipus*, and *Heteropterus morpheus*. These butterflies are all of a sooty dull black above, and have much the same black appearance on the wing. At Guéthary they flew together in very restricted little bogs or swamps—swamps at the upper ends usually of the little streams of rarely more than three or four acres in extent, and lying in very sheltered hollows, perhaps 100ft. below the general upper level. They were the only butterflies in these swamps, and they did not occur outside them. If really minute accuracy is required, as it ought to be, this broadly true statement must be modified by saying that *S. dryas* did fly a little way up the slopes bounding the bogs, and one or two were even seen on the upper levels. These were all, however, occasional stragglers, possibly because the swamps were so small as to be easily left by so large a butterfly. *S. dryas*, however, as well as the other two, were often seen to get anxiously back to the bog if driven by the collector's net (or otherwise) only a few feet up the side slopes. Of other butterflies, *Colias edusa* flew across the bogs as it does across anything, and *Brenthis euphrosyne*, *Coenonympha arcanius*, *Hesperia sylvanus* afforded an occasional example. Many butterflies were abundant all around. Taking this to be a Müllerian association, it presents three species that might be grouped together, not only by the entomologist, but by a bird or any other predaceous animal, as a group different and easily distinguishable from everything else about. It differs from the Neotropical Müllerian associations of butterflies, in its members having merely a broad but unmistakable resemblance, and none of the minutely detailed identity of size, colour, and markings seen in the Heliconine groups. At Guéthary butterflies of many species abounded at this time, and any bird, say, could catch plenty without trenching on these bog species, and making it not worth its while to discriminate between them. Were other butterflies scarce, and one or other of these bog species edible, a bird would have no difficulty in differentiating them—*S. dryas* by its size, *H. morpheus* by its hopping flight and underside shown at each skip, etc. That they were protected seemed probable from their lazy flight, rendering them of very easy capture, very different, for example, from *Satyrus arethusa*, which was abundant close by, but very difficult to take. They could fly if they liked—*C. oedipus* was the weakest, but *S. dryas* could go powerfully if frightened, and *H. morpheus* possessed to the full the skipping faculty for a mysterious disappearance. My experience of these three butterflies certainly does not present them as always associated. Last year

we took *S. dryas* and *H. morpheus* flying together in a swamp in this same district, *viz.*, at St. Jean-de-Luz, only a few miles south of Guéthary, but *C. oedipus* was absent, the reason apparently being that the swamp was a large one in an open river valley, and, therefore, far from being as warm and sheltered as where we took the species this year. *S. dryas* occurs in many places where the other two species are absent; it is, in fact, so common and widespread a species that I fear I have taken but little notice of the places in which I have seen it. It certainly affects damp and shady places, but I think I have seen it in dry open places, and its slow, floppy flight never struck me as it did this year.

The following is a list of our captures:—*Papilio podalirius* (very dark), Canales; *Thais rumina*, Canales, June 28th; *Parnassius apollo*: *Aporia crataegi*, abundant, Canales; *Pieris brassicae*, seen; *P. rapae*, Canales; *P. napi*, Canales; *P. daplidice*: *Euchloë euphenoides*, Canales, June 30th; *Leptosia sinapis*, Canales; *Colias hyale*: *C. edusa*: *Limenitis camilla*, Canales; *Pyrameis atalanta*, seen; *P. cardui*, abundant; *Aglais urticae*: *Eugonia polychloros*: *Vanessa antiopa*: *Melitaea athalia*, Moncayo; *M. didyma*, Canales; *M. phoebe*, Canales; *Brenthis euphrosyne*, Canales; *B. selene*, Canales; *Issoria lathonia*, abundant; *Argynnis aglaia*, Canales, larvæ; *A. niobe* var. *eris*, Canales; *A. adippe* var. *chlorodippe*, Agreda; *Dryas pandora*: *Melanargia lachesis* and var. *cataleuca*, Cueva de Agreda; *M. iapygia*: *Erebia epiphron* var. ?, Canales; *E. stygne* var. *hispana*: *E. evias* var. *hispana*: *Satyrus circe*, Soria; *S. briseis*, Soria; *S. semele*, abundant; [*S. arethusa*, Guéthary; *S. dryas*, Guéthary; *Pararge aegeria*, Guéthary;] *P. megaera*: *P. maera*, Moncayo; *Aphantopus hyperanthus*, Canales; *Epinephele jurtina*: *E. tithonus*: *E. ida*: *E. pasiphae*: *Coenonympha arcania*: [*C. oedipus*, Guéthary;] *C. pamphilus*: *Nemeobius lucina*, Canales; *Lacosopis roboris*, Moncayo; *Thecla ilicis* and var. *cerri*: *Chrysophanus hippothoë*, Moncayo; *C. alciphron* var. *gordius*, Moncayo; *C. virgaureae* var. *miegii*, Moncayo; *C. phlaeas*: *Lampides boeticus*: *Everes argiades*, Moncayo and Canales; *Plebeius argus*, Moncayo and Canales; *Polyommatus baton*, Canales; *P. astrarche*, not abundant; *P. icarus*: *P. hylas*, Canales; *P. hylas* var. *nivescens*, Agreda; *P. bellargus*, very violet tint, Canales; *P. corydon* var. *hispana*, Agreda, Soria; *P. admetus*, Agreda; *Cupido sebrus*, Canales; *Nomiades semiargus*, Moncayo: *N. cyllarus*, Canales; *N. melanops*, Canales; *Lycaena arion*, Moncayo; *Cyaniris argiolus*, Canales and Moncayo; *Heteropterus morpheus*, Guéthary; *Adopoea thaumas*: *A. actaeon*: *Syrichthus sao*: *S. malvae*: *S. carthami*: *S. proto*: *Spilothyrus lavaterae*: *Orygia aurolimbata*, abundant, Canales; *O. splendida*, abundant, Moncayo; *O. antiqua* (? Canales); *Euproctis chrysorrhoea*: *Oeneria rubea*, Canales; *Malacosoma neustria*, Canales; *M. franconica*, Canales; *Achnocampa ilicis* (?): *Lachneis catax* (?): *Lasiocampa quercus*: *Hadena dentina*, Canales; *Agrotis conspicua*: *A. tritici*, bred, Canales; *Leucania lithargyria*, bred, Canales; [*Hecatera dysodea*, Guéthary;] *Catocala elocata*: *C. conversa*: *Euclidia mi*: *E. glyphica*: *Acontia luctuosa*: *Agrophera trabealis*; [*Herminia crinalis*, Guéthary:] *Arctia caja*: *A. fasciata*: *Nudaria murina*: *Emydia striata*: *E. cribrum*: *Nemeophila plantaginis*: *Endrosa irrorella*: *Heterogyna canalensis*: *Anthrocera loniceraе*: *A.* ? *achilleae*, Canales; *A. transalpina*, Canales, very small; *Aglaope infausta*: *Adscita statices*: *A. geryon*:

Crambus culmellus; *C. cassentiniellus*; *C. uliginosellus*; *C. pratellus* ab. *alfacarellus*; *C. pascuellus*; *P. cerussellus*; *Phycis subornatella*; *A. moldarica*; *Scoparia ambigualis*; *S. dubitalis*; *Pyralis terrealis*; *P. flavalis*; *P. ferrugalis*; *T. pollinalis*; *Mecyna polygonalis*; *Pyrausta cespitalis*; *P. sanguinalis*; *P. alborivulalis*, Canales; *P. austriacalis*; *Stenia punctalis*; *Pyropsyche moncaunella*, Moncayo; *Egeria asiliforme* (*cynipiformis*), Canales; *Oxyptilus tristis*, common; *O. laetus*, Moncayo, etc.; *O. pilosellae*, Moncayo; *Enemacmidophorus rhododactyla*, Soria; *Alucita tetradactyla*; *Stenoptilia fuscus*. A few Tineids and Tortrices have been sent to Mr. Durrant.

Sale of an Entomological Library.

Books are the index of a man's mind. A glance at a man's library will tell almost exactly the mental equipment and intellectual capacity of the man. The advertised sale of the library of the late Dr. P. Brookes Mason, at Stevens' sale-rooms, on May 17th, reminds us at once that another of the best entomological libraries in this country is to be broken up, and that, in a short time, this country will be the poorer by the loss of those volumes that will find their way into the libraries of the Continent and of America. The last sale of equal importance was that of the library of the late Mr. H. T. Stainton, when many of the best entomological works were bought by the dealers at prices far below the lowest possible standard of value that could at all fairly be placed upon them, and were at once included in special sale catalogues at their true prices, often from five to ten times above that that had been paid for them, and, one surmises, found no lack of buyers (possibly mostly abroad), if one may judge by the fact that in scarcely one case was a second offer made of them. The low prices at which most of the books were sold in the sale-rooms suggest eloquently how few scientific entomologists there are in this country, for one has not long to live in the entomological world to learn that the number of really good entomological libraries in this country is exceedingly few, and can possibly be counted on the fingers of the hands. It has long since passed into a proverb among naturalists that "A collector is known by his specimens, the savant by his microscope and books"; and one feels that only those who have ample collections for private work, and an extensive library for continuous study and reference, can ever reach a high place in the branch of science they study, or prosecute any line of original research with a fair prospect of lasting success. It is a remarkable fact that few men appear to buy books for study, and one is inclined to think that the numerous entomological societies scattered through the country do little or nothing to foster real research. So far as one can judge, the additions to their libraries are largely modern works, which any entomologist worthy the name will buy for himself, whilst the best works of the old masters—Linné, Réaumur, Geoffroy, Hübner, Esper, Haworth, Curtis, Stephens, Herrich-Schäffer, etc.—with which our younger lepidopterists should be tempted to become conversant, are usually sought in vain on the bookshelves (and what is true of works on lepidoptera is still more so in the case of those relating to the less-worked orders); and, whilst a long series of modern present-day magazines (which any good library committee would recognise the more intelligent of its members possessed) is generally

available, one seeks in vain for a complete series of the old magazines —Fuessly's *Magazin*, Loudon's *Magazine*, *Annals and Magazine of Natural History* (early series), the *Linnaea Entomologica*, etc.—nor is any real attempt made to add those modern works produced in America and on the Continent that the average entomologist may be supposed not to know. One would assume that when the sale of an important library was about to take place, the library committees of our natural history societies would attempt to make really useful additions to the collections under their charge, but this appears not to be so. One surmises that the wealthiest entomologists of to-day are far wealthier than the wealthiest of 50 to 100 years ago, and that the poorer are much less poor than the poorest then, yet there are far fewer even fair entomological libraries in the houses of entomologists nowadays, apart from the few really first-class ones still in existence. The general principle of never buying what you can possibly borrow has evidently become a part of the unwritten code of a great part of the large section of that "nation of shopkeepers" that does not keep shops, and this really seems to be, quite as much as want of intellectual capacity, one of the reasons why there are so few really good collections of first-class entomological works in this country, and, hence, one's regret is all the keener when a large and excellent library, that has been years in the making, is broken up, and its best treasures find their way into dealers' hands, and ultimately, in many cases, are bought up by the big libraries of America and the Continent, and no longer remain a part of the scientific wealth of what is still by far the richest country of the world, which allows itself apathetically to be despoiled by the fresher and more active leaders of the intellectual life of advancing foreign lands. We still maintain the high standard of our private entomological collections; we must not allow the contents of our hitherto unrivalled entomological libraries to pass out of our hands.

Further Note on Peronea cristana ab. gumpinana.

By J. A. CLARK, F.E.S.

In the *Ent. Record*, xiii., p. 289, I describe a form of *Peronea cristana*, under the name of ab. *gumpiana*. I had at the time, as I thought, examined all available sources in which an early description had possibly been made, but strangely enough quite overlooked a note, published by Mr. Dale (*Entom.*, xxxiii., pp. 179-180), whilst I was working out my own paper. In a recent letter from Mr. Dale, however, that gentleman points out to me his own note, and also gives me the reference to the original description of this aberration, which, by-the-bye, was not named *gumpiana*, but *gumpinana*. In 1842, in the *Annals and Magazine of Natural History*, x., pp. 365-6, is an article signed under the pseudonym of "Capucina," communicated by J. Curtis, F.E.S. It is well known (*teste* Stephens, Humphreys and Westwood) that "Capucina" was the pseudonym of the Rev. W. Johnson, but I may add that there is nothing in the index to show that this was so, nor is there any reference in the index to the article in question, and that must be my explanation for the statement on p. 299, where I say that I am unable to find it. Reference to the article shows that not only did "Capucina" name *gumpinana*, but also *ruficristana* and *capucina* (to which reference (without page) is correctly made in my

account). It follows, therefore, that the synonymy of the two other forms should be :

1. *Gumpinana*, "Capucina" (Johnson), *Ann. Mag. Nat. Hist.*, x., p. 366 (1842). *Gumpiana*, Dale, *Entomologist*, xxxiii., p. 179 (1900); Clark, *Ent. Record*, xiii., p. 289 (1901).—This is also a "white button"; the anterior part of the upperwings is a bright chestnut, besprinkled with a profusion of powdery white, dust-like particles, the blending of the two colours producing a beautiful roan; the underwings are not dissimilar to those of *capucina* (shining pale brown). I propose to call this insect *gumpinana*, and, although I am not connected with the family of Gumps, the name is not without its charms, and, therefore, I hope it will not be unacceptable to the public (Johnson).

2. *Rufcristana*, "Capucina" (Johnson), *Ann. Mag. Nat. Hist.*, x., p. 366 (1842); Dale, *Entomologist*, xxxiii., p. 180 (1900).—So nearly allied to *rufcostana*, which is so well described by Mr. Curtis (*Brit. Ent.*, 2nd ed., no. 24), that it is unnecessary to particularise respecting it; the shape of the wings and the colours throughout are precisely the same, with the addition of a well formed red tuft or button on each of the upperwings; I have, therefore, ventured to name it *rufcristana* (Johnson).

As I stated (*antea*, xiii., p. 289) that I could not find the original description of ab. *capucina*, "Capucina" (Johnson), *Ann. Mag. Nat. Hist.*, x., p. 366), it may be advisable to add it :

3. *Capucina*, "Capucina" (Johnson), *Ann. Mag. Nat. Hist.*, x., p. 366.—The ground of the superior or upperwings dark brown, with a shade of burnt umber, and an elevated white tuft or button in the centre of each wing; the palpi and head white, and the corselet and the anterior part of the wings as far as the tuft nearly covered with an incrustation of pure white, with two blotches of the same, and several raised snow-white dots towards the extremity of the wings: the underwings shining pale brown, not unlike those of some of its congeners (Johnson).

Lepidoptera of the Val d'Herens—Useigne to Evolene, Haudères to Arolla.

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

The morning of July 28th broke dull and threatening, but as my luggage and clothes were ahead, I caught the ramshackle post-diligence at Sion at 5 a.m., and by 9 a.m. was at Useigne, having difficulty in keeping thoroughly warm in spite of an overcoat that I had taken the precaution of keeping, and when I descended at Useigne threatening drops of rain fell and a bad morning seemed certain. However, I walked on with little entomological success, picking up here and there an insect off the flowers, or boxing a Geometrid from the rock-hewn faces bordering the roads, until I crossed the rushing Borgne, a mile or two higher up the road. Here, for a few moments, the sun broke out, and, at once, insect life appeared everywhere; it seemed impossible that one could practically walk over so many insects—*Melanargia galathea*, mostly fine dark specimens, *Melitaea didyma*, magnificent mountain forms among the females, *Parnassius apollo*, large, well-marked specimens, *Anthrocera loniceræ*, *A. achilleæ*, *A. transalpina* and *A. carniolica* were, perhaps, the most abundant. With the momentary outburst of the sun a difference in the atmosphere was distinctly noticeable, and one was glad to take off one's coat owing to the higher temperature. A longer sunny spell made one really busy, and swarms of *Polyommatus damon*, *Epinephele ianira*, *E. lycaon*, almost all males; and *Erebia aethiops* joined those already mentioned. On the thistle flowers *Vanessa io*, *Argynnis adippe*, *A. aglaia* and *A. niobe*, often with fine silvery-spotted undersides, fought the assertive Anthroceras, who

often, however, managed to keep the heads to themselves. *Polyommatus corydon*, too, was usually abundant, *Aporia crataegi* still in passable condition, whilst *Pararge maera* was not uncommon along the roadside, and several *Hipparchia alcyone* were stalked, only one specimen, however, a very fine ♀, worth keeping being captured. The *Melitaea phoebe* were in grand condition, but *Lycaena arion* was quite over, and *Chrysophanus gordius* almost so, although one fair ♂ and a fairly good ♀ were selected from the ragged remnants as trophies of the chase. After about half-an-hour the sun disappeared again, but the warm air kept the insects on the move, and, for about three hours, from 11 a.m. until 2 p.m., the slopes on either side of the road, and right away down to the torrent below, were alive with insects, few, it is true, in the number of species, but none the less welcome. In one place *Satyrus cordula* was abundant, but I was astonished to see their poor condition considering how fine they had been between Roche and Yvonne the previous day, at some 2000ft. lower elevation, and I could only select a few specimens, and these hardly up to cabinet standard. The females, too, were poor, and it struck me that, perhaps, there had been rough weather, locally, in the valley that had spoilt the specimens. Here and there *Hipparchia semele* was not uncommon, but I saw no ♀ s, so surmised that the species was only just coming out. Among other insects I captured several *Callimorpha dominula*, all, however, wasted, and almost all ♂ s, some were on the wing, others were sucking greedily at the thistle flowers. Whilst the sun was shining I got a couple of ♂ *Leucophasia sinapis*, but none appeared during the afternoon; *Setina aurita*, beautiful golden-coloured specimens, some spotted, others well-streaked, were netted as they flew lazily down the slopes, whilst *Lithosia lurideola* and *L. lutarella* (the golden mountain form) were also not infrequent. A single *Cupido minima* was netted, one well-marked *Syrichthus carthami*, also two *Syrichthus sao*, but *Pamphila sylvanus*, *Thymelicus thaumas*, and *Syrichthus alveus* were in greater numbers. A single worn example of *Polyommatus baton* and one *P. eumedon* also fell a prey, whilst the meadows were alive with *Strenia clathrata*, and a dark form (♂) of *Fidonia atomaria*: a specimen or two of *Selidosema plumaria* were taken, whilst from the rocks I boxed *Anticlea berberata*, *Eupithecia contiguaria*, *Nudaria mundana* and a few other species. Well on the way up towards Evolène, *Erebia goante* began to be frequent, and from a flower I took a single specimen of *Anthrocera scabiosae*, the only example I have ever seen in the valley. At one point in the afternoon, the sun again shone for a few minutes, most of the time being wasted in stalking a magnificent fresh *Polygonia c-album*, which I lost on the loose rubble, but as I stepped back, a large butterfly came straight down the path, and with a quick stroke I found I had taken a ♂ *Apatura iris*, which, although recently emerged, had been badly mauled in some way or other, and was worthless. A few specimens of what I suspect may be *Melitaea parthenie* were taken near the same spot. Space alone limited my captures, or, in spite of the want of sun, I should have made one of the biggest bags that I had ever made in one day of the alpine butterflies. As it was I worked on contentedly until near Evolène, when the sky clouded over and rain began to fall, hastening my steps to the Hôtel de la Dent Blanche in Evolène.

It would appear that I am doomed not to have a really fine day in this part

of the Val d'Hérens. On August 13th, 1903, I again traversed the distance from Evolène to Useigne, on my return journey to the Rhone valley. Another dull morning was my lot, and my bag over this magnificent ground consisted of eight *Setina aurita*, two *Parnassius apollo*, a single *Erebia ochrolenca* taken seated in the centre of a *Centaurea* bloom, one *Aciptilia xanthodactyla*, and a common burnet or two. About 11 a.m. I lunched at Useigne, and soon afterwards the sun broke through, and by noon a great improvement had taken place, so that between Useigne and Vex, a district in which I had not seen an insect on the up journey, I took a large number of specimens of fairly common species, one of the best corners, apparently, being the big curve from which the Val d'Hérémence branches, and which ends up at the interesting "Pyramides d'Useigne." Here *Pyrameis atalanta*, *Melitaea didyma*, *Argynnis adippe*, large and brilliantly spotted *A. niobe*, but, above all, *Dryas paphia* and var. *valesina* and *Callimorpha hera* made a brilliant show, whilst *Epinephele ianira*, *Melanargia galathea* and *Erebia aethiops* were also abundant, and *Papilio podalirius*, *Satyrus alcyone*, several of each observed. *Zephyrus betulae*, a very large ♂, was in the nature of a surprise, whilst *Thecla ilicis* was not so unexpected. The roadsides were swarming with *Polyommatus damon* and *P. corydon*, *P. icarus* and *P. astrarche* being less abundant, whilst *Pararge maera* and *P. megaera* were both frequent, the latter quite abundant between Vex and Sion. In a coppice through which the road passes, near the entrance to the Val d'Hérémence, *Pararge egeria* was not infrequent, and, further on, a magnificent large and well-marked form of *Anthrocera carniolica* swarmed on the flowers by the roadside. Towards Vex many of the species became even more abundant, particularly *M. didyma*, which appeared to be in quite as fine condition as it had been a fortnight previously. *Leucophasia sinapis* and *Colias hyale* were occasionally seen, but *Epinephele lycaon* was, perhaps, the most abundant species. Among the Hesperiids only *Pamphila comma*, *P. sylvanus* and *Syrichthus alveus* were taken, and among the Lycænids, except those mentioned, nothing better than a specimen each of *Polyommatus hylas* and *P. bellargus*. The large numbers of *Anticlea berberata* observed on this jaunt have already been noticed. *Melitaea phoebe* appeared to be absolutely over, not a single specimen worth pinning was captured.

The morning of July 29th, 1903, broke sunny and almost cloudless, and by 8 a.m. I was on the move from Evolène to Haudères. The sun on the Ferpècle glacier shone brilliantly, and the peaks of the mountains all around stood out quite clearly against the sky. The fields on either side of the road swarmed with newly-emerged *Tanagra atrata*, the ♀s clinging to the grass stems, the ♂s flying rapidly hither and thither, hundreds of paired specimens hanging conspicuously in every direction. I passed over the bridge, under which the rushing Ferpècle stream flows, and round the base of the Dents de Veisivi on which fine large typical *Erebia ligea* flew with quite typical *E. euryale*, yet each apparently distinct, whilst two or three *E. stygne*, in not at all bad condition, were also taken. Once over the Borgne and up through the tiny village beyond, one enters the Combe d'Arolla, and it was clear that it was to be a great butterfly day, but my two zinc boxes were already almost filled with the efforts of the two previous days, and only a little space was left for captures. The season was late, so the fields were in

many places uncut, and the flowers swarmed with common butterflies and moths. *Erebia aethiops* so far up the mountains was somewhat of a surprise, but no Erebias were really common, although *Erebia goante*, *E. ceto*, *E. melampus*, *E. eurvale* and, later, *E. tyndarus* were in greater or less abundance. In the lower part of the valley *Epinephele lycaon* was really very common, as also was *Pararge maera*, although the latter was rather worn. On the banks here, too, *Anthrocera loniceraе*, fine, large, full-spotted examples, just emerged, were in lovely condition, as also were *A. transalpina* and *A. achilleae*, but *A. purpuralis* was here worn to shreds and was not to be found in good condition, until at least two miles further up the valley, after which, and all the way along to Satarme, it was both abundant and in very fair condition, many only just emerging; *Melitaea phoebe*, here, was not common, but I was very pleased to take a few fine *Brenthis ino*, and at the runnels in the road I captured a few of the dark alpine form of *Melitaea cinxia*, and some freshly emerged ♂ *M. parthenie* var. *varia* of dark colour, some worn ordinary looking specimens having been rejected nearer Haudères. By the sides of the roads a little alpine form of *Plebeius aegon* was in great abundance, but sadly worn, *P. argyrognomon* (*argus*) occurring just as freely, but of larger size a little farther up the valley. The large fritillaries here were *Argynnis niobe* and *A. aglaia*, but *Brenthis amathusia* and *B. euphrosyne* still gave rather worn examples. *Polyommatus damon*, *P. corydon* and *P. astrarche* were as usual the abundant species, but some very fine *P. hylas* and *P. donzelii* were especially welcome, and I was much disappointed in not finding the latter all the way up the valley to Arolla, but *P. orbitulus*, rare here, became more abundant as we went on. *Cupido minima* now and again, mostly worn, was met with, and *Nomiades semiargus* was in lovely condition, but of the three abundant skippers at the water, viz., *Syrichthus alveus*, *Pamphila comma* and *Thymelicus lineola*, the last-named was in very poor condition. A single *Polyommatus bellargus*, ♀, was in the nature of a surprise, although I am always picking up single specimens of this species where one might expect it to be abundant, but where one sees no more; a single *P. eumedon* in fine condition was more expected. *Chrysophanus hippothoë* was apparently only just coming out, a single ♂, at any rate, alone came under observation, and *C. virgaureae* was in good condition. So pushed was I for room that I practically discarded everything except types, just to remind me what I did see on the journey up, although I remember how abundant was *Fidonia brunneata* in the pine woods. After leaving Satarme, at the last ascent to the Kurhaus after the road branches, *Brenthis pales*, *Argynnis niobe* and *Colias phicomone* became very abundant, and *Anthrocera purpuralis*, in splendid condition, was in numbers on every *Centaurea* head. It was one of the days of an entomologist's life, when everything combined to show off nature at her best, and, crippled as I was at the time, and thoroughly fagged out when I reached the Kurhaus, I still retain the liveliest recollection of the vivid hues, and the many beautiful winged things, that gave colour to one of the finest Alpine pictures to be found anywhere on the continent of Europe.

COLEOPTERA.

Omalium septentrionis, Th., in Kent.—In Canon Fowler's *Coleoptera of the British Isles*, *Omalium septentrionis* is only recorded

from Scotland, and is said to be very rare. Since then, however, Mr. Blatch has recorded it from Knowle (*Ent. Mo. Mag.*, 1890, p. 37), Mr. Day has recorded it from Cumberland (*Ent. Mo. Mag.*, 1902, p. 268), Mr. Champion from Guildford (*Ent. Mo. Mag.*, 1903, p. 279), and Dr. Joy from Bradfield (*Ent. Mo. Mag.*, 1904, p. 40). I have a specimen which I took at West Malling, in Kent, on a dead hedgehog, in September, 1893, and now record for the first time.—Horace Donisthorpe, 58, Kensington Mansions, S.W. *April* 24th, 1904.

Peritelus griseus, Ol., in Surrey.—I took a specimen of this very rare beetle at Purley, in 1888. At the time I did not know what it was, and it stood in my collection for some years as *Tropiphorus mercurialis*, until I took it to the Museum and identified it as *Peritelus griseus*. It has only been recorded from the Isle of Wight before in Britain, where it was said to have been taken by Sidebotham and Wainwright at Ventnor and Sandown.—Ibid.

Experimental proof as to the distastefulness, or otherwise, of certain Coleoptera.—In my paper on "Cases of Protective Resemblance, Mimicry, etc., in the British Coleoptera" (*Trans. Ent. Soc. Lond.*, 1901, Part III.), I write of *Meloë*, "These beetles are called oil beetles, because of the yellow fluid which exudes from their limbs when handled, and which no doubt possesses distasteful properties. They are large, heavy creatures, and crawl about regardless of danger. Their colours are doubtless aposematic." Having captured *Meloë violaceus* in some numbers this month, at Richmond, I took specimens to the Zoological Gardens on April 27th, to offer to insectivorous creatures. I first dropped a specimen into a cage which contained two lizards, when an Australian lizard at once seized the beetle by the body but quickly rejected it. He again attacked it, this time at the head but promptly let go. Froth was seen round his mouth and he wiped it many times on the pebbles which formed the ground of the cage. All the time the beetle "feigned death," exuding the oil from its joints. The keeper thought the lizard had killed it, but this was not the case, as before I left the gardens I went to have another look at it, and the beetle was crawling unhurt up the side of the cage. The keeper told me the green lizard had also attacked it twice, but neither would have anything more to do with it. A specimen thrown into the aviary which contained a plover and other birds, was unhurt, and escaped, as the other birds would not go near it. A missel-thrush pecked the beetle several times, but eventually rejected it and would not touch it again. Two marmosets were afraid of the beetles and would not touch them, but a Capuchin monkey seized one greedily and endeavoured to eat it, throwing it down, however, in evident disgust. A grand Galago also seized a beetle, and made several attempts to eat it, looking in evident surprise at his keeper for giving him so nasty a morsel, he also threw it down and would not touch it again. I put two specimens into my observation nest of *Formica rufa*, and, although slightly attacked, the ants soon left them alone, and being left in the nest all day and night, they were alive and unhurt next day when I removed them. Finally, I painted an ant with some of the oil caught on a paint-brush, when the ant died in a few minutes. It is, therefore, certain that *Meloë* are very distasteful. I tried similar experiments with *Dermestes murinus* last year, which beetle I had taken in some numbers in Pamber Forest. In the paper before referred to, I

said of this beetle, that it was just one of those cases where experiment is required, to prove its edibility or otherwise. In these experiments the beetle was eaten readily by birds, lizards, monkeys, etc., in fact by everything it was offered to, and so proved to be undoubtedly edible.—Ibid.

Stereocorynes truncorum, Germ., at Cobham Park, Kent.—Among a few unexamined insects left over from my 1902 captures, a specimen of this rare beetle has turned up. I can find no record of its appearance within recent years, and, therefore, think it well to notify my capture in the *Ent. Record.* Moreover, as the insect, according to Canon Fowler, appears to have hitherto only occurred in Epping Forest, and its presence in Kent is not noted on the Victorian County History it forms an addition to the fauna of the county as well as to Mr. J. J. Walker's list of the coleoptera of Cobham Park.—E. C. Bedwell, "Elmlea," Cleveden Road, Norbiton.

Immigration flight of Aphodius inquinatus.—In strolling along the shore between Birkdale and Ainsdale on the afternoon of April 16th, I came across *Aphodius inquinatus*, Fab., in great numbers flying in from seawards. They gradually became less numerous as I progressed southwards, and after I had gone about five hundred yards further scarcely any were to be seen. Continuing my walk, I was surprised to meet with a still larger swarm, the insects being, however, rather more dispersed, and extending for a distance of over half a mile, stragglers being encountered, in fact, all the way to Seaside Railway Station, a quarter of a mile further still. The direction of the flight of both swarms was from the northwest, the wind at the time being light and almost due west. The main meteorological disturbance which had lain over the Atlantic earlier in the week had nearly filled up, but the fitful occurrence of shallow secondaries had imparted somewhat local and "patchy" conditions to the type of weather experienced over the western portions of England and Wales, at Birkdale, on the date in question, the general conditions being weak, both local and diurnal variations were traceable. Detached, but heavy clouds, which formed a distinctive feature of the morning, speedily cleared about eleven o'clock after slight precipitation caused by the flow of the spring tide, which reached its maximum at 11.33. A steady and rather cold wind from the southwest gradually veered during the day, moderating considerably towards the later afternoon, when the sun became scorching. I at first thought that both the columns of insects belonged to the same general flight, but found on closer observation that, in spite of their common direction, they almost certainly constituted two distinct swarms. In the first and narrower column the insects were flying low down and closer together, more especially along its northern border. Many alighted on the wet sand immediately on reaching land, others higher up on the shore or on the adjacent sandhills, and but few appeared to pass far inland. In the second and broader column the insects were more scattered, and flew at a greater elevation, scarcely any settling on the shore and few alighting on the bordering dunes, the vast majority passing over the railway and away landwards. On returning to the scene of the first swarm, after about an hour and a quarter's absence, I found very few chafers on the wing, and I think the majority of these were insects which, having first rested on the wet sands further out, were now

seeking higher ground. In the broader column I saw insects after settling on the sandhills, again take wing and join the main body moving inland, but none of the insects composing this swarm seemed to continue their flight, many, indeed, appearing content to remain on their backs as they fell. Under these circumstances I should have expected on my return to find more insects on the ground instead of less, and I think they must have burrowed in the sand. I, however, only saw one doing so, nor did the scraping away of sand in several places serve to disclose more than one other. As *A. inquinatus* has been common in the neighbourhood this spring, it might be supposed that the insects had flown out from this coast earlier in the day, but the overcast sky, and the direction and steady increase in force, caused by the incoming tide, of the prevailing cold wind during the morning, would be opposed to that theory. Despite the parallel direction of their flight I am of opinion that there was a considerable difference in the distance which had been covered by the two columns. In the first and narrower one the insects appeared fatigued, in the second they were comparatively fresh. Whence came then these doughty immigrants? The direction of their flight would point to the Isle of Man as their starting place; the direction of the wind would favour the Wirral or north Welsh coast. Dr. J. Harold Bailey writes me he has not so far observed the species in the island, and suggests they may have hailed from the north of Ireland. Should any have so crossed it would probably be the insects composing the narrower column as their flight from so great a distance, and across the wind, would account for their exhausted condition. The second swarm may have come from the dunes of Cheshire or north Wales, whence, having flown out to sea, with the wind earlier in the day, they would make for the nearest land towards sunset, or, should the insects of both columns have followed the same general course, it is possible that the larger may have come from the Wirral, barely fifteen miles to the south-south-west, and the smaller from some more remote point westward along the Welsh coast. Of course it is well-known that *Aphodius contaminatus*, Fab. (*Col. Brit. Is.*, vol. iv., p. 32: *Naturalist's Journ.*, January, 1902, p. 9), *A. sordidus*, Herbst (*Ent. Record*, viii., pp. 143-144), and other *Aphodii* occasionally swarm in countless numbers, but to me, the most interesting feature in the present instance is that, though there is strong presumptive evidence of the two swarms having started from separate localities, they should practically converge on one point, for less than half-a-mile separated the two zones of shore traversed by the insects in their journey landwards. The only recorded flight of *A. inquinatus* which I have been able to discover, is that mentioned by Schäffer (*Entom. News*, viii., p. 173) as occurring in Delaware county towards the end of March, 1897, and referred to by Mr. Tutt in his *Migration and Dispersal of Insects* (1902, chap. vi., p. 101). This swarm was observed shortly before sunset, the insects flying from east to west and across the wind.—E. J. B. Sopp, F.R.Met.S., F.E.S., Birkdale. *April 26th*, 1904.

NOTES ON LIFE-HISTORIES, LARVÆ, &c.

Important larval structure in Coleophorids.—I wish to call the attention of micro-lepidopterists to the following facts:—In certain species of the genus *Coleophora* (*fuscedinella*, *hemerobiella*, *limosipennella*,

etc.) there are only three pairs of ventral prolegs. They, like the Gracilariids, are without claspers on the sixth abdominal segment. *C. fuscedinella*, at least, leaves the egg in this condition. On the other hand, certain species, *C. lineolea*, *C. murinipennella*, *C. caespititiella*, and others, are provided with four pairs of ventral prolegs, besides the anal pair.—ALFRED SICH, F.E.S., Corney House, Chiswick, Middlesex. *March 17th*, 1904. [This observation appears to us to be of the greatest importance. The superfamily of Coleophorides no doubt has within its limits all the materials for a complex and scientific subdivision. The present arrangement of putting so many and diverse species in the genus *Coleophora* results from similar want of knowledge to that which led Linné 150 years ago to put all the butterflies into the genus *Papilio*. We still want the student who will work out all the structural differences in the egg, larval, pupal, and imaginal stages. The collector has worked out a fair number of the life-histories, without, however, giving us any important or exact biological details, and he will continue to do so. Dr. Chapman has hinted to those who are studying the group some remarkable oval and pupal characters, but our micro-lepidopterists at present do not seem to know what to do with his hints. No doubt there is much to work out in this interesting group before their natural subdivisions and affinities can be made out satisfactorily.—ED.]

PRACTICAL HINTS.*

Field work for May and early June.

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

1.—The ova of *Petasia nubeculosa* hatch from the beginning to the middle of May in normal seasons, and the young larvæ will feed on birch or oak (preferring birch).

2.—In late May the young larvæ of *Petasia nubeculosa* are to be found on birch eating small holes quite through the leaves, and spinning a few silken threads in order to ensure a safer foothold.

3.—The larvæ of *Lithosia caniola* are fullfed in May and June, and in confinement will eat clover (Buckler).

4.—The larvæ of *Lithosia muscerda* are fullfed in May and June, and, in the Norfolk fens, the species affects the sallow bushes growing in the wettest parts of the fens, the larvæ most probably feeding on the lichens growing on these bushes throughout the autumn and winter from August to May.

5.—In May the fullfed larvæ of *Setina irrorella* are to be found feeding on a blackish-brown lichen growing on stones above high-water mark, and, in some cases, mixed with a yellow lichen.

6.—Larvæ of *Cybosia mesomella* may be obtained in May on the trunks of oaktrees feeding on a pale lichen intermixed with the moss.

7.—The larvæ of *Egeria chrysidiformis* are to be found in May and June feeding in the thickest portion of the roots of *Rumex acetosa*, ejecting heaps of brown frass at both ends of its mine, and spinning a tough brown silken covering over any part of the side which has been eaten quite through, so that an affected stem is easily detected.

---

* "Practical Hints for the Field Lepidopterist," Pts. I and II each contains some 1250 practical hints similar to these, but relating largely to the Macrolepidoptera. Interleaved for collector's own notes. Price 6s. each part.

8.—The full-grown larvæ and pupæ of *Ægeria cynipiformis* are best collected in late May and early June, the imagines appearing towards the end of the latter month and on into July. Care must be taken not to interfere with the pupæ when they emerge from their cocoons, which they do some little time before the imagines appear.

9.—The pupa of *Ægeria tipuliforme* is to be found in a gallery in the stems of currant bushes (pruned preferably) the thinnest possible layer of rind alone being left to separate it from the outside; in the gallery it spins a slight silken cocoon, woven with the sawdust-like frass.

10.—The earliest hatched larvæ (May and early June) of *Stauropus fagi*, frequently feed up rapidly, and produce pupæ and imagines in August. The extent of this partial second-brood depends much on the season.

11.—At the end of May and early in June, the fullfed larvæ of *Hepialus hectus* spin near the plants of *Pteris aquilina* on which they feed, an oblong cocoon, covered with soil, on the surface of the earth under moss or among dried leaves, in which to pupate; the pupal stage rarely lasts more than a fortnight.

12.—The so-called *Anthrocera filipendulae* captured in late May and early June, with a tiny sixth spot (in male) should be put aside for examination as probable *Anthrocera stephensi* (*hippocrepidis*, St.).

13.—Full-grown larvæ of *Anthrocera trifolii* are to be found in May; they pupate low down near the ground, and are largely restricted to dry situations, the imagines emerging in early June (or even in late May in very early seasons).

14.—The larvæ, pupæ and imagines of *Adscita geryon* are sometimes, in favourable seasons, very forward in their transformations. On May 18th, 1864, larvæ, pupæ and imagines were taken at the same time (Horton).

15.—The larva of *Adscita geryon* spins its tough little web-like cocoon in May or June, low down among the stems of *Helianthemum vulgare*; the imago emerges in June or July.

16.—The larva of *Phragmatoecia arundinis* lives for two years as an internal feeder in the lower part of the stems of *Arundo phragmites*, *i.e.*, underground, but comes up in May and June when the pupation-period is approaching.

17.—During May the larvæ of *Phragmatoecia arundinis* are of various sizes, but many quite full-grown. These pupate within the stems of the *Arundo phragmites* in June, the imagines emerging in July.

18.—The young larvæ of *Cerura vinula* are easily found on poplar and willow in May and early June, although their peculiar dark coloration when young makes them very similar to the black curled edges so frequently seen in spring on quite young poplar leaves.

19.—The larvæ of *Lophopteryx carmelita* feed up very rapidly in May and June, only about four weeks elapsing from the time the eggs hatch until the larvæ commence to spin.

20.—The eggs of *Agrotis cinerea* laid at the end of May or in early June, hatch in about twelve days; the young larvæ should be fed on wild thyme (not on grasses), of which at first they gnaw the under-surface of the leaves. The larvæ are almost fullfed by the time they are ready to hybernate in October.

21.—The larvæ of *Alucita pentadactyla* re-commence feeding in April,

by the 15th are about ¼in. long, but by mid-May are practically fullfed. They are to be found on *Convolvulus* (Porritt).

22.—The larvæ of *Aciptilia tetradactyla* are to be found from mid-April to mid-June on wild thyme. They are difficult to detect and readily drop (Bankes).

23.—The larvæ of *Aciptilia baliodactyla* are to be found at the end of May on the top shoots of marjoram, *Origanum vulgare*: they bite practically through the stems near the tops of the plant, causing them to hang down and wither, which is the sign betraying the presence of the larvæ; they eat large holes through the leaves as well as portions out from the edges (Grigg).

24.—The larvæ of *Aciptilia spilodactyla* are to be found feeding on *Marrubium vulgare* in late May and June; they are to be found again in late August and September, a second brood of imagines occurring again in late September and early October (Buckler).

25.—The larvæ of *Leioptilus tephradactylus* are to be found throughout May feeding exposed on the leaves of golden-rod, the pupa being attached by the anal segment to a stem or leaf of the foodplant (Porritt).

26.—The larvæ of *Mimaeseoptilus fuscus* are to be found during May and the first half of June feeding on speedwell in more or less exposed situations —banks, etc. (Porritt). They are generally found half-hidden among the flower-buds.

27.—The larvæ of *Mimaeseoptilus bipunctidactyla* are to be found in mid-May working up inside the young shoots of *Scabiosa columbaria*, *S. arvensis* and *S. succisa*: the infested portions of the plants are concealed by the healthy shoots, and the whereabouts of the larvæ are not to be discovered without difficulty (Barrett).

28.—The larvæ of *Marasmarcha phaeodactyla* are to be found readily by searching plants of restharrow (*Ononis*) at the end of May and throughout the first half of June; they are moderately exposed, and mostly towards the upper parts of the plants.

29.—The larvæ of *Oxyptilus heterodactyla* are to be found on *Teucrium scorodonia* during May; they eat the stem about half-way through about 1½in. from the bottom of a shoot, causing the part of the plant above to bend down, and soon this withered portion on which the larva feeds is overtopped by the neighbouring plants (Greening).

30.—In the second week of May the larvæ of *Platyptilia isodactyla* are to be found in marshy places mining the stems of *Senecio aquaticus*, feeding in the thick main stem of the plant, in which each hollows out a space in which to assume the pupal state (Barrett).

31.—In the first fortnight of June the larvæ of *Platyptilia ochrodactyla* are to be found in various stages of growth mining in the stems of *Tanacetum vulgare*, the mouth of the mine being generally between the axil of a leaf and the stem, with a few silk threads spun from one to the other, among which the blackish frass gets entangled and becomes conspicuous (Buckler).

SCIENTIFIC NOTES AND OBSERVATIONS.

Homeydew.—An excellent paper* on the "Aleyrodids of California," by Miss Florence E. Bemis, will be of great value to all students

* *Proceedings of the United States Nat. Museum*, xxvii., pp. 471-507, pl xxvii.-xxxvii. 1904.

of this interesting order, whilst one paragraph at least will prove interesting to the collecting entomologist in general. Writing of the "pupæ" of the group the authoress says: "All the pupæ secrete 'honeydew,' sometimes in such quantities that the leaf around the case and the dorsum of the pupa is covered with it. In some species there are seen minute, blunt tubes on the apex of the lingula, through which the fluid may be excreted (fig. 47, pl. xxxiii.). When the 'honeydew' is emitted, the operculum is lifted, the lingula is protruded, dorsally recurved, and the drop thrown with considerable force (fig. 46, pl. xxxiii.). The liquid is sweet, and when exposed to the air it becomes thick and finally hardens. The frequent appearance of fungus in and about the cases is probably induced by the presence of this medium, as it is in the *Coccidæ*. On *Chamædorea* sp., an introduced plant from Mexico, which was kept in the Golden Gate Park Conservatory, San Francisco, the author saw many large, black ants busily engaged in gathering 'honeydew,' acting as ants do with Aphids."—J. W. TUTT.

ERRONEOUS AND FAULTY FIGURES OF PLUMES AND THEIR LARVÆ.—One is often in doubt whether, if one cannot equal what was done a century or half-century ago, it is fair to inflict inferior work on present-day scientists. The thought has just been called up by a glance through plates 413-416 of Barrett's *Lepidoptera of the British Islands*, published December, 1903 (in which a part of the plumes are figured), as they lie side by side with plates 1-7 of Herrich-Schäffer's *Schmetterlinge von Europa*, published in 1855, on a table at the South Kensington Museum. The latter are, in many instances, among the finest figures of the plumes ever drawn; the former can only be compared with the poorest of those in Wood's *Index Entomologicus*, to some of which it is next to impossible to attach even the name. Among the most remarkable in Barrett's work are pl. 416, figs. 3-3*a*, called *lithodactylus* ♂ and ♀; fig. 5, called *lienigianus*; fig. 6, called *tephradactylus*, and fig. 1, called *zophodactylus*; pl. 415, figs. 5. 5*a*, 5*b*, referred to *bipunctidactyla*; pl. 414, fig. 7, called *distans* ♂, etc. A comparison of Herrich-Schäffer's Oxyptilids, pl. iii., with Barrett's Oxyptilids on pl. 414 and pl. 415, his Stenoptilias, pl. iv., with those on the latter's pl. 416, says little for our modern methods, either in execution or production. Buckler's *Larvæ*, ix., pl. clxiii.-clxiv., also lies here with them, and one observes that the transference of the larvæ from the plates of the latter author to Barrett's work has proved a total failure; how great can readily be seen in the larva of *bipunctidactyla*, pl. 315, fig. 5*c*, in which the reddish longitudinal marks of Buckler, pl. 163, fig. 9*b*, are converted into reddish intersegmental transverse rings, and the ground colour is changed from green to yellow. Buckler's larva of *teucrii*, pl. 163, fig. 7, is a marvellous failure with its fine green hair-tufts, but the copy in Barrett, pl. 135, fig. 3*b*, with the hairs green and black and the change in the ground colour, is even more remarkable. We may say that this larva has in nature raised warts with beautiful white hairs that can be only compared with spun glass or silvery filigree-work. Nearly all Buckler's figures of plume larvæ are completely erroneous in their detail; great complicated warts are converted into single hairs, arising anywhere and everywhere on the segments, and the colour of these hairs, usually white in nature, is almost always green or black in Buckler's figures, and one can only ask what scientific purpose is served by recopying badly these erroneous figures. In

Barrett's work the figure of *lienigianus*, pl. 416, fig. 5*a*, is perhaps the worst where nearly all are bad. Why, too, have the Amblyptiliid imagines not got the tooth on the inner margin of the forewing? The figures 4 and 5 of pl. 414 have the wing outline of Platyptiliids, but the markings of Amblyptiliids. Of course, no blame attaches to the author of the letterpress, who knows the insects in nature, for these remarkable drawings, except so far as he should guide his artist and colour-printer with his knowledge. Mr. Barrett, of course, knows his larvæ, but so we might have thought did Buckler; still, he leaves out the warts, and gives most of them green or black hairs, placing them often where no hairs of any kind are present in the actual larva.—J. W. Tutt. *April 30th*, 1904.

NOTES ON COLLECTING, Etc.

Spring lepidoptera at Aigle.—I have already opened the ball here with a few ordinary species, *Pieris rapae*, mostly of the ab. *immaculata*, being not uncommon, and yesterday I took a ♀ *Euchloë cardamines* with orange in the apical cells of the forewings, which are usually whitish. The *Leptidia sinapis* are very typical. This afternoon I went up the Sepey Road and had three *Papilio podalirius* under my net at once, although two very cleverly got from under it. There was nothing very special flying, *Papilio machaon*, *P. podalirius*, *Polygonia c-album*, *Aglais urticae*, *Vanessa io*, *Euranessa antiopa*, *Eugonia polychloros*, *Pyrameis atalanta*, *Pararge megaera*, *Nomiades cyllarus*, *Cyaniris argiolus*, *Callophrys rubi*, *Nemeobius lucina*, *Brenthis dia*, *Issoria lathonia*, *Pieris rapae*, *P. napi*, *Leptidia sinapis*, *Gonepteryx rhamni*, in quantity, *Nisoniades tages* and *Syrichthus malvae*, appear to be the species seen. Of *G. rhamni* I saw some 30 or 40 on one day, but this and the other hybernated species are only fit for breeding-purposes. I saw a ♀ *P. c-album* lay an egg on the 20th inst. on hopbine. There is already any quantity of larvæ of *Aglais urticae* in their first stadia, and, speaking generally, one surmises there will be an abnormal number of Vanessids here this year. Vegetation is exceedingly forward. We had the thermometer at from 80°-70° F. for some days, but during the heat it blew a hurricane, and all the specimens that emerged were soon blown to ribands; now, however, for the last few days we have had copious rains, and if the heat comes on again we shall be very busy.—G. O. Sloper, F.E.S., Hôtel Beau Site, Aigle. *April 21st*, 1904.

Early lepidopterological notes.—I was very surprised to find so little moving during Easter week (April 2nd to 9th) in the Torquay district. In the sheltered grounds at Cockington were huge bushes of rhododendrons in full bloom, and there were others in some of the gardens on the outskirts of Paignton, but nothing lepidopterological seemed to be on the move during the daytime. The first *Pieris rapae* of the year was seen between Paignton and Torquay on April 6th, a lovely summery day, whilst at Dartmouth, on the 7th, one of the lanes just outside the town provided a fair supply of larvæ of *Callimorpha dominula*, apparently in their penultimate skins, mostly basking on leaves of comfrey, although many were to be obtained by turning the plants back and carefully searching the ground afterwards, for they drop very readily when disturbed. Compared with three that have

been carefully nursed through the winter, and that hatched from eggs laid by a ♀ captured between Useigne and Evolène in the Val d'Hérens, one observes scarcely any difference in size, although one might have expected the Swiss larvæ to have been a little behind, the parents not having been taken till well towards the end of July; the Swiss ones are, however, perhaps, a little darker. These larvæ have kept on the move very nearly all the winter, and only for a few weeks at the end of December and in January were they really quite still. The Dartmouth larvæ began to spin up on May 2nd. A few common Noctuid larvæ were noted, but no micro-larvæ worth collecting were met with. On the 8th, another lovely day, several *Pieris rapae* were observed between Torquay and Babbicombe, whilst *Aglais urticae* was busy sunning on the flowers both at Torquay and Babbicombe. With the exception of a moth on the wing, crossing the road between Torquay and Paignton on the 6th, and which I believe must have been *Brephos parthenias*, and one or two, apparently *Taeniocampa gothica*, on the lamps, none of which were get-at-able, nothing else was observed during my stay. Searching for small larvæ was quite time wasted. The first *Pieris rapae* noted in the southeast London district, was observed on April 25th, at Westcombe Park.—J. W. Tutt. *May 3rd*, 1904.

Biston hirtaria in south-east London.—Common as I have seen the imagines of *Biston hirtaria* in the Lewisham and Lee districts on the trunks of lime-trees, it was a new experience to me to see the ♂s quite abundant on the lamps on the still warm evening of April 17th. All those knocked down for examination proved to be males.—Ibid.

Hybernating larva of Eutricha quercifolia.—Larvæ of *Eutricha quercifolia*, reared from eggs sent me by Mr. T. Hall, from Croydon, have been remarkably still all the winter, *i.e.*, from mid-November till towards the end of February, when they began to get a little restless, and were supplied with twigs of plum and hawthorn, the bark of which they stripped off evidently with great relish. Hawthorn buds with the leaves just showing were available in late March, and plenty of well-grown blackthorn and hawthorn by April 2nd at Torquay. They fed up well till April 14th, when they began to rest, and were evidently preparing for a moult. The first one changed on April 17th, and presented a striking difference in its bright mottled coat and plentifully distributed white hairs from the dull-looking hybernating-skin of almost uniform tint and tiny dorsal orange dots; the others followed within the next two or three days, and since then have gone ahead at a rare rate on wild plum. On May 2nd they measure respectively 1⅞ins., 1⅝ins., 1⅜ins., the large one evidently a ♀, the middle one is particularly plentifully marked with white, in fact, the three larvæ are very different in their appearance and the amount of white mottling, although all have come from the same batch, and have been reared under identical conditions.—Ibid.

On the winter habits of certain plume larvæ.—Leioptilus lienigianus: On April 3rd, 1904, I first saw two larvæ of *Leioptilus lienigianus* after hybernation; they were still in their winter dress, and no more examples could be found in a place where, until mid-November, they were common enough, in fact, only a few shoots of the foodplant were above the ground. The two larvæ discovered were lying exposed in the sun, but no trace of feeding could be observed. Where they hide from

late November until the end of March has quite escaped me; at the former date they were still curled up in their autumnal domiciles, which, however, were slowly rotting away, whilst at the end of March no vestige of their habitation is to be found, and one has to wait to find the exposed larvæ on the new foliage. By the middle of April, however, a fair number could be found in the little tents they make for themselves by spinning a young leaf into a little hollow chamber, in which each larva lives.

PLATYPTILIA GONODACTYLA: In the late autumn of last year (October, 1903), I found a single tiny larva mining the leaves of coltsfoot, but a later searching was fruitless, possibly from want of giving sufficient time to the quest. A search on April 13th, on the marshes near here, resulted in my finding two or three larvæ, but they are very small, and, judging from their appearance, I am inclined to believe that this larva is more or less a miner all its early life, continuing in the leaves from autumn to spring, and then entering the lower part of the flower-stalk where one of the bracts wraps the as yet only partly developed peduncle.

PLATYPTILIA BERTRAMI: An examination of the yarrow plants at Higham, on April 4th, where *P. bertrami* occurred last year, was fruitless; there was no sign of larvæ, nor did I see any sign of curled or otherwise affected shoots. I doubt whether they have yet commenced their work, nor can I find where they have been hiding all the winter.

ACIPTILIA GALACTODACTYLA: What becomes of the young larvæ of *Aciptilia galactodactyla* during the winter I cannot discover. In November they are at rest on the stems, but these slowly rot in the winter, and, in March, no trace of the foodplant appears to exist. One suspects that they must pass the winter curled up snugly among the *débris*, close to the old rootstock. Still, it is not at all certain that this is so. Between April 10th and 14th I visited three localities where the species is common, but, altnough the leaves of the foodplant were up, and in some cases fairly grown, I could find no traces of larvæ, sunning or feeding openly, of any kind.

AGDISTIS BENNETII: The autumnal larvæ of *Agdistis bennetii* are readily found on the old dried stems, etc., of *Statice*, until the weather becomes too bad to search for them on their marshy habitat, *i.e.*, about mid-November; at this time they are exactly of the colour of the dried stems and seedheads, and the larvæ appeared to eat little or anything for at least a month prior to this date. On April 12th a search for larvæ proved unsuccessful; every leaf of the foodplant was dry, brown, and as thin as a piece of tissue paper, with no sign of young growth, and although I beat and looked over a quantity of old flowering-stalks and seedheads I did not find a single larva. A single larva was, however, found a week later, and was then well grown, the vegetation, due to the hot weather, having come on by leaps and bounds.—J. OVENDEN, Frindsbury Road, Strood, Kent. *April 5th*, 1904.

APPEARANCE OF SPRING LEPIDOPTERA.—The first example of *Anisoptteryx aescularia* observed this year in this district was noticed on April 4th on palings; the season seems to be at least a month late, owing to the low temperature. On the evening of April 14th I went to Chattenden to work the sallows, but the results were most unsatisfactory, the only insects I took being *Anticlea badiata*, commonly,

Taeniocampa gothica, *T. pulverulenta*, fairly abundant, and *Pachnobia rubricosa* (two). I also took a few larvæ, among others a small larva of *Eutricha quercifolia*, but what astonished me most was the entire absence of *Triphaena fimbria* larvæ, of which, at this time last year we took several dozens.—IBID.

LEPIDOPTERA AT SOUTHEND.—*Hybernia rupicapraria* was first seen here on February 1st, and on the 21st several larvæ of *Porthesia similis* were found in their silken hybernacula tucked away in crevices of oak-bark, whilst the first *Hybernia marginaria* was observed on the same day; an example of the latter species, however, emerged in one of my breeding-pots on April 12th. Four examples of *Petasia nubeculosa* emerged on April 1st-2nd from pupæ obtained from Rannoch larvæ in 1902. *Amphidasys strataria* emerged here on the 9th, and *Eriocrania unimaculella* was taken in lovely condition on the 10th.—F. G. WHITTLE, 3, Marine Avenue, Southend. *April 13th*, 1904.

LEPIDOPTERA AT LYNDHURST.—The only real observation of importance made so far seems to be the extreme lateness of the season. I spent Easter (April 1st) onwards at Lyndhurst, but only captured the common Tæniocampids, *viz.*, *Taeniocampa gothica*, *T. pulverulenta*, *T. stabilis*, in addition to a female *Xylena solida*. Two examples of *Panolis piniperda* were knocked out on April 6th whilst beating for larvæ of *Thera variata*, and now *Anisopteryx aescularia* and *Eupithecia pumilata* are just putting in an appearance.—R. B. ROBERTSON, Forest View, Southborne Road, Boscombe. *April 8th*, 1904.

TEN DAYS AT HYÈRES (March 20th-30th, 1904).—The winter here, as in England and everywhere else I hear of, had been dull and damp and chilly, and now the season is certainly very late, the last ten days, corresponding perhaps to about the first ten days of March in an average season at Cannes, though, curiously, some things are earlier whilst the mass are late. March 28th marks the first *Cistus* in flower, the first *Biscutella* in blossom, and one odd *Euchloë euphenoides* seen and taken. The ten days have had only one warm, four windy and two wet. The larvæ of *Charaxes jasius* are rather scarce, possibly due to the bad winter, but more probably to over-collecting. At present there are at Hyères a good many butterfly people, and of these six at least have larvæ of *C. jasius*. With two friends I joined in a search for larvæ on the 28th, we picked up about 14; I heard of two persons going over the same ground next day, they found only one. Mine were handed over to another member of the party, but even so, I do not feel quite clear that I am not in some degree guilty of the overcollection referred to. *C. jasius* would certainly be extirpated very shortly, were it not that it had a summer brood, in which its efforts to increase are no doubt much less interfered with. Of those taken very few were in the last skin, illustrating the lateness of the season. *Thestor ballus* is certainly well harried, but from the extended nature of its habitat, is probably in less danger than *C. jasius*. An odd specimen was seen on the 21st, two were taken on the 23rd, on the 29th it was very fully out, but not perhaps completely so, females being comparatively rare, and all, or nearly all, in first-rate condition. On the same date five specimens of *Thais medesicaste* were taken. On the 21st the first *T. polyxena* var. *cassandra* was taken, and three have since appeared, but only one per diem, they are fine and fresh. *Polyommatus baton* is not

yet fully out, though the first was seen on the 20th, and one *Nomiades melanops* was taken on the 29th. *N. cyllarus* has not yet been seen. *Gonepteryx cleopatra*, *Pieris daplidice* and *Anthocharis belia* have been seen all the time in an abundance, fairly corresponding with the propitiousness of the weather. An *Eriocrania*, probably *subpurpurella*, was taken freely round a woolly-leaved oak on the 28th, and a fine *Ophiusa lunaris* on the 29th, when also a dark (for Riviera) *Phragmatobia fuliginosa* was taken. *Euranessa antiopa*, *Eugonia polychloros*, *Vanessa io*, etc., frequently appear, and males of *Saturnia pavonia* (*carpini*) are plentiful on the wing, but only one captured. *Pararge egeria* is rather over, and *P. megaera* just fully out. Several *Cyaniris argiolus* in fine condition have been seen, and *Papilio machaon* and *P. podalirius* are quite fresh. Notes on collecting at Hyères without any reference to Mr. Powell and his work amongst butterfly larvæ would be very defective. I had the pleasure of taking a stroll with him with lanterns and seeing larvæ of *Melanargia syllius*, *Epinephele pasiphae*, *Satyrus hermione*, and others *au naturel*. We were especially lucky in finding three larvæ of *M. syllius* of the green form, which is so rare that, though Mr Powell had heard of it, he had never seen it before; larvæ of *Arctia pudica* and of various Noctuids were also frequent. A search by day for larvæ of *Melitaea deione* was unfortunately not successful, but those of *M. aurinia* var. *provincialis*, and of *M. cinxia* were seen in some numbers. Perhaps the most satisfactory discovery here is that of *Lozopera deaurana*. Four specimens have already emerged, so that there can be no doubt about the species. This is very pleasing, since there seemed considerable danger that it would shortly be exterminated, not by entomologists but, by housewives in search of fuel in its hitherto only known locality (see *Ent. Mo. Mag.*). I am much interested in the Tortricid in the asphodel here, which (*Tortrix hyerana*) with its foodplant, is so close to, and yet so different from, the *Tortrix unicolorana* in the asphodel in the Esterel. Another old Cannes friend, *Hypotia corticalis*, seems to be very common here, its foodplant being much more abundant than at Cannes, and much more freely inhabited. *Nola chlamydulalis*, *Tortrix pronubana*, various Geometrids, larvæ and imagines of *Spilothyrus althaeae*, etc., make up abundant material of interest, notwithstanding the ungenial conditions of the weather.—T. A. CHAPMAN, M.D., Hyères. *March 30th*, 1904.

CURRENT NOTES.

At the meeting of the Entomological Society of London, held on March 16th, 1904, Mr. J. E. Collin exhibited (1) *Phora formicarum* Verr., which is parasitic on the ant *Lasius niger*, obtained by sweeping the herbage in a paddock at Newmarket. In his book, *Ants, Bees, and Wasps*, Lord Avebury said of this species, "If the nest of the brown ants be disturbed at any time during the summer, some small flies may probably be seen hovering over the nest, and every now and then making a dash at some particular ant. These flies belong to the genus *Phora*, and to a species hitherto unnamed, which Mr. Verrall has been good enough to describe for me (see Appendix). They lay their eggs on the ants, inside which the larvæ lives. Other species of the genus are in the same way parasitic on bees." Prof. Westwood, as long ago

as 1840 (*Intro. Mod. Classification Ins.*), recorded having "repeatedly observed, on disturbing the nest of the common brown garden ant, a very minute species of *Phora* hovering over and flying upon the ants." This species has not been found or recognised by Continental dipterologists. (2) *Phora* sp., found in a garden at Newmarket, running about at the entrance (which looked like that of a mouse's hole) to the nest of a species of *Bombus*. Specimens received from Dr. Sharp, labelled "from *Bombus* nest." are also of the same species. It is evident that its life-history is in some way connected with that of the *Bombus*, but, because of the different shape and form of the female ovipositor, it is probably not parasitic on the bee like *P. formicarum* is on the ant, but acts as a scavenger, by living on the dead pupæ in the nest.

At the same meeting Dr. F. A. Dixey exhibited a remarkable pale form of *Mamestra brassicae*, taken by Dr. G. B. Longstaff and himself at Mortehoe, North Devon, on July 16th, 1903. The specimen showed the usual markings of the species on a cream-coloured ground, faintly shot with pinkish or apricot. There was a slight smoky shade over the central area of the forewing, the hindwings were yellowish-grey, the thorax yellowish-brown, the abdomen apricot-coloured with a dorsal chain of dark tufts. Sir George Hampson had examined it, and pointed out that it was provided with the spur on the anterior tibia, which is characteristic of *M. brassicae* among the allied European species.

It is now a long time since Mr. J. Hartley Durrant published the preliminary work on which a decent list of the lepidoptera of Hertford could easily be constructed, and we understand that the Hertfordshire Natural History Society is, under the guidance of Mr. A. E. Gibbs, continuing the work begun so well and so long ago. There are sufficient lepidopterists in the county for the compilation of a really first-class list, and there are many county lists, those of Yorkshire (Porritt), Northumberland and Durham (Robson), Cheshire, etc. (Day), Lancashire (Ellis), which might well serve as models on which it might be based. We still await the list for Cumberland and Westmoreland that the Carlisle Entomological Society was to have taken in hand, the Warwickshire list from the Birmingham Entomological Society, the Glamorgan list from the Penarth Society, and many others. A natural history society, a good working secretary, who has the confidence of the entomologists of his county, an annotated list from each town in which is a working lepidopterist, a good referee to deal with doubtful species, and a society that will finance an undertaking that need not, after all, be very expensive, are all that is necessary to secure a really first-class county list anywhere. There are times when we would give almost anything for a good county list of the lepidoptera of Cornwall, Devon, Hants, Berks, Worcester, Lincoln, etc. There are surely enough county societies to take the work in hand. Of course, most of the Victorian county lists are practically worthless for entomological work. One wonders what some of them have been printed for, since the details that go to make such a list valuable are often entirely wanting.

We should be exceedingly thankful for oval, larval and pupal material relating to any of the British Hepialids, Zeuzerids, Cossids, Nolids, Liparids or Notodontids (as well as Plumes). Will any gentleman rearing any species belonging to these superfamilies please send us notes on (1) exact date of hatching of eggs, (2)

exact dates of each larval moult, (3) exact account of the difference in the larval appearance following each moult, (4) date of spinning cocoon, (5) actual date of pupation? Any information on above lines will be useful. Eggs, larvæ and pupæ, including the commonest species, are wanted for description.

The Council of the Entomological Society is to be congratulated on the index to the *Transactions* for 1903, and we have at last a specific index that looks usable. Whilst the consideration of genera is on the board, and changes are necessarily of frequent occurrence, a specific index is the only practicable one if it is to be of the maximum of use to the worker.

We have received the *Twenty-seventh Annual Report and Proceedings of the Lancashire and Cheshire Entomological Society* (1903), and find it full of interesting matter. We are pleased to see that Mr. Capper still retains the Presidency, and there can be no doubt that, under its active Secretaries, new life has been of late infused into the proceedings. The style of the reports of the meetings is this year based on that of those of the South London Entomological and Natural History Society, and make excellent reading. The address of the Vice-President, Mr. W. Webster, M.R.S.A.I., entitled "The Entomologist before the law," is an excellent *resumé* of the position of entomologists with regard to trespassing, rights of way, the introduction of noxious insects, and other interesting details, and should be carefully perused by all field-workers. Two other papers, "Specific differences in Lithosiidæ," etc., by Mr. F. N. Pierce, F.E.S., and "Some notes on Entomological Antiquities and folk-lore of insects and other creeping things," also by Mr. Webster, are reprints, having already been published elsewhere, and are not continuously paged with the rest of the *Report*. Both papers will, however, prove quite interesting to entomologists who have not yet seen them. The price is only 1s., and can be obtained from Mr. E. J. Burgess-Sopp, 104, Liverpool Road, Birkdale.

The excellent account of *The life-history and habits of the imported Brown-tail moth* (*Euproctis chrysorrhœa*)†, by Professor Fernald and Mr. Kirkland, is sure to find favour in the eyes of British lepidopterists. The information given of the uncertainty of its appearance in Britain, the damage it has done occasionally in Britain and on the Continent, the history of its introduction into America, and the serious consequences entailed, together with an account of the urticating properties, etc., of the larval hairs, will be read by all European entomologists with the most careful attention and the greatest possible interest.

We have received a copy of Dr. Stefano Bertolini's Catalogue of the Coleoptera of Italy.* It appears to be very complete, and the author has brought the synonymy and general arrangement right up to date. It is quite impossible to compare it with the British list, as the number of species enumerated is very much greater, and very many genera occur of which we do not possess even a species. We should think it will prove a very useful list, and anyone collecting in Italy would do well to procure it.

† Published by the Wright and Potter Printing Co., State Printers, Post Office Square, Boston, U.S.A.

* *Catalogo dei Coleotteri d'Italia*, compilato dal Dr. Stefano Bertolini. Siena, 1904.

We have to call attention to the latest *Catalogue of the British Coleoptera*, by Professor T. Hudson Beare and Horace St. J. K. Donisthorpe, which has just been published by Messrs. Janson and Son. We shall publish a review shortly, but may remark here that the list seems to be very complete, and the type clear. The authors give a short preface, a list of the abbreviations of authors' names (a new and useful addition), and an index of genera. It is also made clear for the first time where only a variety of a species occurs in this country and not the type. Another good idea is exhibited in the label list, which is so bound that it can be used either as a label list or as an interleaved copy for notes.

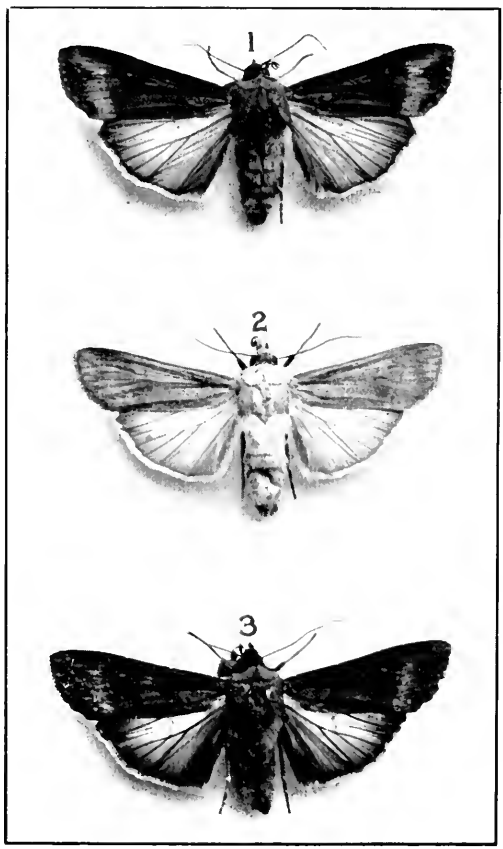
We are already indebted to Messrs. Bankes, Ovenden and Whittle for the larvæ of several plumes, although still very short of material. The species of which we have so far this spring had larvæ are—*Agdistis bennetii*, *Platyptilia gonodactyla*, *Oxyptilus heterodactyla*, *Mimaescoptilus fuscus*, *Leioptilus lienigianus*, *Aciptilia tetradactyla*, *A. baliodactyla*, *A. galactodactyla*, and *A. pentadactyla*. We shall also require pupæ of all these, as we are permanently preserving a good deal of the larval material for reference and illustration. Larvæ of any species not mentioned above will be gratefully acknowledged. Critical species particularly wanted are—*Platyptilia isodactyla*, *P. ochrodactyla* and *P. bertrami*, *Oxyptilus distans* and *O. parvidactyla*, *Mimaescoptilus bipunctidactyla* (*plagiodactyla*) and *M. zophodactyla*, *Pterophorus monodactyla*, *Leioptilus tephradactyla* and *L. osteodactyla*, and *Aciptilia paludum*. The early stages give fundamental classificatory characters, which will prevent the lumping of *phaeodactyla* and *microdactyla* (see *Marasmarcha*, Meyrick, *Handbook*, p. 138), of *osteodactyla*, *tephradactyla*, *lienigianus*, *monodactyla*, and *lithodactyla* (see *Alucita*, *op. cit.*, pp. 138-9), etc. Will those gentlemen who are so kindly helping us please pot up a plant of the different foodplants *now* on which to enclose imagines later in the season, so as to get eggs, and from these larvæ in their 1st instars?

In the *Ent. Zeits. Guben* is a description of a new aberration of *Pharetra menyanthidis*, named ab. *sartorii*, Hockemeyer, its peculiar character being the dark coloration of the basal area. The specimens were bred in quite the normal way by Sartorius, at Hamburg.

What has happened to the *Proceedings of the South London Entomological Society* and the *Transactions of the City of London Entomological Society* for 1903? It is a great pity these cannot be brought out quite early in the year, and without unnecessary delay.

BOOK NOTICE.

Practical Hints for the Field Lepidopterist.—Part III and Specific Index to Parts I, II and III.—This will be put in hand as soon as 120 guarantors (at 4s. 6d. each) are forthcoming. The following names have been received up to the present: Miss Alderson, Rev. F. E. Lowe, Rev. W. W. Flemyng, Capt. E. W. Brown, Dr. J. N. Keynes, Messrs. A. Bacot, E. R. Bankes, P. J. Barraud, C. W. Colthrup, J. W. Corder, E. Crisp, G. Fleming, J. E. Gardner, G. C. Griffiths, A. Harrison, O. Harrison, H. Main, J. F. Musham, J. Ovenden, V. E. Shaw, A. Sich (2), F. Wallace, C. J. Watkins.



Peridroma ypsilon (suffusa).

Progressive Melanism in Lepidoptera.

The attention of working lepidopterists is called to the collective inquiry into progressive melanism, which has been set on foot by the Evolution Committee of the Royal Society. This inquiry was begun in 1901, and, in response to the circular then issued, a good deal of information was sent by collectors in various parts of England, together with a few returns from continental entomologists, some of exceptional value.

To assist in the maintenance of systematic records a coloured plate has now been prepared, showing the most characteristic varieties of the melanistic species. A copy of this plate, with forms for recording, has been sent to a large number of those who might be interested in the subject of the inquiry. Anyone who has not received these circulars and would wish to see them is requested to communicate with W. Bateson, Grantchester, Cambridge.

As an investigation of this kind is one in which the help of local organisations for the promotion of the study of natural history may be of the highest value, the circular and the coloured plate have been sent as far as possible to the secretaries of all natural history societies and field clubs which were believed to have entomological members.

To students of evolution the subject is one of exceptional importance. It is well known to collectors that, within the last 50 years, melanism has rapidly progressed in the case of some thirty species, and that the change is steadily going on. It is certain both that within the last decade many new species have become affected, and that the distribution of the melanic varieties formerly known has extended to districts where no such varieties formerly occurred. The melanics, therefore, provide an unparalleled opportunity of watching an evolutionary change proceeding at a sensible rate under our very eyes. It is obvious that a record of the steps by which such a significant change is being accomplished will give evidence of great weight in any attempt to ascertain the nature of evolutionary processes in general.

Collectors are, therefore, urged to miss no opportunity of noting the first appearance of melanism in their districts, and, as far as possible, to ascertain the proportions of melanic to non-melanic individuals in cases where both are already present. Precise numerical information is, of course, most desired, but general statements as to the present condition of any given species in a district are also of great interest in view of the certainty that some ten years hence, at least, an alteration will have become perceptible.

As to the state of things in the districts most affected, which may be spoken of as the northern midlands, the information received is fairly complete, but records, *whether negative or positive*, in regard to the counties south of this area are greatly desired, and particular information is wanted regarding Derbyshire, Leicestershire, Lincolnshire, Nottinghamshire, Shropshire, Staffordshire, Warwickshire, and Northamptonshire.

In view of the belief, to some extent supported by the facts, that the spread of urban conditions favours the spread of melanism, the appearance and spread of these varieties in the metropolitan area is worthy of special study, and a good deal of important information on this point has already been received. It is not a little remarkable that

the chief centre of melanism on the continent lies in the neighbourhood of Crefeld, Barmen, and the other great manufacturing towns of western Germany.

One of the most important questions which the collective evidence may be expected to decide is the question whether the change takes place by the comparatively sudden appearance of unmistakeable melanic varieties in a species or a district previously unaffected, or by a gradual change in the "population." Thus far the evidence suggests that the answer to this question will not be the same for all the species concerned, and that the manner of the change must be separately studied in the case of each. The coloured plate above referred to represents some of the distinctive varieties met with in the best known species which are believed to be exhibiting melanistic changes. The figures were made by Mr. F. W. Frohawk from specimens kindly lent for the purpose by Mr. W. H. B. Fletcher. The forms represented are as follows:

1—2. *Venusia cambrica.* 1, light; 2, dark.
3—4. *Hemerophila abruptaria.* 3, light; 4, dark.
5—8. *Boarmia rhomboidaria.* 5, light ♂; 6, light ♀; 7, dark ♂; 8, dark ♀.
9—11. *Acidalia aversata.* 9, light ♂; 10, yellowish ♂; 11, banded ♂.
12—13. *Amphidasys betularia.* 12, light ♀; 13, black ♀.
14—17. *Phigalia pilosaria.* 14, 15, light ♂s; 16, medium ♂; 17, dark ♂.
18—23. *Boarmia repandata.* 18—20, light forms; 21, medium ♀; 22, 23, black ♀s.
24—27. *Miana strigilis.* 24, 25, light or mottled form; 26, 27, dark form.
28—30. *Polia chi.* 28, light ♂; 29, medium ♂; 30, dark ♂.
31—34. *Hybernia progemmaria.* ♂. 31, 32, light; 33, medium; 34, dark.
35—40. *Eupithecia rectangulata.* 35, 36, green light form; 37, 38, medium; 39, 40, dark form.
41—42. *Aplecta nebulosa.* 41, light ♀; 42, dark ♀.
43—46. *Xylophasia polyodon.* 43, 44, 45, light to medium; 46, dark form.
47—50. *Acronycta psi.* 47, light ♂; 48, light ♀; 49, dark ♂; 50, dark ♀.
51—53. *Odontoptera bidentata.* 51, light; 52, medium; 53, dark. (Darker specimens occur.)

The Evolution Committee wish to thank those correspondents, English and foreign, who have already contributed information as to the distribution of these and other species. The answers received are now fairly complete, as already noted, as to the present state of the forms in the northern midlands of England, the chief centre of the melanic varieties. Information, however, is greatly needed respecting the condition of the species on the southern borders of this area. Records will be particularly valuable from the counties specially mentioned above.

Great importance attaches to the evidence sent by foreign correspondents as to the spread of melanism in Belgium and Germany. The Committee will be glad to receive further particulars from collectors working in or near the districts affected.

A new aberration of Peridroma ypsilon *(with plate).*

By J. A. CLARK, F.E.S.

In *British Noctuae and their Varieties*, vol. ii., pp. 7-9, Mr. Tutt gives a detailed account of the variation of *Peridroma ypsilon* (*suffusa*). He quotes Rottemburg's original description of the species (or rather gives a translation thereof), and further deals with the following aberrations—*annexa*, St., *idonaea*, Cr., *pallida*, Tutt, &c. This latter aberration is quite typically coloured, except that the outer transverse band of the

forewings, which is of an ochreous tint in the more typical specimens, is in this quite pale; this variation is particularly noticeable in northern specimens and is moderately well exhibited in pl. viii., fig. 1. The object of this note, however, is to call attention to a very marked pale aberration which I believe to be quite unique, and which is represented in pl. viii., fig. 2. This specimen I captured myself at sugar on September 13th, 1902, at Torcross, in South Devon.

It is, however, so unusual and striking a form that I think a special description should be made of it and a name given to it. I propose, therefore, to call it :—

Ab. *albescens*, n.ab.—The head and thorax of an exceedingly pale whitish-grey tint, the abdomen even more white, so that, roughly, the thorax follows the forewings and the abdomen the hindwings, in tint. The ground colour of the forewings appears to be of a pale whitish-grey tinged with pale rufous or reddish-brown, the usual pale areas in the typical form, *viz.*, the basal line, and patch at base thereof, the pale patch below the orbicular, the reniform stigma, and the outer transverse band being of the paler tint exhibited by the ground colour; the fringes of the same pale tint as the ground colour. The hindwings are pure white, slightly iridescent as in the type, with the outer marginal edge and the nervures (especially towards the outer edge of the wing) finely outlined in dark grey. The specimen is a ♂.

I have never seen such a pale specimen as this before. So marked is the failure of the normal dark pigment that we could call it quite albescent, yet there is no sign of disease about it, the specimen being, in every respect, quite perfect. If a similar aberration exists in any collection I should be very glad to hear of it. The other two specimens, on pl. viii, are only added for comparison. They are females, captured at the same time and in the same place.

Notes on the Geographical and Seasonal Variation of Heodes phlaeas in Western Europe.*

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

The fact that I reared an interesting, if small, brood of *Heodes phlaeas* this autumn, from eggs laid by a ♀ taken at Reigate, led me to compare the same with various other specimens from different localities, and to formulate some general conclusions on the variation of the species. The variation of size, form, and colour, may be briefly considered as follows:—

Size.—This does not seem to depend on place or season, but on the period spent in the larval state, though there is much variation in any one locality, as temporary strains that are hereditary. There is thus some tendency for the more northern specimens to be the larger, the Lapland specimens shown being amongst the largest. These are also the only certainly single-brooded specimens shown. The species is, however, usually single-brooded in Scotland, but I happen to have no Scotch specimens in the exhibit. The uniformly most small specimens shown are those bred this autumn at Reigate. These were reared at a temperature not less than 85°F. throughout. They had plenty of food of good quality, and their rapacity and continuous feeding struck me very much, as well as the very few days they took to feed up. Their small size is due, therefore, to rapidity of growth, and not in any way to starvation, development outstripping the possibilities of the mere mechanics of eating. Nevertheless, it seems very

* Notes on exhibit made at meeting of the South London Entomological and Natural History Society.

frequently the case that the *eleus* form presents very large specimens. The *phlaeas* form may be small from starvation, having passed the winter as larva, whilst the summer form may have fed up slowly on fine fresh grown food in the cooler early summer, and have only been submitted to an *eleus*-producing temperature when it has reached the pupal stage.

Form.—There seems considerable difference in the sharpness of the apical angle, the wing looking short and square in some specimens and long and pointed in others. The difference is not perhaps very great, and setting may sometimes exaggerate the appearances. Still two specimens from Arcachon and two from Susa that I have selected, seem very pointed, and two from Torre Pellice very square, others from these same localities are otherwise, and I am unable to associate these forms with either place or season. *Tails.*—One point as regards form is the development of tails. No large pale specimen has any development of tails, in the dark ones there is great variation, but there seems to be a tendency for the tails to be better developed in the small than in the large ones. *Sexual differences.*—I am unable in many cases to distinguish the sexes of the specimens, but I think it is usually the case that the pointed-winged specimens are ♂ s and the square ones ♀ s, a sexual dimorphism that is common to the rest of this genus, very notable in its nearest ally *Chrysophanus dorilis*, to which also some (♂ ?) specimens approximate in having, not the tail, but the anal angle somewhat produced.

Colour.—Apart from the greater or less abundance of black scales there is a difference in the richness or paleness of the copper colour, as a rule, the darker specimens having the richer colours. The greatest variation in colour is in the amount of black scaling. This occurs in two very distinct ways, *viz.*, by greater extension of the black areas, spots, hind margin, etc., and by the invasion of the copper area by a suffusion of black scales. The former not unfrequently occurs with hardly any of the latter, but suffusion of the copper is almost always associated with some increase of the black areas. The evidence of the specimens submitted is to the effect that both these are the result of heat in the earlier stages, that is, that it is entirely climatic, and in no definite way geographical or racial. There are specimens that might be ordinary English ones from France, Switzerland, Italy and Spain, and all intensities of suffusion occur through Tutt's *suffusa* to var. *eleus*. The Locarno specimens are interesting. Specimens taken in 1902 immediately after a very cold spell, during which they were no doubt in pupa, were ordinary typical specimens though emerging in May; this year (1903), in April, the specimens approach *suffusa*, though taken in April, the weather was then cold, but had just before (when the specimens were in pupa, doubtless) been fairly warm

What causes some specimens to confine the darkness to increase of spots, and others to add suffusion, is not at all elucidated. Those that affect suffusion, often have the spots with a sort of halo around them, that is not the deep black of the spots, nor yet suffusion of the copper. My specimens, reared in heat, are remarkable as having the spots and margins much increased, so that the spots form a continuous band, yet they are very well defined, and the copper in most of them is bright, only one of the captured specimens is quite like them, one from Bronchales (central Spain). The pupæ of some of my specimens were

kept very damp, others very dry, but there is no difference in the resulting butterflies.

Amongst Mr. Pickett's captured English specimens are several that are quite the form *suffusa*, and one or two approach in some degree my bred ones, showing that it is climate and not our race of *phlaeas* that prevents *eleus* being a common form with us. They also show that the want of suffusion in my bred specimens has nothing to do with the type of the race, though whether it arises from some special cause in my treatment of them, or is hereditary in the actual brood experimented with, I cannot say. I am not dealing with aberrations, so say nothing about *schmidtii*, and forms named by Oberthür and others.

It remains to refer to the Lapland form. This is large, pale, tolerably typical above, except that the black spots of the hindwing are much more easily seen than in the type, and, perhaps, that the blue spots are the rule, rather than, as elsewhere, the exception. Beneath, however, the black spots of the underwings, and the orange marginal line, are pronounced in a way that no other form approaches.

Staudinger calls this *hypophlaeas*, Boisd., and says that it is identical with the American form. Though Scudder regards the American form as abundantly distinct from the European, he does not appear to have been aware of the identity of the Lapland form with the American (some of my specimens agree exactly with his description of the American form), whilst it is difficult to regard the Lapland form as distinct from our ordinary form, though I have no specimens from intermediate districts to show the gradation. I am not quite sure, but I think the warm varieties have the underside of the hindwing distinctly of more uniform tint and freer from spots and orange marginal line than the type. I may mention that Mr. Merrifield has shown that the effect of a high temperature in producing dark specimens of *phlaeas*, takes place during the pupal stage, whilst the imago is maturing within it, and that warmth in an earlier pupal, and in the larval, stage, has little or no effect.

We speak of the difference between *phlaeas* and *eleus* as a seasonal one. This is not strictly correct. It is an individual change due to the direct action of temperature, there is no distinct alternation of forms as in *Araschnia levana* and *prorsa*, or as in our English Ennomids, alternatives which Merrifield found he could break through only with difficulty. In *H. phlaeas* each individual is prepared up to the pupal stage to take either form. How then may we arrange the ordinary (*i.e.*, not aberrational) forms of *phlaeas* (west European)? We may, with little hesitation, accept *hypophlaeas* as a distinct geographical race or subspecies. When we come to *eleus*, we must, I think, in the first place use the name in two senses, it is primarily the name of the darkest form of *phlaeas*. It must also be given to the southern race of *phlaeas*.

The experiments of Weismann, Merrifield, Standfuss, Fischer, &c., bring out apparently, that the southern races respond with much greater readiness to the proper temperature stimulus that produces *eleus*, than the central European form does. There also exists a belief that the normal (cool) form of this southern race is darker than central European *phlaeas*. In some cases this is probably true. Whether essentially darker, or merely responding more easily to stimuli to become darker, it has a sufficiently different constitution to be

recognisable as a race, though not, perhaps, so definitely a subspecies as we may take *hypophlaeas* to be. The name of this southern subspecies would necessarily be *eleus*. We cannot but recognise, however, that English *phlaeas* can provide *eleus*, and very commonly takes the transitional form of *suffusa*, Tutt, whilst specimens I show you demonstrate that, in the south of the Alps and in Spain, the race *eleus* can produce tolerably typical *phlaeas*. We have then :

Heodes phlaeas, *phlaeas* f.t. *phlaeas*		Central Europe.
,, ,, ,, ,, *eleus*		
,, ,, *eleus* ,, *phlaeas*		South Europe.
,, ,, ,, ,, *eleus*		
,, *phlaeas*, *hypophlaeas*		Lapland.

It must also be recognised that *eleus*, besides such transitional forms as *suffusa*, presents a large, dark, suffused form, and a smaller, brighter, clearer form, with the dark marking increased, but not suffused.

Mr. Pickett's captured specimens from Dover, present no extreme forms, but demonstrate clearly that English *H. phlaeas* varies in the intensity of the copper, and varies a considerable way towards the darkening that constitutes *eleus*, both by increase and by suffusion of black. I believe many English collections contain fully developed *eleus*. One of this year's (Dover, August) specimens is *suffusa*, well on towards *eleus*, so that even in a year (1903) like the present, examples succeed in finding warm places in which to pupate. A Dover specimen of August, 1902, is nearly as dark, as well as two or three May specimens from Clandon. They have all been obviously selected as nice specimens and represent rather the well-marked and rich-coloured examples, and do not fairly show a normal proportion of paler copper, with smaller spots and narrower border. The majority are, in fact, though not by a good way as far as *suffusa*, yet an appreciable distance on the way to being *eleus*. It is curious this should be even more the case with the May (1902), than with the August specimens (Dover, 1901, 1902, 1903).

Mr. Carpenter's beautiful exhibit of about 112 bred specimens, was most interesting. They were of three several broods, from three parents, and each brood was of tolerably uniform type and so far different from the others that it might almost have been possible to separate them again had they been mixed together, yet the total difference was not great. All were reared in an unheated greenhouse, and the uniformity of each brood may be referable to the uniform conditions under which all its individuals were reared, but more probably arose from an hereditary identity. The parents were not exhibited with them. All were very fine bright specimens, a little more darkly marked, perhaps, than an average of English captured examples. Specimens emerging in July, 1896, from an Abbott's Wood parent, were well spotted, and some, emerging 15th-21st, slightly suffused. Those of June, 1897, from Folkestone parents, were paler with smaller spots (cooler period of emergence). From a Bude parent specimens emerging September, 1902, were larger, brighter, and well spotted.

Mr. Montgomery's series had, unfortunately, nothing but memory to co-relate the specimens with the facts of their education. They formed a long series of about 300. They were from four ♀ s taken at

Greerford, Middlesex. The four broods were raised together. Eggs laid August 5th-31st. There was considerable mortality in the larvæ and some of those that were smallest on September 24th were turned out. The first emerged September 13th, and up to October 9th, 240 emerged. On October 6th, the temperature fell decidedly, especially the night temperature, and remained low for two or three weeks, 60 emerged during, and just after, this period—October 10th-20th, 50; October 23rd-28th, 9; and one on November 7th. Of the whole number five or six are slightly suffused and with dark veins. These were amongst the earliest emergences (up to the date of first emergence the mean maximum temperature was 71·2°F.). Amongst the mass of emergences of ordinary aspect were five remarkable for their small size (about 19mm.), and not very different from 20 to 25 that emerged amongst the last 50 or 60, of which some were as small as 21mm., these were also pale in the copper and rather weakly spotted. Apart from discoverable temperature effects, some specimens were remarkable for having the row of spots less in pairs than usual, but more in a continuous sweep (like *hippothoë* and *amphidamas*), and others had them very close up to the discal spot; there is much variation in width of dark margin, and exact position and size of spots without anything strikingly extreme. Blue spots were fairly represented in all forms.

The American *H. hypophlaeas*, as described by Scudder, agrees very closely indeed with the Lapland form. The specimens differ in one point. The three large apical spots that lie in a slightly curved line, one in each interneural space, are continued, in my specimens bred at 95°F., by one or two others in the next one or two spaces, continuing exactly the sweep of the curve of the three below. Average English and many European examples are without any trace of these extra spots, and Scudder makes no mention of their occurrence in any American forms. In the European specimens, the first of them is not unfrequently present, but does not continue the line of the three below, and occupies a more apical position. This spot is always present (or almost always) in the Lapland specimens, and, in them, is very decidedly more apical, so as to seem moved outward, just as the lowest of the three is beyond the upper one of the pair below. In a considerable proportion of the Lapland specimens the second of these extra spots is present, and lies in the line of the three spots, without reference to the dislocation of the preceding one. Beneath, the spots are repeated, and where both are present, they look like a pair standing above, and one to either side of, the top of the three usual spots. Although the dislocation of the first extra spots is so variable in amount, or even absent (as in my bred ones), I have not seen sufficient specimens possessing them to say how far it marks a peculiarity of race. It is certain, however, that this pronounced development of these spots in the Lapland specimens, contrasts very decidedly with their absence in American forms. One, would, however, expect to meet with them in some American specimens, even although so careful an observer as Scudder had not seen them.

Mr. Moore showed a specimen from the Himalayas, from whose upper wings all copper had disappeared, except a few spots outside the row of spots, though the hindwing was nearly typical and with blue spots. American specimens from Indiana (U.S.A.). Cape Breton and

Halifax, were small (26mm.) but otherwise very like the Lapland specimens.

I also exhibit some other species of the genus *Chrysophanus*—*virgaureæ*, the var. *miegii* taken this year in Spain, a very fine form of *hippothoë*, and some very large, finely coloured *alciphron* var. *gordius*, taken this year and last in Spain. Mr. Tutt has kindly lent me his drawers containing this genus. The *phlæas* would probably afford a fuller disquisition than I have ventured to give, to any one who studied them more minutely, whilst the other species are definitely beyond my grasp. The parallel variation of the several species is remarkable.

The Early Stages of Colias edusa.

By J. W. H. HARRISON, B.Sc.

On September 24th I got a fine female of *Colias edusa* ab. *helice*. Wishing, if possible, to rear a series from the egg, I enclosed the insect over a growing plant of Dutch clover (*Trifolium repens*). On the morning of the 25th I was delighted to find that about 30 ova had been deposited. On the three following days I kept watch on the insect, and found that the ova were deposited about 11 a.m. to 11.30 a.m. with unfailing regularity. They were all laid either upon the underside of a leaf or upon the petiole of the leaf. In the act of ovipositing the female grips the edge of the leaf with her feet, and curving the abdomen round deposits one, two, or three ova, and then moves to another leaf. This female laid about 80 ova. Taking the average of about a dozen females I have had at various times, I should say about 65 or 70 was the usual number. I kept most of these eggs but some were given to two friends. Mine were kept in a room facing the south, and hatched on October 2nd, 3rd, and 4th. Those I gave to one friend were kept in a room with a north aspect, and hatched on October 11th. A few I gave to another friend were kept in a cold outhouse, and exposed to the frosts of October. At the beginning of November, these, though apparently fertile, had not hatched, so they were removed to a warm kitchen, when all, without exception, hatched during the first week of November.

Egg.—The egg is shaped like a ninepin, and is, in form, not unlike those of *Pieris rapæ* and *Leptosia sinapis*. While not so elongated as those of the latter, it is more so than those of the former. Its length is ·8mm., and greatest breadth about one-half that. It tapers towards both extremities. To the naked eye it appears to be finely and regularly ribbed longitudinally. It presents a great difference, however, when under the microscope. The longitudinal ribs seem to vary from about 12 to 15. These ribs are very far from being regular, sometimes coalescing close to the base and then separating. In one example I had, I counted 15 ribs, and the 5th and 6th, 10th and 11th, 15th and 1st, coalesced at about one-seventh the distance down from the apex, and thence continued as one almost to the apex. Transversely, there are also ribs, not so strong as the others, and not at all continuous, as they terminate in both directions by merging into those placed lengthwise. The space between the two series of ribs is very finely punctuated. This punctuation is very irregular. At the apex the ribs degenerate into a series of irregular cell-like spaces. Similarly, one ovum which I detached, and so arranged that I could examine the point of attach-

ment, showed at the base a cell-like appearance. When first deposited, the eggs are of a creamy-white colour, which changes to a delicate pink on the third day. A depression appears in the side, and the pink gradually merges into a decided red. A day before hatching the colour changes into a dull metallic black.

Larva.—The young larva emerges from a point about one-sixth of the distance from the apex, and proceeds to eat a portion of the egg, but rarely eats even one-half of it. The larvæ as they emerged were placed, some upon *Trifolium repens*, some upon *T. pratense*, and some upon *Lotus corniculatus*. The larva described in the following notes fed on *T. pratense*. Without exception, the larvæ fed readily on the plant offered to them, and, at any period of their existence, if removed from *Trifolium* to *Lotus* would continue to feed without cessation. One point I consider worthy of note is that they *would eat grass*. By chance, in digging the foodplants, I brought in some grass. I was astonished to find it being eaten, so I put some larvæ on the grass, and found that they ate it readily enough. The larva, chosen to describe, hatched on October 2nd, and was placed on clover on the lower side of a leaf, but it immediately, without eating, proceeded to the upperside. This each larva did, utterly refusing to feed on the underside. The reason of this I afterwards discovered.

First instar: The larva soon after hatching was 1·5mm. long. In colour the body was of a bright brown. No traces of hairs were visible. The head was jet black in colour, and was small in comparison with the body. The larvæ fretted out irregular holes in the upperside of the leaf but did not eat the epidermis on the underside. They fed constantly during the day. When done feeding, they went to the midrib of the leaf and stretched themselves at full length along it. When the clover leaf closed for the night, the small larvæ were safely folded up in it and thus protected. On October 8th my particular care ceased to feed, and attached itself to the leaf, remaining motionless for two days. It moulted on October 10th and entered its second stadium.

Second instar: The larva was now 3mm. in length—exactly twice its original length. A change in the body coloration had now taken place. Although the head was still jet black the body was no longer brown. Ventrally it was decidedly green, but dorsally it was green with a suggestion of brown, giving it a rusty appearance. No spiracular lines were visible, but the larvæ had now distinct hairs, and each segment could be distinguished as being subdivided. The larvæ still continue to have the same habits of feeding and rest as in the first stage. They feed by day and rest in the folded leaf at night. This continued until October 16th, when my first larva again ceased to feed, and rested again for two days, casting its skin on October 18th.

Third instar: It was now 4·5mm. long. There again had been an increase of 1·5mm. in the length. It was now uniformly of dull sage-green. The head, if anything, was a lighter green than the rest of the body. One individual, and only one, kept its head of a shining black even to this stage. The body, as also the head, was distinctly hairy, and each segment was divided into six subsegments. The larva tapers both to the head and the last abdominal segment, from the last thoracic segment. A faint indication of a lighter spiracular line was visible as the green shaded off almost imperceptibly. In this

stage the larval habits underwent a decided change. No longer did the larva feed by day on the upperside of a leaf. By day it rested on the petiole of a leaf head downwards, and fed only about sunrise and sunset. I do not think I observed one to feed by day after this stage. When they did feed, they ate at the edge of a leaf as large larvæ usually do. They also ate the stalks and stipules of very young leaves. On October 26th, the larva observed again set for a moult, which was successfully accomplished on October 28th.

Fourth instar: The larva was now 7mm. long. It is of a dull green colour dorsally. Ventrally it is of a bluish-green colour, in fact, it is quite glaucous. The head is decidedly lighter than the rest of the body. The body is very rough, but under the lens is found to owe its roughness to the subsegments mentioned above. On these transverse divisions are black dots. Each dot emits a short stiff hair, giving the larva the appearance of being bristly. This is particularly noticeable immediately after a larval moult. Around each of the black dots is a ring of a light green colour. The head likewise, is covered with black dots emitting hairs, but the black dots are not surrounded with lighter coloured rings. The green of the dorsum shades off to the spiracular line, which is of a white colour. The larva still tapers to last segment, and to the head from the last thoracic segment. On November 5th it again set for a cast, which took place on November 7th.

Fifth instar: Its length was now 10mm. Generally, in all its coloration, hairs, etc., it is the same as in the last stadium. The spiracular line, however, is different. It is yellowish in colour on the last segment, and of a pure white on the others, and generally is more distinct than before. On November 14th, when the larva was 1·6cm. long, the spiracular line was now blotched with yellow upon every segment, between the 3rd and 4th transverse divisions. This yellow mark was not noticed until seven days after the moult, so must have developed in the meantime. On November 19th, when 1·9cm. long, the spiracular line again underwent a change. Although the blotch remains yellow on the prothorax and on the last abdominal segment, yet on all the others it is orange-red, shading off to yellow on the 5th subsegment. Immediately below each red spot is a very conspicuous black dot. The last moult took place on November 25th, the larva having prepared itself on November 22nd.

Sixth instar: It was then 2·0cm. in length, but was not described until full-grown. It reached its full size on Dec. 22nd. Its length then was 2·8cm. (measured when at rest on the foodplant); width of broadest segment, 4mm.; width of head, 2·75mm.; width of prothorax, 3·25mm.; width of last segment, 3mm. The 2nd abdominal segment is the largest. Thence the larva tapers to the head and last segment. Dorsally each segment is divided into six divisions or subsegments. The first of these six is the broadest, being almost of the width of two others. For this reason it does not seem so rounded as the others. These divisions are not so recognisable on the ventral portion. In colour the body is of a deep velvety-green dorsally, but ventrally it is quite glaucous. The head is also green, but is of a lighter shade than the rest of the body. Under the lens, the body is found to owe the deepness of the green to black dots, arranged upon the subsegments, each giving rise to a short hair. Upon the first of

the six subsegments, owing to its breadth, the small black dots are less orderly arranged than on the others. Around each black dot is to be seen a lighter ring. Under a lens of higher power, smaller secondary black dots are discernible, from which smaller hairs issue. Ventrally, the black dots are not surrounded by lighter rings, and the hairs are much longer and stiffer. The hairs, when microscopically examined, all appear unicellular. There are no dorsal lines, but on some specimens the contractile vessel is discernible. Upon some of those upon which it can be seen, on each side of it, on the prothorax and mesothorax, are faint, rusty-brown lines. The spiracular line is of a white colour, merging into yellow as it proceeds ventrally. On each segment, along the spiracular line, is a reddish spot, which is found to be wedge-shaped. It is found on the 3rd and 4th subsegments most conspicuously, shading to yellow on the 5th. At this point the spiracular line expands in width considerably. Immediately below it, and about halfway along it, is a large black dot, which reaches its maximum size upon the 7th and 8th segments, and is almost obsolete on the prothorax and mesothorax, where the anterior portion of the red blotch seems more orange than red. The portion of the spiracular line upon the last abdominal segment is totally pale yellow. The head, too, is covered with black dots, giving rise to short hairs. These black dots are more sparsely scattered than on the body. Upon the head is a faint depression in shape like an inverted Y. Between the two arms of the Y the hairs are much closer together. The head is slightly retractile into the second segment (prothorax). The mouth-parts I did not describe fully. The maxillæ are edged with black, which passes imperceptibly through dark brown and yellow to green. The antennæ are slightly clubbed, and are tipped with black, which extends closer to the base above. Attached to the antennæ above is a long hair, fully three times as long as the body-hairs, which is periodically vibrated even when at rest. This hair is also much finer than the body-hairs. Underneath is one very short stiff hair. The eyes, six in number on each side, as usual, are arranged four in a row; three of these are close together; the fourth is at about twice the distance of the others; the other two are outside these—the first in a line with the first of the four, and the second intermediate to the second and third; the first three are dark brown in colour; the fourth is decidedly brown, but not so much so as the first; the last two are colourless. The legs and prolegs are green, but it was found impossible to describe the latter owing to the larvæ clasping the prolegs together. However, it could be seen that the hooks were dark brown. Immediately below the spiracular line, and of the same average breadth, is a sort of flange of the same colour as the back. This is very sparingly covered with hairs. Its outline on the lower side on each segment is that of the letter W, the part of the W sloping to the head appearing to be more deeply impressed. Above the spiracular line are small irregular wrinkles or puckers (not to be confused with the transverse divisions or subsegments mentioned above). The spiracles are dirty white in colour, and are surrounded by a dark brown chitinous ring. In the centre is a black dash. The first spiracles are not placed centrally in the spiracular line—their lower extremity is slightly below it. The last pair of spiracles are nearly central. The last pair but one are least central, and are

rounder than the others, which are elliptical. The full-grown larva rests at full length, with the thoracic segments slightly raised, and the head bent under. The first pair of legs do not rest on the stem. When irritated, the larva does not fall; but when forcibly knocked off, it forms a complete ring, but soon unfolds and climbs up a fresh stem. It is very sluggish, only moving when compelled. When not feeding, it rests habitually on the petiole of a leaf, with its head downwards. If brought near a bright light, such as an incandescent gas-burner, the larvæ would immediately commence to feed. If heat were applied, the larvæ would not feed, but would move about in a frantic manner. They spun up in the manner of the Pierids, with a central cincture and silk pad, to which the anal hooks were attached. The head was turned upward. The larvæ readily spun up, but not one safely pupated, and all I have left is one which is half-grown, in its last stadium, and seems up to this date (January 7th) to be in a very healthy condition.

Notes on the egg, larva, pupa and cocoons of Phragmatobia fuliginosa.

By A. W. BACOT, F.E.S.

On April 20th, 1903, I received from Mr. J. W. Tutt, a box containing a number of ova of *Phragmatobia fuliginosa* laid by a specimen taken at Pegomas, near Cannes, on the 6th, with a request to count the ova and rear as many imagines as possible, with a view to studying their variation.

Oviposition.—Eggs examined April 20th, 1903: The eggs were laid in patches on the sides of a medium-sized glass-topped box (about $1\frac{1}{4}$in. diameter). Their arrangement was fairly regular, laid after the usual Spilosomid fashion; the smallest patch contained 10 ova, the largest 163, and between these extremes there were patches containing 74, 51, 14, 84, 103, 46, 48 and 17 loose, in all 610. A few patches were still of a pearly-cream colour, but most were of the delicate flesh-pink, which is their most beautiful phase, and one was already darkening to a lilac or dove-grey prior to hatching. This batch commenced to hatch on April 22nd, and the last on May 1st. The hatching occurred, apparently, strictly in the sequence of laying, and it was most interesting to see how the successive darkening of the eggs brought out the composite nature of the larger patches. The large patch of 163 eggs proved to be composed of at least three separate layings. About 10 or 50 ova would seem to be the normal batch, and so far as later observations on the egglaying of the resulting imagines showed, probably the result of one day's laying, or, possibly, an evening's labour, a second batch being perhaps laid in the early morning, the moth taking a rest between. I much regret that I was too busy when the moths emerged and I was obtaining pairings to make sufficiently frequent observations to definitely settle the point; but those I did make, lend some support to the above explanation, which I think may be taken as fairly reasonable. Temperature is probably a most important factor in extending or shortening the period of oviposition, as it certainly is in regard to the number of hours or days that are allowed to elapse before pairing takes place. I think, therefore, it may be taken as probable that the egglaying period of the specimens captured by Mr. Tutt extended over some ten days, the

moth laying on average some 60 eggs per day. Some further support to this view is perhaps afforded by the analogy with the ova of *Spilosoma mendica*, which Mr. Tutt forwarded at the same time. These did not show any large composite patches, the numbers in each patch being comparatively regular, only ranging from 31 to 52 in five patches, containing some 200 to 220 eggs. In shape the eggs form as nearly as possible $\frac{2}{3}$ of a sphere, possibly they are, when first laid, quite spherical, but become flattened at base while still soft, and the slight irregularities of surface which occur are probably due to stresses at laying and during development.

Ovum.—The horizontal diameter is between ·6mm. and ·7mm., generally nearer to the latter; the vertical axis is, at a guess, ·5mm. to ·6mm., but it is difficult to gauge exactly, owing to the base being depressed centrally, and consequently the vertical diameter is considerably less than appearances would warrant. The surface is slightly reticulated with a cellular pattern, but not sufficiently to deaden the shining and pearly iridescence of the egg. The micropyle is not very specially differentiated from the surrounding surface, but owing to the way in which the cellwalls run into the centre it is somewhat suggestive of a lunar crater.

Larva.—*1st instar:* In their 1st instar, after a short period of growth, the larvæ are quite normal Spilosomas in shape, with prominent segments and deeply-cut incisions. No subsegments are apparent; the skin is covered with a coat of very minute spicules; the tubercular plates at base of primary setæ are very large; the setæ or hairs are mostly very long, stout, and thorny. The head, scutellum on prothorax, anal plate and tubercular plates are pale brown, the general skin-surface pale green. Tubercles: The dorsal tubercles on meso- and metathorax bear two black hairs, probably i and ii conjoined; iii on all segments (mesothorax to 8th abdominal) bears two hairs. On the abdominal segments i is small, and bears a very small, pale hair, and is noticeably the inner; ii, the outer, is very large, and bears a very large and long dark hair. The lateral tubercles are not at all easy to homologise; iii is large and bears, as previously noted, two long hairs on segments from 2nd thoracic to 8th abdominal. The spiracles are small but distinct, with brown chitinous rims, and set rather anteriorly on the segments; the prothoracic is somewhat, and the 8th abdominal much, larger than the others. On the meso- and metathorax, beneath iii, and rather posterior to it, is a small plate bearing a minute slender hair (? iv); below this, and slightly anterior to it, is a large plate bearing a single long hair (? v), and below this again is another large plate bearing two hairs.* On the abdominal segments, immediately beneath, and slightly posterior to

* I am by no means certain as yet as to the exact homology of the thoracic tubercles in this and the allied species. In larvæ of *Nemeophila plantaginis* there is another exceedingly minute tubercle and hair behind the large single-haired tubercle below iii (? vi), and this is observable on the larvæ of *Phragmatobia fuliginosa* in later stages. (I have traced it on one larva in 2nd or 3rd instar, and it is generally present in 4th or 5th stadium). According to Dyar's arrangement, taking his figure of *Cossus cossus* as a type, the meso- and metathoracic setæ would be upper dorsal plate bearing two hairs i and ii*a*, the plate beneath it, or subdorsal or upper lateral area also bearing two hairs, ii and ii*a*, and I presume the strong hair and weak one above it would be iii and iii*a*, and the lower double-haired plate be iv and v.

spiracle, is a tubercle with large basal plate bearing one long hair; this I take to be iv; well below it, as far below as iv is below iii, is another similar tubercle and hair; this, from its position, is at first difficult to homologise with v of other groups, but a comparison with the position in Noctuid larvæ leaves no doubt in my mind that it is really v, in spite of its great distance beneath the spiracle. Its unusual position is to a great extent explained if we consider that the trend of evolution in Arctiid larvæ, like that in the Anthrocerids, is to increase the girth of the segments at the expense of their length, thus causing a shortening of the distance between the tubercles in a *longitudinal* direction and an increase in transverse direction, so that there is a tendency in the direction of the tubercles forming a single ring round each segment. Close to the spiracle, but slightly above and in front of it, is a minute point that proves on close examination* to be a very small tubercle, bearing a minute, but proportionately short, stout hair or spine; in spite of its minuteness, it is abundantly distinct from the spicules. A second and exactly similar minute tubercle occurs on the anterior margin of the dorsal area, slightly further from the median line than is ii. The one situated dorsally on the anterior margin of segment I have previously alluded to as no. 0. That in front of and slightly above the plane of spiracle, might be called no. iii*a*, were it not for the fact that Dyar has already used the term iii*a* (*Ent. Record*, vol. xi., pl. i) to signify an accessory hair situated behind the spiracle on Alucitid (Pterophorid) larvæ, which I much doubt to have any relationship to the prespiracular point above referred to. It may, therefore, be provisionally termed no. 00 until its exact relationship has been worked out.

2nd instar (specimen in formalin): Shape and colour as before; spicules still present. Tubercles are still based by large flat plates, but they are more rounded and do not show the diamond and slash-like outlines which are so marked a feature of the first skin. All tubercles except i and the weak ones on meso- and metathorax that I queried as iv, bear more than one hair. This, of course, does not refer to the exceedingly minute ones referred to in 1st instar, which retain their primitive condition throughout the larval period, and undergo no change beyond slight increase in size, which appears to be somewhat less than an increase strictly proportional to the size of the larva would warrant. The hairs are mostly black, a few only being pale; all are long, tapering, and thorny. The dorsals on meta- and meso-thorax, i + ii, are larger, and bear as many as nine hairs; iii, on same segments, bears four; beneath and posterior to it, the weak tubercle (? iv) is still single-haired, and remains so in later stages; the large tubercle below and anterior to it (? v) bears five or six hairs; and there is another similar tubercle below this again (? vii). On the abdominal segments i is still only single-haired, although the plate at its base is proportionally larger; ii now forms a large wart bearing seven or eight hairs, one of which is central; iii is still a long and narrow tubercle, bearing about six hairs; iv is also still long and narrow, set somewhat obliquely, close to the lower posterior side of the spiracle; some way below and only slightly anterior to it is v,

* A 1in. or $\frac{2}{3}$in. objective will enable one to see it, but it requires either a no. 3 eye-piece added to the above or $\frac{1}{4}$in. objective to make it out in detail.

bearing six or seven hairs. There is also a well-developed marginal tubercle above base of prolegs, bearing three hairs. The spiracle on the 8th abdominal is about three times the diameter of the other abdominal ones, that on the prothorax being not quite so large. The prespiracular tubercle on prothorax is large, and bears several long, forward-jutting hairs, forming quite a noticeable tuft on either side of head. There is a marked tendency to a median division of the prothoracic shield (scutellum) into two separate plates.

3rd instar: In a later (probably the 3rd, but possibly the 4th) instar, the larvæ are 13mm.-14mm. in length. No general change in the appearance of the larvæ has as yet taken place. The head, prothoracic and anal plates are darker, almost black, and the tubercles are also much darker and more horny in appearance. They are also much larger, the flate plate spreading over the skin-surface is not now apparent, the whole area of tubercle being raised into a cushion-like wart. The hairs are much more numerous; i bears at least three small hairs, but the plate on the meso- and metathorax, that I take to be iv, situate between iii and v, still bears only a single hair, and this a weak one. A coat of minute spicules is still present, but no *hairs* springing from the general skin-surface are developed. All the hairs are thorned, the strong black ones noticeably so. The ground colour of these dead larvæ, from which I have made descriptions of the 2nd and 3rd (or ? 4th) skins, is a pale yellowish-white.

4th (possibly *5th*) *instar* (living): Not far from moult; length 15mm. at rest. In shape stouter and tapering off more markedly at head and rather less markedly at anus. Segments still short and very full the incisions being exceedingly deep. The 6th and 7th abdominal segments are the longest, and gradually taper off to either end; at 4, 5, and 6 the greatest girth occurs. The larvæ are now definitely coloured instead of as previously, a monochrome of dark plates and tubercles on a pale ground. They have a broad mediodorsal band of dull orange, on either side of this a band of about the same breadth of mottled smoky grey, this appears darker than it really is, owing to the large black dorsal tubercles, both i and ii being situated on it; below this is a band rather irregular in width of dull white, faintly mottled with grey in places, and somewhat constricted near the incisions. Tubercle iii is situated on the lower edge of this band. Beneath this, the lateral and subventral areas are pale grey, mottled with darker grey; on this ground colour occurs a series of broad obliquely set slashes of dull orange, this series extends from the metathorax to 9th abdominal, but the patches are small and vague at the extremities, on the larger abdominal segments the orange extends from iii almost to iv beneath, and has an extension forwards and upwards above the spiracle, which it borders, but does not enclose. A fainter and narrower oblique white dash also occurs just above vi tapering obliquely upwards and forwards. The spiracle is white rimmed with black. This instar is specially marked by a great increase in the hair growth, but this is still exclusively from the tubercles, which are developed into large warts with the exception of the small single-haired (? iv) tubercle on the meso- and metathorax. The increase in the number of hairs arising from i is very remarkable, but the hairs are still somewhat weak and are all pale, ii, the largest tubercle, bears the largest and strongest hairs, nearly all black, the other tubercles, iii, iv, v, and vi, have a majority of pale with a few black

hairs intermixed. The dorsal tubercles i and ii are black, the lateral ones iii, iv, v, and vi are paler. The head is still polished and semi-transparent-looking on the face and mouthparts, which are very pale brown approaching yellow, the remainder, sides, crown, etc., are very dark brown, all but black. Younger larvæ in this skin are somewhat brighter coloured, and this is chiefly due to the greater intensity of the orange.

5th (? 6th) instar (living): Length about 20mm. In shape there is but little alteration, but this little is still in the direction of greater stoutness at the expense of length. The chief feature is again the great increase in number of hairs. The tubercles are much enlarged and raised so that a greater spread of hairs is now possible. As a whole the larvæ are now much darker but this is chiefly due to the increased hairiness, and, in part, to the darkening of the general skin surface to a dark smoky-grey. Many of the raised warts are paler than before; i, although still dark, is hardly black, ii remains black, but the lateral ones are pale. The smaller hairs described as pale in the last skin are now of a bright brown, and the entire increase in number seems to be of hairs of this description. It is to this dense coat of brown hairs that the larvæ owes its characteristic colour. In the larvæ I am examining, the black dorsal hairs still presist, but, in others, which may possibly have undergone a further moult (I am still uncertain as to the exact number of moults), the long dorsal hairs are also brown, only darkening towards the tip, and then the colour is not black but very dark brown. The orange-red mediodorsal band is still a noticeable feature but appears darker, partly, no doubt, owing to the general darkening; the whitish subdorsal line of the last skin is reduced to a series of detached whitish or yellowish spots at the ridge of each segment just about iii, and the series of orange spots between iii and iv has a tendency to combine with the remnants of the subdorsal series above mentioned, sometimes forming a large irregular dull yellowish spot which encloses iii to a greater or less extent. The head is very dark brown, the pale yellow area being greatly reduced, only the area close to the mouth remaining pale.

? 6th (? 7th) instar: On other larvæ, which possibly, although not certainly, had undergone a further moult, the hairs appear even more thickly set, and the head is to all intents black. Partly in consequence of the denser growth of hairs and partly owing to a less intensity of the black of dorsal tubercle ii, the rows of black dorsal spots (formed by dorsal tubercle ii) which are so characteristic of the larva in its 4th or 5th skin, and a fairly conspicuous feature in the following skin, are now quite inconspicuous. In the adult larvæ of the second brood there was again a wide variation as regards depth of colour, from a pale to a very dark brown, almost black in extreme individuals. This range of coloration seems to be chiefly, if not entirely, due to the tint of the hairs and not to any alteration in the coloration of the skin-surface. An aberration, or possibly it would be more correct to call it an unusual form, of the larva in respect of hair-growth occurs both in this species and that of *Spilosoma mendica*. It consists in that the hair-growth arising from the warts is produced into comparatively compact and prominent tufts, in which, all, or the great majority of, the hairs stand more or less upright instead of spreading out at all angles from horizontal to vertical in an elaborate chevaux-de-frise. This is possibly

due to some accident at the final moult, but as the only larva of *Nemeophila plantaginis* that I have ever found was of this form, and as a somewhat similar but accentuated arrangement is normal, in the larvæ of *Syntomis phegea*, the character may be atavistic.

Cocoons.—Those made by the larvæ of the first brood are somewhat larger and denser in texture than those spun by the larvæ of the second brood. The size of those of the first brood is:—Length 22mm.-25mm., width 12mm.-16mm., those of the second brood have a length of 19mm.-22mm., and are proportionally narrower. The position chosen for spinning makes a considerable difference in the shape and the relative proportions of the cocoons, those spun on the roof of the cage well away from the sides and each other, tend to be deep and narrow, possibly owing to the action of gravitation. In favourable situations the shape is an almost perfect oval, and nearly as regular as that of *Lasiocampa quercus*, but usually a trifle more pointed at the ends. A small amount of loosely spun silk is used as a scaffolding or for stays while the cocoon proper is spun. The cocoons of the second brood larvæ are, as a whole, less regular in shape and more flimsy in structure, and, in some cases, they are so slight that the outline of the pupa may be clearly seen. The silk of which the foundation of the cocoon is formed is comparatively thin, formed of fine soft pale or white silk, but it is thickly felted with cast larval hairs on its outer side, and the colour of the cocoons, ranging from a paler to darker brown, is chiefly, if not entirely, due to the colour of the larval hairs. In spite of this, however, a glance at the interior proves that by no means all the larval hairs have been used in its construction as the shrunken larval skin within is still thickly clothed with hairs.

Emergence of Imago.—The moth on emergence makes a small opening at one end, the holes remaining wonderfully clear and sharp as though they had been cut or the silk had been dissolved by some solution.

Pupa (from empty-case only).—The pupa, as frequently happens with those of its allies, does not become entirely freed from the larval skin, the last two pupal segments being hidden within it, and it is moderately firmly attached, chiefly I think by the anal armature which is entangled in some portion of the cast larval membranes. In shape, it is quite typically a Spilosomid, being short, stout and solid-looking, with a smooth and highly polished surface, which, however, upon examination with a lens, proves to be minutely pitted, and from many of these pits arise very small brown hairs. In colour the pupa is very dark brown or black with bright red-brown or orange on the intersegmental membrane, in an unemerged pupa (dead) the pale intersegmental areas do not show at all, but I see that Newman mentions the pupa as being "blackish, with paler bands," which leads me to suppose that the intersegmental areas are visible, at any rate sometimes, in the living pupa. The length of my specimen is about 16mm.-18mm., but it is probably somewhat less before emergence, greatest girth some 6mm.-8mm. The sexual organs are tolerably clear but not prominent. The anus ends abruptly and its armature consists of a small group of tall slender curved-topped spines very closely set together, which frequently, if not usually, are partly obscured from view by some portion of the larval integument that remains attached to them after the cast larval skin has been removed from the pupa. The wings, antennæ

and leg-cases, etc., are all highly polished, the antenna-cases, which are very slender, showing faint traces of transverse striations. The tips of the 3rd legs just show between the extremities of the wing-cases, the antennæ extend just beyond the 1st pair of legs, the space between these is filled by two long angular slips, which are, I suppose, the haustellum-cases. The shield, composed of the mouthparts, legs, antennæ, etc., is not entirely detached at dehiscence, presumably owing to the antennæ, the outer margin of which forms one of the lines of rupture, not extending so far as the 2nd pair of legs. The other lines of dehiscence are from base of antennæ behind the head, and then backwards along the median suture to posterior margin of mesothorax, and thence between the meta- and mesothorax and along the suture between fore- and hind-wing-cases as far as the spiracle on the 3rd abdominal segment. The spiracles are rather large and distinct, but as usual narrow and slit-like.

Synopsis of the Orthoptera of Western Europe.

By MALCOLM BURR, B.A. F.L.S., F.Z.S., F.E.S.

(*Continued from* p. 121.)

Division : Mantidea.

This is a very extensive group, subdivided into several subfamilies, occurring in every part of the world except the coolest regions. They are easily recognised by the peculiar form of the anterior pair of legs which are remarkably developed for catching and holding the small insects which constitute their prey; the middle and hinder pair of legs are weak, and only adapted for a comparatively ungainly scramble, very different from the nimble run of the cockroaches and powerful springs of the saltatorial section.

They are, in general, sluggish insects, sitting for a long time in an attitude of prayer, that is, with their powerful raptorial fore-legs raised together in front of them, ready to seize any insect that comes within range. They are frequently assimilated in a remarkable manner to their environment, less, apparently, to screen themselves from foes than from their prey.

The characters of the group can be seen from the synoptical table.

Table of Families.

1. Pronotum broad, not dilated over the insertion of anterior coxæ, the sides almost parallel : anterior tibiæ unarmed.	Orthoderidæ.
1.1. Pronotum narrow, dilated over the insertion of anterior coxæ, narrower before and behind : anterior tibiæ armed with spines. Feet not lobed, vertex plane or concave, antennæ setaceous or filiform in both sexes	Mantidæ.
2.2. Posterior femora with a lobe near the knee : (abdomen laterally lobed) : vertex produced into a cone : antennæ pectinate in ♂ s. and setaceous in ♀ s.	Empusidæ.

Family I. Orthoderidæ.

This family is represented in Europe by a single genus containing a single species; it may be recognised by the broad pronotum with parallel sides, and the unarmed anterior tibiæ.

Genus 1. Discothera, Fin. and Bonn.

1. Discothera tunetana, Fin. and Bonn.

Discovered in Tunis by Dr. Bonnet, it has been taken in Spain at Uclés (Cuenca) by Pantel, and at Cartagena by Sanchez Gomez. Pantel's specimens were taken in July and August on dry hills among stones.

Family II. Mantidæ.

This is the most extensive family of the group. Several genera occur in Europe.

Table of Genera.

1. Broad part of pronotum situated approximately in the middle: small insects: wings of ♀ s abbreviated or abortive, some species apterous.
   2. First segment of the four posterior tarsi longer than the remaining ones together: head with a blunt tubercle on each side behind the eyes — 1. Geomantis, Pant.
   2.2. First segment of four posterior tarsi hardly longer than the second.
      3. Eyes rounded .. .. — 2. Ameles, Yers.
      3.3. Eyes conical.
         4. Organs of flight well developed in ♂ s, abortive in ♀ s .. .. .. — 3. Parameles, Sauss.
         4.4. Organs of flight short or rudimentary in both sexes.. .. .. .. — 4. Yersinia, Sauss.

1.1. Broad part of pronotum situated approximately in the anterior third; larger insects; elytra and wings well-developed in both sexes.
   2. Supra-anal plate of ♂ short, transverse and rounded in both sexes. Elytra and wings longer than abdomen; wings hyaline.
      3. Middle and posterior femora armed with an apical spine on the genicular lobe. Elytra with a prominent yellow oblong stigma .. .. .. — 5. Hierodula, Burm.
      3.3. Intermediate and posterior femora unarmed at extremities. Elytra with stigma very narrow, not prominent, same colour as elytra .. — 6. Mantis, Linn.

2.2. Supra-anal plate triangular in both sexes. Elytra and wings of ♀ s shorter than the abdomen. Wings with an ocellus.
   3. First segment of posterior tarsi smooth above and shorter than the rest united. Elytra green or testaceous. Wings with a peacock-eye spot in the anal angle .. .. — 7. Iris, Sauss.
   3.3. First segment of posterior tarsi spined above, and longer than the rest united. Elytra grey. Wings dark, with an ocellus at apex of costal margin .. .. — 8. Fischeria, Sauss.

Genus 1. Geomantis, Pantel.

This curious genus falls into the group *Gonypetae*, characterised by the shortness of the pronotum and length of the first segment of middle and posterior tarsi*; the pronotum is of a peculiar form owing to the shortness of the anterior portion, which brings the supra-coxal dilated portion farther forward than is the case in the typical *Mantidae*. The parallel form of the abdomen should also be noted.

* These two characters occur in various other groups but their presence together characterises this group.

1. Geomantis larvoides, Pantel.

Small, slender, apterous; greyish-brown. Length of body, 21mm. ♂, 24mm. ♀; of pronotum 1·3mm. ♂, 5mm. ♀.

This curious little Mantid resembles a larva in its appearance, size, softness of integument, absence of wings and small genitalia; it was in fact originally mistaken for the larva of *Fischeria baetica* by Pantel, who discovered it on dry stony places near Uclés and the Sitio, in central Spain. The larva is found in June, the imago in July and August.

Genus 2. Ameles, Burm.

This genus, in common with the two following, is characterised by the small size, and the short first segment of the posterior tarsi, and absence of tubercles behind the head, taken together with the supra-coxal dilation of the pronotum situated nearer the anterior than the posterior border; its normal rounded eyes distinguish it from the two following genera.

Table of Species.

1. Pronotum more than twice as long as broad; abdomen of ♀ almost cylindrical .. .. .. 1. decolor, Charp.
1.1. Pronotum shorter and broader; abdomen of ♀ very broad in the middle.. .. .. 2. abjecta, Cyr.

1. Ameles decolor, Charp.

Length of body, 23mm. ♂, 20mm.-23mm. ♀; of pronotum, 5·7mm. ♂, 5·5mm. ♀; of elytra, 20mm. ♂, 5·5mm. ♀.

Occurs in southern Europe. In France only in the extreme south, at Hyères, Cette (rare), Montpellier, Basses-Alpes, Montélimar, Cannes. In Spain, Barcelona, Malaga, Valencia, Guadalajara. In Italy, Pegli (rather rare), Tolentino.

2. Ameles abjecta, Cyrillo (=*brevis*, Ramb.=*spallanzania*, auctt.)

Easy to distinguish from the preceding by its much shorter and strongly dilated pronotum, and dilated abdomen in the ♀. Length of body 22mm.-23mm. ♂, 18mm. ♀; of pronotum, 1·5mm.-5mm. ♂, 5mm.-5·5mm. ♀; of elytra, 19mm.-25mm. ♂, 5mm. ♀.

Occurs throughout southern Europe and northern Africa. In France on the southern littoral, but nowhere common; Marseilles, Hyères, Cannes, Nice, Bagnols, and in Corsica. In Italy at Vintimiglia, Pegli (common on shrubs), Sicily, Calabria, Sardinia; it occurs throughout the Spanish peninsula. The adult insect is found from July to November in uncultivated places, chiefly on *Echium vulgare*, *Retama*, *Rosmarinus officinalis* and *Quercus ilex*.

Genus 3. Parameles*. Sauss.

Separated from *Ameles* by the conical eyes, and from *Yersinia* by the well-developed organs of flight of the males.

Table of Species.

1. Upper side of head moderately concave. Supra-anal plate nearly three times as broad at the base as long; cerci very short and cylindrical .. .. 1. Assoi, Bol.

* *Parameles*, Sauss. and *Yersinia*, Sauss. are treated by Bolivar as subgenera, but I treat them as genera, as I hold the *Species* to be the next division after the *Genus*, and there can be nothing between the two. At the best they are only separated from each other by the comparative length of the organs of flight, a most unsatisfactory character.

1.1. Upper side of head strongly concave. Supra-anal plate hardly twice as broad at the base as long; cerci very long, depressed at the base in the male 2. NANA, Charp.

1. PARAMELES ASSOI, Bolivar.

Dirty reddish-yellow, with greyish spots.

Length of body 26mm. ♀; breadth of pronotum, 2·5mm.; of abdomen, 4·5mm. ♀.

This species is peculiar to central Spain: Madrid, Toledo, Cuenca; it is adult from May.

2. PARAMELES NANA, Charpentier.

Length of body, 24mm. ♂, 25mm. ♀; of pronotum 5·5mm. ♂, 6mm.-6·3mm. ♀; of elytra, 16mm.-19mm. ♂, 5mm.-6mm. ♀.

This species is more meridional than the preceding; Andalusia: it occurs also in Sicily and Algeria.

Genus 4. YERSINIA, Saussure.

Differs from the preceding in the organs of flight being absent or rudimentary in both sexes; the eyes are conical.

1. YERSINIA APTERA, Fuente.

Length of body, 27mm. ♂. 35mm. ♀; of pronotum, 6mm. ♂, 8mm. ♀.

This species is of larger size than its relatives, with the eyes conical and prolonged, and the wings and elytra absent. It is a Spanish species, and has been recorded from Ciudad Real and Brunete.

2. YERSINIA BREVIPENNIS, Yersin.

Differs from the preceding in having rudimentary elytra in both sexes. Length of body, 24mm.-25mm. ♂ ♀; of pronotum, 5·2mm. ♂, 5·8mm. ♀; of elytra, 4mm. ♂ ♀.

It is found at Hyères.

Genus 5. HIERODULA, Burm.

In this genus the femora intermediate and posterior are armed with an apical spine above the genicular lobe; the head is robust and the frons forms with the vertex almost a right angle: the elytra have a distinct oblong yellow stigma.

1. HIERODULA BIOCULATA, Burmeister.

This fine species is easy to recognise by its large size and robust build, with a distinct opaque yellow stigma on the elytra. In colour it is green, testaceous or variegated. Length of body, 60mm.-70mm. ♂, 57mm.-77mm. ♀; of pronotum, 19mm.-22mm. ♂, 20mm.-26mm. ♀; of elytra, 51mm.-55mm. ♂, 40mm.-50mm. ♀.

It is an African and Asiatic species, occurring in Spain, where it has been taken at Malaga, Seville, and Cadiz.

Genus 6. MANTIS, Linn.

This is the typical genus of the group; it contains a number of African and Asiatic species, but a single European form, which is extremely widely distributed.

1. MANTIS RELIGIOSA, Linn.

Colour green, pale; elytra more or less opaque, subpellucid in the male, in both sexes with costal margin pale, with a darkish line;

sometimes the elytra have the marginal field brownish, or the entire elytra are brownish; wings pellucid, the anterior margin greenish or brownish. Anterior coxæ denticulated on upper and lower margins, specked with whitish on inner side, with a black spot near the base, sometimes with a white centre; anterior femora with the alternate spines on inner margin black. Length of body, 42mm.-52mm. ♂, 48mm.-75mm. ♀; of pronotum, 4mm.-14mm. ♂, 14mm.-23mm. ♀; of elytra, 9mm.-10mm. ♂, 14mm.-20mm. ♀.

This is the common Mantis that is familiar to most visitors to southern and south central Europe. It occurs in grass, and is to be found adult in September and October. In France it is found in many localities, but is commonest in the south: Nice, Hyères, le Havre, common on the Upper Rhine, but rare in the Vosges; common in Languedoc, Dijon, Ile de Re, Gironde, Grenoble, Besançon, Chartres, Reims, Lyon. In Switzerland it occurs at Geneva, in the Valais, and at Freiburg. In Austria it is common in the south, and is found also at Passau, Vienna, Weisbergen, Krems, the south Tirol, and in Germany at Frankfort-on-the-Main. It is found in Sardinia and throughout the Iberian Peninsula. It is familiar to the peasants in the places where it is common; in France it is known as "prie Dieu," and in Catalonia as "Prega-deu," and Bolivar relates that it is known in Portugal as "Louva-Deus," and in Andalusia as "Santa Teresa."

Genus 7. Iris, Sauss.

The only European species of this genus is easily recognised by the peacock-eye on the wings; the general colour varies from green to brownish-chestnut.

1. Iris oratoria, Linn.

Length of body, 29mm.-37mm. ♂, 32mm.-47mm. ♀; of pronotum, 8mm.-11·5mm. ♂, 11mm.-16mm. ♀; of elytra, 22mm.-30mm. ♂, 15mm.-22mm. ♀.

This beautiful Mantid is easily recognised by the eye-spot on the wings. It occurs along the shores of the Mediterranean. In France it is abundant at Cette, on the coast of Provence and of Languedoc, Hyères, Cannes, Draguignan, Valence, Drôme, Montpellier, etc.; it is recorded from Sicily, Sardinia, and from San Remo and Bordighera in Italy, where it is probably widely distributed. In Spain it occurs in the centre and north, and also in Portugal.

Genus 8. Fischeria, Saussure.

This genus is characterised by the two spines on the base of the subgenital lamina of the female.

1. Fischeria baetica, Rambur.

The only European species is easily recognised by the dark grey colour, slender build, and indistinct eye-spot on the fore margin of the wings. Length of body, 57mm. ♂, 61mm.-66mm. ♀; of pronotum, 14·5mm. ♂, 18mm.-19mm. ♀; of elytra, 37mm. ♂, 20mm.-21mm. ♀.

On shrubs, especially *Cistus* and *Thymus*, in dry places in Spain; Malaga, Valencia, Almeria, Cartagena, but seems to be absent in the centre. (The record of the species from Uclés by Pantel is to be referred to *Geomantis larroides*.) It occurs also in North Africa and Asia Minor.

(*To be continued.*)

Agabus unguicularis, Thoms. and A. affinis, Payk.

By JAMES EDWARDS, F.E.S.

After a careful perusal of Mr. W. E. Sharp's elaborate article on these two species (*antè*, pp. 90-92) I find myself fully able to agree with him that the result of his investigation into the subject is not quite so satisfactory as could have been desired. So far as I can gather he intends to use the name *affinis* for the species taken by Dr. Sharp and the late Mr. Lennon near Dumfries; and *unguicularis* for the more widely distributed species long known to us under that name, but, in dealing with the insects themselves, my experience is not quite the same as his. In his *affinis* the male has the outer anterior tarsal claw armed with a very distinct large sharp tooth which extends to the middle of the claw; this may apply to *affinis*, W. E. Sharp, but in *affinis*, Payk., as I know it (I speak of Dumfries specimens *ex* Lennon) the position of the tooth is practically basal, *i.e.*, distinctly before the middle of the claw, and in shape it is a triangle as high or higher than its width at the base. In Mr. Sharp's *unguicularis* the male has the anterior tarsal claws with an inconspicuous tooth at the base; but in *unguicularis*, Thoms., as I know it (I speak of Norfolk specimens) there is a tooth on one anterior tarsal claw only, and its position is practically midway between the base and apex of the claw, whilst its shape is that of a triangle not so high as its width at the base. One hardly likes to think that so careful a worker, after elaborating his subject through two pages of print has finished by transposing the names of the species dealt with, and yet something of the kind seems to have happened.

As bearing on the question of distribution and the differences in the stridulatory organs, it may, perhaps, be well to transcribe the following passage from my "Supplementary List of Norfolk Coleoptera" (*Trans. Norf. and Norwich Nat. Soc.*, 1898-9, p. 523) "*Agabus affinis*, Payk.—This species must be expunged from our list; my Brandon specimens proving to be *unguicularis*, Thoms. The unsatisfactory nature of the characters given for the separation of these two species in the English text-books led Mr. Thouless to make a critical examination of authentic specimens of the males of each, and it is clear from the material prepared by him that the striæ in the series forming the stridulatory organ on each side of the third ventral segment of the abdomen are about twice as numerous in *affinis* as in *unguicularis*; the œdeagus of the former, too, has, in the lateral aspect, a distinct angular projection near the middle of its upper edge, which is entirely wanting in that of the latter."

With regard to these Brandon specimens, I should add that, so far as I am aware, Mr. Sharp sought no opportunity of seeing them.

PRACTICAL HINTS.*

Field work for June and early July.

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

1.—The full-fed larvæ of *Nola strigula* are to be obtained in early June feeding on oak, principally on the under cuticle of the leaves.

* "Practical Hints for the Field Lepidopterist," Pts. I and II each contains some 1250 practical hints similar to these, but relating largely to the Macrolepidoptera. Interleaved for collector's own notes. Price 6s. each part.

2.—The boat-shaped cocoons of *Nola strigula* are to be obtained in late June on the trunks of oaks, the colour of the cocoon assimilating perfectly in tint with that of the surrounding surface of the bark; very difficult to detect.

3.—The cocoons of *Lithosia griseola* are to be found in June under moss or lichen on moss- or lichen-bearing trees (Greene).

4.—The eggs of *Eulepia cribrum* arrayed in the neatest possible manner are to be found in June and July upon little stems of heather in their well-known localities in and near the New Forest (Corbin).

5.—Young larvæ of *Enistis quadra* are to be beaten from the lichens on oak-trees in early June; they appear to nibble the oak-leaves that feed on the lichens on oak-trees preferring *Lichen caninus*, of which they eat the dark cuticle quite voraciously, not caring for the pale fleshy substance beneath.

6.—The full-fed larvæ of *Enistis quadra* may be beaten from oak at Lyndhurst in late June: the favourite food is *Parmelia caperata*, which grows in abundance on all the trees where they occur, but they will also eat other species of lichens. They are very restless in confinement and especially prone to cannibalism (Lockyer).

7.—The cocoon of *Lithosia quadra* is to be found spun up on palings in the neighbourhood of trees covered with lichens at the end of June (Greene).

8.—The cocoon of *Lithosia muscerda* is spun under cover of a leaf, piece of bark or lichen; it is thin, webby, formed of greyish silk, enclosed in a finer and thinner web of white silk.

9.—The thin web-like cocoons of *Lithosia griseola* are spun in June and July, and placed under some protecting cover—stone, piece of wood, &c.

10.—In June the pupæ of *Lithosia molybdeola* are to be found enclosed in a very slight web of silk, under cover of a stone or piece of moss (Hellins).

11.—The larvæ of *Phryxus livornica* are to be occasionally found on fuchsia, dock, &c., in June and July (progeny of spring immigrants) and again in August and September (progeny of July-August immigrants). [Several imagines already recorded for May, 1904.]

12.—The eggs of *Amorpha populi* are deposited singly, or in pairs, on the upper- and underside of the leaves of the various species of poplar, at almost any height from the ground, from about two or three feet up to the tops of tall trees. They are not at all difficult to find in June.

13.—At the end of June and in early July the young larvæ of *Amorpha populi* are not at all difficult to find on the underside of the leaves of various species of poplar.

14.—The young larvæ of *Adscita statices* in June and July burrow into the substance of a sorrel leaf, being, however, never quite hidden, making semitransparent blotches by eating away the under epidermis and clearing out the soft cellular tissue leaving only the transparent upper epidermis.

15.—The young larvæ of *Adscita geryon* leave the eggs in late June or July, burrow into the underside of the flower-buds or leaves of *Helianthemum vulgare*, eating out a little blotch, each one inserting half its body into its burrow; the upper skin of the leaf is untouched.

16.—The full-grown larvæ of *Anthrocera exulans* are to be found on

a great variety of plants in their habitat throughout June and July, burying themselves in the fleshy leaves of some alpine plants, or feeding on the leaves of alpine *Trifolium*, *Geum*, *Alchemilla*, or *Silene*.

17.—Full-grown larvæ of *Anthrocera palustris* are fullfed in June, they are generally restricted to boggy and marshy places, follow the habit of *A. filipendulae* in pupating high up on grass culms or other tall herbage, the imagines appearing in July (in early seasons they may emerge in late June).

18.—The larvæ of *Egeria ichneumoniformis* are to be obtained in June and July, mining in the main roots of *Lotus corniculatus*: the larva scrapes out a channel along the side of the root, covering the open end of the groove with silk in which frass and the *débris* of the plant are entangled, thus maintaining the outline of the root.

19.—The workings of *Egeria ichneumoniformis* are readily detected, the external covering of the groove being of a pale yellowish (sawdust) tint, forming a strong contrast with the dark grey-brown colour of the rind of the root.

20.—Throughout June the plants of *Statice armeria* should be collected for the full-grown larvæ and pupæ of *Egeria muciformis*.

21.—The eggs of *Hepialus velleda* are scattered on the ground, amongst plants of *Pteris aquilina* in June.

22.—In June the pupæ of *Phragmatoecia arundinis* are to be found in the stems of *Arundo phragmites*, up and down the hollow stems of which they move actively: the fullfed larva gnaws a thin spot in the stem, and lines it with a thin layer of silk, in preparation for the emergence of the imago.

23.—In the localities where *Phragmatoecia arundinis* occurs, the pupæ may be found protruding from the affected reed-stems for some time before the moth emerges therefrom.

24.—The young larvæ of *Stauropus fagi* appear to like the chaffy stipules of the beech leaves, although they soon set to work and eat out long pieces down to the midrib. They will also thrive on oak.

25.—The eggs of *Microdonta bicolora* are laid in June on birch, the young larvæ feed up readily in ordinary leno sleeves, and are no trouble whatever till they are fullfed, when they are very liable to die off, unless plenty of room, well sifted earth, dried leaves, &c., be given them among which to pupate.

26.—The fullfed larva of *Ptilophora plumigera* changes to an uniform semitransparent green colour just before pupation, which takes place from the commencement to the middle of June in a thin brittle earthen cocoon just below the surface of the ground and near the roots of the foodplant.

27.—The fullfed larvæ of *Lophopteryx carmelita* are to be beaten from birch about the middle of June (more rarely at the end of the month and in early July).

REVIEWS AND NOTICES OF BOOKS.

Catalogue of British Coleoptera, by T. Hudson Beare, B.Sc., F.R.S.E., F.E.S., and H. St. J. K. Donisthorpe, F.Z.S., F.E.S. [London, O. E. Janson & Sons, 51 pp., 8vo. .—Since the catalogue of Sharp and Fowler was published, eleven years have elapsed, during which time many species of coleoptera have been added to our British list, doubtful cases have been cleared up, and questions of synonymy decided. The list of 1893, therefore, useful as it has been in the past, is now

somewhat obsolete, and Professor Beare and Mr. Donisthorpe have given us a new one brought up to the present state of our knowledge. The general design is on the lines of the Sharp catalogue, 2nd edition, with the important addition of authors' names to the genera, and also an index of genera and a list of abbreviations of authors' names quoted in the list. In the present issue about 60 names are added to the 1893 catalogue, and some 43 are removed to the "doubtful" and "introduced" lists which are to be found at the end of the work together with addenda bringing the list up to the date of publication. It is gratifying to note that so far as has been possible, the arrangement adopted in Canon Fowler's "British Coleoptera" has been maintained, which will greatly facilitate the use of the catalogue for reference purposes. All the recorded varieties appear to have been included, and where the variety only, and not the type form, occurs in Britain a novel method of clearly showing this has been adopted. A large number of the authorities for species have been altered, although it is not clear in all cases why this has been done. The synonymy of *Harpalus tardus*, *H. rufimanus* and *H. frolichi* is clear. *Calathus piceus* assumes the generic name *Amphiguus*, the *Bembidium riparium* synonymy is put right, and *B. callosum*, Küst, has been reinstated with perfect justice. The genus *Anacaena* is placed after *Philydrus* and *Enochrus*, *Paracymus* coming next. *Myrmedonia plicata* assumes the generic name *Myrmoecia* and *Astilbus* becomes *Drusilla*. *Cnypeta coerulea* takes the generic name *Ischnopoda*, and the genus *Zenusa* becomes *Myrmecophora*, and *Ptomaphagus* is now *Catops*. The Clavicorn families have been placed in different order, the *Pselaphidae* come immediately before the *Trichopterygidae*, and are preceded in the following order by the *Leptinidae*, *Clambidae*, *Silphidae*, *Scydmaenidae*, and *Clavigeridae*. The *Phalacridae* are placed before the *Coccinellidae*, the *Colydiidae* before the *Histeridae*, which, in their turn, now immediately precede the *Micropeplidae* instead of being placed near the *Silphidae*. The *Cucujidae* (of which the genus *Rhizophagus* is now included in the *Nitidulidae*) follow the *Lathridiidae*, the *Byturidae* coming next followed by the *Cryptophagidae*. Of the other changes *Bryaxis sanguineus* takes the generic name *Bybaxis*, whilst *Carcinops minima* becomes *Kissister*. The genus *Saprinus* is divided and *Hypocaccus* includes three of the species. *Saprinus maritimus* is under the genus *Pachylopus*, and *Acritus* becomes *Halacritus*. The species of *Anthrenus* are divided into *Anthrenus*, *Florilinus*, and *Helocerus*, whilst *Myrmecoxenus* is taken out of the *Cryptophagidae* and placed in the *Colydiidae*. Of the other sections little need be said as they practically follow the same order and nomenclature as the 1893 catalogue. The synonymy of the Elaters is clear and *Drilus* is placed after the *Cleridae* instead of after the *Lampyridae*. The type and the printing of the list are good and it is remarkably free from printer's errors, whilst the compilation is very carefully done and adds another item of good work to the record of the authors, both of whom have so assiduously worked for the advancement of our knowledge of British beetles.—H.W.E.

CURRENT NOTES.

We are astonished at the number of letters we have recently received complaining already of the "bad" season, for we are able to record that we have had sent to us, or have collected, larvæ of twenty of the British species of "plumes" this year up to date, and these have been obtained by three or four collectors (with very scant and limited

leisure) so that one would assume that those who know how to work otherwise than with a net have little or nothing at which to grumble. We still want larvæ and pupæ of *Platyptilia tesseradactyla*, *Pselnophorus brachydactylus*, *Oxyptilus distans*, *O. pilosellae*, *O. parvidactyla*, and *Aciptilia paludum*, among the most critical species, and should be glad to buy larvæ or pupæ of these species (alive or preserved), of professional collectors. We have promises of *Amblyptilia acanthodactyla*, *A. punctidactyla*, *Mimaescoptilus zophodactyla*, and *Pterophorus monodactyla*, but trust that each of our readers who gets these species will do his best to supply us in case our present proposed source of supply fails. Among other species we appear to have stumbled on a larva of *Platyptilia zetterstedtii*, hitherto among our unknown and undescribed European species in its earlier stages. As a large amount of our present material will be used up in getting thoroughly good descriptions of the larvæ and pupæ, we should be exceedingly glad to receive from any of our correspondents living ♀ s and a supply of the foodplant to try for eggs. We shall have larvæ and pupæ and we must get the eggs to make the life-histories complete. The material can be sent to Dr. T. A. Chapman, Betula, Reigate, Mr. A. W. Bacot, 154, Lower Clapton Rd., London, N.E., or Mr. A. Sich, Corney House, Chiswick, who are collaborating with us in this matter. A division of material, if sufficient is available, might be useful and prevent possible failure.

At the Conversazione of the Royal Society, held on May 13th, 1904, there were no very definitely entomological exhibits, although the following may be interesting to our readers:—I. "Examples of Photo-Micrography," by Mr. Arthur E. Smith and Mr. Richard Kerr, F.G.S. The exhibit included sections of histological, botanical, and entomological specimens, intended to assist students of biology generally and medical students especially. The camera used is unusually large in order to ensure direct photography. In no case are the results produced from the enlargement of small negatives. Some of the photographs of insects were especially good. II. "Ticks and Tick-transmitted Diseases," by Dr. G. H. F. Nuttall, F.R.S. (1) *Piroplasma canis*, a parasite living within the blood corpuscles of the dog, is the cause of a very fatal canine disease in Africa and parts of Europe. In South Africa the disease is carried by a tick (*Haemophysalis leachi*). Similar parasites cause diseases peculiar to cattle (Texas fever or Redwater, Rhodesian fever) and sheep, both of which are tick-transmitted. The horse may suffer from "Piroplasmosis," also men apparently (Rocky Mountain or Tick fever). (2) *Spirochaete* of Marchoux, a blood parasite causing a fatal disease of fowls in Brazil, is transmitted by a tick (*Argas miniatus*). Similar parasites cause relapsing fever in man, a fatal disease of geese in Russia, a bovine disease, but in none of these three has the carrier as yet been determined. Nothing is known regarding the development of the species of parasites belonging to the above genera (1 and 2). It is remarkable in both cases that infected ticks may transmit the diseases to dogs or fowls respectively after starving for five and six months. The exhibit includes specimens of ticks which transmit several of the diseases above named, also specimens of the parasites and figures. III. "Microscopical preparations and Diagrams of the Chromatophores of the Higher Crustacea," by Mr. Frederick Keeble and Mr. F. W. Gamble. The coloration of such crustacea as *Hippolyte varians* is due to pigments contained in chromatophores. The chromatophores

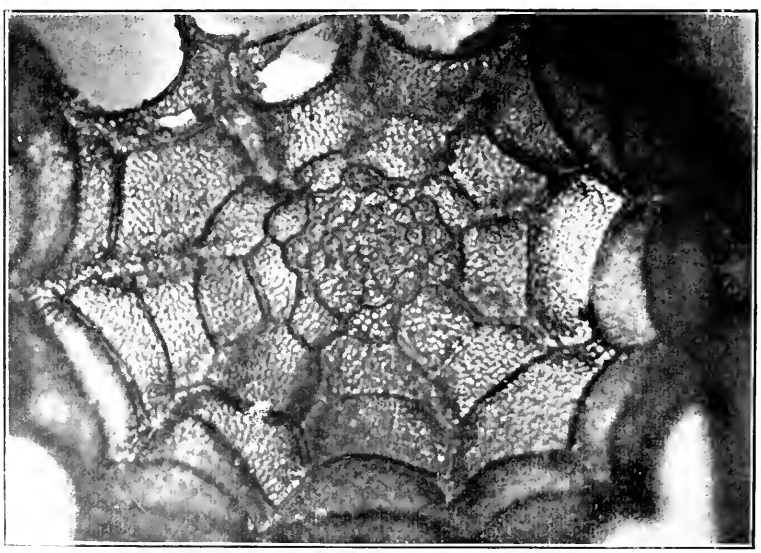
consist of several compartments, in each of which a single pigment is present. When contracted to the centre of the chromatophore, a pigment plays no part in the coloration of the animal; when expanded into the superficial network which communicates with the centre, the pigment takes a share in the coloration. The exhibit showed *permanent* microscopic-preparations of the chromotaphores, in which the natural colours of the pigments (red, yellow, and blue) are preserved. Other preparations demonstrated the fact that the chromatophores also contain a colourless fat which contracts and expands like the pigments themselves. The minute structure of the chromatophores was illustrated by microscopic-preparations and by diagrams. The crustacea exhibited presented a most wonderful adaptability to the colours of their environment.

We noticed, amongst others, the following entomologists present—Rev. W. W. Fowler, Professors T. H. Beare, E. B. Poulton, and R. Meldola, Colonel Bingham, Dr. Dixey, Messrs. H. Rowland-Brown, A. J. Chitty, J. Collin, H. St. J. K. Donisthorpe, Hamilton Druce, Herbert Druce, H. Goss, W. J. Lucas, R. Trimen, and C. O. Waterhouse.

We have just learned with the greatest regret of the death of Mr. Thomas Tunstall in February last. Mr. Joseph Merrin, too, the author of "Merrin's Catalogue," also, we regret to state, died quite recently. Now we hear of the loss of one of our leaders, Mr. R. McLachlan, F.R.S.

We understand that the sale of the first part of Dr. Mason's library went off fairly well, but that most of the buying was done by the trade the London trade combining as usual, but that extensive commissions from some of the largest continental firms prevented the combination having it all its own way. This cannot be said to be at all satisfactory, though some of the best lots went to private British buyers. We should say that the prices were still, on the whole, unreasonably low. Among the best a complete set of Buckler's *Larvæ*, 9 vols., produced only £6 2s. 6d.; an original subscriber's copy of Wood's *Index Entomologicus*, 1st ed., £2 2s.; whilst a copy of the unsatisfactory 2nd ed. produced £2 15s.; complete set of Stainton's *Natural History of the Tineina*, £4; Stephens' *Illustrations* (Haustellata and Mandibulata), £3 3s.; Curtis' *British Entomology*, £15 10s.; Lang, *Butterflies of Europe*, £2 12s. 6d.; Godart and Duponchel, *Histoire Naturelle*, etc., £13 10s.; Haworth's *Lepidoptera Britannica*, £3 5s.; Barrett, *Lepidoptera of British Islands*, 7 vols., coloured plates, £11 5s.; Buckton, *Monograph of British Cicadæ*, etc., £1 12s. 6d.; "Zeller's Manuscripts," 4 vols., half calf, £2 12s. 6d.; Saunders' *Hymenoptera-Aculeata of the British Islands*, 5 vols., £5; Ganglbauer, *Kafer von Mitteleuropa*, 15s.; Saunders' *Hemiptera-Heteroptera of the British Islands*, £1 16s.; Edwards' *Hemiptera-Homoptera of the British Islands*, £1 12s. 6d.; Candeze, *Monograph des Elaterides*, £2 2s.; Buckton's *Monograph of British Aphides*, 4 vols., £3 5s.; Cameron's *Monograph of British phytophagous Hymenoptera*, 4 vols., £2 10s.; Gemminger and Harold, *Catalogus Coleopterorum*, 12 vols., £3 16s.; McLachlan's *Monographic Revision and Synopsis of the Trichoptera of the European Fauna*, with supplements, £1 11s.; *Linnæa Entomologica*, 16 vols., £1 12s. 6d., and so on. The next part of the sale, on June 21st, contains long series of the *Transactions* of the various learned societies and periodicals. Of the publications of local British Societies, usually very rare even in the best libraries and always difficult to obtain, there is an especially strong lot. The quartos and larger books will be sold later.

1.



2.

Egg of Brenthis thore.

The numerical relationship of the sexes of Lepidoptera.

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

A recent remark made by Dr. Chapman (*anteà*, p. 139) as to the numerical relationship of the sexes of lepidoptera in nature leads me to call attention to an important series of tabulations by Standfuss (*Handbuch der Palaearktischen Gross-Schmetterlinge*, pp. 190-191), in which it will be seen that, as the result of breeding above 32176 insects of 40 species, between the years 1877 and 1893, he obtained results in which, in almost every case, the males were in excess of the females, but to such a small extent that—eliminating the well-known factors of the greater difficulty of breeding ♀ s of some species owing to their longer larval stage and their requirement of a greater quantity of food (resulting in the larger size of the abdomen and the formation of ova), as a contingency consequent upon the artificial conditions—one may safely say that the evidence goes to prove that, in almost all broods, the sexes are, to a great extent, fairly equal, the total numbers being 16524 ♂ s to 15652 ♀ s. It is quite true that when one is out in the fields one frequently sees more ♂ s than ♀ s, and observes that this appears to be particularly the case when one hurries from place to place, spending a day here and there, but the difference gradually fades as the length of stay in a given place increases, and when one makes observations on a species throughout the full period of its appearance in a given locality, and more particularly when one has learned the difference of the habits of the sexes, for, in many species, especially among the butterflies, the habits are exceedingly different, and the much more retired and less active ♀ comes into much less prominence than the ♂, and is comparatively rarely seen by the superficial observer who covers ground and does not remain for a fair length of time to study the species. A case in point will illustrate my meaning. On my arrival at Arolla towards the end of July, 1903, *Erebia mnestra* was just appearing, and I captured possibly 30 or 40 ♂ s (out of a very much larger number observed) per day for 3 or 4 days, to 1 or 2 ♀ s; had I left the locality then I might have assumed that, in this species, at Arolla the ♂ s largely outnumbered the ♀ s, but, having obtained a fair number of specimens, I only captured, until August 9th, such specimens as came in my way, without attempting to step aside for them; these again were largely ♂ s. However, on August 10th, recognising that my series after all was a very poor one, owing to the comparative absence of ♀ s, I collected the species carefully as it flew about the long grass round the juniper bushes and netted those on the flowers on the slopes, with the result that I took home some 50 ♀ s, and only saw about half-a-dozen ♂ s worth netting. No doubt at Arolla the ♀ s are a little later, their habits are very different and more retired than those of the ♂ s, but that there is no real difference in the numbers of the sexes is certain. Similarly with *Erebia goante* and *E. nerine*. It is possible, in their respective localities, to take up a position on an exposed path with rocks beetling up, and capture hundreds of ♂ s without ever seeing a ♀, but find the flower-clad slopes where the ♀ s lay their eggs, and learn the habits of the latter, and you will soon discover that the apparent difference in numbers is due almost entirely to a difference in habit and not, in fact, the result of any real numerical difference. Illustrating the same point among the moths I may say that, in climbing the slopes at Arolla

JULY 15TH, 1904.

whilst there in 1903, one perhaps put up from 6 to 12 ♀ s of *Nemeophila plantaginis* during a morning, but never a ♂, whilst, in the afternoon, millions of ♂ s flew rapidly up and down the grassy slopes, but only by the most careful searching could a ♀ be detected. The morning observer would conclude that the ♀ s largely outnumbered the ♂ s, the afternoon observer that the ♂ s outnumbered the ♀ s by tens of thousands; no doubt both conclusions are equally erroneous. I was much interested, and not a little amused, a short time ago, at some elaborate, and, up to a point, interesting, mathematical results worked out by Mr. G. Smith (*Entom.*, xxxiv., pp. 276 *et seq.*) on some data that I had no doubt were almost wholly erroneous*. Mr. Smith assumed that:—(1) The various species of *Erebia* are extremely variable in their wing-facies. (2) There is a great preponderance of ♂ s over the ♀ s in the majority of species. The first assertion is certainly open to question as a general statement, and, taking into account the specimens of a given locality, the second has not in my own opinion the slightest foundation in fact. Mr. Smith does not appear to tell us (1) how many times he had made these special investigations that he relies upon for his facts in the English Lake district and Savoy, nor on what species they were based (surely not on *epiphron* and *ligea* alone); (2) how many specimens on each occasion he captured for comparison; (3) how much difference there was in the various localities in different years; (4) how long he had stayed in each locality on each occasion to make sure that he had a clear idea that the material he obtained and generalised on was taken at the commencement, middle, and end of the period that the particular species was on the wing in the given locality, and therefore a good average; (5) that he had taken fully into account the difference of habit of the sexes at these different times so as to be able to average up his material with some hope of success. We are getting a good many calculations published relative to this and allied problems, based on haphazard material collected without aim, and, without any detailed remarks to show that it has been obtained with due regard to the purposes to which it has been put. It is cheerfully said that one can prove anything by mathematics, but by some obscure process of reasoning this same "mathematics" strangely asserts as an Euclidian axiom, that if the premises are all wrong the conclusions are sure not to be accurate.

To a real student, who will allow for the fact, that the insects were bred in confinement, and that the conditions of confinement are generally in favour of the ♂ as compared with the ♀, some of Standfuss' figures may be very suggestive. Thus we find that he reared:—

1. *Papilio podalirius* in 1887 and 1892, obtained 453 ♂ s and 441 ♀ s, *i.e.*, 102·7 : 100.
2. *Papilio machaon* in 1892 and 1893, obtained 628 ♂ s and 607 ♀ s, *i.e.*, 105 : 100.
3. *Thais cerisyi* in 1890 and 1891, obtained 170 ♂ s and 154 ♀ s, *i.e.*, 110·4 : 100. [Of this species the 1890 specimens gave 123 ♂ s and 92 ♀ s, but the 1891 lot 47 ♂ s and 62 ♀ s.]
4. *Thais polyxena* in 1884, 1890, and 1891, obtained 758 ♂ s and 752 ♀ s, *i.e.*, 100·8 : 100. Of this species the 1890 specimens gave 192 ♂ s and 141 ♀ s, but the 1891 lot 542 ♂ s and 595 ♀ s.]
5. *Doritis apollinus* in 1887, 1888, 1889, 1890, and 1891, obtained 54 ♂ s and 53 ♀ s, *i.e.*, 101·8 : 100. The specimens giving this near approach to equality

* The remark on p. 90 *re Erebia ligea* and *E. eurgale* is very remarkable so far as the capture of *E.* var. *ocellaris* in the St. Gervais' valley goes. I know this country moderately well, but have not seen this variety, which I have always considered an eastern form.

were bred over a series of five years, the largest number any one year being 46—20 ♂ s and 26 ♀ s.]

6. *Euchloë cardamines* in 1888, 1889, 1890, 1891, and 1892, obtained 125 ♂ s and 119 ♀ s, *i.e.*, 105 : 100.
7. *Aputura ilia* in 1886, 1888, 1889, 1890, and 1891, obtained 58 ♂ s and 52 ♀ s, *i.e.*, 111 : 100. [Although this looks a fair excess of ♂ s over ♀ s the most widely different figures were 17 ♂ s to 12 ♀ s, 8 ♂ s to 12 ♀ s.]
8. *Aglais urticæ* in 1884, obtained 643 ♂ s and 630 ♀ s, *i.e.*, 102 : 100.
9. *Vanessa io* in 1883, 1884, and 1893, obtained 1203 ♂ s and 1132 ♀ s, *i.e.*, 106 : 100.
10. *Euvanessa antiopa* in 1888, obtained 250 ♂ s and 242 ♀ s, *i.e.*, 103 : 100.
11. *Pyrameis atalanta* in 1884 and 1888, obtained 192 ♂ s and 176 ♀ s, *i.e.*, 109 : 100.
12. *Thaumas respertilio* in 1888, obtained 221 ♂ s and 209 ♀ s, *i.e.*, 105·7 : 100.
13. *Hyles euphorbiæ* in 1885 and 1886, obtained 540 ♂ s and 530 ♀ s, *i.e.*, 101·8 : 100.
14. *Amorpha populi* in 1891, obtained 261 ♂ s and 259 ♀ s, *i.e.*, 100·7 : 100.
15. *Callimorpha dominula* in 1890, 1891, 1892, and 1893, obtained 1327 ♂ s and 1245 ♀ s, *i.e.*, 106 : 100.
16. *Malacosoma castrensis* in 1884, obtained 207 ♂ s and 198 ♀ s, *i.e.*, 104·5 : 100.
17. *Lachneis lanestris* in 1889, 1890, 1891, and 1892, obtained 586 ♂ s and 550 ♀ s, *i.e.*, 106 : 100.
18. *Pachygastria trifolii* in 1882 and 1893, obtained 143 ♂ s and 131 ♀ s, *i.e.*, 109 : 100.
19. *Gastropacha ilicifolia* in 1882 and 1892, obtained 255 ♂ s and 234 ♀ s, *i.e.*, 109 : 100.
20. *Dendrolimus pini* in 1879, obtained 782 ♂ s and 745 ♀ s, *i.e.*, 104 : 100.
21. *Dimorpha versicolora* in 1886, 1889, and 1890, obtained 291 ♂ s and 280 ♀ s, *i.e.*, 103 : 100.
22. *Saturnia pyri* from 1887 to 1893, obtained 887 ♂ s and 829 ♀ s, *i.e.*, 107 : 100.
23. *Saturnia spini* from 1884-1893, obtained 1546 ♂ s and 1459 ♀ s, *i.e.*, 106 : 100.
24. *Saturnia pavonia* from 1881-1893, obtained 1920 ♂ s and 1818 ♀ s, *i.e.*, 105 : 100.
25. *Aglia tau* from 1881-1892, obtained 763 ♂ s and 723 ♀ s, *i.e.*, 105 : 100.
26. *Harpyia bicuspis* in 1881, 1886, and 1887, obtained 159 ♂ s and 141 ♀ s, *i.e.*, 113 : 100.
27. *Hybocampa strigosa* in 1885, obtained 77 ♂ s and 73 ♀ s, *i.e.*, 105 : 100.
28. *Leucania impudens* in 1878, 1879, and 1881, obtained 82 ♂ s and 77 ♀ s, *i.e.*, 106 : 100.
29. *Leucania loreyi* in 1882, obtained 97 ♂ s and 89 ♀ s, *i.e.*, 109 : 100.
30. *Amphipyra livida* in 1887 and 1878, obtained 458 ♂ s and 438 ♀ s, *i.e.*, 104 : 100.

These represent the most striking results, *i.e.*, those obtained from the greatest number of specimens reared, the nearness of the numbers in many (or most) cases is very remarkable, and tend to point the moral that, in nature, there is very little difference in the sum total of the sexes of any species that come to maturity in any given season. There is no doubt that any similar experiment conducted on an equally large scale would give results not far removed from those already arrived at. Our only reason for writing this note is to give our lepidopterists a knowledge of Standfuss' results, so that they may be on their guard against wild and unsupported assertions that the females of lepidoptera are so much rarer than males in nature.

Further notes on Orgyia splendida.

By T. A. CHAPMAN, M.D.

On our first arrival at Moncayo I met with one or two small *Orgyia* larvæ, sunning themselves on stones or grass stems. By degrees I got more familiar with them, and learned how to take them easily and to understand their habits. Also, those found became rapidly much larger and more easily seen during the few days of our stay. I finally collected between 200 and 300 of these larvæ, but there is little doubt I should have done better with them had I been more moderate, as there was considerable difficulty in doing anything with them

during our travels after leaving the Santuario; even getting any food for them was a difficulty not always adequately solved.

I have already dealt with some aspects of this species (*Ent. Rec.*, xiv., p. 41, and xv., p. 113, etc.), but hitherto had little knowledge of the larva. Rambur figures the larva (*Cat. Lep. And.*, pl. ii.) as well as that of *O. dubia*, of which *splendida* is recognised as a local race, and describes it on p. 284. His Andalusian larvæ had the dorsal tufts light brown (*fauve-brunatre*) with the centres yellowish (*blanc-jaunatre*), and he figures *dubia* as a very pale larva indeed. My larvæ, from so much further north, have the dorsal tufts of a pure black, with the central portion pure white. The larva is thus, with its brilliant red tubercles and other colours, one of the most beautiful and striking I know, and fully as much entitled to be called *splendida* as is the imago.

Rambur believed *dubia* and *splendida* to be distinct, and the larval differences he describes seem to bear him out. Still they are only differences of colour, and the differences may, no doubt, be held to be either specific or varietal according to the views (rather of names than of facts) of each authority. My black *splendida* larvæ from north Spain differ from his brown ones of south Spain, only in a little less degree than his do from the pale *dubia*, but there can be no doubt that both the Spanish forms are one species. About the Santuario de Moncayo the ground is stony, not exactly screes, but still rough pieces of rock of all sizes, only in places more or less bedded in finer material, and all lying at a steep slope, little less than that suitable for preventing screes being overgrown. Amongst this screes, or moraine-like material, a species of sorrel grows in some plenty. I was told it was *Rumex patientia*, whether this be correct or not, it is a species of sharp acid flavour, a habit much like that of *R. acetosella*, but with a broader leaf. It is also much larger than *R. acetosella*, at least than the form that grows on Moncayo, which is usually the small red-leaved variety that we find here on open dry places. This sorrel usually grows amongst and between the stones, so that, where it is most common, stones of considerable size are much more abundant than sorrel.

My first larvæ of *O. splendida* were met with amongst general herbage, especially *Alchemilla alpina*, in a place well covered with herbage, and this led me for a time astray, as there was nothing to connect it with the *Rumex acetosella*, which was its food at that spot, and as this was a place where the larva was really rare. However, I shortly met with others that put me on the right way. Its real food is the larger sorrel, so common near the Santuario and in various other places on Moncayo. It is found, however, rather rarely on its foodplant, and usually on a large stone many inches, or even several feet, from its foodplant, right out on the bare surface, basking in the sun. This habit is curious, as the aspect of its habitat is a north slope. The range of the species on Moncayo is considerable. East and west of the Santuario the larvæ were common anywhere that the sorrel grew. Its vertical range was more limited. Taking the Santuario as 5400ft. it was found 100ft. to 200ft. lower, but below this was absent, although, in the damp hollows of the gullies below the Santuario, its foodplant grew in abundant luxuriance. Upwards its range was limited by that of the foodplant. This did not grow upwards more than 300ft. to 400ft. above the Santuario, the limitation being, I think, not so much climatic as a question of sufficient moisture in the soil. I think

we found the plant and larvæ at higher levels somewhat to the west. Above the Santuario the larva is found up to 600ft. or 800ft. higher, but is rare, and lives then on *R. acetosella*. Odd larvæ were met with on broom and heath, but these were clearly stragglers that had to make the best of it when they had lost their way. Otherwise these plants would have afforded quantities of larvæ instead of only an odd one.

My larvæ in confinement did not do very badly, on the whole, better than I expected, since keeping them in a box along with a number of others was certain to be obnoxious to a larva whose habits involved solitude in an airy and exposed position. I had, moreover, to starve them a little on some occasions, and to feed them on *R. acetosa* and *R. acetosella*. They would not eat docks. I certainly lost a good many larvæ, and my last specimens to emerge were small and of less vitality. I think the Albarracin district is the furthest north from which the species has been recorded, and this abundance in quite the northern half of Spain is, on the whole, unexpected. The following notes were made at the time on young (and other) larvæ of *O. splendida* :—July 12th, about $\frac{3}{8}$ inch long. Black, white, and red. No side tufts. Tufts on 1st, 2nd, 3rd, 4th, and 8th abdominal segments white, no others. Hairs on general surface rather long, black and white. Dorsal tubercles on 2nd and 3rd thoracic and on 5th, 6th, 7th abdominal, as well as the supraspiracular large and red. Central glands on 6th and 7th abdominal, tall, yellow. Other tubercles black, especially the dorsal ones on 1st, 2nd, 3rd, and 4th abdominal, where they contrast strongly with the white tufts and the red tubercles. Skin black, with white marks in several situations: (1) In the incisions between the dorsal tubercles and between the subdorsal tubercles (iii), (2) three or four round the subdorsal tubercles (iii). (3) in the incision between the subspiracular tubercles (iv ?), and (still in the incision) below these. The largest of these specimens is 13mm. long (about $\frac{1}{2}$ inch).

As the specimen grows (two more moults to become full-grown) the white skin-marks take quite a yellowish tone, except those just above the supraspiracular tubercles (iii), which have a bluish tint. At the first of these two moults these changes of colour may be noted, and the dorsal tubercles of 1st, 2nd, 3rd, 4th and 8th abdominal segments are no longer visible, but support black hair-tufts. In the last skin, these black hair-tufts become the large dorsal black brushes or pencils, having still very conspicuously in their middles, longer pure white hairs, which stand up above the black ones, and make a conspicuous contrast. These are the same brushes that are so characteristic of all *Orgyia* and *Dasychira* larvæ. They appear first as a longitudinal row of white plumose hairs on the dorsal line, naturally arising from the inner margins of the dorsal tubercles. These white hairs are present in, at least, the three last instars. The black hairs, that form the mass of the brushes on the adult larva, arise subsequently, in the two last instars, or earlier in a slight form, from the trapezoidal tubercles and around them. In the fullgrown larva the white hairs, which form so brilliantly contrasting a centre to the black tufts, and rise above the black ones, seem more or less pressed out of a longitudinal alignment by the exuberance of the black hairs, and sometimes run down the centre of the tufts as several zigzags. There are no front or lateral tufts, and the tufts on the 8th abdominal, which we are used, in other Orgyias, to see as of a different structure from the dorsal ones (on *pudibunda* growing a flowing

tail) is here of precisely the same structure and appearance as those on the forward segments. Further, there is, on the 5th abdominal segment, that is, the one behind the dorsal pencils, almost always a fifth dorsal pencil, usually ill-developed and abortive, sometimes almost rivalling those in front, and almost always with at least some white hairs.

The doubts which I raised last year in my remarks on *O. aurolimbata*, as to whether I was correct in supposing the female of *O. splendida* gave the male any assistance in entering her cocoon, doubts which I regarded as being probably very ill-founded, prove, nevertheless, to be fully justified. My original observation on *O. splendida*, made at Tragacete, proves to have been quite accurate, but my conclusion that the female was at work within the cocoon during the quiescence of the male was unjustified. The observation of a large number of specimens this year shows that up to a point the procedure of *O. splendida* ♂ and *O. aurolimbata* ♂, is identical, each tears at the surface of the female cocoon with the tibial claws, till it finds the proper place (or *a* proper place) for entry, and there *O. aurolimbata* continues tearing till it makes an actual hole. *O. splendida*, on the other hand, takes a firm grip of the cocoon with the tibial claws and presses the head down on the cocoon close in front of them, just as if there was already a tube prepared, and then, though apparently quiescent, and certainly doing no more tearing, it keeps up a steady pressure on the selected spot, until the threads of the cocoon give way and allow a hole to form. The threads of the cocoon appear to slip aside as the depression deepens under the pressure. Unfortunately my observations were made by the time I began to know what to look for on the weaker later specimens, and on cocoons unnaturally placed, and more or less weak, so that I still remain in doubt, whether a special point of the cocoon is selected (the proper emergence end, if so) and whether the effect is produced entirely by continuous pressure or whether any softening fluid is used by the male.

British Lepidoptera*.

The fourth volume of the *Natural History of the British Lepidoptera* maintains fully the high standard of the preceding volumes. In it the Sphingides are concluded, and offer to the lepidopterist a fresh mass of material concerning the species treated both for study and reference. In the preface the author maintains his position with regard to synonymy against the innovation of Hampson, Rothschild, and Jordan, who, as we understand it, ignoring the work of their predecessors as to generic restriction, alter the generic names wholesale, on the plea that the first species named by an author shall be considered the type of the genus. As this mode of selection is contrary to all acknowledged rules we presume that our author's criticism will meet with the approval of most advanced lepidopterists. It is often asserted that the subject of British lepidoptera has been worn threadbare, but the series of books to which this volume belongs causes one to doubt whether, in reality, anything of importance has hitherto been published in our so-called text-books about them. Scattered throughout our magazines is a great quantity

* *A Natural History of the British Lepidoptera* (a text-book for students and collectors), by J. W. Tutt, F.E.S., pp. 535+xvii, pl. i-ii, portrait. London: Swan Sonnenschein & Co., Paternoster Square, E.C. Berlin: Friedländer & Sohn, 11, Carlstrasse, N.W.

of detail, which Stainton, Newman, Meyrick, and Barrett seem never to have read, and which only wanted abstracting and arranging with critical skill to become available to that large army of lepidopterists who cannot afford the £50 or £60 now necessary to purchase complete sets of the various magazines—*Zoologist*, *Ent. Weekly Intelligencer*, *Ent. Annual*, *Ent. Monthly Magazine*, *Entomologist*, *Ent. Record*, *Young Naturalist*, to say nothing of the *Trans. Ent. Soc. of London* and the many continental magazines—to which reference must be continually made by a really intelligent lepidopterist who wishes to be *au fait* with his work, and does not wish to join the laggards who have neither time for advanced study nor the necessary training to understand it. The British lepidopterist has here, at hand, a large quantity of research and original work for reference, by means of which his own work can be done with the least possible waste of time. The biological student has also a fine accumulation of facts relating to his own particular branches of study, and the bringing-together of the work done by hundreds of isolated students into a well-planned whole must produce a feeling of satisfaction in the minds of the recorders of to-day who see the possibility of their observations being rescued in the future from the buried dustheap of the almost-forgotten volumes of past days, to help to build up a detailed account of species such as has never been published before.

Of the detailed work only a few points can be mentioned. The paragraphs on the "Habits" and "Times of appearance" of *Sesia stellatarum* are of great interest as bearing on the spasmodic appearance of the species in northern latitudes. That on the "Hybridity of the Eumorphids" is of the greatest value. How many of our lepidopterists know anything of the crossing of *elpenor* and *porcellus*, of *galtii* and *euphorbiae*, and their relatives? Those parts of the chapters on *Celeriogallii*, *Hyles euphorbiae*, *Phryxus livornica*, *Hippotion celerio*, and *Daphnis nerii* that relate to their position as British species is exceedingly full, and the facts are well put, whilst in the study of *Hyloicus pinastri* is a clear marshalling of the facts relating to its appearance in the British fauna, and few will differ from the author's conclusions. Concerning *Sphinx ligustri* the correction of the previous work done in the early larval stages of this species is most important, involving as it does a critical appreciation of the differences between the Sphingid and Amorphid larvæ in their first instar. But the part of the book which will attract the British lepidopterist most will be the life-histories of *Agrius convolvuli* and *Manduca atropos*. With the exception of the author's own account of *Lasiocampa quercus*, no species, perhaps, has before been treated quite in this exhaustive manner. The history of the first-named species occupies from p. 330 to p. 392, and that of the second from p. 398 to p. 471. The chapter on the habits of *M. atropos* (pp. 435-455) is, in short, a monograph of all that has ever been written on the subject, and from the account of its peculiar pairing habits, through a consideration of the use of its scent-fans, the details of its breeding, the facts of its migrating habits and extent of its immigration, its remarkable attacks on apiaries, the consideration of the theories brought forward to account for the production of its well-known sound, to the discussion of the peculiar structure of the so-called "barren" females, offers an intensely interesting array of readable facts compressed into the smallest possible space and of the greatest possible value to all bio-

logical observers. A complete catalogue of the Palæarctic Sphingides appears to be carefully done. Besides the "Specific index" to vol. iv, this volume contains, thanks to the Rev. G. Wheeler, a "Synopsis of the contents of vols. i-iv," and a "General Index of vols. i-iv." Somehow, in working through this volume, one is convinced that the subject of the British lepidoptera has not yet been worn threadbare, that there is still work for the worker, and that a standard has been set by which the work of the coming generation of lepidopterists must be judged in this ever-increasing and complicated branch of study.

"Types" in Natural History.

By GEORGE WHEELER, M.A.

As the author whose views on the matter of types have lately been held up to ridicule by some of the writers in the *Ent. Record*, it may perhaps be permissible for me to offer a few remarks on the other side of the question. It is less than nothing to say that I am wholly unrepentant, as it would be impossible to repent of anything which produced the delightful satire of Dr. Chapman's remarks on the subject (vol. xv., p. 310), the delicacy and charm of which caused me to assign the article in question to Mr. Prout (I hope Dr. Chapman will realise what a high compliment I feel this to be), and to exclaim "I would rather be scolded by Mr. Prout than praised by most people." However, neither the gentle satire of Dr. Chapman, nor the more jubilant persiflage of Mr. Prout in the April number of the *Ent. Record*, nor even the Olympian pronouncements contained in the "Revision of the Sphingides," have succeeded in persuading me that the use of the word "type" to represent the first-named individuals of a species is anything else than a misuse of language. I am not so sanguine as to hope to persuade any of these leaders that my view is correct, but I hope at least to show that I am neither so unscientific, nor so illogical, as I have been represented to be.

First with regard to principles. There are, I take it, two chief points of view from which nomenclature may be regarded; either as a handy means of recognising what species other people are writing and talking about, or as a means of illustrating, and, so to speak, condensing, the facts of phylogeny as they become known. If the former be the view taken, any name which is universally recognised will serve, and fixity of nomenclature is the one desirable end to be kept always in view, and striven for "at any price." This I take to be the view advocated by Mr. Rowland-Brown in his review of my *Butterflies of Switzerland*, etc. (*Ent. Record*, xv., p. 345), and it is, from the collector's point of view, a wholly reasonable one, but I fail to see how it can be considered scientific, for, carry the matter to its logical conclusion, and what is the outcome? If the recognition of any species under discussion is the only *raison d'être* of nomenclature, why proceed to give generic names? or, if these are required *for adequate recognition*, they should be based on the most obvious external resemblances, and may be perfectly arbitrary; for certainly, the moment we get beyond such obvious groupings, we have got out of the region of pure nomenclature into that of classification, and the moment we arrive at classification we are pulled up by the necessity for a scientific basis on which to proceed. In former times there may have been several such

bases to choose from, but by this time we have universally agreed—have we not?—to accept some theory of evolution, and, consequently, phylogeny is the only basis on which a satisfactory classification can be built. It follows then, that if we are to have a *classification* as opposed to a mere *nomenclature*, the "recognition" theory of names will not satisfy us, but we require groupings more or less comprehensive, the genus, the tribe, the family, etc.; and further, these groupings must be made on the facts of evolution as they gradually come to light, one of the consequences of which is that generic, tribal and family nomenclature must continue, at whatever inconvenience to collectors, to be in a somewhat unfixed condition "until omniscience is attained." So far, probably, my critics and I are at one, but at this point we join issue. They would say (I hope I am not misrepresenting them): "Yes, this is all very well until you come to the species, but at this point the 'recognition theory,' as you call it, becomes more important, and unless we agree to call every individual of a species by the name given to the first-captured, or rather the first-named specimens known, *and to consider this form the type of the species*, fixity of nomenclature will never be obtained; and this must be carried out even to the original spelling of the name, however incorrect or grotesque, in utter defiance of orthography and grammar, and *no compromise is possible*." (I repeat that I hope I am not misrepresenting my critics, and I offer the most heartfelt apologies if I am doing so, for such a position seems almost inconceivable when gravely attributed to such logical and scientific workers, and I am almost afraid I shall be accused of trying to give a comic turn to the discussion; quite honestly, nothing is further from my intentions, I consider the matter too important.) This theory would be less open to attack, or perhaps might, in spite of certain inconsistencies, have escaped attack altogether, if it had been universally agreed to disallow all varietal and aberrational names, and to describe all such forms as i, ii, iii, or α, β, γ, etc., but the moment varietal and aberrational names are admitted, the species ceases to be the lowest term in use, and assumes towards its varieties and aberrations a position somewhat, though not wholly, analogous to that occupied by the genus towards the species, and logically the same rules must be, as far as possible, applied. Let me take a possible, though perhaps not very probable, instance. Suppose that a pair of some new species is taken and named. Later, a number of ♀ s are taken in some other locality, and also a few ♂ s, the latter, the season being nearly over, in a worn condition. The ♀ s are apparently identical with the first taken (such cases occur among the Lycænids), though the worn ♂ s differ somewhat from the original specimen, which was fresh. On the strength of the apparent identity of the ♀ s it is taken for granted that the two sets of specimens belong to the same species and the original name is applied to all. For some years the original locality remains unvisited, but numerous examples corresponding with the second set of specimens are taken in various localities, and the original ♂ is then supposed to be an unusual form. After some time, anatomical investigation, or the discovery of the earlier stages, shows that the two are specifically distinct. What about the name then? It belongs of right to the original pair only, until others of the same form are discovered, and the name of all other specimens must be changed. As "convenience" and "fixity of

nomenclature" seem to be the only arguments for the existence of the "literary type," it appears to me that, in a case of this kind, both the arguments would irretrievably break down. On my theory of types, the more numerous and widely spread form would have become the type, to which a name would have been given, the original name becoming var. (or ab.) so-and-so, and on the discovery of the specific distinctness of the two forms, all that would be needed would be to omit the word var. from the nomenclature of the original pair, a proceeding which would interfere less than the other, both with convenience and fixity of nomenclature, though for the sake of honesty I must add that neither of these points seems to me a matter of importance; I merely wish to point out that, even on this ground, the argument is not all on one side.

(*To be concluded.*)

SCIENTIFIC NOTES AND OBSERVATIONS.

"TYPES" IN NATURAL HISTORY.—I have read Mr. L. B. Prout's article on "Types in Natural History," but there are one or two points to which objection may be taken. Dr. Chapman's two different meanings of the word "type" are two *really* different meanings. Mr. Prout's four meanings are branches of only *two* groups, which include (1) Numerical type, Phylogenetic type. Local type. (2) Average type. It is the "average" type that "the man in the street" talks about. He speaks of a typical Englishman or a typical Irishman, meaning a form of person, that the majority with whom he converses will recognise by the same characters as he does as chiefly to be found in the country from which the individual hails from. The great mass of English-speaking people use the word type in this sense, and in no other. The natural history type, as so well shown by Mr. Prout, must be a definitely described form, whether that form be the type of the man in the street or not. This is where the whole difference comes in, and, if an entomologist cling to the more usual and generally accepted use of the word "type," it is probably only because he learned the general use long prior to the technical use. Mr. Prout has apparently so given himself up to types in natural history that he has forgotten that there ever was an outside use of the word having nothing to do with the term "type" which has been "coined" by the naturalist. The latter part of Mr. Prout's article only shows up more in relief how impossible it would be to have in natural history the same meaning for "types" as that which the man in the street has. Has anyone ever asked for a nomenclatorial type which should be the equivalent of, or have the same meaning as, that which is usually assigned to the word? If some of Mr. Prout's friends have asked for this they certainly deserve derision and are "utterly unscientific," for science is, or should be, an exact understanding of terms. It much looks as if once again the whole of Mr. Prout's article has arisen over a pure matter of terms. "Type" in the general sense has no very exact definable meaning; type in the technical sense has an exact meaning, and it is most unfortunate that the technical sense is often wholly at variance with the general sense. It, of course, cannot be helped, but surely one may occasionally say that the type is not typical if an unique aberration has been described as the type! The type (in a general sense, *i.e.*, average sense) of *Triphaena*

comes in Britain is not red, neither is it black, it is grey, but so is the technical type, so here there is no cause for controversy. But either the red or the black form might have been made the type in the natural history sense. One word in conclusion. If I tell Mr. Prout that Mr. Hibernius is typically Irish, does it convey anything to his mind? If it does there is a "general" meaning for the word apart from its natural history meaning.—W. J. Kaye, F.E.S., Caracas, Ditton Hill, Surbiton. *April 22nd*, 1904.

NOTES ON LIFE-HISTORIES, LARVÆ, &c.

Notes on Pygaera pigra, Hufn.—Moths emerged first week in April from two chrysalids, the full-grown larvæ of which were found in the autumn of 1903. A pairing was secured without any trouble. Eggs were laid a few on each night for the period of a week. When first laid they are white, turning after a few days to flesh-colour, later on dark purple, and, finally, just before the emergence of the larva, almost black. Placed in a cold place, the larvæ hatched during the first week in May. Larva:—*First moult* not noted. *Second moult.*—May 19th, 20th, and following days. Head black; body dark chocolate-brown, slightly covered with small whitish hairs, with broad yellow dorsal band, interrupted on the 4th segment by two, on the 11th by one, black velvety patch. Down centre of band a black stripe, bordered by a row of dots. The whole band is bordered by a row of black warts. Slight traces of yellow lateral stripe. *Third moult.*—May 27th, 28th, and following days. Head black, with short hairs. Body chocolate-colour, washed with greyish-blue. Yellow dorsal band, bordered with a row of deeper yellow or orange tubercles. Patches as before, former black markings much less distinct. Chain-like yellow band on side preceded by a row of small black warts. Body covered with short whitish hairs. As the larva approaches pupation, the yellow markings tend to become duller and more washed with grey. On June 1st the first larvæ began to draw the leaves, between which it lived, more closely together, forming a fairly thick cocoon. Actual pupation took place on June 5th during a very hot spell of weather. Others pupated during the few following days.—J. McDunnough, Berlin W., Moritzstr. 6. *June 15th*, 1904.

The larva of Hypolycaena livia attended by ants.—I am sending you a pupa (dead) of *Hypolycaena livia*, probably the first sent to England. I have about 15 larvæ, in all stages, at the present time, of this species. They feed on the pods of *Acacia farnesiana*, and some of the larvæ are already in their last stage here. The remarkable feature of their economy, however, is that they are attended by small black ants which eat their frass. The first ♂ s of this species appeared at the end of April and beginning of May, whilst fresh ♀ s are still emerging in localities near Alexandria.—Philip P. Graves, 33, Rue Cherif Pasha, Alexandria. *May 16th*, 1904.

VARIATION.

Aberration of Pharetra menyanthidis.—It may be worth noting that *Pharetra menyanthidis* ab. *sartorii* is the corresponding form to your *Triaena psi* ab. *birirgae*, and should, therefore, be specially characterised as having "the basal and limbal areas of the anterior

wings of a dark coloration." The figure in the *Guben Zeitschrift* is wretched.—M. Gillmer, 2, Schlossplatz, Cöthen, Anhalt, Germany. *June 2nd*, 1904.

Amphidasys betularia var. doubledayaria near London.—On June 18th, driving through Mottingham, Kent, I took on a wall, asleep, the black form of *Amphidasys betularia*. I believe only once before has it been taken in this district.—Jos. F. Green, F.L.S., West Lodge, Blackheath. *June 19th*, 1904.

COLEOPTERA.

On some doubtful or very rare British Coleoptera.

By E. A. NEWBERY.

The appearance of a new and excellent catalogue of British coleoptera, by Messrs. Beare and Donisthorpe, in which they have had the courage to remove a number of doubtful species from the catalogue proper, and place them in a separate list, has led me to believe that an inquiry into the claims of some other species still retained by them will not be without use. I have also appended some notes and references to a number of other species, about which further information or additional records are highly desirable. The authors of a catalogue are placed in some difficulty, since a name must either be inserted or rejected, and no qualifying note is possible. Many species come thus to be admitted about which the authors are uncertain. Messrs. Beare and Donisthorpe allude to this matter in the preface.

A local catalogue, whether of a county or more extended region, is an ephemeral work somewhat in the nature of a census, and should, as far as possible, represent the state of knowledge at the time at which it is written. The only question on which much difference of opinion obtains, is as to whether species which have not occurred for a very long time, should be retained, or placed in the list of doubtful insects with a view to their subsequent excision. Many insects still figure in British catalogues, which appear to have no better claim to do so than others, long since excluded, which were recorded by Stephens and other old authors. The insects I propose to consider fall for the most part into three classes. Those of Class I should be deleted altogether. Those of Class II, in my opinion, should be placed in the list of doubtful insects. Those of Class III are simply very rare.

Class 1.—Insects which should be deleted for the reasons given below:—*Bembidium lampros*, Hbst., var. *celere*, F., has no character but its small size to separate it from the type. *Hybius obscurus*, Marsh, var. *sexdentatus*, Schiodt, is, according to continental opinion, a synonym of *obscurus*: at most it is a form of the ♂ separated by a variable character common to many of the *Dytiscidae*. *Homalota cribriceps*, Sharp = *Caenonica punctipollis*, Kr. (Fauvel, *Rev. Ent. Fr.*, xxi., 159. 1901). *Megacronus formosus*, Gr. No trustworthy record. *Philonthus trossulus*, Nord. Synonymous with *nigritulus*, Er., a very variable species. *Gnathoncus punctulatus*, Th. Represented in British collections by small specimens of *rotundatus*, Kug. *Cychramus fungicola*, Heer.—Dr. Sharp (*Ent. Mo. Mag.*, xxv., 404) points out that *C. luteus*, F., and *fungicola*, Heer, are sexes of one species: there is no doubt that this is correct. *Cominomus carinatus*, Gyll. A synonym of *constrictus*, Gyll.

Brachus riciae, Ol. This must be deleted as the var. *fahraei*, Gyll., does not appertain to this species; I have a British example (♂) named *fahraei* by M. Bedel, which appears to me to be a small *rufipes*, Hbst., with dark legs and antennæ (see also *Ent. Mo. Mag.*, xxxvi., 145). *Orchestes sparsus*, Fabr. The "unique" British specimen in the Power collection is a small form of *ilicis*, F. (*Ent. Mo. Mag.*, xl., 134). *Apion opeticum*, Bach. The two insects in the Power collection are not *opeticum*, Bach. (*Ent. Mo. Mag.*, xl., 133).

Class II.—Insects belonging to ancient history, which have not occurred for about 50 years, some of them being extremely doubtful as British:—*Rhantus adspersus*, F., *Bledius femoralis*, Gyll. (probably erroneously named). *Oxytelus piceus*, L. *Scraptia dubia*, Ol. *Rhynchites auratus*, Scop. *R. bacchus*, L. *Otiorhynchus morio*, F., var. *ebeninus*, Sch. (one of Greville's specimens is in the Power collection). *Polydrusus planifrons*, Gyll. (Dr. Ellis records a capture in 1887, but is it certain that the insect is correctly named?). *Tapinotus sellatus*, F. *Hypothenemus eruditus*, West.

Class III. — Insects inserted upon the authority of a single specimen:—*Cicindela campestris*, L., var. *funebris*, Sturm. (*Ent. Ann.*, 1867, 101). *Harpalus calceatus*, Sturm. (*Ent. Mo. Mag.*, xxii., 172). *Bembidium callosum*, Kust. = *laterale*, Dj. (Dawson, *Geod. Brit.*, 207). *Oxypoda longipes*, Muls. (*Ent. Ann.*, 1871, 29). *Stichoglossa semirufa*, Er. (*Ent. Mo. Mag.*, xxxv., 55). *Homalota rufotestacea*, Kr. (*Ent. Mo. Mag.*, v., 218). *H. hypogaea*, Rye. *H. sharpi*, Rye (*Ent. Mo. Mag.*, vii., 7). *Borboropora kraatzi*, Fuss. (*Ent. Ann.*, 1866, 63). *Myllaena gracilicornis*, Fair. *Medon dilutus*, Er. (*Ent. Mo. Mag.*, viii., 83). *Eudectus whitei*, Sharp (*Ent. Mo. Mag.*, viii., 73). *Anisotoma claricornis*, Rye. *A. silesiaca*, Kr. (*Ent. Ann.*, 1867, 69). *Atomaria divisa*, Rye (*Ent. Mo. Mag.*, xii., 178).—Locality unknown, and not found on the continent. *Epuraea nana*, Reit. (*Ent. Mo. Mag.*, xxxii., 4). *Diastictus vulneratus*, Sturm. (*Ent. Mo. Mag.*, xxxviii., 253). *Pentaphilus testaceus*, Hell. (*Ent. Rec.*, xv., 128). *Bagous lutosus*, Gyll. (*Ent. Mo. Mag.*, xxxviii., 240). *Cryphalus granulatus*, Ratz., the single specimen mentioned by Fowler (*Brit. Col.*, v., 431) is not now in the Power collection.

It is quite possible that I have overlooked some records of the insects in Classes II and III, since my researches have been confined chiefly to the *Ent. Mo. Mag.* and *Ent. Record*. If other coleopterists can add to these records, one of the objects I have in view, *i.e.*, that of placing the species named on a more secure basis, will be accomplished. In a future number I intend to say something about the synonymy of one or two species, and to make some remarks on others not properly falling into any of the above mentioned classes.

Note on Orsodacna lineola, Pz.—*Orsodacna lineola*, Pz., occurs early in June on hawthorn blossoms; there are two forms, that with testaceous elytra and a dark suture (*lineola* proper) and a form entirely blue black (= *humeralis*, Latr.). At the same time two common Telephorids are also about on the hawthorn, which, in the net or beating-tray, may lead to the *Orsodacna* being overlooked, they are *Rhagonycha limbata* and *Dasytes aerosus*, Kies. I found I made one mistake in the case of the *Dasytes* in separating the insects after death. Anyhow, it is worth while for a collector in Surrey to bear this in mind, whether

it is a case of mimicry is of course a different matter on which I offer no opinion.—A. J. Chitty, M.A., F.E.S., 27, Hereford Square, S.W.

Cicindela campestris feeding on Myrmica rubra.—Ants are supposed to enjoy almost complete immunity from the attacks of other insects for the purpose of food, so that it may be worth recording that on May 25th I noticed a considerable number of *Cicindela campestris*, L., on a narrow sheep track. Among them a ♂ and ♀ were running together, the ♀ had in her jaws a *Myrmica rubra*. I thought the ant was struggling, for it was alternately right inside the mouth of the beetle, and then nearly out, but I think this was really the mode adopted by the beetle in devouring its food. Finally, the mesothorax and spiny metathorax were ejected from the mouth, and also the shell of the abdomen, which had been sucked empty. The rest of the ant was apparently consumed, but possibly it was only the contents of the abdomen that were really eaten. The beetles then flew away. The jaws were very busy during the devouring process.—Ibid.

Bembidium adustum and other Coleoptera at Tewkesbury.—On May 14th I went down to Tewkesbury for a week's collecting, to look for *Bembidium adustum*, which has only occurred on the banks of the Severn, in England, and where it was taken first by Harris, afterwards by Blatch in some numbers, and subsequently by Canon Fowler, but it is over 20 years since it was last captured. Professor Beare joined me for a few days and we were very successful. The weather was beautiful, fine and warm, and the quaint old town of Tewkesbury, with its old-world houses and grand old Abbey, full of memories of the battle and the Wars of the Roses, was looking its best. Our first expedition was to the banks of the Severn, where *Bembidium adustum* was at once found in numbers on its sandy shores, in company with *Bembidium flammulatum*, which was also abundant. Other species worthy of mention found along the banks of the river were—*Bembidium gilvipes*, rare; *B. bruxellense*, *guttula*, *riparium*, and *aeneum*, *Tachyppus flavipes*, abundant; *Anchomenus gracilis* and *micans*, *Elaphrus riparius*, *Tachyusa umbratica*, very common; *T. flavitarsis* and *constricta*, common; *T. scitula*, rare; *Actobius procerulus*, *Stenus biguttatus*, not uncommon; *S. bipunctatus*, rare; *S. bimaculatus*, *S. binotatus*, *S. tarsalis*, *Platystethus cornutus*, *Trogophloeus fuliginosus*, *Oxytellus insecatus*, *Georyssus pygmaeus*, and *Heterocerus marginatus*. *Erirhinus bimaculatus* and *Clivina collaris* were found under flood-refuse, as was *Synaptus filiformis*, which was also swept. Sweeping in the meadows near the river produced *Omias mollinus*, not uncommon, *Barynotus moerens*, *Tanymoecus palliatus*, *Apion aethiops*, *Polydrusus pterygomalis*, *Hylesinus fraxini*, etc. An old poplar was discovered, part of which had been blown down, in grand condition. How seldom it is one finds an old tree really in good condition for coleoptera! Out of the harder parts a nice series of *Cossonus ferrugineus* was dug, among the paper-like layers of soft wood *Plegaderus dissectus*, not uncommon (quite a new locality for this rare insect), *Abraeus globosus*, *Paromalus flavicornis*, *Cerylon histeroides*, and *Baptolinus alternans* were found, and, in the rotten wood-mould, *Quedius scitus* (7 specimens), *Q. microps*, and *Q. centralis* were taken. The rare *Stereocorynes truncorum* also occurred in this tree, and under loose pieces of wood and fallen branches on the ground *Dorytomus corax* and some 8 specimens of *Carabus monilis* (always a rare insect in our experience) were taken. A series of

Gyrophaena laevipennis was shaken out of a fungus from a tree near the field known as the "bloody meadow," the spot where so many of the Lancastrians were slaughtered after the battle; and *Tachyporus hunerosus* was swept at Breedon, a village near to Tewkesbury. This terminated the more interesting captures of a most pleasant, as well as a most successful, trip.—HORACE DONISTHORPE, F.Z.S., 58, Kensington Mansions, S.W.

PRACTICAL HINTS.*

Field work for July.

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

1.—From the commencement to the middle of July the very young larvæ of *Hepialus velleda* burrow into the earth by the side of the underground rhizomes of *Pteris aquilina*, eating the surface of the stems on their way to the root-stock.

2.—The full-grown larvæ of *Hepialus sylvinus* are to be found feeding in the roots of dock throughout July.

3.—In late July the cocoons of *Hepialus sylvinus* are to be found near the surface of the earth, at or near the tops of the mines excavated in the roots of dock by the larva. The pupa, like those of all Hepialids, emerges some hours before the imago appears in August and September.

4.—The young larvæ of *Drepana sicula* must be given the tender leaves of *Tilia parvifolia*; they will not eat *T. europæa*.

5.—The larvæ of *Miltochrista miniata* will feed in confinement on sallow-leaves that have begun to decay, also on withered oak-leaves and various species of lichen.

6.—The ova of *Lithosia straminicola* are laid in July and August, the larvæ soon appearing, and feeding throughout the winter on *Lichen caninus*, becoming fullfed in May and June.

7.—The imagines of *Lithosia muscerda* is on the wing in July and August from early dusk till darkness sets in, when it disappears until midnight, after which it has another short flight, and probably there is a third flight in the morning dusk (Barrett).

8.—The young larvæ of *Cybosia mesomella* may be fed from July onwards on sallow-leaves, although this is probably not their natural food (Hellins).

9.—The cocoons of *Lymantria monacha* are to be found at the end of July, in the crevices of the bark of the trunk of oak-trees (Greene).

10.—At the end of July, keep a sharp eye on your breeding-cages in the south of England for the imagines of many Notodonts, which, though single-brooded in Scotland and northern England, are double-brooded in the south of England.

11.—The fullfed larvæ of *Lophopteryx cucullina* are to be obtained on maple in late July and throughout August (also feed on sycamore).

12.—The fullfed purplish larvæ of *Leiocampa dictaeoides* are to be found on birch in July (and again towards the end of September).

13.—The large grey silken cocoon of *Leiocampa dictaea*, covered with loose earth, is to be found at the roots of aspen and poplar bushes in early July (and again in September).

---

* "Practical Hints for the Field Lepidopterist," Pts. I and II each contains some 1250 practical hints similar to these, but relating largely to the Macro-lepidoptera. Interleaved for collector's own notes. Price 6s. each part.

14.—The fullfed larvæ of *Peridea trepida* are to be beaten from oak from the commencement to the middle of July; the oblique lateral stripes make the larva a very fine-looking creature.

15.—The weak cocoon of *Pterostoma palpina*, formed of greyish silk with a small quantity of earth intermixed therewith, is to be found near the roots of sallow and aspen, and more rarely poplar, from about the beginning to the middle of July (also in late August and September).

16.—The cocoons of *Asteroscopus sphinx* (*cassinea*) are to be found at roots of elm in July, in Gloucestershire (Greene). The fullfed larvæ can often be beaten freely from elm in late May and early June in the Kentish woods.

17.—The half-fed larvæ of *Dygmonia chaonia* are to be taken at the end of July by standing beneath a tree and looking up, when they can be seen resting along the midrib of a leaf; they may be found even after a tree has been well beaten, so tenacious is the grip of the larva.

18.—The tough dirty grey silken cocoon of *Lophopteryx carmelita*, covered with fine earth, is to be found at the base of oak-trees in July and August.

19.—The larva of *Stauropus fagi* should be very carefully treated during its moulting-periods: the operation is a long and often troublesome one, the actual moult usually taking place during the night.

18.—The larvæ of *Egeria musciformis* spin a silken tube covered with frass through the solid materials of a tuft of *Statice armeria*, leaving a projection of an inch or more out of the tuft; in this the larva pupates, and through it the pupa works its way before the emergence of the imago.

21.—The larval and pupal tubes of *Egeria musciformis* sometimes stand out perpendicularly from a tuft of *Statice armeria*, at other times they are almost horizontal, and may be at any angle between these positions.

22.—The imagines of *Egeria musciformis* always jump backwards when one attempts to box them. The habit usually leaves the collector without a victim.

23.—During July (and August and September) clear blotches observed on the surface of the leaves of *Centaurea nigra* indicate the feeding of the larvæ of *Rhagades globulariae*: such spots are usually vacated, but the larvæ are to be found quite near in a fresh piece of similar leaf. By September the large blister-like mines are conspicuous.

24.—The young larvæ of *Hyloicus pinastri* leave the egg throughout July, and feed on *Pinus*: the fullfed larvæ may be beaten throughout September.

25.—*Boarmia abietaria* occurs in the New Forest, on larch trunks, in July. It is a rather difficult species to see, and it has a habit of flying off suddenly as you approach the trunk, and dropping sharply to the ground and resting there. Fanning the trunks for them is a good dodge (Bayne).

26.—The imagines of *Eupithecia tenuiata* are to be collected from the stems of large sallows in early July: the species is best bred, the captured specimens usually being more or less faded in colour.

27.—When fullfed, in July and August, the larva of *Pasypolia templi* leaves the foodplant and makes up in the earth. Larvæ fed on wild parsnip, produce larger and brighter coloured imagines than those fed upon cow-parsnip (Gregson).

28.—The young larvæ of *Agrotis cortica* feed exposed in July, and make holes in the leaves of knotgrass, clover, etc., but by August should be treated as other Agrotids, *i.e.*, placed in large pots partly filled with sea-sand, into which they burrow by day; dock, mullein, hollyhock, are also eaten freely, but slices of carrot are as usual preferred. They are chiefly night-feeders, but will feed by day in dull weather. The larva is more rugose than that of *A. segetum*, and the back and sides are similarly coloured with brownish-grey.

29.—The eggs of *Noctua ditrapezium* hatch in July, and the young larvæ feed freely on dock and sallow, and through the winter can be satisfied with bramble and dock, eating during the milder, and hybernating in the colder, periods; in the spring, hawthorn should be added to their bill of fare; the larvæ become fullfed in May.

30.—The captured ♀s of *Pachnobia hyperborea (alpina)* (taken in July) are not averse to laying their eggs within glass-topped or glass-bottomed boxes.

NOTES ON COLLECTING, Etc.

Immigration of Plusia gamma.—I am wondering whether others are noticing the evident arrival of large numbers of *Plusia gamma*. I first noticed the insect buzzing about on May 15th, but last night, the 17th inst., the moths were everywhere, at flowers, over nettles, etc. Perhaps this is a hint of the possible arrival of other and more valuable foreigners.—(Rev.) C. R. N. Burrows, The Vicarage, Mucking, Stanford-le-Hope. *May 18th*, 1904.

Long pupal period of Lachneis lanestris.—As an addendum to the many very interesting facts relating to the extended pupal stage of *Lachneis lanestris* published in *British Lepidoptera*, ii., pp. 514-517 *et seq.*, I have no doubt your readers will be interested to hear that I have recently bred five imagines of *Lachneis lanestris*, that emerged in my breeding-cage from pupæ, the result of larvæ taken in 1899; these consisted of four ♂s and one ♀; I may add that a few came out in 1900 from the same batch, several in 1901, several in 1902, and not one in 1903. I do not know that this is very unusual, but I have never kept them other years so long, and such facts appear always to be worthy of record as additions to those already published.—W. Butler, F.E.S., Hayling House, Oxford Road, Reading. *May 21st*, 1904.

Pairing of Dimorpha versicolora.—I have again managed to get a wild pairing of *Dimorpha versicolora* this year, on April 17th. I may add that I have not missed doing so once since finding a ♀ in 1896, the dates being as follows: March 20th, 1897, April 8th, 1898, April 3rd, 1899, April 11th, 1900, April 17th, 1901, April 13th, 1902, April 8th, 1903, and April 17th, 1904. The facts relating to the 1901 pairing are detailed in *British Lepidoptera*, iii., p. 259, and of some of the others on p. 263 of the same work.—Ibid.

Phryxus livornica at Headsnook.—A specimen was seen in my garden hovering over flowers of garden-rocket on June 8th.—G. B. Routledge, F.E.S., Tarn Lodge, Headsnook, Carlisle. *June 14th*, 1904.

Spring Notes from County Tyrone.—We have had a fairly mild spring so far in this locality after a very wet winter. *Phigalia pedaria* turned up in some numbers, at light, towards the end of February. At sallows, in March and beginning of April, Tæniocampids were com-

mon, and two *Taeniocampa gracilis* ab. *rosea* and several *Xylocampa areola* occurred. *Lobophora carpinata* was also much more abundant than usual, and a few *L. viretata* were beaten out of holly, an addition to the local list. Last week I took *Hadena glauca* in a gully on the mountain near here. *Hypsipetes impluviata* common, and *H. ruberata* are now coming out among alder.—T. Greer, Lissan. *June 14th*, 1904.

Query as to the time of appearance of Stenoptilia zophodactylus. —Barrett states (*Lep. Brit. Isles*, ix., p. 378) that this species is "on the wing at the end of June and in July, and has a second generation in August and September." He further adds that the larvæ occur in "May and June, and a second generation in the latter part of July and beginning of August, on *Erythræa centaurium*, *E. pulchella*, and *Chlora perfoliata*, the second generation feeding on the flowers and seeds, but the earlier gnawing the leaves." Is there an atom of evidence as to the double-broodedness of this species? Every scrap of published evidence so far as we have been able to collect it, tends, on the contrary, to prove that the insect is distinctly single-brooded. We are not even able to find a single record of an imago being captured until July, and then only in early seasons; the records are nearly all for August and September. We should be glad if any of our readers can throw light on this suggested double-broodedness, especially as far as relates to the alleged larval habits of the assumed early brood.—J. W. Tutt. *June 13th*, 1904.

Phryxus livornica in Surrey.—It may be of interest to your readers for me to record that I received a specimen of *P. livornica* on May 21st. It was taken at rest on a rose-tree, and brought to me by a village youngster, and is only very slightly rubbed.—Harold E. Winser, Kent House, Cranleigh, Surrey. *June 9th*, 1904.

Phryxus livornica at Bournemouth.—I captured three fine specimens of *Phryxus livornica* in our gardens here last week, and have heard of several more captures of this rare species.—W. McRae, 5, Norfolk Terrace, Bournemouth. *June 3rd*, 1904.

Hadena glauca abundant at Rugeley.—The season here looks promising. *Hadena glauca* has been much commoner than usual. *Ematurga atomaria* is in clouds on the heaths.—Richard Freer, M.D., Rugeley, Staffs. *June 4th*, 1904.

Cyaniris argiolus at Blackheath.—It always appears worth while to record the occurrence of this species within the London district, and I therefore note that I saw a male, apparently in good condition, in one of the gardens facing the heath this morning about 11.30 a.m.—J. W. Tutt. *June 5th*, 1904.

Pieris rapæ attacked by a sparrow.—On the glorious morning of June 5th, about 11.30 p.m., as I was walking over Blackheath, I saw a sparrow make directly for a specimen of *Pieris rapæ*. As soon as the shadow of the sparrow fell across the butterfly it dropped suddenly for about a couple of yards in a straight line, and then took a very zigzag course into a near garden, where I lost sight of it. I think I have before recorded that, at Lausanne, in August, 1899, Dr. Chapman and I watched three sparrows make ineffectual attempts to capture a fine specimen of *Dryas pandora*, the butterfly getting safely away.—Ibid.

Sparrow attacking a beetle.—On the morning of May 30th, as I was walking up the road to Westcombe Park railway station, at about 7.45 a.m., I saw a beetle about an inch in length crawling rapidly

across the road. When I was some five yards distant, a sparrow flew at it, pecked it, picked it up and dropped it a foot or so further on, flew back, pecked it again, and then flew through the fence with it in its beak, the legs of the beetle moving rapidly the while. I did not for a moment think that the bird would succeed in taking it away, especially with me rapidly closing up to it, and I was somewhat disappointed that I was not able to determine the species.—Ibid.

Phryxus livornica near Bournemouth.—To-day I had brought to me in good condition a ♀ *Phryxus livornica*, unfortunately killed. This may be of interest to the readers of your esteemed magazine.—W. G. Hooker, Old Christ Church Road, Bournemouth. *May 27th*, 1904.

Phryxus livornica near Burnley.—A living specimen of the above insect was brought to me on May 23rd, 1904. It was taken on May 21st in a stone quarry at Hupton, about three miles from here. It is in fair condition, but the dulness of the colours and the state of the wing-fringes show it to have been on the wing some time. It is interesting to note that several have been observed in the Isle of Man at this time of year. In addition to the above, a second *P. livornica* has been brought me to-day, to kill and set for a friend, this one was taken at Mereclough, on the other side of Burnley from the previous one, it is in a very similar condition.—W. G. Clitten, 124, Coal Clough Lane, Burnley. *May 26th*, 1904. It may be well to refer to the fact that nineteen-twentieths of the specimens taken in this country are immigrants captured in the spring. Such records as these want adding to those already published in the *Natural History of the British Lepidoptera*, iv., pp. 162-165, where are some four pages of dates of recorded captures (with localities), from which it will be seen that autumnal emergences (the progeny of spring immigrants) are, in this country, exceedingly rare. The details on pp. 161-162, giving all the known facts relating to the immigration habits of this species will also now have an exceptional interest.—Ed.

Additions to the Burnley Lepidoptera.—In addition to *Phryxus livornica* the following species have been added to our local list, *viz.*, two *Pharetra rumicis* on the trunk of an alder, on June 13th, 1903, and one *Caradrina morpheus* at sugar, in July. On the next tree to the *Pharetra rumicis* was a fine specimen of *Viminia menyanthidis*, rather suffused, but very dark, and in the same district two *Habrostola triplasia* drying their wings on a wall just above a bed of nettles.—Ibid.

Plusia gamma in the Strood district.—I hear that *Plusia gamma* put in an appearance in Essex in numbers, about May 20th; they appeared in this district about the same time, but not in what I should call abnormal numbers. Did any other entomologist notice the immigrants?—J. Ovenden, Frindsbury Road, Strood, Kent. *May 31st*, 1904.

Plusia moneta at Strood.—Strood is not a new locality for *P. moneta*, for I remember that one of the first recorded British specimens was from the vicarage grounds here. Still, it may be worth while noting that I have taken a larva on a head of delphinium, the first I have seen in the district, although I hope it will not be the last.—Ibid.

Hybernation of Epunda lichenea.—Some larvæ of *Epunda lichenea* kept during last winter, fed more or less throughout the whole of the winter months, and by March 11th were about three-parts grown.

They fed up well on sheep sorrel and wood sorrel.—G. O. Day, F.E.S., Knutsford.

Early spring lepidoptera.—The unsettled weather of early March made it most unpleasant even to go into the woods for *Phigalia pedaria*. *Asphalia flavicornis*, however, appears to have emerged directly the east wind and the frost left, and during a long walk through the woods about March 20th, I only found a single worn ♀. My main reason for writing is, however, to ask if it is usual for *Hybernia defoliaria* to be taken in January, as Mr. Studd records. The species here is out in late October and November, at the same time as *H. aurantiaria* and *Cheimatobia borcata*, and, at that time, any number may be taken sitting on the bare twigs between 8 p.m. and 10 p.m., with the aid of a strong lantern.—F. C. Woodforde, B.A., F.E.S., Market Drayton, Salop. *March 22nd*, 1904.

Late appearances of Hybernia defoliaria.—With reference to Mr. Woodforde's remark (*suprà*) as to the time of appearance of *H. defoliaria*, I find on referring to my journal that I am quite right in recording its occurrence here in January, and, although I cannot explain why, I find that the darker, more unicolorous, forms occur more frequently then than earlier in the season. The imagines must come out in this district in a constant succession from mid-October to the middle or end of January according to season, as I take them quite fresh during this time. My series consists of the pick of thousands of examples, and only contains absolutely perfect ones, and I find in it now, insects labelled—January 21st and 22nd, 1893, January 11th, 12th, 13th, 14th, and 28th, 1894, January 13th, 16th, 20th, 22nd, 23rd, 1896, January 11th, 12th, 1897, January 7th, 8th, 10th, 12th, 1902. These are all males. I found records of females as follows: Two bred January 2nd, 1897 (from dug pupæ), 2 bred January 25th, 1897 (also from dug pupæ). In 1894, I see I had in my traps on January 11th, 25 males, January 16th, 11 males, January 30th, 1 male; in 1896 a fresh female was taken on January 22nd, and males as late as February 9th: in 1897 I entered numerous males on January 31st and February 3rd. In 1899, I saw a fresh male on February 9th, and, in 1901, numerous males on January 22nd. It might be useful if collectors in other districts would give actual dates of the appearance of this species in January and February, as here at least such appearances are by no means uncommon.—E. F. Studd, M.A., Oxton, Exeter. *March 26th*, 1904.

Spring Lepidoptera.—Whether it be due to the cold unsettled spring weather, or possibly to the unfavourable breeding-seasons of last summer (1903) and the preceding one (1902), or to both causes combined, I do not know, but lepidoptera here are exceedingly scarce. I have paid two or three visits to localities where *Phigalia pedaria* and *Hybernia leucophaearia* are generally common, but although, on February 20th, two friends and myself searched carefully, we only found a single ♀ *P. pedaria* and a ♂ *H. leucophaearia*, whilst on the other occasions we saw nothing. On February 20th a ♂ *P. pedaria* was captured at light, and an example of *H. marginaria* on February 23rd. On February 22nd, *Hybernia rupicapraria* was fairly common at Great Ayton. Indoors I have been breeding *Amorpha populi* and *Cidaria silaceata*. Some time since there was a note published in the *Ent. Record* relating to the winter feeding of certain Acidalias in confine-

ment. I should like to add to this, that, during the past winter, I have been hybernating larvæ of *Acidalia trigeminata*, *A. remutata*, and *A. rusticata*, all of which have gone through the winter similarly, they are all feeding now, but very slowly.—T. A. Lofthouse, F.E.S., The Croft, Linthorpe, Middlesborough. *April 8th*, 1904.

The spring here, for lepidoptera, at any rate, appears to be a very late one. During Easter week there was not an evening fit for sallow work, but during the two following ones the evenings have been more favourable, although insects appear to be very scarce. A visit to the woods on April 11th resulted only in the capture of a few each of *Taeniocampa gothica*, *T. pulverulenta*, and *T. stabilis*, all in good condition, and one beautiful freshly-emerged *Pachnobia rubricosa*, the latter species usually common in the locality worked. Nearer home on April 13th and 14th, a few *Taeniocampa gothica*, *T. stabilis*, *T. pulverulenta*, two *T. instabilis*, and one *T. gracilis*, were taken. The prospects for the season so far do not appear to be bright.—(Rev.) E. C. Dobree Fox, M.A., Castle Moreton Vicarage, Tewkesbury. *April 16th*, 1904.

Larvæ of Plusia moneta, etc.—I have only to note that just recently I have cleared my *Aconitum* plants of the larvæ of *Plusia moneta* for the benefit of the members of our local entomological society, and especially of the plants themselves. None were found on the delphiniums, and I hope that this season they will continue to leave them alone. I have larvæ of *Phorodesma smaragdaria* nearly full-fed, and moved them recently from the plant on which they have been sleeved all the winter, into an old breeding-cage. I soon noticed that one looked badly ichneumoned, but a close examination proved that it had only decorated itself with some empty ichneumon cocoons that had not been removed from a corner of the cage.—E. A. Bowles, M.A. *May 23rd*, 1904.

Spring Lepidoptera at Hyères.—I spent about three weeks (from March 28th to April 16th last) at Hyères. Butterflies, although rather late, were certainly plentiful, and I obtained almost all the species one could expect to get, including *Papilio podalirius*, *P. machaon*, *Thais rumina* var. *medesicaste*, with one specimen entirely without red spots on upperside of superiors, a very rare form the authorities I met with inform me, and *T. polyxena* var. *cassandra*. *Anthocharis belia* was common, and from larvæ left with Mr. Powell, I have bred the summer form *ausonia* since my return, all the pupæ emerged. One could have taken almost any number of *Thestor ballus*, and, amongst those I netted, was a specimen of each sex, with the spots on the underside of the superiors coalesced; the uppersides varied also a good deal. I brought away eighteen larvæ of *Charaxes jasius*, and have since bred from them sufficient to form a series of magnificent specimens of this fine butterfly. I was particularly pleased with the fine Riviera form of *Brenthis euphrosyne*, half as large again as my English and Swiss examples, and very bright in colour. Half-a-dozen female *Euchloë euphenoides* were very welcome, the males were common during the latter part of my stay. *Gonepteryx cleopatra* was, of course, plentiful, but most of them were chipped, and I had great difficulty in obtaining sufficient good ones for a series. Perhaps the rarest insect I came across was a female of *Libythea celtis*, which earned me the strong remonstrances of my friend, Dr. Chapman, for not saving it for ova: as a matter of fact, until I had it out of the net, I put it down as an example of *Polygonia*

cgea, which it somewhat resembles on the wing. *Limenitis camilla* was just emerging when I returned home, and my bag was only four specimens, all taken in as many minutes. Thanks to Mr. Powell I brought away larvæ of *Melanargia syllius*, *Epinephele pasiphae*, and *Satyrus hermione*, from which I have bred some nice specimens during the past few weeks.—W. G. Sheldon, Youlgreave, South Croydon. *June 20th*, 1904.

Pyrameis cardui in Kent.—On June 20th I saw an example of *Pyrameis cardui* at Cuxton, and a few more specimens to-day, poor.—J. Ovenden, Frindsbury Road, Strood, Rochester. *June 24th*, 1904.

Aciptilia tetradactyla in June.—To-day (June 24th) I took an example of *Aciptilia tetradactyla*, the earliest I have seen for many a year. I know the species occurs occasionally in April in south France, but has anyone an earlier date for the imago in England.—Ibid.

Stenoptilia pterodactyla in October!—In the county history of Worcestershire, p. 117, there is a statement that *Marasmarcha* (!) *monodactyla* is "common" in the county; whilst directly after is the record: "*Stenoptilia pterodactyla*, Trench Woods, October 26th, 1894; generally distributed (W. H. Edwards)." I do not know whether Mr. Edwards is responsible for the date, but I should like to know for my own information, whether *Stenoptilia pterodactyla* has ever occurred to any British entomologist in October at any time, anywhere.—J. W. Tutt.

CURRENT NOTES.

All Plume material collected for description—eggs, etc.—in July and August should be forwarded to Mr. A. W. Bacot, 114, Lower Clapton Road, London, N.E., as Dr. Chapman, Mr. Sich, and Mr. Tutt all expect to be on the Continent during the greater part of these months.

It is with great pleasure that we notice that Professor T. D. A. Cockerell is in England for a short visit. For the information of those who would like to correspond with him, his address until the end of August, will be Erle Cottage, London Road, Ewell, Surrey.

Mr. Joseph F. Missir, Smyrna, Turkey-in-Asia, a keen collector of coleoptera, is anxious to exchange with collectors in any part of the world.

We are indebted to Mr. Luff for the enclosed, taken from a local paper:—"On Wednesday morning, June 8th, the beach and harbour approach around Braye were noticed to be strewn with thousands of dead specimens of the hard, brown-winged, silvery-tipped May-bug or beetle, commonly known as the cockchafer (Fr. *hanneton*). Myriads more floated on the incoming tide. It is supposed these must have swarmed on the adjoining Cotentin mainland the day previous, have been swept out to sea, and drowned in the tremendous thunderstorm of that day, already reported in these columns." Mr. Luff states that the reports in the London papers do not appear to be quite accurate, as he believes the chafers cast up on the beach at Alderney were all dead specimens, and he has not heard of the reported complaints of the Alderney people.

"Synonymy is of the devil." We still maintain this as an indisputable fact. The American lepidopterists are in the thick of a discussion on nomenclature. In 1902, Dyar published his catalogue,

entitled *A List of North American Lepidoptera*. No sooner done, than Smith, to be up-to-date, issued a new edition of his *Catalogue of the American Noctuidæ*. As soon as this had been launched, the first volume of Hampson's series on the Noctuidæ appeared. The synonymy in these is entirely different, and now, it appears, everyone is asking what is to be done, as the synonymy of this latter group is in such delightful disagreement, etc. Webster (*Ent. News*, pp. 193 *et seq.*) writes a very sensible article on the subject. He sees, what every naturalist sees, that "to the morphologist, genera and species imply relationships, to him of the greatest importance," and he wants names to explain his facts and position. "The systematist, in his applications of modern entomological nomenclature, has become more literary than scientific," and often has no knowledge of the biological or morphological details that the names he is juggling with represent. Often, indeed, he has but a very hazy notion of the literature of which he pretends a special knowledge. But most of the points of difference in nomenclature fall into two groups—(1) Those due to the refusal to acknowledge certain works as authoritative; (2) those due to the fixation of types. As to the former, we consider every published work authoritative so far as its facts are accurate and understandable, whilst as to the latter, we have no manner of doubt. "When no type is clearly indicated by the framer of a genus, the author who first subdivides the genus may restrict the original name to such part of it as he may judge advisable, and such assignment shall not be subject to subsequent modification," is a standard rule among ornithologists and most other zoological specialists of repute. That Hampson's (and, we believe, Rothschild and Jordan's) mode of selecting the first species of every genus as type, independently of the work of all previous workers in their own branch of study, and resulting in the changing of the generic names of half the fauna of the world, is repugnant to common sense and general intelligence, is self-evident, and our sympathies are with the Americans who refuse to accept Hampson's nomenclature, or any, indeed, that conflicts with so wholesome a rule. That such an excellent (in some respects) piece of work as these Catalogues, paid for, we believe, by public moneys, should have their usefulness marred by an egoism that insists on making its own rules and refusing the general rules of zoological nomenclature, is to be regretted, and one suspects that the peculiarity of nomenclature, adopted in them will render them as likely to be as little generally used as were their predecessors from the same building—the Catalogues of the late Francis Walker, the contempt for which has been so often and so bitterly expressed. The entomologists of Britain are not likely to follow the nomenclature of the British Museum Catalogues; we would earnestly advise our American *confrères* to reject them for nomenclatorial purposes also. At the same time, we quite agree with Webster, who asks entomologists to enquire into the truth of the biological and morphological facts on which all new attempts at classification should be based, and not accept red-hot the views of each new reviser of a genus, whose methods may be more antiquated than those of Linné, and whose ability to do the work may be his own *ipse dixit*, and whose real knowledge may be nil. It is, however, humorous to note that there are still entomologists who think that as soon as a new catalogue is published they are in duty bound to alter the arrangement of all the specimens in their collections forthwith.

and who have a feeling that names are changed to worry them, and to give them much unnecessary labour. Collectors never will and never can keep pace with scientific entomologists, who devote as many hours in a week as the collector does in a year to his subject; they can be very useful to the scientific worker if they collect with their heads as well as their hands, and they may depend upon it there is no need to rearrange their specimens in their collections, to make the latter look scientific, every time a new catalogue is published.

Herr Embr. Strand, of Christiania, has distributed advance copies of his "Beitrag zur Schmetterlings-fauna Norwegens," no. iii, forming pp. 109-179 of vol. xiii. of the *Nyt Magazin for Naturvidenskaberne*. It deals chiefly with material collected by the author in southern Norway in 1902, but lack of time has prevented his yet working out some of the families, and, in many other cases, from the same cause, he "has had to content himself with the determination of the species without given special investigation to the varieties and aberrations included." Even as it is, we fear that the author—who collects also other orders of Arthropoda—has attempted more than he could quite satisfactorily carry out; and a piece of interesting work on local variation, on which we should have been glad to be able to bestow unmingled praise, is marred by the same fault which stultifies so large a proportion of similar publications — namely, an insufficient acquaintance with the previous literature of the subject. To be sure, Herr Strand has been less negligent in this respect than some other writers, and his list of 86 works and articles quoted includes much of the most important of the literature, especially that of his indigenous fauna; but still he has failed to consult some books which should have been essential before he burdened synonymy with another instalment of varietal or aberrational names. In particular, he seems to be unaware that we have analysed the ordinary range of variation of many of the European Rhopalocera in our *British Butterflies* (London, 1896), and he gives us three "new" aberrations of *Coenonympha pamphilus*, not one of which seems to differ enough from previously known forms to merit renaming: ab. *caeca*, Strand, certainly sinks to *obsoleta*, Tutt; ab. *biocellata*, Strand, without doubt to ab. *bipupillata*, Cosm.; whilst ab. *albula*, Strand, is hardly, if at all, more extreme than ab. *pallida*, Tutt. In *Agrotis* (*Euxnobia*) *hyperborea*, a new variety, var. *norvegica*, is fully described and discussed (pp. 134-137), and, although it seems to be founded upon too slender material, considering the extreme variability of the species, it is quite possible that it will really show sufficiently constant differences from other known local races. In the Geometrids, Herr Strand has had a somewhat clearer field for the introduction of new names, as most of them have not yet been systematised from this point of view, and our author is acquainted with most of the scattered work of Fuchs, Reuter, Lampa, Huene, etc. His *Larentia sordidata* (*Hydriomena furcata*) ab. *constricta* is here (p. 140) indicated as "n. ab.," which is misleading, as it was already published in his last year's papers (*vide Arch. Math. Nat.*, xxv., no. 9, p. 20). Other forms newly named, which will be of interest to British entomologists, are *Argynnis lathonia* ab. *obscurascens* (the two large silver spots in cell 8 confluent, etc.) and *Cinophos myrtillata* (*Catascia obfuscata*) ab. *anastomosis* (transverse lines sharply black, meeting below the middle, thus forming an irregular figure 8).

As in Strand's former papers, there is at the commencement a useful tabulation of the species met with (331 in all) and the localities where each occurred. Faunistically, the article is of distinct value, and it should be consulted by all who are interested in the distribution of the lepidoptera in the district investigated.

It is with the greatest regret that we record the death of our neighbour, Mr. R. MaLachlan, F.R.S., on May 23rd last, at the age of 67 years. His high position in the entomological world has long been assured. Joining the Entomological Society of London when only seventeen years of age, he has, during the past 40 years, filled almost every possible official position, having been President, Vice-President, Member of Council, or Treasurer, almost continuously since the middle "sixties," although it is in the latter position he will be best remembered by the younger entomologists. Commencing entomological work as a lepidopterist in the early "fifties," he was a frequent contributor to the pages of the *Entomologist's Weekly Intelligencer*, and, as a neighbour of Douglas and Stainton, became an active participator in the starting and subsequent continuation of *The Entomologist's Monthly Magazine*, of which, since the death of Stainton, he has been more or less the active manager. His early studies soon drifted off to the Trichoptera and Odonata, and his work on the former group is still the classic in its particular branch. Elected Fellow of the Royal Society, and Honorary Member of several of the leading entomological societies of the Continent, he has—besides his publications in Britain—written a fair amount of work for foreign *Transactions*, more recently for those of Belgium, the celebrated Belgian savant, de Sélys Longchamps, having been for many years his great personal friend, and the two have collaborated more or less in a great deal of their work. He remained a bachelor till his death, and his reserved disposition led many to misunderstand him, and some, among the more goahead of the younger generation, failed, no doubt, to fully appreciate his great ability. He was, however, at heart an excellent man, and when he had once made friends, he held to them tenaciously and obtained the greatest pleasure from their society. He had been in failing health for some time, and his retired life and the way in which he had of recent years eschewed active exercise almost altogether, did not improve matters, for, in his youth and early middle age, he was one of the pioneers in the study of the fauna of the mountains of France and Switzerland, and explored the Dauphiny and Savoy Alps at a time when inns were unknown, when a shepherd's hut was the only accommodation on the higher mountains, and when a holiday spent in entomological studies among the Alps of central Europe spelt something different from palatial hotels, abundant food, and great comfort, and his unvarnished stories of those early entomological trips were always a source of the greatest pleasure to the writer, who has since travelled the same ground under so much more comfortable conditions. His work is sound and thorough, and will always hold its place among that of the pioneers in the branches he himself specially studied. His face will be long missed from the meetings of the Society he loved and served so well. Britain has lost one of her first entomologists, but the mark he has left on entomology will endure whilst there are entomologists, and whilst entomology holds an honoured place among the serious studies of biological and natural history students.

On May 16th at a meeting of the Lancashire and Cheshire Entomological Society held at the Johnston Laboratory, Liverpool University, Major Ross gave a most instructive and interesting lecture on the connection between malaria and mosquitoes, copiously illustrated by lantern slides. He began with a series of maps, showing the relative prevalence of malaria in various parts of the world, and then gave statistics from India from which it appears that 40 per cent. of the native children are infected with malaria at one year old, and 60 per cent. at two years; after that the percentage gradually decreases until complete immunity ensues, and the parasite is rarely found in adult natives. This parasite is a minute jelly-like speck resembling an *Amœba* and lives inside the corpuscles of the blood. Bursting, it throws out spores—usually nine in number—into the blood at regular intervals, together with a minute speck of poison; this causes a rise in temperature and the profuse perspiration which follows carries the poison off. The regular recurrence of this process causes the regularity of the periods at which malarial fever comes on, the different varieties of fever—quartan, tertian, blackwater, etc.—being due to different species of parasites. It is, however, necessary that the parasite should be transmitted from one human being to another by an insect, a female gnat, or mosquito, for it is only the female that bites. A day or two after the insect has sucked the blood of an infected person, the parasites have travelled into its tissues, and, after taking about nine days to mature, burst, scattering thread-like spores into the mosquito's blood. These threads work their work into the fly's salivary glands, and remain there until they have an opportunity of passing together with the saliva into human blood, when the mosquito perpetrates her next bite. The species of *Anopheles* are by no means all harmful; those that cause malaria can be always distinguished by the black spots along the anterior nervures of the wings, the usual species being *A. costalis* and *A. funestus*. Their eggs are canoe-shaped. The larvæ breed in shallow pools of stagnant water, floating flat upon the surface, and feed on *Confervæ*. They have no breathing-tube and can thus be easily distinguished from the larvæ of our commoner gnats which belong to the genera *Culex* and *Stegomyia*, and hang head downwards in the water with a long breathing-tube projected upwards to the surface. The larvæ of the latter insects breed in tubs, pots, and other vessels lying close to houses. Since the pools were drained and filled up at Ismalia, a town of 6000 inhabitants, the cases of malaria have fallen from 2000 to 200 per annum, and these are nearly all relapses, as only ten actually fresh cases were reported last year.

We owe an apology to the author, Mr. George T. Bethune-Baker, of "A revision of the Amblypodia group of butterflies of the family Lycænidæ,"* for not having noticed his valuable paper before. The group is divided into six genera—*Surendra*, *Iraota*, *Amblypodia*, *Mahathala*, *Thaduka*, and *Arhopala*. We suspect that these divisions are altogether inadequate to obtain a thorough grip of the more detailed phylogeny within the Amblypodids, and one surmises that most, if not all, of the genera used are really of tribal value. To say that because all the British Vanessid species fall so naturally into a group that "even a tyro can recognise them as Vanessids," even partial reason is

* "A Revision of the Amblypodia group of butterflies of the family Lycænidæ," by George T. Bethune-Baker, F.L.S., F.Z.S., &c. [The *Transactions of the Zoological Society of London*, xvii., pt. 1, pp. 1-153, pl. i-v. August, 1903.]

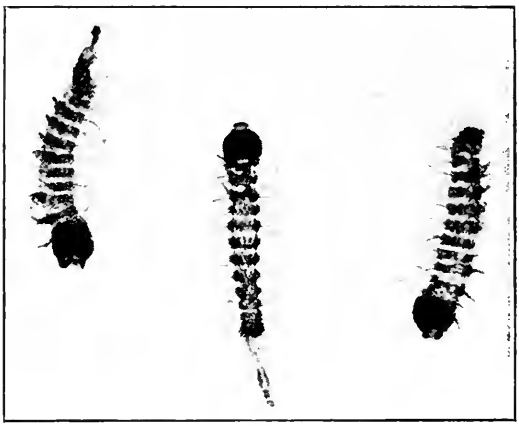
shown for putting them into one genus, does not commend itself to us, nor does it tend to give us the detailed knowledge that we want, *viz.*, that certain species in these large unwieldy so-called genera are much nearer to each other than to other species included in the group, and the comparative position these subdivisions hold to each other. None of this criticism, which may be held to be entirely due to personal predilection, however, detracts from the excellence of the systematic part of the work, which appears to be carefully worked out, and generally thoroughly done, and exhibits well the care that the author has taken to obtain an inspection and first-hand knowledge of the types of many rare and little known species. The specialist will be particularly thankful for the long series of beautiful figures, among others being the new species—*Mahathala hainana*, *Arhopala dohertyi*, *A. kiriwinii*, *A. mindanensis*, etc. On plates iv and v a large number of genitalia are carefully depicted, and these add much to the value of the work. Altogether the *Revision* brings together a mass of hitherto scattered material in an easily accessible and well-arranged form, and reflects great credit on the author, who must have spent a great amount of time and devoted much patient labour before completing the work.

We are in receipt of the *Transactions of the City of London Entomological and Natural History Society*, for 1903, which are, so far as the contents are concerned, quite up to the usual standard. The reports of proceedings are particularly well arranged under headings, whilst the special papers include a reference to melanism in Mr. Mera's Presidential Address; "Variation in *Sciadium* (*Gnophos*) *obscurata*," by Mr. L. B. Prout, an excellent paper in every way; "Notes on breeding *Gonodontis bidentata* ab. *nigra*," by T. H. Hamlin, an exceedingly useful paper on the lines of work suggested by Mr. Bateson, and "Tacuarembo," by Mr. A. F. Bayne, with whom, above all things, we should like to be, when on his entomological excursions in Brazil. We are intensely pleased with these notes from an old friend and fellow-member; they remind us of many happy hours spent in the rooms at the London Institution at a time, that will soon have to be defined as, many years ago. We hope he will write again and often. The number of printer's errors in this part, are, fortunately quite unusual. Without looking for them, a glance at the early pages introduces one to "central fascial," "irridescent," "emergencies," "emergered," "Eynsford," "Hellin's," "Mr. W. L. Prout," "Mr. Prout, L. B.," "*attanticus*," "*janeira*," "*Pyramies*," "*Apantelis*," "*bevolensis*," "*leplastricana*," and many other evident cases of the MSS. not being followed. On p. 13 "*Malendryis*" and "*Melendryis*" occur in successive lines, whilst on page 8 we read "SPHINX PINASTRI ALIVE.—Dr. Chapman further exhibited some bred living *Sphinx ligustri*," the latter certainly not quite intelligible. We congratulate the Society on the standard of its work, and trust that another year these minor blemishes will disappear.

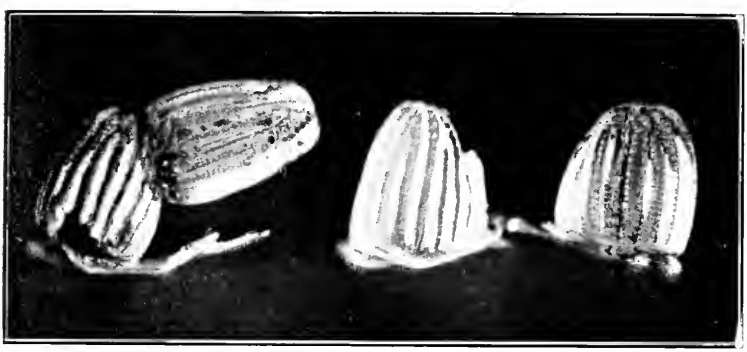
The volume of *Proceedings of the South London Entomological and Natural History Society*, for 1903, is, if not quite so bulky as some of its predecessors, at least quite up to the average, consisting as it does of 90 pages, with a beautiful plate done by colour-photography, and chart. There are a number of most interesting papers, which all naturalists should see, and the faunistic reports of the field outings make an excellent feature and reflect great credit on the secretaries. The chart of the Oxted district (illustrating Mr. Adkin's report) is an excellent

one, and must prove exceedingly useful to all Surrey workers. The reports of the meetings are still excellent, and give a great deal of information, though dates of the captures exhibited and other details are more often left out than inserted, in spite of the repeated requests of the Secretaries to be supplied with such information. Until collectors are more anxious to record the scientific facts relating to their exhibits than to take personal credit for the element of luck in capturing the specimens, they will possibly have the same trouble. There are, as is usual in these smaller *Proceedings*, a fair number of printer's errors, though these are neither so glaring, nor numerous, as those in the *Transactions* of the sister society. In the interesting presidential address we find much to praise, but there is one point to criticise, *viz.*, that in which the ex-president gives a wofully incomplete picture of the year's work, so far, at any rate, as relates to the additions to the British fauna. Taking the "Coleoptera" for comparison, we find that the President states that "five" new species have been added to the British list, *viz.*, *Œdemera virescens*, *Hydroporus bilineatus*, *Tetropium fuscum*, *Criocephalus polonicus*, and *Aphanisticus emarginatus*. As a matter of fact "nine" new species were added, as recorded by Professor Beare (*Ent. Record*, xvi., pp. 29-30), and, assuming the other orders to be as incompletely scheduled by the ex-president, it is a serious item. The injury done is that, in the future, these summaries, worked out at length by successive presidents, will be assumed to be accurate, and comparisons will some day be drawn between these and those of later years, and all attempts at sound generalisations are frustrated by erroneous data, surely more easily collected now, at the time when the literature can fairly easily be overhauled, than in the years to come when it will be much more difficult to get at. We hope that the next volume will contain a complete *resumé* of the 1903 additions, as well as those of 1904, although one never overtakes an error once it has started. We see, too, no illustrations of exhibits that one would expect from a Society that has won such a deservedly high position in photographing natural history objects. These, we suppose, will come in time. The Society has much to be thankful for in its excellent membership, which, indeed, it thoroughly deserves, and one suspects that, on the whole, its officers and council comprise men more widely known in the entomological world than many of those representing more powerful societies. Whilst the standard of its officials remains as high as hitherto, there is little doubt that the Society will maintain its position as one of the premier natural history societies in the British Islands, and we congratulate the Society heartily on an excellent year's work. The *Proceedings* are published at the Society's rooms, Hibernia Chambers, London Bridge, S.E.

The Rev. G. H. Raynor is to exhibit his *Abraxas grossulariata* in the Zoological section at the British Association Meeting to be held at Cambridge, on August 17th. In the exhibit will be included several of the aberrations described in *Ent. Rec.*, vol. xv., pp. 321-325, and vol. xvi., pp. 8-11. Mr. Raynor informs us that he has this year (for the first time during the six years he has been working at the species) at last bred some male specimens of ab. *flavofasciata*, Huene. These, six in number, appeared in two different families, and he now has eggs resulting from the pairing of four of them with female *flavofasciata* of different families. Entomologists who happen to be present at Cambridge will find this a most interesting exhibit.



1.



2.

Eggs and Newly-hatched Larvæ of Brenthis thore.

Majorca—Eight days' entomology. Two new butterfly aberrations.

By P. A. H. MUSCHAMP.

The island of Majorca this Easter, in spite of the glorious unclouded midsummer sky, was chiefly remarkable from a lepidopterist's point of view for the great scarcity of lepidoptera. In the daytime an occasional solitary "white," generally *Pontia daplidice*, came to gladden the eyes, but not one single moth did I find after nightfall, either by lamplight or by sugaring! The flowers of the island are many and sweet-smelling; thirty plants are, I am told, peculiar to the Balearics, and these same, being very commonly distributed all over the north-west, *i.e.*, the mountainous and less highly cultivated part, make the country look unlike any other part of the world. There are hardly any tall trees, I noticed only umbrella-firs, orange, lemon, locust, olive, fig, and almond trees and date and other palms with several kinds of stunted prickly oaks. The people fatten their pigs with the figs, feed their horses and cattle with the locust-beans and themselves with the olives. I feel greatly tempted to give some little description of the island and its natural beauty, its inhabitants and their dances and ballads—especially as I found so few butterflies there. Those that I did find, are, however, rather interesting, and I do not consider that my time was absolutely entomologically lost, after all. The following is a list of everything netted:—PAPILIO MACHAON (5): Red anal spot very large and bright, black border varying greatly in breadth, but all five insects having red spots in upper yellow lunules of hindwing, constituting the ab. *rufopunctata*, Wheeler. PIERIS BRASSICÆ: Fairly abundant, underside hindwing dark greenish ground colour thickly powdered with dark scales; ♂, size of a large *P. rapae*; ♀ rather undersized. PIERIS RAPÆ: Normal size; those having normal markings being powdered with black, on both upper- and undersides, the others being intermediate forms between ab. *leucotera* and ab. *immaculata*. PONTIA DAPLIDICE (9): Of the size of var. *bellidice* and smaller. LEPTIDIA SINAPIS VAR. LATHYRI: A few well-marked insects. GONEPTERYX CLEOPATRA: Fairly abundant in places. Rather small with the orange more widely distributed over forewing. Paler ground colour. COLIAS EDUSA: The majority much smaller than any I have taken in Switzerland, may possibly be considered to be the var. *pyrenaica*, Gr.-Gr.: "duplo minor, vix nominanda" (Staud., *Cat.*). CARCHARODUS ALCEÆ VAR. AUSTRALIS: Small, only two specimens. POLYOMMATUS BELLARGUS AB. CERONUS: (1) Very brilliant, ♀s with blue extending beyond orange border to fringe. POLYOMMATUS ICARUS (5): Very small and brightly coloured, from $\frac{2}{3}$ to $\frac{1}{2}$ of size of *P. icarus* as I take it in France and Switzerland. EUVANESSA ANTIOPA AB. HYGLÆA: Worn; curious to say, comparatively slow fliers and very easy to catch. PARARGE ÆGERIA: Same size as those I took last Easter in Corsica, *i.e.*, about $\frac{2}{3}$ of normal size. PARARGE MEGÆRA (15): Wing rounder than in type as in Corsican var. *tigelius*: size of latter with exception of one ♂ that is only a little smaller than type; markings heavier than those of *tigelius* but not quite so pronounced as in type; underside colouring like normal Swiss insect, *i.e.*, more powdered with ash than the British form, if I may judge from four examples received from Mr. A. J. Hipwell. The general appearance of this butterfly, in spite of its heavy markings, is that of *tigelius*. It was only when I confronted it with the Corsican insect that I discovered that I had not

netted a series of *tigelius*. It is evidently an intermediate form, and as such I have named it *Pararge megaera* ab. *intermedia*. Cœnonympha pamphilus: This was fairly common near Palma. Four out of twelve insects netted proved to be well-marked specimens of var. *marginata*, the remaining eight are evidently a local form and constitute the most interesting part of my Easter catch. On the forewing underside between IV_1 and IV_2 below the apical spot is a black unpupilled eye surrounded by a narrow band of light tawny similar to that surrounding the apical spot. This spot is constant in ♂ and ♀, and is distinctly visible from the upperside. The markings of the hindwing vary as in type between ab. *unicolor*, Tutt, and ab. *ocellata*, Tutt. To this insect I propose to give the name of *Cœnonympha pamphilus* var. *balearica*. Callophrys rubi ab. immaculata: Fairly abundant. Eurranthis plumistraria: Twelve specimens, no two of which are of the same size and markings, varying from size of insects taken at Digne to about one-half that size. The ♂s were flying very wildly over rough ground and I could not get near them till I was fortunate enough to locate a ♀ drying her wings. Ten minutes or a quarter-of-an-hour passed by her side, chip boxes in hand, and net thrown aside, gave me eight ♂s. One worn ♂ that I discarded came back repeatedly, and had to be boxed for awhile in order to keep it from spoiling the sport. I afterwards netted one more ♀ (worn) and two more ♂s on my way down the hill. Ematurga atomaria: Very rich in colouring. Aspilates ochrearia ab. unicolorata: One specimen only. Tephroclysta, Sp. (?): One insect that I have not yet been able to determine. As for the few micro-lepidoptera I have netted, I can only recognise *Psacaphora terminella* and *Pyrausta cespitalis* var. *intermedialis*, and I do not intend to work them through till those that I have taken as larvæ are ready for identification.

As there was so little to be done with the butterflies, I naturally turned my attention to other insects. I discovered that there is in the island only one collector of beetles, and he but a half-hearted one and a priest to boot. To him I wrote for permission to examine his collection, and, after much waiting, came an impolite answer (the only one I have received in Majorca): "Did I want to buy the lot? If not——." Wherever I turned my steps I saw large families of *Ateuchus laticollis* rolling along closely packed balls of dung, about twenty times their own bulk—it struck me that they make bigger balls than their larger brethren *A. sacer*. A very common *Cicindela* was *C. maroccana*, *Brachycerus barbarus* was fairly plentiful on the hillsides, but easily passed by as it was always thickly coated with earth. I took *Carabus hispanus* and another large *Carabus* (32mm.) dark bronze-green in colour, shaped like *escheri* and marked like *fastuosus*. In the scrub I took a dark-coloured *Asida sericea*, several other varieties of *Asida* and a few Telephorids. I fished out about a dozen small Cybisters from a mountain torrent, and swept up a certain number of tiny beetles to be worked through next winter. The Myriapoda, the Hemiptera and the Hymenoptera are particularly well represented on the island and combined to fill up the spaces left in my boxes, thanks to the poverty of the butterfly world. I fear I am taking up too much space for so poor a catch. My excuse is that I myself would have given a good deal for some such general information before starting on my trip. Mr. Tutt kindly gave me the address of a British entomologist who had hunted in Majorca,

but as this gentleman answered my letter of inquiry too late to be of service, the letter not arriving till long after my return, I went on my way like a veritable Robinson Crusoe. Actually I have gathered together a fair amount of useful information which I shall be only too willing to dispose of to future explorers.

General Notes on the Larval and Imaginal habits of Phragmatobia fuliginosa*.

By A. W. BACOT, F.E.S.

The larvæ described in my previous paper (*antè*, pp. 176 *et seq.*), numbering some 400 or 500, were very healthy and fed up with great rapidity. They were kept indoors, at first in a glass jar, afterwards in an 8" flower-pot, and were finally transferred to a large box measuring about 1' 6" × 1' 6" × 2' 0" with gauze stretched across the top. Their food was chiefly broad-leaved plantain, but dock and various species of *Salix* were given as well. In habits, the larvæ are typical Spilosomas behaving almost exactly as do those of *Spilosoma menthastri*, *S. lubricipeda*, *S. urticae* and *S. mendica*, that I have previously reared, resting and feeding beneath leaves if possible, dropping on the slightest jar or disturbance, but not so readily if moulting, rolling up into a compact ring, then, after a brief interval, starting off to crawl with great suddenness and extreme rapidity, the stops being equally as sudden as the starts, and both being exceedingly erratic. In moulting, the larva selects as firm and well-hidden a resting-place as possible, and, if undisturbed, remains quiescent for the whole period, but, if disturbed, they show themselves by no means inactive, so far as my observation goes; little, if any, silk is used, and disturbance seems to have no ill effects whatever; this, as with the ground-feeding Noctuids, is probably a special adaptation to meet the liability of disturbance at this period, which is probably much more frequent in ground-feeders than in species having arboreal habits. I am uncertain as to the exact number of moults but I believe it to be either five or six, possibly it is variable, certainly a variable habit would fit in better with my observations than a fixed one. In the adult skin, the larvæ are dimorphic, ranging from very bright pale brown to almost black. I segregated half-a-dozen of each extreme, but found that the difference was certainly not sexual, as ♂s and ♀s emerged from both batches. In the first brood the larvæ kept well together as regards growth, there being no individual lagging or racing, but there was nothing like so much uniformity with the larvæ of the second brood.

Pupation.—As the brood was so large I made special provision for the larvæ to spin up by pinning a number of paper ledges round the sides of the box to prevent overcrowding at any one point, a somewhat disastrous experience with *Malacosoma castrensis* a few years since having taught me that cocoon-spinning larvæ will take advantage of each others cocoons, to economise silk, forming dense masses of

* These notes must not be taken as being in any sense final. They are more or less of a loose and scrappy nature, for I was too busy feeding this and other races of larvæ during the month of June to allow of the close and detailed attention that is necessary for a full and and exact account of their life-history even in confinement. Publication, however, of the notes may lead to further observations by other lepidopterists.

cocoons which one must either separate and pin up separately or leave alone with the certainty of a large number of cripples and many failures to emerge. In its mode of pupation, the larva of *P. fuliginosa* differs widely from those of *Spilosoma urticae*, *S. mendica*, *S. lubricipeda*, and *S. menthastri*, all of which spin on the ground for preference in confinement, although a few cocoons are generally spun up among the leaves. With *P. fuliginosa*, however, few, if any (I did not discover any), spun up on the ground, all going up, and many as high as possible, before spinning. A considerable proportion of the larvæ, perhaps nearly one-third, did not spin with the others although they occupied similar situations, and rested as if about to moult, in fact they attempted hybernation at the end of June and beginning of July. From time to time, throughout the remainder of summer, persuaded by those too brief intervals of warmth that, what I presume they mistook for, the southern European winter was at an end, a few individuals would spin up, pupate and emerge in due course. I had a few specimens out in September, two or three in October, and one misguided individual at the beginning of November. By far the greater number of the hybernators, however, gradually pined away and died, either from want of moisture (I kept them indoors with the exception of a few, which I put into a cage in a cool entry facing east, and which fared no better than the others) or because the situation was not right, or the winter was too long, or from other unexplained causes; at any rate they died and concern this history no further.

The second-brood larvæ, either from disparity of dates of laying and hatching or as I think partly from the sequence of hot and cold periods delaying the moults of some and urging forward those of others, showed a great disparity as regards speed of growth, and I had to pen them out on growing plants while I was away during the latter part of August and the first week of September; one week of this period was I am told, very hot, the other part of the time was wet and windy, if not cold. By October 1st, the greater proportion of these had pupated but there were many backward larvæ in various stages of growth, some still quite small; a few, apparently adult but rather small, larvæ were resting as though for hybernation, but very few in proportion to the number of first brood larvæ that attempted it. As events proved, however, nearly all these subsequently spun up during the warm fine weather we had in October, and now (middle of November) I do not think that there are more than half-a-dozen hybernating. The third brood larvæ are considerably smaller than the first brood, but this is probably quite as much due to unfavorable conditions of food and temperature as to in-breeding.

The emergence of the imagines was rather erratic, sometimes the favoured period was the forenoon, but at others the evening about 5 p.m.-8 p.m. The temperature was, I think, chiefly responsible for this difference, as, on hot days, most of the emergences would take place in the forenoon and in cooler weather towards evening. The time of flight and pairing was about dusk, say 8 p.m.-9.30 p.m. The temperature being here also the governing factor, as the moths would remain dormant or very sluggish in cold weather, and pairing was rare and very difficult to bring about, except on warm windy nights or when on a warm night the cage was placed in the draught from a window. In copulation the ♀ often supports the ♂, although this is

not invariable, and the moths remain together for several hours, but not, as a rule, for the whole night.

The rearing of Pachetra leucophæa.

By J. C. DOLLMAN, F.E.S.

A batch of eggs from Wye received from Mr. Kaye, which were laid on June 11th, 1903, hatched out on June 24th. The young larvæ were $\frac{3}{16}$ in. long on emergence and were very active and restless in habit. The head was large, with dark lunules and a chestnut face. The body grey with two subdorsal dark lines, and the anal segment black. It was thickly set with black hairs, and, between the 2nd and 3rd abdominal segments, possessed a band round the body of a lighter tint than the main part. A dark plate was suggested on the prothoracic segment, and the two subdorsal lines were constructed of black warts, below which was also a lateral line of dark warts, all giving off hairy projections. The body was glabrous and shiny, and there was a transverse row of dark spots on the prothoracic segment behind the cervical plate. The legs were darkish and the pro-legs of the body colour, only two pairs of the abdominal series, however, being fully developed, the other two pairs, on abdominal segments 3 and 4, being still in embryo. This formation begot a pseudo-geometric action almost like that of the larvæ of the Hypenids. The appearance of the larva at this early stage and its habit of existence were totally at variance with those of the next stage and those of its later periods, for while it was now eager, restless, and quick in movement, and was semitransparent in appearance, it developed for the future a dull inert method of life, and was sleek and fat in appearance, having a colour of opaque grey or tawny, with dorsal and subdorsal lines of a deeper shade of the body tint. This first change took place on July 7th and onwards for a few days, when the larvæ seemed to assume their true character and appearance, which cannot be said to have altered materially to the final stage, with the exception that the markings and warts gradually became more declared and emphatic. The appearance of the larva in its second stage was more opaque in colour and the shiny translucency had left it. The head was light glabrous brown or grey with two dark vertical lines on the face. The suggestion of a cervical plate, which was observable in the first skin had merged into the general dorsal ground colour. The larvæ might be roughly classified under two headings, in the matter of colour, those that were grey in general effect and those that were tawny in tint, the markings in each case remaining the same in design and were but of a darker tint of the ground colour pertaining to the example. The dorsal surface was occupied with a broad stripe of the darker, and down the centre of this was a fine mediodorsal line of the lighter, tint, dividing it into subdorsal stripes. On each side of this thin bright mediodorsal line, which slightly expanded at the junction of the segments on the skinfolds, ran a broken thin line of dark reticulation, suggesting a fine stripe. This fine striping was also observable at the limit edge of the broad subdorsal line itself. Next to this fine outside broken dark stripe was a very fine light line, adjoining which was a space of the light ground colour for about the width of the broad dark dorsal surface measured from the mediodorsal light line. Nearly as wide

as this lighter portion, there followed a stripe of the darker tint, like the dorsal surface, which was supplied at each edge with the broken reticulated dark line. The spiracular region came next, and was of the lighter tint, gradually getting greenish-grey as it neared the ventral surface, which was of that tint. Speaking generally, the larva was light tawny or grey, with a broad darker dorsal stripe (containing the thin light mediodorsal line) and with a stripe on each side of the same darker tint, the darker surfaces being edged with still darker reticulated lines. These markings ran the whole length of the larva, from the head to the anal segment. The first of the dorsal warts on each segment, and the wart above each spiracle, were picked out strongly dark—more or less with the individual. The spiracles were light, edged with darker, and the larva still showed hairy projections, particularly around the head and the anal segment. The larvæ appeared to grow quickly at this stage of existence, and were about $\frac{3}{8}$ in. long at this record. From now they led a very sluggish life and remained amongst the bottom of the grass on which they were fed (*Poa annua*) all day, feeding apparently only at night. The feeding at this period resulted in the eating through the grass of elongated holes, near the edges of the leaf. This seemed characteristic of the feeding habit for the earlier part of existence, and when about $\frac{1}{2}$ in. long the larva fed at the edge of the leaf, in which it ate long deep notches. On July 20th the appearance of the larva was the same as before, in its markings, but it had begun to show a tendency to alteration in contour, having a gradual tapering shown in its form to both extremities, though still remaining stout and obese in construction.

On August 4th the larva was $\frac{1}{2}$ in. long, and seemed to be feeding well and growing faster than before. The markings were still the same but rather deeper in character, and a segmental division at the skinfolds now showed a greenish-grey tincture when the larva was extended. A very fine reticulation all over its body-surface began to assert itself. This was a tint midway, in strength, between the lighter and darker parts on the light portion, and rather darker and richer in hue than the ground colour on the dark portions. The same sluggish existence was followed, and the creature showed an aptitude for concealment amongst the grass which was very striking. On August 20th things had not advanced greatly. The aspect of the larva was still the same, though it had grown to a length of $\frac{3}{4}$ in., and had, perhaps, developed a more marked tapering in its form towards the head and anal segment. Not that the head was small, but this conformation had been arrived at by a tendency to enlargement in the central segments. Nothing of note marked the progress of the larvæ from this time of gradual growth up to the middle of September except the misfortune of losing all of the examples but four individuals, suddenly. Possibly this was the result of an unlucky feed of grass which may have become contaminated by animals. This is an unforeseen trouble which I cannot help thinking often arises in and around London, and is most disastrous in effect. By September 20th the larva was 1 in. long, very smooth and sleek in form, and looked like a very well bred handsome creature. It had all the graceful obesity of the slug type, the head was blunt and fairly large, though smaller in volume than the prothoracic segment, into which it could be partly received. It was rather more yellow and

glabrous than the body colour, had two vertical and rather wide dark lines on the face, expanding downwards, and a thinner dark line parallel with it on each cheek. These lines were produced by broken, dark, and reticulated dots. The head was irregularly marked also with isolated dark dotting, though somewhat sparsely, and had many short, light, projecting setæ which were set forwards and outwards. The segments gradually increased in size to the 4th abdominal, where they began to gradually decrease in volume, to finish in a sharply sloping way at the anal end. The fine, light, mediodorsal line was the lightest part on the body, and it was now sharply defined, while the definition of the broad darker tone of the dorsal region, and the broad darker lateral striping had become very evident. The greenish-grey segmental divisions at the skinfolds were more pronounced than heretofore, and the entire larva seemed to be very delicately and evenly peppered with a refined reticulated tracery. The spiracles were each set in a small light space free from this reticulated surface, and were rather deeper in tint than the light ground colour around them, from which they were separated by a firm dark brown, or black, edging. The ventral area was of the light ground colour, and without detail. The legs and prolegs were of the same tint, the latter having a thin grey-black line around them for a pedal ring. The larva led a quiet undemonstrative life without developing in size much, and only occasionally nibbling at the foodplant, until October 5th, when a change of skin was accomplished by the most forward. The alteration in appearance after this change was not great, but those that had hitherto been greyish in colour were more or less fawn-colour like the others had been from the first. The head, after this change of skin, was not different in appearance from what it had been, and the general markings on the body were very similar to those last recorded. The light thin mediodorsal line was still the leading feature, and it ran from the crown of the head to the anal end. Next to this was a fine dark broken line and then for a space of one-third of the distance to the spiracular line was a broad stripe of ash-coloured reticulation on an ochreous ground, which ran from the head to the anal end also. The outer edge of this broad stripe was edged with a broken and rather intermittent reticulated fine line, which was more darkly accentuated at the segmental divisions than elsewhere. The second third of the space, downwards to the spiracular line, was occupied by a stripe of about the same width as the first named, only of a lighter tint. Along the centre of this ran a suffused and slightly marked course of reticulation, rather darker than the ground colour. This reticulated wart, however, stopped short of contact with the adjoining darker stripes on either side and left a thin line of the light ground colour which made a suggestion of two light thin stripes, a subdorsal, and a lateral one. The remaining third of the space between the mediodorsal and spiracular lines was occupied by a lateral stripe of darker ash-coloured reticulation, like the subdorsal stripe above. This was edged with darker, in a broken way above and below, and was scalloped out on its lower edge at the spiracular projections, which made a light crescent-shaped notch in the tint over every spiracle. This lateral stripe of darker tint commenced on the mesothoracic segment and terminated on the 8th abdominal, short of the anal development. The spiracular line was much corrugated and showed a strong crescent-shaped skin-

fold under each spiracle. It was lighter in colour than any part of the larva, save the mediodorsal stripe, and was firmly wrinkled in relief against the ventral area, which was of the same colour, though rather more transparent in quality. The legs and prolegs partook of the same effect. The detail of the darker parts of the markings were principally found in the warty formations. On the dorsal region there was a dark wart on each side of the mediodorsal line, just removed from it, at the junction of the segments. Outwardly from this ran a suffused oblique dark marking to a smaller dark wart rather more than half-way to the boundary of the broad subdorsal stripe. This oblique marking on each side of the mediodorsal stripe suggested a V-shaped decoration, with the apex pointing forward. Midway on each segment, and just removed from the mediodorsal line, was another dark wart on each side, and, in a line with this, halfway from it to the posterior edge of the segment, was an elongated small dark mark formed by two short longitudinal lines. A similar mark to this was aligned with it on the outside, midway to the boundary of the dark ochreous stripe on which they were all situated. Above each spiracle, on the dark edge of the lateral line, and also in front of each on the spiracular line, was a wart, but not so dark as those on the dorsal surface. The spiracles were as before, light with a dark ring around them. The short setæ were still in existence on the head and anal segments, though sparsely present.

After this change of skin the larva seemed to desire a rest, and simply lay about in a lethargic state, without feeding, for a week; after which it began, languidly, to feed again, though not in a manner which promised early maturity. Since September 20th, when the larva was found to be 1in. in length, very little gain in size had been attained. In fact, the larva was now no longer than it was three weeks before, but it possessed the largeness of head and general bagginess of aspect, which indicated that it ought to be feeding up and growing. Previous to this last change of skin, for a few days before it, the excrement of the larva was quite light in colour and relaxed in consistency. It was of a pale straw-colour and looked more like some extrusion of entrail that that of fæces. Only two of the remaining four of the larvæ survived this last change of skin, and they did not appear to have come through the ordeal with strength or appetite. On October 12th one of these two remaining larvæ died, never having fed properly since the change, but gradually dwindled away in size and vitality. The solitary remaining example, however, commenced feeding well, and grew and fattened. It threw off its languid existence and seemed in a fair way to achieve maturity, feeding regularly and heartily. This, however, seemed to be but a last effort, for about October 24th it ceased feeding, became inert in manner, slowly collapsed, and shrunk as the preceding one had done. On November 1st it was found to be dead. The only reason I can suggest for these disasters is, as I have already noticed, that the grass supplied from the local fields may have been contaminated by animals, as, while the larvæ were fed in the country, in their earlier existence, all had gone well. This is, I believe, a frequent cause of trouble with the feeding of larvæ round and in London. The brood had received every attention, having had fresh food every other day, were confined and fed separately, and kept in a room of the same temperature.

Synopsis of the Orthoptera of Western Europe.

By MALCOLM BURR, B.A. F.L.S., F.Z.S., F.E.S.

(*Continued from* p. 186.)

Family IV. Empusidæ.

Genus 1. Empusa, Illiger.

The family is characterised by the lobiform appendages of the legs and abdomen. This genus, the only one occurring in Europe, has also a conical protuberance between the eyes; the antennæ of the male are pectinate and the pronotum long and slender. Only one species is found in Western Europe.

1. Empusa egena, Charpentier.

Greenish, testaceous: easily recognised by the peculiar form of the vertex and lobed legs and abdomen. Length of body, 60mm. ♂, 67mm. ♀; of pronotum, 24mm. ♂, 26mm. ♀; of elytra, 40mm. ♂, 35mm. ♀.

Found in moist places in hot districts on shrubs and grass. It is adult in May. Finot remarks that the larvæ, which can be easily reared on flies, are commonly kept as pets by invalids, on account of their amusing antics.

In France it is common in the southern parts; Provence, Toulouse, Cannes, Hyères, Tarbes, Medoc, Bordeaux, Toulon, Ollioules, Aix, Caraman, Haute Garonne, Draguignan, Bagnols, Valence. In Spain it is widely distributed, occurring as far north as Coimbra in Portugal, and Longroño, also Granada, Malaga, Madrid, Guadalajara are given as localities. It occurs in Sardinia, and in Italy is recorded from Florence, Sicily, and Serravalle and Scrivia in Liguria.

Section III. Euorthoptera.

Division I: Phasmidea.

This group is represented in Europe by but two genera, closely allied to each other, with very few species.

They are herbivorous, sluggish and harmless insects, familiar on account of their stick-like build; the European genera are entirely apterous; the antennæ are somewhat thick and shorter than the anterior femora; the whole body is slender and cylindrical, and the legs slender.

Family I. Bacillidæ.

Table of Genera.

1. Intermediate and posterior tibiæ with inferior carina forked at the apex; cerci ♂ straight or slightly curved at the apex; abdomen ♀ not notably compressed nor attenuated near the apex; ova almost globose .. .. 1. Bacillus, Latr.

1.1. Carina beneath middle and posterior tibiæ simple, not forked at the apex; cerci ♂ dilated and toothed at base, then curved; abdomen ♀ notably compressed and attenuated near apex; ova elongate, oblong .. .. 2. Leptynia, Pantel.

Genus 1. Bacillus, Latreille.

In this genus the carina under the middle and posterior tibiæ is forked at the apex, forming a small triangular area. Only two species occur in Western Europe.

TABLE OF SPECIES.

1. Antennæ of ♂ as long as mesonotum; anterior femora unarmed, the middle and hinder pair with two spines beneath at the apex on both sides: antennæ of ♀ from 20 to 25 segments; anterior femora with two or four small teeth on the outer margin .. .. 1. ROSSII, Fabr.

1.1. Antennæ of ♂ much shorter than mesonotum; anterior femora toothed beneath, the middle and hinder pair lobed above at the apex and toothed beneath; antennæ of ♀ of 13 segments; anterior femora unarmed .. .. 2. GALLICUS, Charp.

1. BACILLUS ROSSII, Fabr.

Length af body, 58mm.-62mm. ♂, 90mm.-105mm. ♀; of antennæ, 10mm.-12mm. ♂, 7·5mm.-9mm. ♀; of mesonotum, 10·5mm. ♂, 15·5mm. ♀; of posterior femora, 17·5mm.-19mm. ♂, 18mm.-24mm. ♀.

This species is a native of the extreme south of Europe, where it may be found all the year round on shrubs and bushes in hot places. In France at Hyères, Cannes, Sainte-Maxime, Draguignan. In Spain at Barcelona. In Italy it is said to occur throughout the country, and also in Sardinia. It occurs also in the North of Africa, Dalmatia, and Greece. The male is excessively rare, and has not been recorded from France; it is said to be less rare in Sardinia.

2. BACILLUS GALLICUS, Charpentier.

Length of body, 52mm.-54mm. ♂, 62mm.-68mm. ♀; of antennæ, 3mm. ♂, 4mm. ♀; of mesonotum, ?♂, 12mm. ♀; of posterior femora, 10mm. ♂, 15mm. ♀.

This species is also a native of southern Europe. The female is not uncommon in the centre and south of France; it is recorded from Nice, Meung, Orleans, Hyères (♂ and ♀), Ile de Ré, La Bernerie, Ile de Noirmoutiers, Tarbes, Mans, Ancenis, Le Blanc (Indre), Touraine, Clisson, Pornic, Blois, and even as far north as Fontainebleau. In Spain it is noted from Malaga. In Italy at Voltaggio, Pegli, Abruzzi, and in Sicily. It occurs in Algeria and Greece. The male is excessively rare.

Genus 2. LEPTYNIA, Pantel.

This genus differs from the preceding as explained in the table. Two species only are known, both peculiar to Spain.

TABLE OF SPECIES.—MALES.

1. ♂. Small and slender; middle and hinder femora unarmed, the former reaching the end of the 3rd abdominal segment, the latter the middle of the 7th or beginning of the 8th; the anal segment is as large as the 9th; cerci distinctly dilated before the tubercle, the latter not very distinct, nearly vertical, not forming an acute angle with the cercus 1. HISPANICA, Bolivar.

1.1. ♂. Larger and stouter; middle and hinder femora with the keel beneath at the apex, armed with regular denticulations, rather short; the former reaching the middle of the 3rd segment of the abdomen, the latter the middle of the 6th or sometimes of the 7th segment; anal segment distinctly shorter than the 9th. Cerci less distinctly dilated before the tubercle, which is elongate, dentiform, and forms an acute angle with the cercus .. 2. ATTENUATA, Pantel.

FEMALES.

1. ♀. Smaller; meso- and metathorax granulated; all femora unarmed; apical part of abdomen (segments 8, 9, 10) hardened, punctulated, keeled above, convex as seen from side; anal segment cucullate and spathiform, and pointed .. .. 1. HISPANICA, Bolivar.

1.1. ♀. Smaller, more slender; meso- and metathorax smooth above; middle and hinder femora denticulate at the apex beneath or unarmed; last dorsal segments strongly attenuated, not hardened nor punctated; anal segment as in *Bacillus*, rounded at apex .. .. 2. ATTENUATA, Pantel.

1. LEPTYNIA HISPANICA, Bolivar.

Length of body, 35mm.-39mm. ♂, 48mm.-58mm. ♀; of antennæ, 6mm. ♂, 3·2mm.-3·5mm. ♀; of mesonotum, 6·8mm.-7·5mm. ♂, 7·9mm.-10mm. ♀; of posterior femora, 13mm.-14mm. ♂, 11mm.-13mm. ♀.

A native of northern and central Spain.

2. LEPTYNIA ATTENUATA, Pantel.

Length of body, 42mm.-50mm. ♂, 48mm.-60mm. ♀; of antennæ, 5·8mm.-6mm. ♂, 3·8mm.-4·8mm. ♀; of mesonotum, 8·5mm.-9mm. ♂, 9·5mm.-9·9mm. ♀; of posterior femora, 15·5mm.-18mm. ♂, 13mm.-17mm. ♀.

Occurs in Portugal at San Fiel, and in Spain at Talavera, Cepeda, south of Salamanca, and Urda above Toledo.

(*To be continued.*)

"Types" in Natural History.

By GEORGE WHEELER, M.A.

(*Concluded from* p. 202.)

In the "Revision of the Sphingides" an importance is assigned to the first individual, or individuals, of a species known to science in respect of nomenclature, which none of the later discovered specimens can acquire, and this position appears to be approved by Dr. Chapman. I maintain that such an importance is wholly fictitious and arbitrary, and because fictitious and arbitrary, therefore unscientific, that is, it is grounded on convention and not on knowledge of the species. Of course, if stability of nomenclature is the be-all and end-all of science to which everything else has to give way, one understands the necessity for doing violence unutterable to grammar and orthography, and the all-importance of the "literary type," but then we get back to the original question, why have a classification at all? Why not be content with a single name with which to label our cabinet specimens? On the other hand, if there are other considerations more important, which the invaluable work done by Dr. Chapman, Mr. Prout and the authors of the "Revision" shows at a glance that they would be the first to concede, why should we be expected to act as if we thought this consideration came first? Why should we cast aside the most elementary rules of grammar and the universally recognised forms of classical orthography? Why, above all, should we not be content to allow our specific nomenclature to change with the growth of our knowledge of individual species, just as we have all agreed to let our generic nomenclature change as our knowledge of

the connections and distinctions between different species increases? Surely it is not illogical to treat the nomenclature of species in the same way as that of genera, tribes and families, nor unscientific to consider knowledge of the phylogeny and distribution of species of more importance than cabinet labels.

To this point I shall have to recur. Meanwhile, to make my position clearer, and to answer the objections made to it, let me come down to details. I heartily rejoice that it is in the power of so insignificant a person as myself to supply so eminent a naturalist as Mr. Prout with much of the information which he expresses himself in the April number of the *Ent. Record* as being anxious to acquire. "Is it conceivable," he asks, "that any thoughtful entomologist has really imagined a type form exists in nature apart from the subjectivity of the individual student?" It is, of course, open to question whether I am "thoughtful" or even an "entomologist," as neither of these terms is defined (my critic, I notice, very rightly hungers for definitions) in the paper in question; but certainly, I not only imagine, but am entirely confident, that a type form does exist in nature, probably in every case, in the perfectly objective sense in which I use the word. As to what this sense is, Mr. Prout has accused me of placing myself "in a hopelessly unscientific position by not even attempting approximately to define" my "conception." I am very sorry to be obliged, in self-defence, to point out that I *have* explained on page 3 of my Introduction, that I hold that the word "type" should be restricted to the "most generally distributed form." I further explained that I did not consider this to be ideal, as what Mr. Prout so excellently calls the "phylogenetic type" is scientifically preferable; but as all the probabilities are obviously in favour of the most widely distributed form being the most ancestral, and therefore the "phylogenetic type," as well as the most numerous, and therefore the "numerical type," and consequently also the "average type," it seems to me that my original definition of *the* "type" as "the most generally distributed form" was less wide of the ideal than I had myself imagined. With regard to applying tests to wing-markings only, it would, of course, be both illogical and unscientific to do so, but in most cases more fundamental differences would involve *specific* distinction. Incidentally my definition supplies an answer to another of Mr. Prout's criticisms. Taking the "type" to be the "most generally distributed form," I do not consider it to be in any way "a miracle of good luck" that in the vast majority of cases the species have "happened to be first described from specimens conforming to" my "ideas of a type"; on the contrary, I should regard it as a miracle of ill-luck, not to say a monument of premature definition, if the first described forms had not been almost always in my sense typical. Further, if such a miracle of ill-luck *had* occurred, I should certainly have been "logical enough to inundate" him "with changes" without the slightest compunction, a contingency which it is happily unnecessary to contemplate. Perhaps, by the way, Mr. Prout would take pity on my stupidity and explain what precise meaning the expression "type of a *name*" is intended to convey; I have puzzled my head over it for some time and cannot understand it; it evidently means *something*, but the something eludes me. Another point on which Mr. Prout much desires enlightenment is how a stable nomenclature can possibly

be based on such a type form as he says I have not defined. The criticism in this form is obviously unanswerable, but the critic begs the question. Where in my writings (they are not numerous) will he find that I have ever regarded a stable nomenclature as being of anything more than a trifling importance? It is, after all, a mere matter of convenience, and, in my humble judgment, convenience is not for a moment to be compared in value with scientific truth. I entirely agree with him that only omniscience can produce a completely fixed nomenclature, and if I am asked with surprise, "Do not you, then, regard a fixed nomenclature as a thing to be aimed at?" I can only reply, "Certainly, just as I regard the eradication of sin, or the elimination of disease, and I consider them all three about equally distant." The putting of convenience before fact may be practical, but surely the putting of fact before convenience ought not to be stigmatised as "unscientific." And, after all, as the miracle of ill-luck has not occurred, the cases in which specific nomenclature would have to be altered by the interchange of a specific and a varietal name are so few that even the inconvenience is practically negligeable. A further difficulty suggested by Mr. Prout is purely artificial. In cases where the two sexes have been named simultaneously and differently under the mistaken impression that they were different species, it is surely a recognised principle that the name of the ♀ is retained for both sexes, the ♀ being regarded as the higher organism, since it is in some cases capable of unassisted reproduction; in cases where only one sex was described, as in *Papilio flava*, the name naturally belongs to both sexes, and it is only in a case where one or both sexes were described from an unusual form, which, but for this accident, would have been regarded as an aberrational one, that any change of nomenclature would be involved, the first name assigned to the form which subsequently proved to be the most widely distributed being retained as the specific, the other, though earlier, being regarded as a varietal or aberrational appellation.

A moment's digression here. It will be seen on reference to my Introduction, page 3, that I have expressed myself as most humbly open to correction with regard to the application of my principles to particular cases, and with regard to *Polyommatus Icarus* I appear to be at fault. My statement as to the first described form was taken from Tutt's *British Butterflies*, p. 174, and so certain did I feel of Mr. Tutt's accuracy in a matter of this kind, that I did not verify the reference. Herr Gillmer, however, who has written a critique of my work, extending over several numbers of the *Societas Entomologica*, and who is about to do me the further honour of translating it into German, has lately written to me quoting Rottemburg's description of the ♀ as being dark-brown, with a border of orange spots, in which case, of course, the name *Icarus* would, on my own principle, hold good, and *Alexis* must once more be dropped. But even though this particular case should fall through, the principle is in no way affected.

It was not in ignorance of what is meant by the "literary type" (as both Dr. Chapman and Mr. Prout seem to have supposed) that I wrote as I did, and I still claim for my theory what I have claimed all along. I claim that it is logical, because specific nomenclature, if it be anything more than a matter of labels, is the first step in classification, and it is more logical to treat *all*

the steps of classification in the same way, not expecting a perfect fixity of nomenclature in one step which we admit can only be gradually obtained in others: I claim that it is scientific, because it is based on knowledge, and, therefore, changes with the growth of knowledge, dismissing as unjustifiable all arbitrary definitions and fictitious values, putting facts before convenience, and relegating complete fixity of nomenclature to the region of unattainable ideals, rather than regarding it as a fetish to which everything must be sacrificed; I claim that it is in accordance with common sense, because it does not compel us to violate elementary rules of grammar and orthography, and still more because it does not, like the opposite theory, drag literature into conflict with science, but renders it possible for nomenclature to be an illustration of the knowledge gradually acquired, rather than a fixed stumbling block to the easy expression of some branches of that knowledge. I dare not expect that these claims will be granted, but I hope they may be fairly considered, and at the worst—"*liberavi animam meam.*"

[Any other communications on this matter should not exceed more than one page of print. We have so much entomological material in hand that space is not available for long articles on a subject which must always belong purely to the literary specialist.—Ed.]

A Natural History of the British Lepidoptera, Vol. iv, by J. W. Tutt, F.E.S.

By W. BATESON, M.A., F.R.S.

A slight delay in the publication of vol. iv of Mr. Tutt's important work was necessary, in order to enable Mr. G. Wheeler to prepare the synopses of this volume, and to complete the general index to the four volumes now published. All who use the book will be grateful to Mr. Wheeler for these valuable additions to the work, but, perhaps, the obligation will be most felt by those who, like the present writer, without being professed entomologists, have frequent occasion to refer to entomological evidence. On previous occasions attention was called to the importance of Mr. Tutt's collections of facts relating to hybridity, variation, and other phenomena of great general interest, records hitherto for the most part hidden by masses of information which only the specialist will read. By Mr. Wheeler's labours these difficulties are now removed, and, as a work of reference, the utility of the book is vastly increased. The high qualities which characterised the earlier volumes are present equally in the new one. Each species is treated with the thoroughness that Mr. Tutt and his collaborators always bring to bear on the subjects they undertake. Whenever possible the several instars of development from egg to imago have been examined afresh for this work, and every departure from normality is minutely described. The lepidoptera offer unique opportunities for such studies in developmental variation, but never before have they been used on so comprehensive a scale. Morphologists have long devoted themselves to the precise study of developmental histories. The phylogenetic significance of every feature has been repeatedly discussed, the freest assumptions being made as to the manner of omission or intercalation of stages. But though in lepidoptera such omissions and intercalations may very readily be witnessed as actual variations, embryologists have but seldom given attention to these facts. We cannot doubt that the

appearance of Mr. Tutt's treatises will do much to promote the study of such suggestive phenomena, and lead to a further recognition of their bearing on the problems of development and evolution of types. Every fact yet ascertained respecting the structure, physiology, and mode of occurrence of each species is given with the utmost detail, so that the work has become rather a series of monographs than a handbook. The biologist who requires a summary of all that is known regarding most subjects—as the polymorphism of the larva in *euphorbiae* or *atropos*, the invariability and singular habits of the imago of *stellatarum*, the modes of oviposition, the production of the "squeak" of *atropos*, the seasonal phenomena of immigrating forms—may go to the new *British Lepidoptera*, with the certainty that he will there find everything that is known up to the date of publication, accurately compiled and set forth.

On all these points Mr. Tutt has done well to err on the side of inclusion, even if some prolixity result. The student, with the help of Mr. Wheeler's synopses and index, can now find his way to what he wants to know. But, as volume succeeds volume, the conviction grows that the profusion of detail which has a use where genuine problems and little-studied points of physiology are concerned, is meaningless in the case of capture-records and locality-lists for cosmopolitan species. It is not in a spirit of criticism, but in the genuine desire to further his magnificent undertaking, that I appeal to Mr. Tutt on this question. The present volume deals with twelve species in 471 pp. Of these no less than 74 pp. are occupied with closely printed matter which I find it impossible to suppose that any one will ever read. For *stellatarum* and *convolvuli*, admittedly cosmopolitan, I find 9 pp. of solid brevier type, giving localities alone, which might as well be the index of a Gazetteer for any scientific purpose they will serve. All this information had to be collected, written, set, corrected, and printed. Surely the time of an able and very busy man would have been better spent in dealing with the essential features of the two or three more species which these lists crowd out.

Every naturalist must hope that Mr. Tutt may be enabled to deal with at least the most important of the groups as yet untouched. In the new preface he states, what is but too true, that, at the present rate, this hope can never be fulfilled. Yet much might be done by the substitution of summaries for these portentous lists of places and dates, to the great profit of entomological science. Had this course been followed from the first, we might now be expecting shortly to receive vol. v. Would not the list of subscribers feel a certain benefit also?

Where scientific judgment is concerned, Mr. Tutt's treatment has every appearance of soundness. In his revision of the Eumorphinae, he comes to the conclusion that the seven British species are outlying representatives of four distinct tribes. This is a point on which only specialists can profess to judge, though since we are informed that Messrs. Rothschild and Jordan have made independently the same decision, this coincidence of testimony may be taken as decisive. Further, in Mr. Tutt's opinion, each of our own species should be regarded as of a separate genus. Now there may be marked points of difference, but if all animals and plants were judged by similar criteria, union into genera would probably have to be abandoned, as serving no useful purpose. Whatever may be held regarding species,

it may now, I believe, be conceded that generic units have no recognisable physiological or evolutionary meaning. Generic names bring together species which have so much in common, that it is convenient to think of them habitually in association, leaving their differences to be sufficiently emphasised by the specific names. These groupings have no natural significance *definite enough for general recognition*. It is, therefore, surely best in every case of doubt to maintain, rather than to subdivide, genera, lest we come to have two names where one is enough.

A considerable section of the book is devoted to a recital of the facts regarding alleged hybrids between the various Eumorphids. Mr. Tutt states that in only one of these instances has it been declared that the actual pairing of the two species (*elpenor* and *porcellus*) been observed, and this case he doubts. He is certainly right in insisting on caution before accepting as evidence of hybridisation phenomena which may well be variational. But, after examining the evidence he has collected, I can find no clear reason for deciding, as Mr. Tutt does, *against* the hybridisation view. Pending experiment, the nature of these cases should be regarded as simply problematical. I have an impression that Mr. Tutt's bias is here determined partly by his judgment on the question of generic subdivision. Nevertheless, the hypothesis that the so-called hybrids are variations connecting the two putative parental forms, somewhat weakens the emphasis laid on the generic distinctions. Moreover, as Mr. Tutt is doubtless well aware, there are many groups, both of animals and plants, in which hybrids occur between types, which all of us agree should be treated as generically distinct. The successful continuation of Mr. Tutt's book is so important to entomology, and especially evolutionary science, for which it contains the raw material in plenty, that I trust both he and his collaborators will give earnest consideration to the recommendation made above. Every page unnecessarily included delays the progress of the whole and tends to obscure its high scientific qualities. If a wise course of compression be followed, we may look forward to acquiring, within a reasonable time, a treatise which will be nothing less than *corpus* of human knowledge respecting the natural history of British lepidoptera. Such a work will rapidly make itself known, and must infallibly find its way to every scientific library.

Egg and newly-hatched larva of Brenthis thore (*with two plates*).

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

These eggs were sent to me by Mr. Tutt, my notes of them have the date of July 25th, 1903, as that on which they were laid and forwarded by Mr. W. H. St. Quintin, to Mr. Tutt. When I received them several eggs were dead and several had hatched, and the young larvæ dead and shrivelled up. By exposure to moisture the larval structure as to hairs, etc., became easily examined, and Mr. Tonge made photographs of the eggs and young larvæ. Those of the egg include a notably successful one of the micropylar area of the egg. These are severally reproduced herewith.

Description of egg.—A tall upright egg, rather thimble-shaped. Height 1·03mm. Width near base 0·7mm., at 0·15mm. from top 0·5mm., but midway between these two points it is more than 0·6mm.,

the sides being rounded, and the outline passing in a regular curve on to the top, which is rather flattened. The micropylar area is, indeed, in a decided depression. The primary (longitudinal, upright) ribs are prominent and rather sharp, and stand up, flange-like, round the micropylar depression. Below the middle of the egg they are nineteen in number in the only one actually counted. Round the micropyle they are nine. They increase chiefly at about 0·15mm.-0·2mm. from the top by an intermediate rib starting from the middle of a secondary (transverse) rib. But sometimes a rib gives way to two, and sometimes the origin is as low as half-way down. The secondary ribs are well-marked fine raised lines, usually opposite each other on each side of the (primary) ribs, and at intervals of about 0·04mm. The micropylar rosette consists of about 11 cells, is about 0·025mm. in diameter, and is surrounded by two rows of cells a little larger than those of the rosette, there is then a third row of larger ones, which are followed by the cells between the secondary ribs. Across these is about 0·12mm.

THE NEWLY-HATCHED LARVA.—This has a length of about 2·6mm. when fully stretched, its width is about 0·4mm., and the length of the hairs is 0·3mm. The head is black and the tubercles very dark, nearly black, the hairs are dark, finely spiculated, and of very uniform

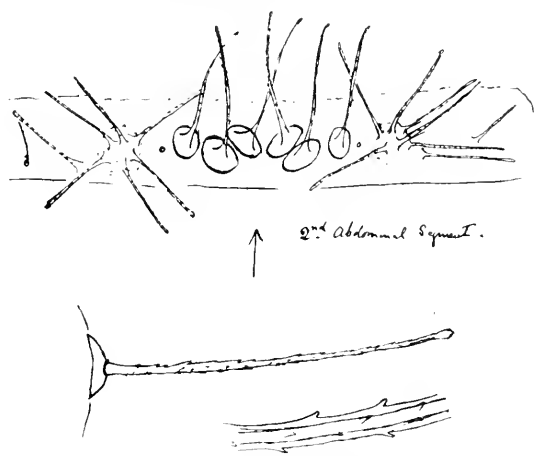


FIG. A.—BRENTHIS THORE.—1. Abdominal segment 2 of larva, ×50 (top figure) showing setæ i, ii and iii above spiracle, iv+v+vi and vii below spiracle. 2. Spiculated hair with swollen extremity · 130. 3. Part of same hair ×400.

length. The tubercles (Fig. A, no. 1) have large chitinous plates completely covering the larva whilst it is small, and before it has become expanded by feeding or otherwise. Each plate is about 0.08mm. wide. Those of i and ii are flattened somewhat against each other (Fig. A., no. 1, ×50), i, ii and iii carry one hair each. The spiracle is hardly tinted and difficult to see. Below the spiracle is a very large tubercle carrying six hairs (five only on a forward and backward segment or two); this tubercle has the appearance of a rounded boss and the several hairs cannot be differentiated as being those of different tubercles (iv, v, vi, etc.) Below this is a solitary tubercle with one hair. This terminates the series of long hairs. Below, and at base of prolegs, are two shorter

hairs. On the 1st and 2nd abdominals at a rather higher level, is a longish plate with one hair, not so long as those above; below this one is a single-haired tubercle, and again another before the ventral line is reached, three tubercles at about equal distances apart, below the long-haired series. They are nearly in the middle line of the segment, the lowest being a trifle posterior to the others. On the 1st thoracic is a plate carrying a pair of median front bristles, one at each posterior corner and two towards the anterior corner, *i.e.*, four on either side. Below the anterior angle of plate is a solitary hair, and another below and behind this. Next a tubercle with two long hairs. On the 2nd and 3rd thoracic i and ii seem to range with those on abdominal segments, iii has two hairs, iv (?) has four hairs on 2nd, and five on 3rd. The 9th abdominal segment has only one tubercle in place of i and ii. 10 has an anal plate with four long hairs on each side, and a row of short simple hairs along its hind margin.

The anal prolegs appear to have ten large hooks arranged along $\frac{2}{3}$rds of a circle. The ventral prolegs are on distinct bosses, and have columns or pedicels about 0·1mm. high, and 0·05mm. thick, and slightly enlarged at the circlet of hooks. This circlet appears to possess seven hooks, but to be without them on the outer side. The true legs are of an usual appearance, with several very long bristles, especially two at end of middle joint (tibia); the bristles are faintly spiculated. Along with the claw is a long claw-shaped hair, placed above the claw proper, and rather longer than it. This is not either of the two shorter lateral straight hairs. The hairs on the legs are very faintly spiculated. The long hairs of body (Fig. A., no. 2, $\times$130, Fig. A., no. 3, $\times$400) as well as being spiculated, have a slightly swollen extremity, and this sometimes looks balloon-like, sometimes serrated or spiculated. It does not seem to have any aperture, or is the balloon appearance due to a delicate membrane that may very easily rupture and afford the aperture usually present in such hairs? The hairs have a double outline as of a central tube. The general surface is covered by minute, apparently very sharp, points.

The ocelli present four in a curve, a fifth in the line of curve but somewhat separated, and at the base of the antenna, and a sixth, near the centre of the curve in which the others lie. The jaws have four large teeth and a smaller one behind, and several very small ones in front. On the anterior aspect the large teeth appear coarsely serrated. The antenna has (1) a narrow basal ring, (2) a large joint rather longer than broad, carrying a long bristle, two narrow processes (thicker than bristles), and (3) a small joint, which again carries a minute hair, two rounded processes, and (4) a minute joint with a fine hair, and (5) a minute process. This description probably overlooks several fine hairs and processes. If the basal ring and terminal process be joints, then the antenna has five joints.

Explanation of Plate IX.

1. Egg of *Brenthis thore* $\times$20.
2. Micropyle of egg of *Brenthis thore* $\times$180.

Explanation of Plate X.

1. Newly-hatched larvæ of *Brenthis thore* $\times$10.
2. Eggshells of *Brenthis thore* (stuck on black paper) $\times$20.

Note on the early stages of Brenthis thore.

By W. T. TRAVIS.

As an addendum to the note on this subject by Mr. W. H. St. Quintin, in the *Ent. Record*, vol. xv., pp. 301-2, and also to Dr. Chapman's longer article appearing in the current no. (pp. 236 *et seq.*) I send, at the instigation of Mr. St. Quintin, the following particulars of the larvæ of *Brenthis thore*, which we obtained from eggs laid in captivity when Mr. St. Quintin and I were staying at Pontresina last July (1903). The 20 eggs which Mr. St. Quintin handed to me hatched on the journey home, at Zürich, and were fed on the common dog-violet, although Mr. St. Quintin found that they would eat the common yellow violet which was no doubt their foodplant where we caught the insect. The young larvæ were quite black, but after what I believe to have been the first change of skin (it *may* have been the second), the only one I got safely home had four conspicuous bright yellow spots on the 4th, 6th, 8th, and 10th abdominal segments, on either side. In this condition I placed it in the garden, protected from rain, but exposed to the air, on a plant of yellow violet. I found it again in May, strong and well and exactly the same as I had seen it in October.

It now fed rapidly and changed a skin, and the yellow spots became *dull*, and the caterpillar not so black. It changed one more skin, and then its appearance was as like as possible to the figure of the larva of *Brenthis selene* in Hoffman's book of the larvæ of the lepidoptera of Europe. The spines were of a dull yellow or red tint and the spots almost gone. I unfortunately crushed it on a leaf when it had hung itself up for pupation at the end of May.

NOTES ON COLLECTING, Etc.

Senta ulvæ and Leucania obsoleta at Rochester.—It has long been known that *Senta ulvae* and *Leucania obsoleta* were to be taken in most of the Thames marshes between Dartford and Sheerness, but it appears not yet to have been recorded from the Medway marshes. I have, therefore, pleasure in recording single specimens of these species from the Rochester district during the last day or two.—J. Ovenden, Frindsbury Road, Strood. *July 18th*, 1904.

Spring Lepidoptera in 1904.—For comparative purposes dates are always instructive. Compared with 1903, the spring of 1904, so far as vegetation and lepidoptera are concerned, has been very backward, as the following comparative dates will show: Sallows in bloom—1903, March 8th; 1904, April 1st. Hawthorn in leaf—1903, February 9th; 1904, April 2nd. Blackthorn in flower—1903, March 24th; 1904, April 22nd. *Pieris rapae* put in an appearance on April 19th, and *Selenia bilunaria* and *Anticlea badiata* were taken in the moth-trap on April 14th. Sallows were unworkable, as the bushes here are in very exposed situations, and a furious gale set in on April 1st, and lasted with but slight intervals till the 12th, by which time the blossom was pretty well beaten to pieces; then followed wet nights which finished off matters. Plum-blossom has so far proved unattractive, but one or two *Taeniocampa gothica* and some dilapidated *Hybernia marginaria* visited the blackcurrant blossom the last few nights of April. The small race of *Amblyptilia acanthodactyla*

found here certainly hybernates in the imaginal stage, as I generally take a few examples on the moor in the early spring, and the moth is plentiful in August. What is its likely foodplant on the moor? I do not think *Stachys sylvatica* grows there, at least I have not seen it anywhere near the spots where *A. acanthodactyla* occurs.—(Rev.) C. D. Ash, M.A., Skipwith. *May 2nd*, 1904.

Lepidoptera in Hants.—Spring insects seem to have been very late and extremely scarce in the New Forest. On May 3rd, I worked all day in the forest, and only obtained four *Boarmia cinctaria* and two *Eupithecia irriguata* after hours of searching. By the end of June, however, collecting has greatly improved and insects are fairly plentiful, although sugar is, up to the present, absolutely useless. The most important capture in this neighbourhood has been that of *Phryxus livornica*, of which species about a dozen have been taken. I had one brought to me on May 20th, but, unfortunately, it had been rather roughly treated. This specimen was kept in a tumbler for two or three days, and then transferred to a cigarette box, in which it laid one egg, which duly hatched, the larva now feeding on vine. Mr. Hooker had one brought to him a week after. Mr. McRae took three at rhododendrons, and Mr. Jackson three more. Dr. Crallan had two or three brought to him, one of which laid about twenty eggs, some of which he kindly handed over to me to keep mine company. Mr. Harpur Crewe, of Melton, took one which flew into his room, and Mr. Druitt, of Christchurch, saw one on several occasions, but failed to catch it, whilst Mr. Dallas also saw one which he failed to secure. Whitsuntide was spent at Lyndhurst, but insects were scarce and the weather bad. A few *Lithosia aurcola*, *Eupithecia pusillata*, *Bapta taminata*, *B. temerata*, etc., being taken, but only very sparingly, whilst sugar produced nothing. More recently in this neighbourhood I have been taking at dusk *Emmelesia affinitata* and *E. decolorata*, and during the day *Enthemonia russula*, *Nemoria viridata*, *Eulepia cribrum*, *Lithosia mesomella*, *Aspilates strigillaria* and *Phycis palumbella*. Good larvæ, such as those of *Nola strigula*, *Hylophila quercana*, *Boarmia roboraria*, *Asphalia ridens*, etc., have been almost extinct for the past two years.—R. B. Robertson, Southborne Road, Boscombe. *June 27th*, 1904. [Considering that the *Natural History of the British Lepidoptera*, vol. iv., was published before these 1904 specimens of *Phryxus livornica* were captured, and that it was there stated, on p. 150, that descriptions of the egg and first two instars of this species were still absolutely desiderated by European lepidopterists, we do sincerely trust that Dr. Crallan or Major Robertson has added, now that opportunity has occurred, these scientific details to our knowledge, and will publish the same. To simply rear a species like this for imagines (of which dozens of examples are available from dealers at a few pence each) appears to us to be purposeless, compared with the completion of our knowledge of the life-history of a common species, of which eggs and young larvæ, however, are rarely enough obtained.—Ed.]

Spring Lepidoptera.—Habits of Micropteryx aureatella.—Owing to cold winds very little could be done in the spring, either with larvæ or with perfect insects. Larvæ of *Agrotis agathina* have been very scarce, and only single examples have been swept where dozens would be obtained in an ordinary season. The same remark applies to

beating for larvæ of *Zephyrus quercus*, and *Cleora lichenaria* has not been seen in a locality where, in ordinary seasons, dozens might be beaten. Among imagines scarcely any spring butterflies were about. I only saw two *Cyaniris argiolus*, no *Pararge egeria*, a very few *Enchloë cardamines*, and *Pieris napi*. The light traps have produced very little—only a few *Nola confusalis*, *Lithosia sororcula*, and *Peridea trepida* (one a ♀, the first I have taken at light), and usually common things have occurred, but very sparingly. There were no suitable days for Micro-collecting, owing to high winds, until May 25th, on which day I got a few of the commoner ones, and turned up *Micropteryx aureatella*. In the *Ent. Record*, xiii., p. 302, I recorded the finding of this species by beating it from a Scots fir among heather and bracken, about 4.30 p.m., on June 6th, 1901; I had not seen it again until the 25th inst., when I found it flitting about freely between 4 p.m. and 5 p.m., just over bilberry on the outskirts of a mixed wood of Scots fir, spruce fir, and larch. I beat several of the trees to see if they were sitting on the branches as in the previous instance, but did not beat any. They seemed to come up from the roots of the bilberry, and then flit about in the hot sun, occasionally settling on the bilberry. I repeatedly saw them come up like this from the roots. They were found spread all along the edge of the wood for about a quarter-of-a-mile.—E. F. Studd, M.A., Oxton, Exeter. *May 28th*, 1904.

Spring Lepidoptera.—I had the pleasure of breeding a male *Nyssia lapponaria* on April 15th, the only moth obtained from six pupæ sent to me last year. Cases of *Coleophora laricella* were abundant on the larches near Thorndon Park on April 17th, *Anticlea badiata* commenced to emerge on the 19th, whilst on the 23rd, at Benfleet, fully exposed on the upperside of a leaf of *Statice limonium*, was a larva of *Aydistis bennetii*, three-eighths of an inch in length, green, rosy laterally, head almost lost in the large 1st thoracic segment. I was at Benfleet on May 14th, and again found a single larva of *A. bennetii*. This was adult, quite hidden at the base of a leaf, and closely resembled the description in the *Entom.*, xvi., p. 27. At North Shoebury, on April 24th, I found a larva of *Platyptilia gonodactyla* in a stem of coltsfoot, about two inches below the receptacle. These plume larvæ were duly sent to Mr. Bacot. On May 6th *Coccyx argyrana* commenced to emerge from oak-galls gathered near Thorndon Park, but by far the best thing obtained from those galls was a larva of *Orygia gonostigma*, which had evidently hybernated in one of them. On May 22nd, near Thorndon Park, *Coleophora murinipennella* was flying among *Luzula*, and *Eupithecia lariciata* and *Tephrosia bistortata* were on the larch trunks, *Gracilaria omissella* emerged here on the 23rd.—F. G. Whittle, 3, Marine Avenue, Southend. *May 30th*, 1904.

Habitat of Callimorpha dominula.—The larva of *Callimorpha dominula* always occurs here on the river-bank, or within a short distance of it, feeding on comfrey. I have never seen it elsewhere in spite of the fact that its foodplant grows in many of the lanes.—E. Buckell, Romsey, Hants. *June 4th*, 1904.

Irregular hatching of the eggs of Ennomos quercinaria.—Larvæ of *Ennomos quercinaria* commenced to hatch from ova on May 23rd, and continued to come out in batches every few days for a fortnight. All the eggs were from the same female.—Ibid.

Micra ostrina in North Cornwall.—It may interest the readers of the *Entomologist's Record* to know that I took, on June 23rd, in North Cornwall, a single female specimen of *Micra ostrina*. The last record, I believe, according to Barrett, is 1880, but I have not searched the *Ent. Record* for anything later. I may add that, to substantiate the identity of the moth, it has been seen by Mr. Charles Rothschild, who has confirmed my idea as to what the species is.—L. S. Brady, 287, Glossop Road, Sheffield. *July 13th*, 1904.

Lepidoptera at Middlesborough.—On the few occasions on which I have been after insects, up to the day of writing, I have found them exceedingly scarce. Two or three visits paid to the *Tephrosia bistortata* locality, at Kildale, only resulted in eight or nine specimens being captured, the earliest on April 30th, when four perfect specimens were taken and two cripples noticed, others were captured on May 19th at Eston, when the four specimens taken were females. All the specimens taken were dark, and they all occurred among larch and fir. On June 4th I took a few *Stigmonota dorsana* flying, between 2.45 p.m. and 4 p.m., in the the sun, at Great Ayton with *Heliaca tenebrata*, the only sunny afternoon's collecting I have had up to the present. I have been trying to get a few *Melanippe tristata* for the last three or four weeks, a friend wanting ova, and have found the species most difficult to obtain, and, although it should have been well out a fortnight ago, it only seems to be now appearing. I took one specimen on May 23rd, another single one on June 4th (a ♀ which laid ova same day and these hatched on June 19th), another single specimen on June 12th, whilst on June 19th I captured three or four. I have found a similar difficulty in hitting off the time for other insects this season.—T. A. Lofthouse, The Croft, Linthorpe, Middlesborough. *July 4th*, 1904.

Lepidoptera at Castle Moreton.—The earlier part of the season was not at all productive here. Sugar has been, and still is, a total failure, and, during June, light attracted few things. Last Thursday, however, a change took place, and insects came freely to light in the house, and have continued to do so to the present time. The list of captures include—*Cidaria dotata*, *C. pyraliata*, *Hemithea strigata* (*thymiaria*), *Geometra vernaria*, *Timandra amataria*, *Acidalia imitaria*, *Anticlea rubidata*, *Eupithecia rectangulata*, *Malacosoma neustria*, *Porthesia similis* (*auriflua*), *Xylina lithoxylea*, *Hadena oleracea*, *Leucania rufina*, *Caradrina morpheus*, *Noctua plecta*, *N. augur*, and two *Hyboma* (*Acronycta*) *strigosa*. Many years ago I captured three or four examples of the latter species here, but had never seen it since until last Thursday, when I noticed one sitting on the wall of my hall, and my daughter took a second in the same place the following night. It appears strange that an insect should occur again after so long an interval. Yesterday a specimen of *Eupithecia succenturiata* was taken on the wall of my house, a species that I had never taken before.—(Rev.) E. C. Dobrée Fox, M.A., Castle Moreton Vicarage, Tewkesbury. *July 14th*, 1904.

Abundance of insects at light.—The night of July 8th was an extraordinary one for light in this part. On this occasion the electric lights between Stratford and Forest Gate were simply swarming with moths, mostly of common species, although I picked up with them four *Zeuzera pyrina*, *Apatela aceris*, and *Amphidasys betularia* var. *doubledayaria*. I was out again on the 9th, but the wind had changed,

and probably there was not more than 1 in 30 compared with the individuals seen the night before, the only insect worth taking being *Cossus ligniperda*.—A. W. Mera, 9, Capel Road, Forest Gate, E. *July 15th*, 1904.

Lepidoptera at light.—It may interest you to know that I observed at the electric arc lights on July 16th, at Purley, the following moths —*Amorpha populi*, *Oeonistis quadra* ♂, *Zeuzera pyrina* ♂, *Cossus ligniperda* ♀, *Arctia caja* ♀, *Spilosoma menthastri*, *Stilpnotia salicis*, *Euproctis similis*, *Eutricha quercifolia*, *Falcaria falcataria*, *Drepana glaucata*, *Cerura vinula*, *Phalera bucephala*, *Lophopteryx camelina*, *Pheosia tremula*, *Acronycta psi*, *A. leporina*, *A. megacephala*, *Leucania comma*, *L. pallens*, *L. impura*, *Agrotis putris*, *Hadena sublustris*, *H. strigilis*, *H. monoglypha*, *Dipterygia scabriuscula*, *Mamestra reticulata*, *M. oleracea*, *M. persicariae*, *M. serena*, *M. adrena*, *M. pisi*, *Caradrina morpheus*, *Agrotis exclamationis*, *A. corticea*, *A. nigricans*, *A. porphyrea*, *Triphaena pronuba*, *Cosmia trapezina*, *Dianthoecia conspersa*, *Cucullia chamomillae*, *C. umbratica*, *Plusia moneta*, *P. chrysitis*, *P. iota*, *Mania maura*, *Geometra papilionaria*, *Deilinia pusaria*, *Abraxas grossulariata*, *Xanthosetia zoegana*, *Pyrausta purpuralis*. This makes a total of fifty. I have taken many species not mentioned in this list, which merely refers to two or three lamps and about six hours' work. This is, unfortunately, a very unscientific way of collecting, but has served to show us many species new to the district and to be caught in no other way. The most interesting, perhaps, in the above list is *O. quadra*, which I have not seen out of the New Forest before. A week later I added the following, from practically the same locality, to the list—*Phragmatobia fuliginosa*, *Malacosoma neustria*, *Bryophila perla*, *Hadena ophiogramma*, *Dianthoecia cucubali*, *Crocallis elinguaria*, *Larentia unidentaria*, *Pachycnemia hippocastanaria*. I hope to be able to add to these during the next month.—Mervyn G. Palmer, 6, Court Road, West Norwood. *August 4th*, 1904.

Curious resting-habit of Mania maura.—Under the above title (*antea*, vol. xiv., p. 265) I referred to the "piling up" of this species. Anxious to see if it was accidental, I have kept a watch on the same spot and have again seen the same species resting in the same way in identically the same spot. On this occasion there were nearly twice the number. This was on July 27th, whereas last year it was early in September. A fact that rather worries me is how can such a large number of larvæ feed up under my eyes, so to speak, and yet escape my somewhat vigilant eye? The outhouse where they cluster is always closed, and there is only a small space, under an inch in width, over the door. On Sunday July 31st, I was interested to see a far larger number of the same species resting in an exactly similar manner under a sluice-gate bridge over the Eden brook, three miles from Edenbridge. In this instance they must have numbered 50 or more and occupied a space as big as that covered by the expansion of my two hands, and each one touching another.—Ibid.

Late appearance of Hybernia defoliaria.—Referring to the note on *Hybernia defoliaria* (*antea*, p. 212), the species is often (probably always) out in January, and may sometimes be taken very much later. In the middle of March 1893, in Epping Forest, I saw several females at rest on treetrunks whilst searching for *Nyssia hispidaria*.—Geo. T. Porritt, F.L.S., F.E.S., Edgerton, Huddersfield. *August 8th*, 1904.

PHRYXUS LIVORNICA AT BOURNEMOUTH.—Seeing in your last issue of the *Ent. Record*, the capture of *Phryxus livornica*, recorded by my friend Mr. McRae, perhaps it may interest you to hear that on the evening of May 22nd last I saw one settle on a bush in my garden, evidently exhausted, but on my approach it flew off before I could secure it. On the 23rd, my wife captured two specimens, ♂ and ♀, on the 24th another ♂, and on the 25th I took one more, unfortunately we missed others; there have also been several more taken here. —W. C. JACKSON, Malvern, Bournemouth. *August 5th*, 1904.

AGRIUS CONVOLVULI AND JOCHEAERA ALNI NEAR EXETER.—It may be of some interest to your readers to know that *Agrius convolvuli* has occurred here, a ♂ having been taken by my friend, Mr. Budd, on August 21st. It was found on the pavement, had hurt itself in some way as it could not fly, and had lost a good deal of its colour. I myself captured a larva of *Jocheaera alni* on elm, on August 22nd. Have you heard of any other captures of this larva this year?—F. BLANCHFORD, 16, Jubilee Street, St. Leonard's, Exeter. *August 23rd*, 1904.

COLEOPTERA.

COLEOPTERA IN THE DERWENT VALLEY, AUTUMN, 1903.—From the third week in September till the end of October the following insects occurred more or less commonly in the vicinity of Winlaton Mill:—*Carabus catenulatus*, Scop., *Notiophilus biguttatus*, F., *Loricera pilicornis*, F., *Anchomenus albipes*, F., *Bembidium rufescens*, Guér., *Dromius linearis*, Ol., *D. quadrimaculatus*, L., *D. melanocephalus*, Dj., *Creophilus maxillosus*, L., *Baptolinus alternans*, Gr., *Lathrobium brunnipes*, F., *Lestera longelytrata*, Goez., *Lathrimaeum unicolor*, Steph., *Rhizophagus dispar*, Pk., *Phyllodecta vitellinae*, L., including the rare blue aberration, *Chrysomela staphylea*, L., *Donacia versicolora*, Brahm, in Gibside, *Galerucella viburni*, Pk., on the guelder-rose, *Rhagium inquisitor*, F., *Rhinosomus planirostris*, F., *Otiorhynchus picipes*, F., *Strophosomus coryli*, F., and *S. capitatus*, De G., commonly. *Cychrus rostratus*, L., *Leistus spinibarbis*, F., and *Anchomenus fuliginosus*, Pz., occasionally. *Dromius quadrinotatus*, Pz., with *D. quadrimaculatus*, L., but much less commonly than the latter, and seeming to prefer plane trees and thorns, *D. meridionalis*, Dj., evidently local. *Halyzia vigintiduopunctata*, L., from tansy; *Rhizobius litura*, F., Gibside; *Triplax aenea*, Schal., from under bark of hollies, Hollinside; *Cerylon ferrugineum*, Steph., one specimen under bark of oak, Gibside; *Rhizophagus perforatus*, Er., from under the loose bark of a felled plane tree, near Lockhaugh; *C. ferrugineum* and *R. perforatus* are seemingly new to the Northumberland and Durham district. In a lingering flower of meadow-sweet, near Gibside pond, I took a small yellow *Epuraea*, of which, when identified, I may have more to say. Single specimens of *Psylliodes napi*, Koch, *Thyamis luridus* var. *fuscicollis*, Scop., *Plectroscelis concinna*, Marsh., *Otiorhynchus sulcatus*, F., *Hypera suspiciosa*, Hbst., and *H. nigrirostris*, F., occurred on sallows and willows near Winlaton Mill, whilst *Grypidius equiseti*, F., *Erirhinus acridulus*, L., *Dorytomus validirostris*, Gyll., *D. pectoralis*, Gyll., *D. maculatus*, Marsh., *Sciaphilus muricatus*, F., and *Orchestes salicis*, L., fell in greater numbers. *O. stigma*, Germ., occurred not uncommonly on nettles. From wild cherry I took *Antho-*

nomus pedicularis, L., in plenty, and also a few examples of its rarer brother, *A. pomorum*, L., both occurring from the same tree and seeming very local. *Hypera punctata*, F., was taken on a rail at Hollinside, and near by I met with *Hylobius abietis*, L., resting on a reed. Another very interesting insect, namely *Anisotoma dubia*, Kug., was taken from long grass one evening early in October.—Richard S. Bagnall, The Groves, Winlaton-on-Tyne. *June 27th*, 1904.

Tachys parvulus, Dj., in the New Forest.—On May 6th last I took a short series of this rare little beetle, the smallest of our indigenous Carabidæ, in *Sphagnum*, near Lyndhurst. The beetle was not uncommon, but I did not spend much time over it, as I wanted to devote my attention to water-beetles. It rested in our list on a single specimen taken by Mr. Smedley at Wallasey, in 1884, till Mr. Champion took it in some numbers in Cornwall in 1897. Then Mr. Heasler recorded one specimen from the New Forest in 1902, and Mr. Champion one from Woking in the same year. I found *Paederus caligatus* in the *Sphagnum* at the same time.—Horace Donisthorpe, 58, Kensington Mansions, South Kensington. *July 14th*, 1904.

A few notes on waterbeetles in 1904.—I devoted some little time to fishing for waterbeetles in the early part of this year, not without success, and I thought that a few notes on the result might be of interest. The very wet weather of last year and the beginning of this seems to have been beneficial to the waterbeetles at any rate, as many species turned up in new localities, and in some numbers in different localities at about the same period of the year. In the New Forest, in May, I took *Haliplus variegatus*, *Pelobius tardus*, the well known screech beetle, and *Deronectes latus*, this is a new locality for this species, and it is also said to be only found in running water (see Fowler, vol. i., p. 170), but I fished it out of a small pond not connected with any running water, and I took it later at Hanwell, also in a stagnant pond. *Hydroporus lepidus*, *H. flavipes*, common in one pool on Beaulieu Heath, it was evidently a favourable year for this species as I took it again at Oxshott, and heard it was abundant at Woking. *Hydroporus pictus*, *H. obscurus*, *H. rittula*, *Rhantus bistriatus*, etc. I was working for *Agabus brunneus*, which I did not find, it really looks as if this species has disappeared, as it has not been taken now for a great many years. In Richmond Park the water-net produced *Bidessus geminus* in plenty, it is evidently a year for this species also, as Professor Beare, who has well worked the Park for waterbeetles, tells me he never took it there. I also took it at Oxshott, and hear it was likewise common at Woking. *Coelambus impresso-punctatus* was also abundant in several ponds, and *Hydroporus incognitus* turned up in numbers in one pond. I also fished a specimen of *Dytiscus circumflexus* out of the pond where *Pelobius tardus* occurs. At Hanwell I took *Hydaticus seminiger*, *Rhantus grapii*, *Coelambus impresso-punctatus*, which was very common, *Hydroporus granularis* and *angustata*, *Deronectes latus*, etc. At Sandown, Isle of Wight, *Hydroratus clypealis*, the object of my visit, was taken, though sparingly, as the pond was very full of water and weeds and difficult to work. *Cnemidotus impressus* (apparently not recorded before from the Isle of Wight), and *Hydroporus angustatus*, etc., occurred in the same pool. At Oxshott, a small pond there proved very prolific, the following species occurring—*Bidessus geminus*, *Coelambus inaequalis*, *Hydroporus lepidus*, *granularis*, *flavipes*, *pictus*, *memnonius*, *obscurus*, *pubescens*, *lituratus*, *planus*, *gyllen-*

hali, *tristis* (a so-called mountainous and northern species), *neglectus* (common), *angustatus*, *umbrosus*, *rittula*, *palustris*, *erythrocephalus*, *Agabus unguicularis*, *sturmi*, *femoralis*, *chalconotus*, *bipustulatus*, *Ilybius ater*, *Rhantus grapii*, *Colymbetes fuscus*, *Dytiscus marginalis*, and *Hydaticus seminiger*: not a bad haul for quite a small pond.—IBID.

COLEOPTERA AT RYDAL (CUMBERLAND).—I had a week's collecting at Rydal, in the lake district, from June 21st, and append a few notes. The weather throughout was bright and warm. Practically two distinct altitudes were worked, *viz.*, the shores of Rydal Water—about 186ft.—and the heights above it and Grasmere, from 1000ft. to 2500ft. RYDAL WATER.—By the wooded shores of this charming little lake, beetles were more abundant than on the heights. Sweeping produced most of the common species of *Telephorus*, and one or two examples of *T. figuratus*, Man. *Polydrusus micans*, F., was also swept, and on plants by the waterside I got one example of *Donacia cinerea*, Hbst., also *D. sericea*, L., and *D. thalassina*, Germ. This latter species appears from Fowler to be a southern insect, but was fairly common, whilst no specimens of the common *D. simplex*, F., were seen. The Longicornia were only represented by *Rhagium bifasciatum*, F., *Leiopus nebulosus*, L., and *Grammoptera ruficornis*, F. Under the bark of some fallen trees I took *Bembidium rufescens*, Guér., *Bolitochara lucida*, Gr., *Agathidium seminulum*, L., and *A. nigrinum*, Stm.; *Coeliodes rubicundus*, Hbst., was beaten from birch, and *Aphodius foetens*, F., occurred in dung in a field. *Dascillus cerrinus*, L., was extremely abundant, and along with *Corymbites cupreus*, F., and the ubiquitous *Phyllopertha horticola*, L., shared the honours of being the species most commonly seen. One *Lestera sicula*, Er., was also taken. THE HIGHER GROUND.—Working upwards, from trees about the base of Nab Scar, the height which rises immediately above the lake, some examples of *Telephorus obscurus*, L., were obtained, and one of *T. paludosus*, Fall. A dead crow furnished two specimens of *Silpha thoracica*, L., and sweeping produced *Athous niger*, L., *Podabrus alpinus*, Pk., *Apion marchicum*, Hbst., *Apion haematodes*, Kirb., and many commoner species. Fungus on a tree-stump yielded *Scaphisoma agaricinum*, L., and from another old tree, an ash, which was riddled with the burrows of *Sinodendron cylindricum*, I got *Melandrya caraboides*, L. About 2000ft. up, there were a number of peat-holes, from which I took *Hydroporus morio*, Dj., *H. tristis*, Pk., *H. obscurus*, Stm., and the common *H. gyllenhali*, Schiöd., and *H. pubescens*, Gyll., and also an *Agabus bipustulatus*, which may be ascribed to the var. *solieri*, Aub. One belated *Carabus arrensis*, Hbst., was taken running amongst the grass, but hardly any beetles were to be seen under stones. Indeed, as one ascended higher, it appeared as though the insect life diminished. *Pterostichus vitreus*, Dj., and *Patrobus assimilis*, Chaud., occurred, and, on the highest point touched, *Geotrupes sylvaticus*, Pz., was flying about, whilst in sheep-dung *Aphodius lapponum*, Gyll., and *Aphodius constans*, Duft., were obtained, along with *A. ater*, De G. An occasional *Notiophilus*, a few *Byrrhus pilula*, L., and some *Pterostichus strenuus*, B., completed the beetle-life of these heights. Probably it was too late in the season for good work. By the peat-holes above mentioned, I got *Donacia discolor*, Pz., and *Corymbites cupreus* var. *aeruginosus*, F., was extremely abundant, many of them being in difficulties in the water, along with *Dascillus cerrinus*, L. In conclusion, I desire to express my acknowledgements to Prof. T. Hudson Beare,

who has kindly verified the determination of various species.—James E. Black, F.E.S., Nethercroft, Peebles, N.B.

Agabus unguicularis, Thoms., and A. affinis, Payk.—Mr. Edwards' reply (*Ent. Record*, xvi., p. 187) to my note on these two species (*Ent. Record*, xvi., pp. 90-92) perhaps demands some rejoinder from me. That I did not inadvertantly transpose the specific names in my summary of specific differences, as suggested by Mr. Edwards, is, I think, obvious from the tenor of the rest of the article. I am, however, quite ready to believe that the shape, size, and position of the male tarsal claw may be variable in both species, as it appears to be in other members of the group, although, in all the specimens which I was able to examine, the character appeared constant, and the insistence by Thompson on it is marked. I should be the last, however, to question the accuracy of Mr. Edwards' observation in this particular, but I might point out that to assume the whole of the late Mr. Lennon's Dumfries captures to be *A. affinis* and the whole of those taken in Norfolk and other southern localities to be *A. unguicularis*, and then to find in any specimen of each group distinctive specific characters to separate them, is perilously like reasoning in a circle. It is, perhaps, needless to say that had I seen the passage quoted by Mr. Edwards from his "Supplementary list of Norfolk Coleoptera," I should have referred to it. I may state that since I wrote my note I have seen evidence that *A. affinis* may occur in the London district and I may perhaps be allowed this opportunity of saying that I should be very glad if captors of *the males* of either species would allow me to see them (unset) so that if possible we may arrive at some more satisfactory conclusion as to their respective distribution.—W. E. Sharp, F.E.S., 9, Queens Road, South Norwood, Surrey.

VARIATION.

Aberration of Hyloicus pinastri, Linn.—Mr. H. Marschner, at Hirschberg (Silesia), has a fine slaty-grey specimen of *Hyloicus pinastri*, which is sprinkled with few white scales and wants the three longitudinal dark lineolæ of the forewings. The two transverse bands of the forewings are almost extinct; of the outer transverse shade a trace on the costa is merely visible, and of the inner transverse shade only two traces, *viz.*, on the costa and in the discoidal cell. The white discoidal spot is faint, the apical streak present. The hindwings are typical. This specimen is a transition form towards ab. *grisea*, Tutt (1904), which is without the dark lineolæ or transverse shades.—M. Gillmer, Cöthen, Anhalt. *August 5th*, 1904.

The typical form of Phragmatobia fuliginosa.—Referring to your remarks in the paper on *Phragmatobia fuliginosa* (*antea*, p. 61), we are, in Sweden, well aware that Linné, in the *Fauna Suecica*, described the form *borealis*, Staud., but it is also quite clear that, in the *Syst. Nat.*, ed. x., p. 509, he described the form occurring in mid-Europe and southern Sweden, and, therefore, this must be taken as the type form. Some years ago I discussed this matter with Staudinger, who held the same opinion.—Chr. Aurivillius, Stockholm. *July 19th*, 1904. [We have, unfortunately, not the 10th edition of the *Systema Naturae* by us for reference at this moment.—Ed.]

CURRENT NOTES.

A meeting of the Entomological Club was held at Oxford, on July 2nd, Professor E. B. Poulton, F.R.S., etc., being the host. Dinner was served at Jesus College, and a very pleasant evening was spent. The following were the members and guests present:—The Junior Proctor; Messrs. H. R. Brown, Chitty, Collin, Dixey, Donisthorpe, Druce, Geldart, Jacoby, Jones, Lucas, Meldola, Trimen, Verrall and Commander Walker.

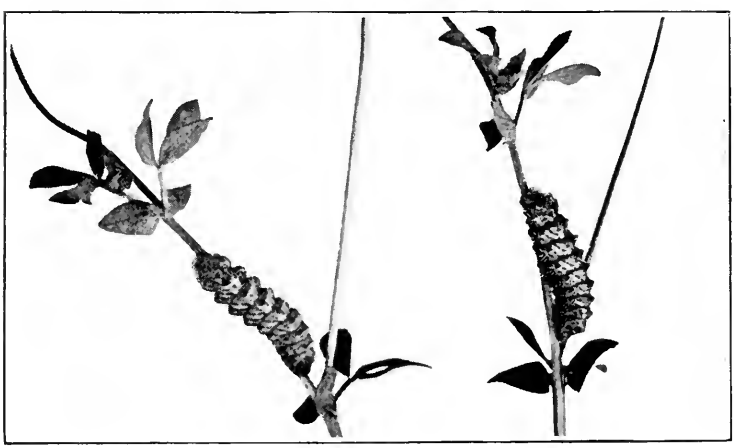
At the British Association meeting at Cambridge, in August, 1904, very few entomologists were noticed, among them, however, being Professor Poulton, Professor Beare, Dr. Sharp, Messrs. Collin, H. St. J. Donisthorpe, E. C. Lamb, C. Morley, G. H. Verrall, etc. Several very pleasant excursions were made during the stay, and Mr. Verrall, who had a houseparty, entertained 150 members of the Association to luncheon on the occasion of the visit to Wicken Fen. In the *Handbook to the Natural History of Cambridgeshire*, issued for the benefit of the members of the Association, a most useful and well got up little volume, the articles on entomology are as follows:—Orthoptera, by M. Burr; Neuroptera, K. J. Morton; Hemiptera, W. Farren; Coleoptera, H. St. J. Donisthorpe; Lepidoptera, W. Farren; Diptera, J. Collin; Hymenoptera, C. Morley.

The last monthly meeting of the Entomological Club was held at 27, Hereford Square, S.W., on Thursday, July 14th, at half-past six o'clock, when Mr. Arthur J. Chitty was the host. A large number of members and friends assembled, and were received by Mr. and Mrs. Chitty, an adjournment being made to the gardens of the Square before supper, which was served at 8.30 p.m. Among others present were Professor E. B. Poulton, Dr. F. Dixey, Dr. Joy, Colonel Swinhoe, Commander J. J. Walker, Messrs. R. Adkin, Donisthorpe, Elliot, T. W. Hall, Jacoby, R. W. Lloyd, Lucas, Morley, Porritt, W. E. Sharp, R. South, J. W. Tutt, Verrall, C. O. and E. Waterhouse, &c. An excellent supper was served, and a collection of the menu cards recently used will make a delightful souvenir of these friendly, and in every way desirable, social meetings. We hope, however, that those members who do not feel equal to these more elaborate functions, will have no compunction in still keeping up the simplicity of the early ones, and remember that we value friends because they are friends, and because we like them, and for no other reason whatever.

Herr M. Gillmer publishes (*Arch. Ver. Fr. Nat. Mecklenb.*, lviii., pp. 64-99) the second instalment of an "Uebersicht der von Herrn E. Busack bei Schwerin und Waren gefangenen Grossschmetterlinge," the present paper dealing with the *Sphingides*. It is an excellent piece of work, including more than the title implies, for a survey is given of the previous literature of this superfamily in Mecklenburg, with various notes on the life-histories, etc. The working-out of the variation of *Smerinthus* (*Amorpha*) *populi* is particularly "eingehend," being on the lines followed in Tutt's *British Noctuae* and *British Lepidoptera* with respect to the more variable species, even to the admission of some of the "double-barrelled" names for sub-aberrations, to which Rothschild and Jordan seem to take exception, such as "ab. *griseadiluta*," "ab. *pallida-fasciata*," etc. If the rest of the Macrolepidoptera are treated in the same exhaustive style, the work will form, when completed, one of the best faunistic lists—probably, indeed, the best—yet published in the German magazines.

1.

2



3.

Egg, Larva, and Pupa of Thestor ballus.

Life-History of Lophopteryx (Odontosia) cuculla.

By WILLIAM S. RIDING, M.D., B.A., F.E.S.

I received a few ova from Buckinghamshire about the middle of June. Colour, pearly cream-white with faint green tinge; form, somewhat less than two-thirds of a sphere with flattened base of attachment. Other ova laid by a ♀ bred from the above, in the middle of August, are pearly pale green; diameter, ·9375mm.-·95mm; height, ·5575mm.-·6mm.; surface, smooth. No depression about micropyle, but small, irregular, straw-coloured clouds are distinguishable through the shell-wall, about its usual situation. Some days before hatching the ova showed dark brown streaks.

Hatched June 26th-27th. Larva 2·25mm. in length; head, pale brown, half as broad again as body; body, pearly cream-white, narrowest posteriorly, tapering gradually from head; tubercles i, ii, iii, iv, v, vi, conical and prominent, each with a long, pale brown seta. A few of the setæ on the thorax are twice its breadth; other setæ scattered sparingly on the head. When alarmed, hangs by a silken thread. Feeds on the parenchyma of the underside of leaves of sycamore or maple. After two or three days the head becomes less disproportionate to the body, and the segments of the latter are more marked, so as to appear annular. The dorsal vessel shows as a dark line. June 30th, larva preparing to moult, and on July 1st sheds its first skin.

After first moult.—Head, pale brown, translucent, with darker mouthpieces; in form, annular, 4mm. in length; colour, pale green, translucent, with indistinct whitish dorsal and subdorsal lines; tubercles conical, with single black seta from each; spiracles very indistinct, with no edging. The larva now eats through the parenchyma of the leaf, making small holes.

After second moult.—July 5th.—The two lobes of the head, brown; clypeus paler, and prolonged between the lobes to vertex; form, less distinctly annular; length, 5·25mm.; colour of upper surface, whitish-green, like underside of sycamore leaf; subdorsal line, whitish; underside paler, with yellowish tinge; tubercles prominent, conical, shining, in darker area; prothorax, brown in front, with eight black tubercles, two in the middle and three on each side; setæ black, shorter; spiracles, distinct but very small, edged with black. On the 8th abdominal segment, a median hump, oval, bifid, each projection having four tubercles with black setæ; a circular row of hooks on prolegs. Larva growing rapidly.

After third moult.—July 8th.—Head, a little broader than prothorax, pale brown, translucent. A purplish-brown line separates clypeus from lobes on each side and vertex. On the upper part of the lobes, above the ocelli and antennal tubercle, there are three conspicuous purplish-brown tubercles with black setæ, forming a triangle with the apex upwards. On the clypeus the setæ spring from colourless tubercles, three from each of the lateral and middle ones. Length, 8mm.; colour of upper surface, green with narrow purple dorsal line; subdorsal line, white; dorsal hump on the 8th segment bifid, the two apices red-tipped, and separated by reddish-brown line, and the four black setæ on each spring from colourless raised tubercles. These represent tubercle i on each side. Tubercles on thoracic segments raised, purplish-brown with black setæ; spiracular line ill-defined, white with yellowish-green

October 15th, 1904.

tinge; spiracles, except first and last which are oval, rather round, small, and edged with black in paler circular area. There is another pale whitish-yellow line between the dorsal and spiracular, indistinct, also a brown interrupted line below the spiracles on a level with the base of the prolegs. Underside, pale brown; setæ on prolegs, colourless. The larva now, when at rest, raises its body upwards, posteriorly, forming an obtuse angle from the 7th segment. It eats the whole of the parenchyma and smaller veins from the edge of the leaf.

After fourth moult.—July 11th.—Head, pale grey-brown, translucent; clypeus and lines as before. On each lobe there is a purplish-brown blotch with a black tubercle and seta, and below it two other black tubercles and setæ forming a triangle with the apex upwards. Antennal tubercle and ocelli purplish-black; four delicate setæ on clypeus. Length, 10mm.; colour, pale brown, translucent, with primrose subdorsal line, and narrow purplish-brown dorsal line less distinct behind where the dorsum is primrose; hump on 8th segment very conspicuous, red-tipped, with reddish-brown furrow; tubercles, black and conspicuous on the head and first four segments. On abdominal segments, tubercle i is raised and prominent, becoming gradually less so from segment 1 to segment 8. The other tubercles are comparatively inconspicuous, with black setæ. On the pro-, meso-, and metathorax and 1st abdominal segment, there is a dorsal patch of leaden-grey colour extending laterally to the subdorsal line, and broadest posteriorly, and through the centre of which the purplish-brown dorsal line passes. Spiracles becoming more oval as developed, placed in primrose-coloured spots, forming with the ground colour a broken, indistinct spiracular line. The largest spiracle is on the 8th abdominal segment, and oval; that on the prothorax, oval, and a little smaller; and that on segment 7, oval, and smaller still again. The others are very small and somewhat more circular; all are edged with black. The line between the subdorsal and spiracular lines is mottled with greenish-grey and yellow; the line below the spiracles, purplish-brown and discontinuous. Characteristic position when at rest, as before, the angle formed with the body being sometimes nearly right. The anal prolegs generally are extended backwards and outwards.

After fifth moult.—July 15th.—Eats the softer parts of the cast skin. Length, 20mm; head, pale translucent green with purplish facial lines, and a dark brown line on the posterior edge of each lobe; tubercles and setæ, less distinct; clypeus, much flattened; upper surface of body, pearly-white with faint greenish tinge; below and on the sides, green, shading off into the paler upper surface; patch on dorsum, greenish lead-colour, widest on metathorax and 1st abdominal segment, narrowing to front of mesothorax and prothorax. On the latter the median purplish line is conspicuous, but only traceable through the patch as a darker shade. Behind it the line is green and thickest in the centre of each segment, becoming faint on segment 10. Segments 2, 3, 4, 5, 6 now appear prominent in the centre, from the raised conical pale tubercles i on each side. These are largest on segment 2 and become gradually less to segment 7. Abdominal segments wrinkled posteriorly, showing traces of three subsegments. On the thoracic segments tubercles i, ii, iii are black, with black setæ, and very conspicuous. On the prothorax tubercles i are close together on each side of the dorsal line. Tubercles ii and iii are represented by three

tubercles on the upper edge of the subdorsal line and in it, and arranged as a triangle with apex behind. Tubercle iv is represented by two large black tubercles close together and above the spiracle, and tubercle v is in front of and below it. Tubercle vi is represented by two black tubercles close together in the subspiracular brown line. On the meso- and metathorax where there are no spiracles, tubercles iv and v are represented by three tubercles and setæ arranged in a semicircle, concavity facing backwards, and tubercle vi is in a whitish area in the subspiracular line. On abdominal segment 1, tubercles i and ii are in the normal position and conspicuous, tubercle iii in the supraspiracular region, tubercle iv is very small and inconspicuous and postspiracular. Tubercle v is subspiracular, and tubercle vi is made up of three tubercles, two above in whitish area in the subspiracular line, and one less conspicuous below. Tubercles i on the other abdominal segments are not so conspicuous as before. On segment 2, tubercle ii is represented by an inconspicuous black dot and seta; tubercle iii is large and black. On segments 3 to 10 tubercle iii is black, but smaller, and placed in paler area. The other tubercles are similar, but inconspicuous, except on segment 7, where tubercles iv and v are black and on the same level below the spiracle, and there is a delicate seta behind in the usual position of tubercle iv. On segment 8, tubercle iv is indistinctly represented immediately behind the large spiracle, and has two black setæ, and tubercle v is very conspicuous and below it, as usual; the tubercles forming vi are placed in a greyish-green shade below the spiracles, and are three in number with black setæ in whitish area, and on segments 1 and 2 are arranged in the form of a triangle, apex downwards. On segments 3, 4, 5, 6 the setæ forming tubercle vi are linear, one in front and two nearer together behind; on segments 7, 8, 9 there are only two, and on segment 10 one; the tubercles forming vii are colourless, with colourless setæ. The hump on segment 8 is very prominent, bifid and red-tipped, with eight black setæ. The larva is now narrowest in front, tapering from the middle. At rest it raises its anterior extremity upwards from the 1st abdominal segment, as well as its hinder from the 7th.

After sixth moult.—July 20th.—Length, 30mm.; larva, stouter, and eating greedily, as shown by the frass; colour, pearly-white on dorsum, pearly-grey mixed with primrose on the sides; subdorsal lines, primrose; there is a mottling of both colours in the supraspiracular region, shading off above and below; undersurface, whitish-green; dorsal patch, greener than hitherto; tubercles and setæ, as after fifth moult, only less conspicuous; clypeus, much flattened; prolegs, pinkish; appears to be nearly fullfed. One larva has much more green in its colouring than the other. On July 21st the two larvæ were still feeding greedily. All the markings similar, but paler and less defined. Length when extended 30mm., when at rest, in characteristic position, measures about 25mm. On July 22nd one larva became glaucous-green, losing its yellow colour, and the other, a more whitish-green, retaining some yellow; both becoming shorter and stouter with less distinct markings. They remained in this state for two or three days, and then changed into pupæ on the surface.

Description of two pupæ.—Smooth, shining, blackish-brown; one, 18mm. long and 6mm. at its broadest part (5th segment); the other, 17mm. and 5mm. The pupa tapers gradually to the anal extremity,

which is rounded; the anterior extremity is blunted, and, in the largest, measures 4mm. across. The separations between segments 5-6, 6-7, and 7-8 are deeply incised broadish grooves, especially the first two, and there is a smooth paler membranous band on the posterior part of segments 5, 6, and 7, edging the deep incisions, that on 7 being less marked. The separation between segments 8-9 is distinct, and the markings of the other segments can be distinguished; segments 8, 9, 10 are consolidated; segments 1, 2, 3, 4 are well-marked where they appear between the wing coverings; the spiracles are distinctly defined. At the anal extremity, which is rounded and shining, two slightly raised knobs, one on each side, with a row of seven or eight short linear projections between them in the centre, are found on the dorsal part, on close examination with a magnifying glass, and below these two longer linear projections in the centre with two slightly raised knobs on the sides nearer together than the upper ones. The segments are closely pitted, especially on the chitinous edges of the deep incisions. A male (probably from the smaller pupa) and a female emerged unexpectedly on August 12th-15th, and the latter had deposited some ova before she was noticed. She laid 145 ova, mostly in batches in a single layer, but a good many scattered. These ova are pearly-green, differing in this respect from the parent ova, which had only a very faint greenish tinge.

Variation of Leucania favicolor.

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

In the *Ent. Mo. Mag.*, xxxii., p. 100, Mr. C. G. Barrett described a new Leucaniid, four examples of which were captured upon the Essex coast in July, 1895, by Mr. G. F. Mathew, under the name of *Leucania favicolor*. On June 3rd, 1896, these specimens were exhibited at a meeting of the Entomological Society of London. After a somewhat cursory examination of the specimens made at the meeting I came to the conclusion that the specimens were probably a form of *Leucania pallens*, with an elbowed line of black dots, parallel with the form *L. impura* ab. *punctilinea*, and embodied my opinions in a note published in the *Ent. Record*, vol. viii., pp. 133-135. The differences between *L. pallens* and the new species were, however, pointed out. Mr. Mathew, convinced of the distinctness of the Essex species, has worked steadily at it ever since, and now, having at last reared it from the egg, and worked out its lifehistory, has submitted to me for report an excellent series of the insect, in splendid condition, and quite convincing as to its right to be considered a distinct species. The specimens under examination are twenty in number, and exhibit a wide range of variation. In order to bring our knowledge of its variation in line with that of the other allied species, the aberrations of which we have summarised, described, and named in *British Noctuae and their Varieties*, vol. i, I append a summary of the forms just now under examination.

Barrett describes the type as being of "a smooth soft honey-colour, or colour of the honeycomb (a shade of buff difficult to describe); the nervures faintly perceptible, but not paler in colour; a black discal dot; the elbowed line indicated by faint blackish dashes." We do not think Barrett's choice of colour tint very descriptive of the actual specimens he examined, but we can apparently devise nothing better. So far as

the ground colour of the forewings and the markings thereon are concerned the grouping of those under examination is easy enough, but there is also a wide range of variation in the hindwings, of which the palest are whitish, with the nervures somewhat darker, whilst the darkest are suffused all over their area, except the fringes, which, in all cases, remain of the ground tint; this difference in the tint of the hindwings is not sexual. Leaving out of account this variation of the hindwings we have (with one exception) four distinct colour groups represented in these specimens:—

1. Bright yellow-buff, with discal dot and two dots representing elbowed line = ab. *lutea*, n.ab.
   Bright yellow-buff, with discal dot and a row of dots or tiny dashes representing elbowed line = ab. *lutea-typica*, n.ab.
2. Wainscot-buff, with discal dot and two dots representing elbowed line = ab. *obsoleta*, n.ab.
   Wainscot-buff, with discal dot and a row of dots or dashes representing elbowed line = *favicolor*, Barrett.
3. Rufous-buff, with discal dot and two dots representing elbowed line = ab. *intermedia*, n.ab.
   Rufous-buff, with discal dot and a row of dots representing the elbowed line = ab. *intermedia-typica*, n.ab.
4. Deep reddish, with discal dot and two dots representing the elbowed line = ab. *rufa*, n.ab.
   Deep reddish, with discal dot and a row of dots representing the elbowed line = ab. *rufa-typica*, n.ab.

One of the ab. *lutea-typica* has sufficient longitudinal shading between the nervures of the forewings to hint that, in its extreme form in this direction, the species is quite capable of producing an aberration parallel with *L. straminea* ab. *nigrostriata*, whilst another, placed by Mr. Mathew among the typical group, has the forewings of such a distinct dull clayey tint that it reminds one of certain specimens of *Noctua castanea* ab. *neglecta*, and, in addition, the fringes of the forewings have a decided rosy flush that is common in the latter species; the hindwings, too, are especially dark and suffused from the outer margin to the base; this, in order to draw due attention to it, I have called ab. *argillacea*, n.ab. It appears to be desirable that Mr. Mathew should select as many of these specimens as possible, as the absence of the yellow tint that is conspicuous in the ground colour of the type is in this so conspicuously absent. The ground colour of the type is, in fact, a combination of the distinct yellow of ab. *lutea*, and the clayey or putty-grey hue of ab. *argillacea*. The red of the most extreme forms of ab. *rufa* is very intense, and is of the red of *Leucania albipuncta*, and not merely the wainscot-red of *L. pallens* ab. *ectypa*, or *L. straminea* ab. *rufolinea*. The yellow aberrations are particularly beautiful and distinct. Mr. Mathew tells me that "from ova from this form he bred typical and red examples, but none like the parent; the apex of the wings of this aberration appears to be slightly less acuminate than those of the type; it appears to be a rare form." Of the typical forms under examination Mr. Mathew notes: "These do not quite agree with Barrett's description of the insect, being much darker, probably due to their finer condition." Further comparison with the various forms of the allied species as described in *The British Noctuae and their Varieties*, vol. i., pp. 30-42 would no doubt prove interesting, but space forbids.

There is really no further need, in the face of Mr. Mathew's fine bred specimens, to attempt to assert its specific distinctness. With

this material it is self-evident. The two species with which it shows the closest alliance are *L. pallens* and *L. straminea*, nearer to the latter than to the former in shape of wing, scaling, and markings, and nearer to the former in structure of thorax and no clear development of prothoracic crest. The scaling is exceedingly smooth and silky-looking, as much so as is that of *Calamia phragmitidis*. The main comparative features between this species and *L. pallens*, relating both to structure and habits, are summarised by Mr. Mathew as follows:—

1.—*Leucania faricolor* appears from three to four weeks in advance of *L. pallens*.

2.—Its general appearance when alive, at sugar, is very different. *L. faricolor* generally sits on the sugar with wings horizontal and quivering, is very shy, and flies off the moment the light is thrown on it, so that one has to be quick in order to secure it in the net as it flies off. *L. pallens* sits with wings closed over its body, and is not shy.

3.—*L. faricolor* is a very much larger and more robust insect than *L. pallens*.

4.—The forewings of *L. faricolor* are much broader, smoother in texture, and without the raised veins of *L. pallens*.

5.—The larvæ are more robust and of a ruddy colour, and are more like those of *L. litharyyria* than those of *L. pallens*.

6.—The moths reared this year were from eggs laid by three different females, and not one of the moths bred in anyway resembles *L. pallens*.

7.—The variation runs into distinct aberrations, which, although in a sense parallel, are entirely different from those of *L. pallens*.

It may be interesting to add that the species may be partially double-brooded, as, on the night of August 27th, Mr. Mathew took four beautiful fresh specimens at sugar. This, he considers, is probably due to the fine warm summer we have had. These examples are a trifle smaller than those of the spring brood, which fact, probably, is to be accounted for by a shortage of food, for the salt-marsh where the species occurs has been completely burnt up, instead of being clothed, as in most seasons, with a luxuriant vegetation.

Mr. Mathew proposes to exhibit a selection of specimens of this species at one of the meetings of the Entomological Society of London to be held this autumn.

Notes towards a life-history of Thestor ballus (*with three plates*).

By T. A. CHAPMAN, M.D.

Last spring (1903) Mr. W. H. St. Quintin sent some eggs of *Thestor ballus* to Mr. Tonge, who obtained photographs of them (pl. xi., fig. 2) and preserved larvæ in the first stage (pl. xii., figs. 1-2), from which the description here recorded is taken. These larvæ unfortunately died. Later Mr. Powell sent me some small larvæ, which I received on May 18th, 1903. They were accompanied by some scraps of *Anthyllis tetraphyllus*, which soon were useless as food. Mr. Powell most kindly sent also, in a separate parcel, several living plants, but as the Post Office chose to detain these for ten days, they also were useless, though two of the plants recovered in the garden, and flowered later in the season. I, therefore, was forced to give the young larvæ *Lotus corniculatus*, and this appeared, both at once and for the rest of their exist-

ence, to suit them admirably, no deaths occurring except by accident and to preserve specimens. The following notes were taken from time to time, and as, probably, notwithstanding their incoherence and repetitions, they will be more descriptive of the progress and appearance of the larvæ than if I were now to edit them, I present them as originally written. All the photographs are by Mr. Tonge from the actual specimens, and the diagrams are copied from my rough notes.

LARVA.—*First instar* (From a larva, well-grown in this stage, preserved in formalin; pl. xii., figs. 1-2):—Structure well-shown, colour, of course, doubtful, a somewhat ochreous-yellow, with head, first thoracic plate, hairs, legs, and proleg crochets, black, the hairs, however, pale at tips. Length 1·6mm., thickness 0·3mm., longest hairs about 0·3mm., hairs spiculated, general surface closely beset with darker points, apparently finely spiculate. The abdominal segments have, on either side, three dorsal hairs, and of these the front one is about a fourth the length of either of the others; these are on the same zone of the segment, one a little nearer the middle line, the other further out than the front one. At an interval below are two hairs about half the length of the dorsal ones, these are nearer to the spiracle than to the dorsal group; they are nearly as far apart as the lower one is from the spiracle, the upper one is in about the same zone as the spiracle, the lower one distinctly behind. Immediately below the spiracle is a group of three long hairs, very close together, one is immediately below the spiracle, the other two behind, one rather above and the other below the first. A little below and behind these three is another rather long hair, it is, indeed, very close to them, and tempts one to describe it as of the same group, its chief distinction is that the three hairs keep together outwards and rather upwards, this one keeps itself separate from them and inclines backwards. Below these again, at some distance, there are, on abdominal segments 3, 4, 5 and 6, halfway between these four and the prolegs, two shorter hairs at the same level, one pointing forwards, the other backwards. On 1, 2, 7 and 8, only one central hair occurs in this position. They, however, possess ventral hairs (in place of prolegs). Immediately above these and between them (on 3, 4, 5, and 6) is a large conspicuous lenticle, another lenticle is conspicuous between the dorsal and supraspiracular groups of hairs. This one occurs also on the 2nd and 3rd thoracic. The thoracic plate is simple, straight behind, rounded to the ends in front, each side with three hairs and a lenticle in front towards the outer end. The first spiracle is quite at back of segment, a little higher than it, and in the middle of the segment is a large lenticle (more like a spiracle than the spiracle itself), between it and the plate are three long hairs, tolerably in line from back to front, another in front of it, and a fifth immediately below it. Two stouter hairs are some way below, toward legs, and are repeated on the following segments, looking identical with the similar hairs above prolegs. On the 2nd and 3rd thoracic segments the three dorsal hairs are the same as on the abdominal, *viz.*, two long and one short on either side. Below these are five hairs representing the circum-spiracular groups (iii, iv, and v ?) of the abdominal segments, of these, four are in a transverse line a little behind the middle of the segment, and one a little in front between the two upper ones. On the 8th and 9th abdominal segments there is a little difference in the arrangement of the dorsal hairs, not determinable in specimens. The anal plate

carries about ten hairs and some lenticles. The claws of the true legs have a very sharp bend close to their bases, making them somewhat recurved, that is, when flexed they point towards the base of the leg. The prolegs present three anterior hooks, two posterior, and a central pad, the third group of hooks is not made out. The anal claspers have apparently three groups of 2, 2, and 1 crochet respectively.

? Second instar (Received on May 18th from Mr. H. Powell, stated to be in second skin, pl. xii., fig. 3):—Length 2·6mm., black head, dark plate on 2nd segment, general tone of colour reddish-brown. The larva is rather thick, about 0·5mm., with long black and white hairs (0·3mm. long). The form of the larva is flattened towards the last segment, and each segment is rounded up, *i.e.*, the incisions are marked, not as narrow slits, but by each segment being cushioned out between them; but the characteristic Lycænid form of the sides being a flattened slope from the dorsal to lateral region, and the head being retractile, is not observed. The larvæ happen to be active, and might have their heads more retractile when quiescent, but the head is too broad for this to be pronounced, being nearly ·34mm. wide. The plate on prothorax is rather narrowed laterally, but not quite pointed. The colour of the prothoracic segment, apart from plate, is pale ashy, nearly white; incision the same. A not altogether narrow dorsal, reddish or reddish-brown line; then, in the trapezoidal region, a nearly white eminence, occupying the subdorsal area, except the incisions. Below this, down to a rather paler lateral flange, the colour is reddish like the dorsal line. Abdominal segments 7, 8 and 9 are reddish, without the paler areas. The hairs are a marked feature of the larva. On the whitish subdorsal boss (2nd abdominal actually described, as being fairly typical of the whole series) are seven large hairs, on dark (nearly black) raised conical bases; five of these hairs are black and two white; there are also six or seven much smaller white hairs, on similar (but much smaller) conical bases. Below these and above the spiracles are three similar dark hairs and four smaller (but not so markedly smaller as are the dorsal ones); one of these is near the posterior margin, directly behind the spiracle. Below the spiracle is again a group of three large, two or three intermediate, and three (or two) small ones. The spiracles themselves are black, and slightly raised; they are at first apt to be confounded with certain brown chitinous circles of about the same size. These circles (very similar to those seen in larvæ of *Spilothyrus lavaterae*) are (on 2nd, 3rd, 4th and 5th abdominals, which happen to be most easily seen in specimen examined) a large one (slightly larger than spiracle) above and a little behind spiracle; a rather small one, on same horizon as the supraspiracular, close to dorsal lines; and one intermediate in size halfway between these and near anterior border of segment. These three are always present; two others, frequently apparently absent, are of intermediate size, one on top of white boss, and one at its posterior border. On the pale lateral flange are three larger hairs, seven or eight intermediate and small ones, and one small brown ring. Below this is a reddish area with only one small hair, sometimes none, sometimes two, one at each margin; then a pale area with one intermediate and six small hairs, and one small circle; then a reddish space, followed by the proleg, whitish, with nine or ten small hairs. On the 1st and 2nd abdominal segments the proleg area carries five or six small hairs in a transverse line near the anterior border. The proleg carries hooks

in three sets; assuming a complete circle, these three sets are at the outer margin, and, at the anterior and posterior points of the inner margin, about 120° apart. Each of the two inner sets consists of two hooks with an abortive chitinous point between them; the outer one of only two chitinous points; that this represents hooks at all is no doubt quite open to dispute (pl. xiii., fig. 1). The anal proleg is identical, except that the outer hooks (?) are not represented. The chitinous portions of true legs are black, and the hooks are nearly straight after being sharply bent at their bases (pl. xiii., fig. 2). In a full-grown specimen in this skin, the reddish spiracular area is more pronounced forwards and dorsally, slightly outlining the oblique bar of later skins.

? Third instar: — In this stage the larva is 3mm.-3·5mm. long, and has now the characteristic Lycænid form, *viz.*, a marked marginal flange, from which the sides slope up to a narrow, but rather flat, dorsal plane, this dorsal plane includes the 1st thoracic segment, or almost does so, but stops abruptly with the 6th abdominal segment; then the following segments form a slope to the latter part of the marginal flange. The marginal flange is yellow, as is also the dorsal plane, the slopes being reddish. This broad description, however, requires certain prominent markings to be noted in modification of it. Dorsally, there is a deep purple-brown, almost black, line spreading out on the mesothorax, with rather bright red wings, on a transverse line to meet the red lateral markings. The prothorax has a marked black dorsal plate. The reddish slopes are a dull purplish-red. On the first six abdominal segments, and nearly as marked on the last two thoracic ones, they present marked oblique red lines sloping backwards and ventral (reverse to *Sphinx* larval lines). Below these, the red is modified by two paler (yellowish) clouds on each segment, being close below the oblique lines; the forward is more dorsal. In the centre of each of these oblique bands on the six abdominal segments (but not on the thoracic) is a hollow or depression, its margins a little darker, the bottom paler, longest in an antero-posterior direction, and slightly expanded at the ends in some cases. These margins of the hollow appear to overhang a little. In looking for the lenticles of the previous skin, it seems at first that they are wanting. A small one, with very dark margin, exists on quite the dorsum of the 2nd thoracic. On the 2nd, 3rd, and 4th abdominal segments, minute rings exist towards the front margin of segments, in line with the hollows above noted. These might, so far as their appearance goes, be hair-spots that had lost their hairs. On the abdominal segments also, near the middle line towards the front of segment, is a minute, dark, chitinous tubercle, with, perhaps, an indication of a paler summit. A small raised tubercle also exists above the spiracle where the lenticle occurred in previous skin. This is a black ring with plain centre, smaller than lenticle of previous skin. Two exist on each side of the 7th abdominal segment. On the 7th, the spiracle is much higher than on the 6th, and, on the 8th, it is very large and quite dorsal (nearer middle line than to flange). The long (·4mm.) spiculate hairs are much as in previous skin, but are (comparatively) smaller, the dorsal group (on yellow back) are about ten in number, with four or five of them larger, and two or three of these black, the rest white; two or three more are on the yellow dorsal colour where it stretches down above the oblique band, at the posterior margin of the segment. Round the spiracles is another group, of which

one, just below the middle of the oblique band, is black ; another black one is on the upper margin of the yellow lateral band (and flange); the others are white, some large, some small. There is, however, really, no very definite grouping into regions by intermediate hairless areas, except, to some extent, just below the dorsal group. The reddish colouring, being divided by the two yellow areas noted, presents a narrow yellow band above the yellow flange, which sometimes seems to be a continuation of the oblique stripe of the preceding segment, or, in a yellower specimen, the red is reduced to two oblique stripes, the lower all but horizontal. The black prothoracic plate is a small islet, sunk in rather a hollow ; it is diamond-shaped, its long axis transverse, its length about one-third that of the segment, and its width about one-quarter that of the segment, nearly half the segment being in front of it ; this in a well-fed larva. The hooks of prolegs are as in previous skin, except that the two inner groups of hooks are three or four in number, with one or two black points, and the outer series have no definite hooks, but are two to four in number, varying in each foot.

? Fourth instar (May 23rd) :—Length 6·5mm., quite Lycænid, with definitely hexagonal transverse section ; the three upper sides apparently the larger, but so far as can be made out really not so (pl. xiii., fig. 3); the width (when inactive) about 2·2mm., seen dorsally it is a yellow caterpillar with reddish-black markings, seen laterally a reddish caterpillar with a few yellow markings. The level (?) dorsal side (of the hexagon) presents down the middle line, beginning on the mesothorax, a dark but reddish dorsal line to end of 6th abdominal, on either side of this, each of these segments presents a rounded eminence of bright yellow (except on mesothorax, where the yellow is overlaid by a brick-red shade), carrying many hairs. The 7th, 8th, and 9th abdominals slope backwards, and cannot be said to show a differentiation into dorsal level or lateral slopes, they are also of a tolerably uniform reddish colour, with darker (but not so dark as in front) dorsal line. On the 7th and 8th abdominals the spiracles are very conspicuous as black spots, somewhat dorsal on 7th, very much so on 8th. They are smaller but equally conspicuous on the other segments, but less visible on a dorsal than a lateral view. The prothorax presents the diamond-shaped plate, which, with nearly black margins, has a yellow centre. The plate is small in proportion to the segment, and is in a depression, the segment in front of it swelling up into a large prominence, giving a curious lateral outline, and suggesting a false head (pl. xiii., fig. 4). The lateral flange is strongly marked, and swells out at each segment, giving the lateral outline seen from above a series of curves and not a straight margin. Its yellow colour is obscured by a slight tendency to flesh-colour, which seems to be reddish on the 7th and 8th abdominals. The same flange structure passes round the posterior margin of 9th, and is here yellow ; this is not, of course, lateral flange, but is continuous with it. The lateral slopes between the yellow dorsal prominences and the lateral flange are yellow as regards the portions of the dorsal prominences that pass down into the slope at posterior halves of segments. On the 2nd and 3rd thoracic, and 1st, 2nd, 3rd, 4th, 5th, and 6th abdominal, segments, is, on each segment, an oblique narrow stripe, passing from top of slope in front downwards and backwards to spiracle of following segment (except, of course, 2nd thoracic). In some degree as an actual fact,

but largely as an effect of shading, this line seems to be depressed, its colour is purplish-red. Below this to the flange the hue is of a flesh-colour, with tendency to yellow around and above spiracles. Below the flange, flesh-colour all round, the lower surface also, a little paler at prolegs. Head and true legs black, except labial and maxillary regions. The hairs, black and white, are long and numerous, and give a darker aspect to the larva in its general appearance than the actual skin-colours produce. The very spiculate hairs are now more regularly distributed; over each of the dorsal bosses are about twenty-four hairs, the central rather the larger, the marginal a little smaller, and elsewhere the distribution is of fairly equal-sized hairs, but smaller at margin of segments. No very definite relative distribution of black and white hairs is determined, but possibly exists. The lenticles are now very small, about the size of the hair-bases or much less, and some of them are so far related to hairs as to have rounded instead of flat centres. Their distribution is irregular, not being even symmetrical, each segment generally has one on each side of the dorsal line in front, and one or two after, laterally they are rather numerous, and on the 7th and 8th abdominal segments they are quite crowded. The prolegs have a very curious and elaborate structure, which was, in a slight degree, present in the previous skin. The three sets of hooks already described still exist. Each of the two inner sets now consists of seven or eight hooks, of which several are very large, but the two sets form an arrangement similar to the one-sided macro-proleg; they are separated from each other by a little space. Just outside this space or notch, and overlapping it, and, in some degree, the hooks of the two sets when the hooks and leg are in action (*i.e.*, holding on), is a tall fleshy process, tall by being on a short pedicel, and terminating in a retractile margin, just like either of the sets of hooks, except that it is fleshy only, with a sharp margin, but no hooks. The third set of hooks is still represented by two (one or three sometimes) black chitinous points. The hairs, and this is most conspicuous in the dark hairs, are still on a raised base, but this is now comparatively small and short, is, in fact, little different from the ordinary hair-base, a small hemispherical eminence, except that it is colourless, *i.e.*, not brown or black, with the curious exception that seven or eight fine black lines, not apparently superficial, radiate to its margin from the actual hair (pl. xiii., fig. 5).

May 27th, apparently still in fourth skin, but much larger; 9·8mm. long, and 2·6mm. wide; nearly 11mm. long when stretched. Whether stretched or at rest, the hollow of the prothoracic plate is remarkable, as is also the flat dark dorsal surface of the 7th, 8th, and 9th abdominal segments. The 7th and 8th look like one large segment, the lateral incision between the two being slight, compared with the deep incision and rounded fullness of the segments in front, when seen from above. The larva is very richly coloured—bright yellow, with rich red-brown and (nearly) black. The dorsal line looks nearly black, but is really deep chocolate. The oblique lines are nearly as dark dorsally, ventrally they get paler, and fade out a little at their lower margin. The white below them makes the darker shade in which the spiracles are, seem to be a second oblique line, and there is the subspiracular red or chocolate line. The 7th, 8th, and 9th have bright yellow margins invaded by red, a little in 7th, and a good deal in 8th. On the 7th, the yellow dorsal area (of the segment) is reduced to a small white area, which is still less on

8th. The large black spiracles are very conspicuous by having a white border round each. On the 2nd and 3rd thoracic segments the lateral whitish of the spiracular region is largely replaced by red, and on the 2nd, and less on the 3rd, is a dorsal red circle, shading out laterally, and so much diminishing the yellow. On the prothorax the subspiracular red line passes forward directly from the spiracles, and, in some movements, ranges with the oblique lines; it is really neither, though a yellow band below it seems to range exactly with the yellow flange. The general appearance of the larva is of seven yellow segments, changing into red at each end, suddenly at 7th abdominal, and nearly as suddenly at 2nd thoracic. The spiracles are conspicuous black dots along the sides. The larva feeds well on *Lotus corniculatus*, and buries itself largely in the top buds, leaving the red tail most exposed, and under a weak lens this exposed portion has very much the look of an animal's head, the spiracles being the eyes, two pairs (pl. xiii., fig. 4).

(*To be concluded.*)

COLEOPTERA.

Some additions, etc., to the Coleoptera of the Northumberland and Durham district.

By RICHARD S. BAGNALL.

CALATHUS MELANOCEPHALUS, L., VAR. NUBIGENA, HAL.—Not uncommon on the Blanchland Moors, and similar localities. I have also taken it near Winlaton Mill, the thorax not being so dark in these latter specimens as in those from the higher lands.

ANCHOMENUS SEXPUNCTATUS, L.—On April 13th, 1903, I met a fellow coleopterist who had just taken a strange *Anchomenus* from the moors near Blanchland; the six "punctures" being distinctive, I naturally put it down to *A. sexpunctatus*, L., but hope shortly to make a closer acquaintance and so record it definitely.

CREOPHILUS MAXILLOSUS, L., VAR. CILARIS, STEPH.—This rare variety of a very common coleopteron is recorded by the Rev. Canon Fowler from the Tweed, Clyde, and Argyle districts, and as having been taken by Mr. Champion at Deal. Mr. Donisthorpe tells me he took it at Ashstead (*Ent. Mo. Mag.*); also common in Ireland (*Irish List* and *Irish Naturalist*, Donisthorpe and Bouskell). In 1901 (July?) it occurred to me near Winlaton Mill, from a dead dog, literally alive with *Creophilus*, *Necrophorus*, *Necrodes*, *Silpha* (including the fine *S. thoracica*), *Hister*, various Staphylinids, etc., all in one writhing heteregeneous mass. Again, on September 2nd, 1902, I took another example of the var. *ciliaris*, this time from under a dead cat "resting" in a field near Winlaton. These several localities are so widely spread—north, south, east, and west—that it seems to me that if all collectors paid the common *Creophilus* particular attention, they would very likely come across var. *ciliaris*, and so add to our knowledge of the distribution of a most interesting beetle.

SILPHA ATRATA VAR. BRUNNEA, HBST.—Occasionally in the Derwent Valley, where I once took a remarkably small example. It has also occurred to me at Riding Mill, in Tynedale.

TRIPLAX RUSSICA, L.—Fell to Mr. H. S. Wallace, of Heaton, Newcastle, and myself, on July 22nd of this year, from fungi growing on

elm, Gibside. The following day I found it in greater numbers (fungi growing on elm, holly, etc.) in common with *Triplax aenea*, Schal., the latter being in such numbers as to be almost a nuisance.

CERYLON FAGI, BRIS.—On May 13th, 1904, I came across a *Cerylon* answering to *C. fagi*, Brisout, from a rotten tree lying in a wood near Winlaton Mill. *Liodes humeralis*, Kug., *Agathidium nigripenne*, Kug., *A. rotundatum*, Gyll., *Scaphisoma agaricinum*, L., various *Rhizophagus*, two (♂ and ♀), *Clinocara undulata*, Kr., *Cerylon ferrugineum*, Steph., etc., were also taken.

CERYLON FERRUGINEUM, STEPH. (ANGUSTATUM, ER.).—Is, I think, the commonest species of this genus we have in the Derwent valley. I have taken it beneath bark of fallen oaks at Winlaton Mill, Gibside, and Rowlands Gill, and one evening (April 28th, 1904) I took it in numbers from a rotten oak-stump near Winlaton, many of the specimens evidently freshly emerged. From the same stump I captured several coleopterous larvæ and pupæ of *C. ferrugineum* (?) but unfortunately they died before reaching maturity.

CERYLON HISTEROIDES, F.—Recorded by Mr. Bold "beneath bark," Ravensworth, and near Gilsland "rare" (*Nat. Hist. Trans. of Northumberland and Durham*, vol. iv., pt. 1, p. 59, 1871). I have met with this species only once, from under the bark of a felled cherry tree in Gibside, June 29th, 1904. Thus it will be seen that the whole genus *Cerylon* is to be found in our valley.

RHIZOPHAGUS PERFORATUS, Er.—Was taken from beneath the bark of a felled plane tree at Lockhaugh, near Rowlands Gill, in September, 1903, where I again came across it early this year. *R. depressus*, F., *R. ferrugineus*, Pk., *R. dispar*, Pk., and *R. bipustulatus*, F., occur commonly in the same locality.

LATHRIDIUS BERGROTHI, REIT.—For more than three years I have taken *Lathridius bergrothi*, Reit.—but recently added to the British catalogue—commonly with other species of the *Lathridiidae*, in a cellar at Winlaton, mostly from the whitewashed walls and ceiling. It bids fair to spread, as did *Niptus hololeucus*, Fall., about forty years ago.

CORYMBITES CUPREUS, F., VAR. ÆRUGINOSUS, F.—I have found this variety commoner in hilly districts than the type *C. cupreus*. The latter, however, occurs the more frequently in the Derwent valley.

MALTHINUS FRONTALIS, MARSH.—I took one example (early June) by beating birch and hazel in a wood near Winlaton. It unfortunately managed to escape whilst bottling an *Attelabus*. I had no opportunity for searching further in that district, but luckily, the *Malthinus* being new to me, I happened to make a careful examination of it before it "slipped" me.

BRUCHUS PISI, L.—Introduced. My brother found a living specimen in a dried pea which he picked up in the Durham College of Science, March 3rd, 1904.

LOCHMÆA SUTURALIS, TH.—I believe, though not recorded by Bold, this species is common on all our moorlands. On April 10th, 1903, Mr. David Rosie, Newcastle, sent me a few very dark examples taken at Prestwick Carr, one of them being quite black. I think it must be referred to *L. suturalis*, Th., var. *nigrita*, Weise, described by Mr. Tomlin in the *Ent. Mo. Mag.*, August, 1904, and not to be found, as yet, in our British catalogue.

CLINOCARA UNDULATA, KR.—Locally near Winlaton Mill, in numbers

on fungoid growth, beneath bark of small trees (*Ent. Mo. Mag.*, May, 1904). I have taken odd examples this year, three (two ♀ s and one ♂) in a dry and fallen branch (April 30th), and two (♀ and ♂) on a brown growth covering this branch (May 13th). Those taken on April 30th were very fresh-looking, the elytra of one of them were not quite hard, so I think they must have been but shortly emerged from the pupæ. Search as I would for pupæ I was not successful, taking instead, a cocoon and pupæ of *Campylus linearis*, near foot of tree.

Meloë violaceus, Marsh.—Whilst crossing the Blanchland moors on April 4th, of this year, my friend, Mr. J. E. Patterson, of Newcastle, found *Meloë violaceus*, Marsh, under a stone in a sandy situation. I was surprised that such a common insect had not been recorded from our district before, but upon consideration one can easily see with what difficulties men in Mr. Bold's time would have to contend to get on these moorlands. Even now Blanchland lies ten long and hilly miles from the generally used station, Shotley Bridge, and little less from Riding Mill. Near the site of Mr. Patterson's capture I met with *Cymindis vaporariorum*, L., hitherto only recorded from Twizell Moor.

Tomicus laricis, L.—Evidently introduced. Was taken by Mr. Fred Johnson at Byer Moor early this year (March ?), and also *Tenebrioides mauritanicus*, L., both from timber.

My sincerest thanks are due to Messrs. H. St. J. K. Donisthorpe and J. R. le Brockton Tomlin for so kindly determining and confirming these and many other beetles.

Monohammus sartor, F., and other imported beetles.—A fine example of this imported Longicorn was taken at Monkwearmouth, and given, whilst alive, to my friend Mr. James W. Corder, September 30th, 1891. Another example, so my friend Mr. Tomlin tells me, was sent him (Mr. Tomlin) from Hartlepool. The smaller *Monohammus sutor*, L., has been taken in the Derwent valley by Mr. William Johnson (*Ent. Mo. Mag.*, 1904, p. 59), is recorded by Bold from Newcastle (*Nat. His. Trans. of Northumberland and Durham*, iv., p. 98, 1871), and Mr. Champion, in acknowledging above note, writes me that some years ago he had several specimens sent him, taken from pit props near Hartlepool. Again Mr. J. W. Fawcett's reprinted note in the *Durham County Advertiser* (April 29th, 1904), adds that an example of *Monohammus sutor*, was taken in a timber yard at Sunderland, 1881, and another from the city of Durham, 1882. Another introduced Longicorn, *Acanthocinus aedilis*, L., was taken by Mr. Duncan at Winlaton (in the early sixties?); recorded by Bold from Newcastle, by Mr. William Johnson, Byermoor (*Ent. Mo. Mag.*, 1904, p. 59); by Mr. James W. Corder, Sunderland district; and by Mr. Fawcett from Sunderland, Stockton, Hartlepool, and Durham timber yards. So much for imported Longicorns.—R. S. Bagnall, 11, Railway Terrace, South Hylton, near Sunderland. *September 14th*, 1904.

Odontæus mobilicornis at Downham.—On July 13th, whilst moth-collecting near here, I took a fine ♂ *Odontaeus mobilicornis* flying just as it was getting dusk and send on this notice as I think the fact to be worth recording.—Robt. S. Smith, The Laurels, Downham. *August 1st*, 1904.

Correspondents wanted among British coleopterists.—I am anxious to enter into correspondence with British coleopterists, with a

view to the exchange of British against continental coleoptera. I am particularly anxious to obtain from British collectors specimens of any of the following species, and should esteem it a great favour if anyone can send me examples of any of them, *viz*:—*Myllaena fowleri*, Matt., *M. masoni*, Mat., *Medon pocofer*, Peyr., *Stenus exiguus*, Er., *S. oscillator*, Rye, *S. kiesenwetteri*, Rosen., *Homalium rugulipenne*, Rye, *H. exiguum*, Gyll., *H. gracilicorne*, Fair., *Bryaxis cotus*, Saul., *Bythinus glabratus*, Rye, *Euthia scydmaenoides*, Steph., *Neuraphes planifrons*, Blatch, *Scydmaenus powcri*, Fow., *Colenis latifrons*, Curt., *Anisotoma similata*, Rye, *A. claricornis*, Rye, *A. lunicollis*, Rye, *Cyrtusa minuta*, Ahr., *Orthoperus mundus*, Mat., *O. punctatulus*, Mat., *Ptinidium kraatzi*, Mat., *Ptilium brevicolle*, Mat., *Actidium concolor*, Shp., *Microptilium pulchellum*, All., *Ptinella britannica*, Mat., *Trichopteryx obscaena*, Woll., *T. championis*, Mat., *T. angusta*, Mat., *T. fratercula*, Mat., *Syncalypta hirsuta*, Shp., *Cardiophorus formosus*, Curt., *Tetratoma desmaresti*, Lat., *Abdera bifasciata*, Marsh., *Salpingus aeratus*, Muls., *Cathormiocerus socius*, Rye, *Anthonomus britannicus*, Desb., *Apion ryei*, Blk., *A. scutellari*, Kirb., *Chaetocnema subcoerulea*, Kirb., *Longitarsus distinguenda*, Rye, *Elmis subriolacens*, Muls., *Heterocerus britannicus*, Kuw., *Hydrates glabricentris*, Rye, *Homalota hypogaea*, Rye, *H. exarata*, Shp., *H. alpestris*, Heer, *H. fallaciosa*, Shp., *H. deformis*, Kr., *H. eremita*, Rye, *H. curtipennis*, Shp., *H. picipes*, Th., *H. excellens*, Kr., *H. fungivora*, Th., *H. pubcrula*, Shp., *H. atomaria*, Kr., *H. percrigua*, Shp., *H. canescens*, Shp., *H. eximia*, Shp., *H. planifrons*, Wat., *H. cribriceps*, Shp.—M. Morel, No. 1, Rue Bosio, Paris, 16e. *August 12th*, 1904.

SCIENTIFIC NOTES AND OBSERVATIONS.

Note on generic types and specific names.—There is a review of the fourth volume of *The Natural History of the British Lepidoptera* in the last number of the *Irish Naturalist*, in which Mr. Carpenter seems to have been unaware of the causes of the differences of the names of the genera of Sphinges in this work and in the *Revision of the Sphingides* of Messrs. Rothschild and Jordan, who seem to have taken the first species in a genus as the type of it. Bearing on this, I do not think that the line taken by these authors was the intention of our older authors, as in those days there was but little knowledge of forms of species, and the endeavours of each seem to have been to arrange the whole system of nature in one long line, with futile attempts to discover missing links, or in a series of circles more or less convergent. Mr. Guénée in his work on *Noctuélites et Phalaenites*, often designated the insect he considered as his type by printing the word "type" against its name, and, except when there was only one species in the genus, it was rarely or never the first species. Westwood, in his *British Moths and their transformations*, in giving reasons for not putting the typical genus *Sphinx* at the head of the family, states:—"I therefore place the genus *Sphinx* in the middle of the family, which is commenced and terminated by less typical species, which exhibit the characters of, and thus point, the way to, other groups."

Regarding another point under discussion I do not think that many zoologists will agree, as Mr. Wheeler seems to suggest, that a specific name can be changed for convenience; but that the name of an animal first described by the author must stand, even if we find that we have

erroneously considered the wrong animal the one meant, as in the case of *Lepus timidus*, which is now known to be the blue hare, whilst our animal has had to take the name of *L. europæus*. Personally I was sorry to see that in Messrs. Staudinger and Rebel's last *Catalog* they use some of the names in Billberg's *Enumeratio*, a work that from published accounts seems of no value. I see small hope of the vexed question of nomenclature ever being satisfactorily settled, except by a conference of some of the principal zoologists from the chief nations of the continent and America to agree—(1) On all the authors to be accepted for reference, and (2) on the dates of their respective works, which might aid in attaining this result.—T. H. Briggs, M.A., F.E.S., Rock House, Lynmouth, R.S.O., N. Devon. *September 14th*, 1904.

The Linnean type of Phragmatobia fuliginosa.—Mr. T. Briggs has been kind enough to send me the copy of Linné's original description of *Phragmatobia fuliginosa* from the *Systema Naturæ*, ed. x, p. 509. It reads as follows:

Fuliginosa. *P.* spirilinguis lævis, alis deflexis fuliginosis puncto nigro; inferioribus rubris nigromaculatis. It. Wgoth. 141, Roes., *Ins.*, i., Phal. 2, t. 43, Uddm., *Diss.*, 76, Wilk., *Pap.*, 23, t. 3a, 14.

This proves Aurivillius' contention to be right, and my notes want revision in this direction. I felt so certain that I should be safe in accepting the more extended *Fauna Suecicæ* description as that of the type, that I did not even carry out my own elementary rule of taking nothing for granted if it be possible to make the reference. Besides, it makes my own criticism return on me with double force.—J. W. Tutt.

NOTES ON COLLECTING, Etc.

Lepidoptera at Oxton.—The season being now well advanced I am writing a few notes in extension of those already published (*antea*, p. 240). On the whole it must be classed among the bad ones, one of the worst, I should say, though hard work has, of course, produced several useful things. Glancing through my diary the following facts appear worth noticing. In spring, sallows were most unproductive and light the same, very few of even the common Tæniocampids putting in an appearance, and *Lobophora carpinata*, usually fairly common, being entirely absent. Larvæ, too, were scarce, and I found, as already noted, the greatest difficulty in getting any *Agrotis agathina*, although they are usually plentiful, and I only obtained one *Noctua neglecta*. *Arctia caja* never turned up at all, and *Cosmotriche potatoria* was very scarce. Among butterflies, *Pieris brassicæ* seemed commoner than usual, and so was *P. napi*, but *Euchloë cardamines* and *Brenthis euphrosyne* were very scarce, and I only saw two *Cyaniris argiolus* and two or three *Syrichthus malvæ* (one of the ab. *taras*). *Pararge egeria* was entirely absent, and I only saw a few *P. megæra*, which was disappointing, as I specially worked for them, wanting ♀s for a friend. I was also unable to find any larvæ of *Vanessa io*, usually fairly plentiful on the nettles here. I turned up a few *Coccyx subsequana* at end of April and in early May, getting thirteen (mostly worn) on May 4th, which was one of the few bright days we had when a hurricane was not blowing. Light continued unattractive, only a few *Peridea trepida* and *Anticlea nigrofasciaria* (usually fairly common) occurring. Perhaps *Nola confusalis* was rather commoner than usual, and later on (and still) *Nudaria mundana*. *Notodonta trimacula* was scarce and in poor condition, the

moon not being right when they first emerged. On May 25th and 29th *Micropteryx aureatella* was abundant, as noted (*antè*, p. 241), and so also has been *M. seppella*. On June 27th, an afternoon in a favourite lane near here gave *Melanippe rivata* in plenty, a very few *Anticlea rubidata*, and one *A. sinuata* (the first I have ever taken). Another visit to the same lane on July 11th, especially for *Cidaria picata*, resulted in fifteen of that insect and a few *M. rivata* and *M. unangulata*. Latterly traps have been doing better, and, on July 18th, I got in them a ♀ *A. sinuata* (which, however, failed to oblige with ova). *Cleora lichenaria* males have been plentiful, with two females (rather unusual), and *Boarmia repandata* var. *conversaria* has not been uncommon, but not in very good order.—E. F. Studd, M.A., Oxton, Exeter. *July 27th*, 1904.

Early appearance of the second-brood of Agdistis bennetii.—The amazing change that took place in the weather in the early summer had a marvellous effect on *Agdistis bennetii*. Although the first brood was on throughout May and until the end of the month, the larvæ of the second-brood fed up with such marvellous rapidity, and pupated so early that the imagines were well out by July 19th, nearly a month earlier than in the previous wet and cold season. It was also abundant compared with the previous year. The season, therefore, late as it was until June for everything, affected some species exceedingly quickly, and produced maturity very rapidly. Specimens of the second-brood, however, kept emerging for quite a month this year, so that this brood also was spread over a fairly long time.—J. Ovenden, Frindsbury Road, Strood, Kent. *August 27th*, 1904.

Remarks on Practical Hints for July.—Mr. Tutt will, I feel sure, forgive me for passing friendly criticism on two of the series of "Practical Hints" from his pen, published *antè*, pp. 207-9:—(1) In Hint 6 it seems strange to find one, who is so exceptionally well up-to-date in all matters of nomenclature, writing of "*Lithosia stramineola*," as though he still clung to the antiquated notions that the form in question is specifically distinct from *Lithosia griseola*, and that "*stramineola*" is the oldest known name for it. I need only add that the form to which he refers has been correctly entered in the best catalogues that have been published during the last thirty years and more as *Lithosia griseola* var. *flava*, Haw*. (2) Hint 18 (I refer to the first of the two so numbered, the number of the second should have been "20") seems to me a sadly unpractical one. I have always understood that *birch* is the only known foodplant of "*Lophopteryx carmelita*," and if this idea is correct, one certainly might search for a very long time before finding its cocoon at the base of *oak*-trees†! In his latest *Catalog* (1901), Staudinger excludes *carmelita* from the genus *Lophopteryx*, and includes it in *Odontosia*‡.—Eustace R. Bankes, Norden, Corfe Castle. *July 26th*, 1904.

---

* Mr. Bankes is quite right; it is really very blameworthy, although we really did not know that this was so certainly the correct synonymy. We had an idea that it was quite open to question whether *flava*, Fab., is not possibly the right name to use. Leaving aside the synonymy, our note should have been *Lithosia* ab. (not var.) *stramineola*.—Ed.

† A *lapsus calami*. It should, of course, be birch.—Ed.

‡ We have not time to work out the point of synonymy that Mr. Bankes here raises, except to say that the chances are always great against Staudinger being right in any of the genera that he has not copied direct from some authority

Lepidoptera at Dover.—I am just back from my holidays, and thought a note on the special insects observed might be interesting. Four insects struck me in particular as being worthy of note. These were as follows:—(1) *Colias edusa* was about in good numbers, and very fresh during first part of August, but very worn later; strange to say no *C. hyale* to be seen. (2) *Plusia gamma* was a perfect pest, and in great numbers at the beginning of August, but gradually thinned out by the end of the month, when only a few were seen. (3) *Sesia stellatarum* turned up in numbers, beginning of August, in good condition. (4) *Acidalia ornata* (2nd brood) were about in considerable numbers, more abundantly than I have seen them before.—C. P. Pickett, F.E.S., 99, Dawlish Road, Leyton, Essex. *September* 1*st*, 1904.

Sphinx ligustri near London.—I have also to record the capture of six larvæ of *Sphinx ligustri* from a garden at Raynes Park (all full-fed). Surely this is getting very near to London.—Ibid.

Agrius convolvuli at Sydenham.—It may be interesting to record the capture of a fine specimen of *Agrius convolvuli* here this morning. It was at rest upon a fence and, having nothing to remove it in, I gently enticed it to cling to my finger. In this position I conveyed it home, a distance of nearly a mile, without it shewing the least inclination to move.—A. M. Swain, 5, Kelvin Terrace, Sydenham, S.E. *September* 1*st*, 1904.

Foodplant of Cucullia gnaphalii.—I have lately been feeding a few larvæ of *Cucullia gnaphalii*, and find they eat freely the common garden aster, better known, perhaps, as "Michaelmas Daisy" or "Farewell to Summer."—Percy C. Reid, F.E.S, Feering Bury, Kelvedon. *September* 4*th*, 1904.

Probable second-pairing of Dryas paphia.—As bearing on the point that some lepidoptera usually supposed only to pair once, do so, at any rate, more frequently than this, I note that a ♂ and ♀ *Dryas paphia*, both exceedingly worn and badly broken, and the ♀ with her abdomen almost empty, were captured paired on July 14th, 1904, at San Jerommio, Montserrat. This is, of course, no proof that the ♀ had paired before, but one's knowledge of the habits of the species leads one to suppose that it most probably had done so.—J. W. Tutt.

Agrius convolvuli at Frindsbury.—I have to announce the capture of a specimen of *Agrius convolvuli* at Frindsbury to-day.—J. Ovenden, Frindsbury Road, Strood. *September* 7*th*, 1904.

---

who has recently worked the group through. *Ptilodon*, Hb. (1806), has for type *camelina* (with which we at present associate *carmelita* structurally). *Odontosia*, Hb. (1826), is a heterogeneric group—*palpina*, *plumigera*, *carmelita*, *camelina*, and *cucullina*. If, as we surmise, *carmelita* and *camelina* are congeneric, these fall out of this genus, leaving *palpina*, *plumigera*, or *cucullina* as a possible type of, or, if anyone has named *camelina* as type, sinking *Odontosia* as a synonym of, *Ptilodon*. To have been accurate, one ought, one suspects, to have written *Ptilodon carmelita*. It is so well known that Staudinger was a great opponent of any but the old tribe-genera of the early authors, and that his work most pointedly neglects all generic synonymy, that one can hardly expect us to follow one who more than once wrote that he did not intend to be troubled about the matter. The name of our generic disagreements with Staudinger's *Catalog*, in such groups as we know, is legion. With increased knowledge, the number is likely to be increased tenfold. When we get our own British *Synonymic List*, based on real independent and first-hand work, and not merely copied from other authors, we shall begin to know where we are. At present, if we had to name the one list in which the greater number of *genera* are most probably wrong, we should suggest Staudinger's.—Ed.

Zicrona cærulea, Linn., in Lancashire.—On August 25th I received from my friend, Mr. E. J. Burgess Sopp, two perfect specimens of this beautiful bug, which he had recently taken on heather on Hampsfell, near Grange-over-Sands.—Oscar Whittaker, 39, Clarendon Road, Whalley Range, Manchester. *September 19th*, 1904.

Phryxus livornica, Esp., at Sandown.—I have recently had the pleasure of seeing a beautiful, though slightly undersized, specimen of *P. livornica*, which was bred by Mr. Taylor of Sandown, on August 31st. The larva was picked up in the neighbourhood five or six weeks previously, and brought by its captor to Mr. Taylor. Unfortunately he did not make any precise descripton of it, but it seemed to him—from the meagre descriptions at his disposal—to be nearest the larva of *Celerio gallii*, and he was rather expecting to breed that species. When he told me about it on my arrival at Sandown on August 25th, I suggested that the locality—right away from sandhills—seemed a very unlikely one for *C. gallii*, and I confess that I had some misgivings as to whether it might not turn out to have been an aberrant larva of some common species. Curiously, we did not think of *P. livornica*, notwithstanding that two imagines were recorded from Shanklin earlier this season (*Entom.*, xxxvii., p. 189), and the emergence of this rarity from the pupa was a pleasant surprise to its owner. As so few seem to breed in this country, I have thought it worth while to record it fully. Unfortunately we do not know on what plant it had been feeding.—Louis B. Prout. *September*, 1904.

Value of English specimens of Lepidoptera.—Will you kindly tell me the value of English specimens of *Ennomos autumnaria* and *Callimorpha hera*? The latter I took in Guernsey this year, and having obtained ova from three females, I am rearing the larvæ, making a detailed life-history of them with dates. As, on the advice of Mr. Luff, of Guernsey, I am going to keep the larvæ feeding in the winter, the life-history will soon be completed. When it is I shall be very pleased to send you a copy for publication if it would be of any use to you.—M. Smith-Richards, Falconhurst, Maison Dieu Road, Dover. *September 17th*, 1904.

Erebia goante and Satyrus dryas at Dover ! !—In September, 1902, I took a male and female of *Erebia goante* and one *Satyrus dryas* in Langdon Hollow here at Dover. I sent them up to Messrs. Watkins and Doncaster, who identified them. No one here can account for their appearance, can you? Can you also tell me if they are worth much? *S. dryas* is very battered, and *E. goante* minus antennæ.—Ibid. [We should be glad if any of our readers could inform our correspondent of the value of English *Ennomos autumnaria* and Guernsey *Callimorpha hera*, although one suspects Messrs. Watkins and Doncaster would be the best referees in this matter. Without wishing to throw any doubt whatever on the *bona fides* of our correspondent, we must express our unbounded astonishment at the capture of the Alpine *Erebia goante* and the central European *Satyrus dryas* at Dover. We should be rather more surprised ourselves to see *Erebia goante* at Dover than we should *Parnassius apollo*, which was once reported to have been observed there!! We presume that Mr. Smith-Richards has either made a mistake, or that someone just arrived home from the continent liberated the specimens alive for Mr. Smith-Richards to catch.—Ed.]

Note on reputed foodplants of Aciptilia pentadactyla, L.—On

July 22nd, 1904, near Lausanne, I found a pupa-case of *Aciptilia pentadactyla* spun on a leaf of blackthorn, with the newly-emerged ♀ imago just below it. Beneath, climbing among the blackthorn, was *Convolvulus arvensis*. The point of interest lies in the fact that some of the older continental authors give plum as the foodplant of this species. They were doubtless led into error by finding larvæ or pupæ in a similar position to that above described. In England I have found pupæ of this species among the herbage on the hedge-bank; but on the continent the hedges sometimes rise direct from the roadside, like a box-edging from a garden path, so that there is no hedge-bank. In this case I presume the larvæ crawl to the upper part of the hedge which is thicker and affords better shelter. At the time when *pentadactyla* is pupating the convolvulus has hardly reached the top of the hedge; but later, when *Pterophorus monodactyla* is feeding, the plant is straggling all over the top of the hedge, affording plenty of shelter. An error, therefore, as to the foodplant of this species, would be less likely to arise.—Alfred Sich, F.E.S.

Bird eating butterfly.—On July 21st we saw, at Evian-les-Bains (France), a Spotted Flycatcher descend from a coping-stone and catch a brown butterfly (almost certainly *Epinephele jurtina*, L.), which it took up to its perch and devoured.—Ibid.

Information wanted.—I am much interested in the preservation of larvæ, and should be greatly obliged if any of your readers could give me information on the preservation of the colour of green larvæ. I cannot at present prevent those I do from turning yellow.—W. Bell, Rutland House, New Brighton, Cheshire. *September 26th*, 1904. [Will some of our readers answer, please? Some notes on this subject have already appeared—vol. i., p. 262; iii., 39-40, 248, etc.—Ed.]

Colias edusa and Pyrameis cardui in Sussex.—I think the following notes on *Colias edusa* and *Pyrameis cardui* may be of interest. On August 7th, I made a trip to Beachy Head to see if there were any signs of *C. edusa* or *C. hyale*, and came across an entomologist there who had taken six *C. edusa*, all ♂ s. and in good condition, but being rather late saw none flying myself. I, however, paid another visit on August 13th, and took two ♂ s of *C. edusa*, one badly worn and one chipped (both of which I released), and missed a very fine freshly-emerged ♀, and saw a number of others flying, but they were almost impossible of capture, owing to a high wind, rough ground, and wild flight, and if one did settle for a second it was immediately set upon by all the specimens of *Polyommatus corydon*, *P. icarus* and *Epinephele ianira* in the vicinity, and driven off. *P. cardui* was exceedingly plentiful, some very much worn, and others in very fine condition, the latter predominating. They were flying among straggling patches of lucerne, and were fairlye asy of capture. On August 20th, *C. edusa* was again fairly plentiful, but as wild as ever, and the only specimen I managed to capture gave me a chase of about a quarter of a mile through fairly long grass, and beat me easily, till I slowed down and it did likewise, and settled on a piece of lucerne, when I successfully stalked it. It proved to be a ♀ in good condition, with the exception of a chip in one wing. I sent it, alive, to Mr. Newman of Bexley, to get ova, but have not heard the result up to the present. On August 21st, at Eastbourne, *C. edusa* was not uncommon on the Church Parade on the lawns, flying in and out amongst the visitors in quite a tanta-

lizing way. I saw no *C. hyale* during my stay at Eastbourne, from August 6th to 22nd. I am keeping a sharp look out on the south coast in the hopes of an October emergence.—C. W. Colthrup, 127, Barry Road, East Dulwich. *October 4th*, 1904.

Agrius convolvuli at Strood.—I have to record the capture of another example of *Agrius convolvuli*, in fine condition; this was captured on the mast of a barge while lying off Strood, in the Medway. —J. Ovenden, Frindsbury Road, Strood. *September 20th*, 1904.

Leucania favicolor at Strood.—In the early summer of 1903 I bred, from a pupa (one of a number from larvæ obtained by promiscuous collecting off grasses in the early spring in this district), a *Leucania*, which emerged among a host of *L. pallens*, *impura*, *lithargyria*, *conigera*, etc., which Mr. Tutt informs me is *Leucania favicolor*. It is unfortunate that I have no detailed knowledge of the particular larva, or whence it came, nor have I met with it again this year.—Ibid.

Manduca atropos at Strood.—Early in September I had a full-fed larva of *Manduca atropos* given to me by one of the potato-diggers in this district. I put it in a flower-pot, half-filled with corn dust, when it immediately prepared for pupation, and is now a fine healthy-looking pupa.—Ibid.

NOTES ON LIFE-HISTORIES, LARVÆ, &c.

Larval habits of Luperina cespitis.—Where *Luperina cespitis* has been picked up accidentally, the imagines should be systematically hunted for in September, hanging after dark in the turfy-hair-grass. The females oviposit very freely in confinement, the ova changing from salmon-pink to purple very early, leading one to expect their speedy emergence, but they go over the winter and hatch in April or May. From the beginning to the end of June, the larvæ may be found after dark on the turfy-hair-grass in parks and in marshes, in fact, wherever the foodplant grows. When young, the bright vivid green tint of the young larva is very conspicuous as it mounts to nibble the tip of the blade of grass on which it is resting, giving it much the same appearance as the blossom on some of the other grasses usually found growing with its foodplant; but as the larvæ grow older the colour tones down very considerably, assuming more of a reddish-bronze tint, whilst the larvæ themselves do not climb so high up in the grass stems; at this time they want looking for much more closely as the grass is beginning to turn a little in colour owing to the sun's increase in power. In places where the foodplant is very plentiful the larvæ may be obtained by sweeping, but I prefer searching, as in sweeping a great number get damaged. The larvæ grow very rapidly.—J. Ovenden, Frindsbury Road, Strood, Kent. *June 23rd*, 1904.

Egg of Eutricha quercifolia. — On July 16th last I found a ♀ of the above species which had no wings on the left side and only about one-third of the forewing on the right and hardly any hindwing. Added to this, it was in a horse-trough and almost drowned. However, judging from the size of the body that it was a female, I boxed it in a wooden chip-box. Before it finally died it presented me with several scores of ova. These, I noticed, were apple-green on deposition and without the well-known markings. As the eggs dried, however, the green darkened and the white rings showed up.—Mervyn C. Palmer,

6, Court Road, West Norwood. *August 4th*, 1904. [The peculiarity pointed out by Mr. Palmer has already been noted by Mr. Burrows (*Natural History of the British Lepidoptera*, vol. iii., p. 208). It is remarkable, as we have noted (*op. cit.*, p. 207), that the primary green tint of the egg is on maturity confined to an area beneath the surface, the egg being somewhat opalescent, the green markings then appearing directly beneath the surface reticulation.—Ed.]

Ovum of Pamphila sylvanus, Esp.—At midday, July 24th, 1904, I saw a ♀ of this species deposit an egg on the underside of a blade of *Brachypodium sylvaticum*. The egg was upright, would have been spherical, but was much flattened at the base, vertical axis to horizontal axis as 0·75 to 1. Under a lens the micropyle appeared as a slight depression on the summit of the egg, with a minute raised point in the centre. The general surface appeared smooth, but there were lines running irregularly in all directions over it like veins in marble. When first laid the colour of the ovum was grey, but in some lights it looked green from the reflection of the leaf. It did not alter in colour. On the sixth day a black spot appeared in the centre, and two days later it hatched, the larva only being eight days in the egg. The weather was very hot during the period. The larva was white, with large black head and a narrow black thoracic plate.—Alfred Sich, F.E.S., Lausanne. *September 14th*, 1904.

Egg of Phryxus livornica.—[Description made from an empty egg-shell received from Mr. E. R. Bankes]. No doubt the egg when laid is green, but of what tint and what further colourings it assumes up to the time of hatching, the shell, of course, affords no information. The shell is very perfect, there is a comparatively very small hole by which the larva escaped, unfortunately, apparently involving the micropyle, and there is, on one side, a shallow dent, which may be the result of an accident, but is more probably the slight collapse that affects so many eggs during the period of maturation, representing the loss of fluid by evaporation, and corresponding in its nature to the air at the end of a hen's egg. The following description is made from the egg in this state. [Unluckily, when I had done with it and proposed to lay it aside, I thought I might attempt to smooth out the depression above noted, but the only result was to add others, so that the specimen is not now so illustrative.] The egg is approximately spherical, but departs from a globular form sufficiently for the difference to be easily seen without measurement. The three diameters are different from each other, the longest is 1·16mm., the next, which may be called the breadth, is 1·00mm., and the height is 0·86mm. The sculpturing is a very fine polygonal network, the lines of the network are raised, with broad flat tops, of a width about equal to a fourth or fifth of the diameters of the polygons they enclose, these are somewhat irregular in form—hexagons, pentagons, and even squares—their diameters are about 0·022mm.-0·025mm. The tops of the lines of network are nearly smooth, but the flats of the enclosed polygons are occupied by a number of round, nearly hemispherical, elevations, not placed quite in lines, but of such a size that four to six in line may be counted across one of the spaces, and so each polygon is occupied by 18 to 35 or so of these knobs. The size of the meshes of the network is so small, and the lines of ribbing or network so flat and little raised, that, without considerable magnification, the egg appears to be quite

smooth and polished. The minute knobs of the spaces are more of the order of texture than sculpture, the diameter of each being about 0·004mm. The opening by which the larva emerged is very small, remarkably so, when it is noted that the other larvæ from the same lot of eggs demolished the egg-shells, a scrap of one, possibly the whole remains, being attached to this one.—T. A. Chapman, Betula, Reigate. *September*, 1904.

Egg and life-history of Phryxus livornica.—With regard to the Editorial note (*antè* p. 240), I am sorry to say that I could not write a life-history of *Phryxus livornica*, as my larvæ died young. Dr. Crallan has, I believe, figured the egg (his larvæ died young also), but I suppose Mr. Bankes will have completed the life-history, as he, I believe, bred three imagines out of four larvæ.—R. B. Robertson, Forest View, Southbourne Road, Boscombe. *September* 19*th*, 1904.

Orgyia antiqua, a query concerning the variation of larva.—I ought to know all about it, but I do not. Sepp's beautiful figure of this larva shows a fine lateral tuft on the 2nd abdominal segment, and smaller ones on the segments on either side. Barrett figures these, but does not mention them in his description. Buckler shows the one on 2nd abdominal. I have read somewhere that this lateral tuft is characteristic of *O. antiqua*, which always has it, and no other *Orgyia* has. I have often seen it myself. Is the larva (full-grown) ever or often without it in England or central Europe? This, I say, I ought to know, but do not. I fancy I should have noticed its absence had I come across it. On the other hand, carelessness in observation is a fault I am liable to, like most other people. The query is suggested by a larva from Spain, a very fine specimen, that was absolutely without it, and which produced a ♀ moth; and some larvæ sent me by Mr. Powell from Hyères, which are equally without it. Are these forms that might have occurred in England or Germany, or are they a definitely southern variety? Mr. Powell's larvæ had beautiful yellow sides in the ♂s and ♀s in penultimate skin, getting, in the last skin of the ♀ larvæ, a coloration like *O. antiqua* usually has with us. That larvæ vary in the south, just as imagines do, and present local races, is a point I have already called attention to in the case of *Aryynnis aglaia* and *Euchelia jacobaeae*. The pupæ of these pale larvæ were largely colourless, having a broad black dorsal band, and sometimes ventral, the colourless portion being transparent on the emergence of the moth (as often in some Plusias). In English *O. antiqua*, my pupæ are entirely dense and black; is this always so? The ♀ imagines, also, have legs of colourless chitin (except on portions of the femur), as I have described in *O. aurolimbata*, etc. I have described them in *O. antiqua* (British) as being quite black (*Ent. Rec.*, vol. xv., p. 197). This is obviously a racial and not a specific character. How far is it constant in British specimens? —T. A. Chapman, M.D., Reigate.

The time of appearance of Stenoptilia zophodactyla, Dup.—In answer to Mr. Tutt's inquiries (*antè*, p. 210, where, by a *laps. cal.*, *zophodactyla* appears as "*zophodactylus**"), my experience with this species has led me to an entirely opposite conclusion to that formed by him on the published evidence, and clearly points to its having at least two broods in the course of the year, though, on the other hand,

*This is quite accurate. Duponchel named the insect "*zophodactylus*."—Ed.

it certainly does not tend to support Mr. Barrett's statement, quoted by Mr. Tutt, that the larvæ of the earlier brood gnaw the leaves of their foodplant. At fairly frequent intervals throughout this season I have carefully examined the plants of *Erythræa centaurium* in a spot where the insect is well-established, but totally failed to find any trace of the larvæ until July 4th, when a few of various sizes were found, feeding, not on the leaves, but on the contents of the unopened flowers (inside which they live, entirely concealed from view, until they become too large for such small domiciles), and of the young seed-vessels. These larvæ were posted to Mr. A. Bacot, but a few more, found on the following day, remained with me, and produced imagines, July 17th-25th. Mr. Tutt says that there are no records of captures of *zophodactylus* before July, and then only in early seasons. The absence of any records of captures in July in normal seasons, is, however, probably purely accidental, for, in this decidedly late season, the imago must have been out in nature by the middle of July, seeing that I bred it, unforced, on July 17th, while last year, ever memorable for the exceptionally late appearances of summer species, I took six *much worn* moths as early as July 10th. Again, seeing that I have bred the imago in different years as late as September 14th and September 16th, from larvæ collected in August, feeding on the green seeds, and have captured beautifully fresh specimens as late as September 27th (in south Devon), and October 2nd (all my dates, unless it is otherwise stated, refer to the same district of south Dorset), it seems pretty evident that there are normally two broods at least, the larvæ of both feeding on the flowers or green seeds according to size and circumstances. Individual plants of *Erythræa centaurium*—the only foodplant on which I have found this species—could always be found in a suitable condition, even in the same spot, to admit of a succession of broods of larvæ being reared from the end of June onwards. Since the above note was sketched out I have succeeded in obtaining ova of *zophodactylus* from both a bred and a captured female; these will be at once placed in Mr. A. Bacot's able hands, so that the question will doubtless be definitely settled in due course*. Remembering that *Erythræa centaurium* is an annual, and cannot be satisfactorily utilized by the insect in any way after it has once died down in the autumn (*cf. antè*, p. 48), the fact that ova are, even in a late year, laid *on it*, in nature, before the end of July, affords strong presumptive evidence that the species is regularly double-brooded, and it seems to me possible that, in some seasons, at any rate in the south of England, there may be more than two broods. [P.S.—I notice now that Snellen, in *De Vlinders van Nederland*, *Microlep.*, p. 1043 (1882), says of *S. zophodactyla* (under the name *Pterophorus loewii*) that it "flies in July and in the autumn,"

*The larvæ, arising from these eggs together with others, were handed over to me about August 15th. They pupated in due course, and the moths commenced to emerge at the end of the month, and had all emerged (some 80 or so) before the middle of September. A large number were sleeved on a plant of *Erythræa centaurium* that I managed to find still in bloom (the mass of the species being practically already dead), and kept there for about three weeks. Not one egg was laid, nor did any of several ♀s that died contain a trace of eggs, but were fairly laden with yellow and oily "fat-bodies," etc. The proof that the imagines hibernate is thus very strong indeed, to my mind conclusive, but I am making an attempt to keep some of the moths over the winter; the probable failure will, I am certain, be my fault, and not that of the moths.—T. A. CHAPMAN.

clearly implying that it is double-brooded. Both he and Sorhagen (*Klein-Schmett. d. Mark Brand.*, 317, 1886) give, as one of its foodplants, *Erythraea littoralis*, which is not included by Barrett in his remarks as quoted by Tutt (*loc. cit.*)].—Ibid. [Hoffmann adds *Gentiana germanica*.—T.A.C.].

VARIATION.

Variation in second-brood of Pericallia syringaria.—With reference to Mr. G. O. Day's note on this subject, which was published *antè*, pp. 108, 129-130; my experience with the second-brood of *Pericallia syringaria* has been widely different from his. In September, 1892, and August, 1893, I was fortunate enough to obtain, without any artificial forcing, second-broods of this species, but on each occasion, although all the larvæ were sleeved together throughout on a lilac bush growing in the garden, the majority of them refused to respond to the excessive heat, or to feed up until the following year. Both these partial second-broods, however, were much larger numerically than the one secured by Mr. Day, and must have together numbered between 30 and 40 individuals. But the interesting points are—(1) that whereas Mr. Day's two ♂ s of the second-brood followed the ordinary colouring of the ♀, *all* my second-brood ♂ s showed the normal colouring of the ♂; and (2) that although Mr. Day found his five second-brood imagines "much about the usual size," all my second-brood moths were remarkably small, the males, according to a fair estimate, showing an average expanse of only 32mm., and the females of only 35mm., instead of averaging 36mm. and 38mm. respectively, as was the case with their own brothers and sisters, who preferred to appear at the ordinary time of year. Only the very largest second-brood specimens were equal in size to the smallest ones of the May (1893) and June (1892 and 1894) broods. Curiously enough the smallest ♂ that I have ever seen, expanding only 29mm., was bred by myself in June, 1894, the rest of the brood being of full size, and the larvæ having been supplied with an abundance of food! All my broods of *P. syringaria*, referred to above, originated from Kentish larvæ received in 1891.—Eustace R. Bankes, Norden, Corfe Castle. *July 28th*, 1904.

ORTHOPTERA.

The genus Stenobothrus, Fischer.

By MALCOLM BURR, B.A., F.Z.S., F.L.S., F.E.S.

To the student who first attempts to name our British grasshoppers, this is the genus which offers the greatest difficulty. We have six species in Great Britain, representing the four subdivisions of the genus, so it will be seen that these six are not very closely allied to each other. But when we turn to the continental fauna it is discouraging to find nearly 60 species, of which no fewer than 30 occur in Spain alone. In his *Prodromus der Europäischen Orthopteren* (1882), Brunner divides the genus into five subdivisions. In 1900, Bolivar effected a revision of the 30 Spanish species. He recognises four subdivisions and calls them subgenera. But if we are to regard the genus as the division next to the species, we must either reject Bolivar's subgenera, or raise them to generic rank. Owing to the number of species the latter course is preferable. Bolivar distinguishes them as follows:—

1. Mediastinal area and elytra gradually narrowed towards the apex, prolonged along the costal margin, and not dilated with a lobe at the base, so that the costal margin is straight .. ..
   2. Valves of ovipositor armed with a strong tooth on the outer side, pointing in the same direction as the points of the valves — Stenobothrus, Fischer (*sensu stricto*).
   2.2. Valves of ovipositor with no lateral tooth — Omocestus, Bolivar.

1.1. Mediastinal area of elytra rapidly narrowing towards the apex, generally not exceeding half the length of the elytra, broadened near the base so as to form a lobe or dilation, so that the costal margin is not straight, but convex near the base.. ..
   2. Lateral carinæ of pronotum bent in at an angle or curved in the prozona, diverging posteriorly .. .. — Stauroderus, Bolivar.
   2.2. Lateral carinæ of pronotum straight and parallel, or only very slightly curved in the prozona .. .. — Chorthippus, Fieber.

The genus *Stenobothrus* in the strict sense is only represented in Britain by *S. lineatus*, Panzer. The broad and regular fenestration of the discoidal area is characteristic of this and the allied species, and the tooth in the valves of the ovipositor is easy to perceive. Other members of the genus are *S. crassipes*, Ocsk., a short-winged Austrian species; *S. nigromaculatus*, H.-Schäff.; *S. fischeri*, Eversm. (=*nigrogeniculatus*, Br.); *S. stigmaticus*, Ramb., occurring in the Mediterranean countries; the three latter are difficult to distinguish from each other and from *S. lineatus*. Other species are—*S. festivus*, Bolivar, probably identical with *S. amoenus*, Bris., from Algeria; *S. grammicus*, Caz., and *S. bolivari*, Br.; these three latter appear to be peculiar to the Iberian Peninsula. The genus *Omocestus*, Bolivar, is represented in Britain by two species, *O. viridulus*, L., and *O. rufipes*, Zett., others are *O. haemorrhoidalis*, Charp., from South Central Europe, *O. raymondi*, Yersin, from South of France, Spain, and Algeria; *O. petraeus*, Bris., from South of France and Pyrenees; *O. minutissimus*, Bol., and *O. uhagoni*, Bol., from Spain; *O. lucasi*, Bris., from Algeria; *O. antigai*, Bol., from Catalonia.

The third genus, *Stauroderus*, Bol., comprises the third and fourth groups of Brunner's arrangement. Our only British species is the universal *S. bicolor*, Charp., but the allied *S. biguttulus*, L., may be discovered yet. A clearly defined group is formed by *S. morio*, Fabr., and *S. apricarius*, L., in which the ulnar veins of the elytra are only separate at the base and united in the rest by their length. Other members of the genus are *S. miniatus*, L., of the mountains of central and eastern Europe; *S. binotatus*, Charp., from southern France and Spain; *S. saulcyi*, Krauss, which occurs along the coast of France and Spain, from the Basses-Alpes to Barcelona. *S. cazurroi*, Bol., from the Asturias; *S. pullus*, Phil., from eastern Europe; *S. apicalis*, H.-Sch., from France and Spain; *S. vagans*, Fieb., common in central and southern Europe. This latter has occurred in the Channel Islands, and might be discovered in our southern counties.

The last genus is *Chorthippus*, Fieber, which was fused with *Stenobothrus* by Brunner and other authors. Our two remaining British species *C. elegans*, Charp., and *C. parallelus*, Zett., are representatives of this, as also *C. longicornis*, Latr., from northern France and Belgium, which is probably often confused with *C. parallelus*, and

very likely occurs in Britain; other species are the large and distinct *C. jucundus*, Fisch., from Spain and southern France; *C. dorsatus*, Zett., occurring in central and southern Europe; *C. pulvinatus*, Fisch.-von-W., from central and southern Europe and northern Africa.

From the above remarks it will be seen that the British orthopterist may take heart and feel thankful that he has only six species, representing four very distinct genera to deal with, and that, with the possible exception of *O. viridulus* and *O. rufipes*, none of them are very closely allied to each other. The other species should really never be confused.

To recapitulate, our six species of *Stenobothrus*, in the wide sense, should be known respectively as:—*Stenobothrus lineatus*, Panzer, *Omocestus viridulus*, Linn., *O. rufipes*, Zett., *Stauroderus bicolor*, Charp., *Chorthippus elegans*, Charp., *C. parallelus*, Zett.

Synonymic note on Thamnotrizon, Fisch.—As pointed out by Bolivar, the generic name *Thamnotrizon*, Fischer, 1853 (*Orthoptera Europaea*), should be replaced by *Olynthoscelis*, Fischer von Waldheim, which has seven years' priority (1846, *Orthoptera Imperii Rossici*, p. 412). Fortunately, this only affects one British species, which should be known as *Olynthoscelis cinereus*, Linn.—Malcolm Burr, B.A., F.E.S., Barcelona. *August 16th*, 1904.

CURRENT NOTES.

We are in receipt of *The South-Eastern Naturalist** for 1904, and wish to call the attention of entomologists to a paper by Capt. Savile G. Reid, R.E., F.E.S., who has been helped by Mr. E. Goodwin, entitled "Notes on the Lepidoptera of Mid-Kent." Satisfactory and interesting as it is, we regret that the visit of the South-Eastern Union of Scientific Societies to Maidstone was not made an excuse for the publication of a really good complete local list of the lepidoptera of the Maidstone district, so that the fauna of Maidstone might be scheduled in as complete and scientific a manner as was that of the Rochester district by Mr. Chaney. The account of a botanical and entomological outing on June 10th, on the North Downs, together with the captures made, etc., is also interesting. Those naturalists who are interested in the teaching of nature-study, and in the advance of scientific education generally, will further be interested in a lengthy paper on the subject by Mr. W. Mark Webb, which should be read, however, side by side with a criticism (pp. xlvi-lii) by Mr. Tutt, who points out details missed by the average lecturer without a knowledge of the inside working of schools of the various types referred to as those in which nature-study should be taught.

There are many curious things in the recently published *Politics for the Pocket*, of which some of the political examination papers are not the least amusing. One of the satirical questions in the latter reads: "Write a short account of recent works of fiction, stating in what order you would place Mr. Vince's leaflets, the foreign intelligence

---

* *The South-Eastern Naturalist* (being the Transactions of the South-Eastern Union of Scientific Societies); Demy 8vo., 88+liv. pp. and 9 plates. Price 2s. 6d.

of the *Daily Mail*, and 'My Pocket Novels.'" A number of enigmatical letters, found on our return from the Continent towards the end of August, among accumulated correspondence, was explained a week later by a friend sending us the following cutting from the *Daily Mail* (published during our absence) :—"FATAL EDELWEISS.—Our Geneva correspondent writes that Mr. Tutt, F.E.S., of London, who was climbing in the mountains near Geneva in search of insects, got on a ledge whence he could neither advance nor retreat. Fortunately, Mr. Muschamp, an English resident of Geneva, saved him from his dangerous position." This was the first knowledge we had of this serious matter, and, as only two or three people had the slightest notion that we were in Geneva in the company of Mr. Muschamp, the *canard* would, one suspects, not be difficult to trace; but, stupid as it is in worrying one's friends, one wonders whether all the rest of the remarkable Alpine accidents published by this paper are as sublimely true as this.

Mr. C. O. Waterhouse, F.E.S., has published a supplement of some 320 generic names, not mentioned in the *Index Zoologicus*, published a short time since by the Zoological Society of London. Of the 320 names, 250 are neither in Scudder's *Nomenclator* nor in the *Index Zoologicus*, whilst 70, although in the *Nomenclator*, are without date, or are incorrect in some respects. The supplement is to be obtained of O. E. Janson and Son, 44, Great Russell Street, W.C., and its price is 1s.

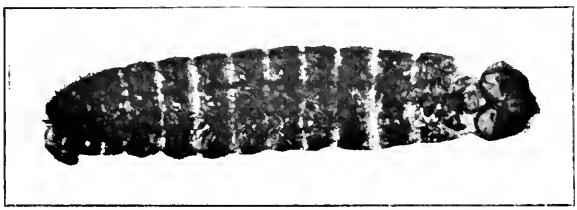
In the *Ent. Mo. Mag.*, for August, Arkle renames *Aplecta nebulosa* ab. *robsoni*, Collins, and calls it "var. *thompsoni*, Arkle." It is unfortunate that only a short diagnosis of *robsoni* was ever published, but comparison with the original type in our collection shows that the latter agrees absolutely with Arkle's description. We cannot understand why the latter in his remarks speaks of "var. *robsoni*, Tutt," instead of "var. *robsoni*, Collins." It is correctly named in *The British Noctuae and their Varieties*, vol. iii., pp. 68-69.

In the *Entom.*, p. 240, Mr. W. J. Lucas records "the purple loosestrife" as not one of the usual foodplants of *Saturnia pavonia*. It is surely one of the best known in the fens, and is mentioned among the very first of the fifty foodplants for this species noticed in *British Lepidoptera*, vol. iii., p. 333. He also asks whether the presence of "orange" and "pink" tubercles is due to sex or age? A full account of the colour variation of these tubercles (which may be yellow, orange, pink, white, black or purple), and Poulton's and Dixey's breeding experiments to obtain facts relating to them will be found *op. cit.*, pp. 325-326. Our official entomologists must not fall behind the times.

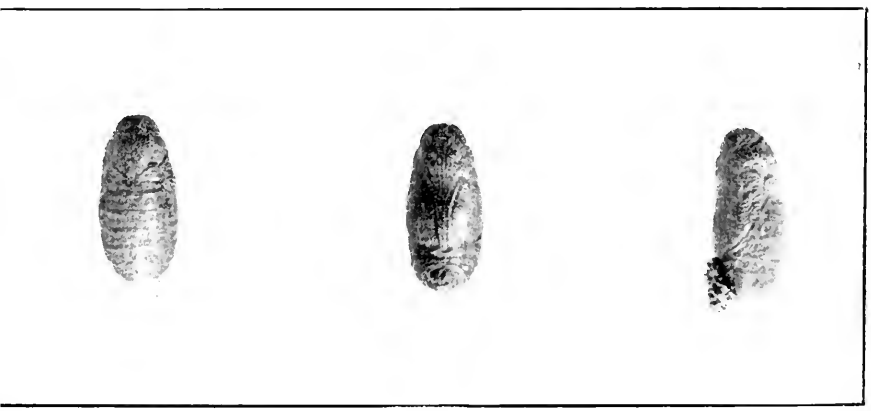
Mr. T. Gristock Brande states in the *Entom.*, xxxvii., p. 264, that he has a "British" example of *Papilio podalirius* in his collection, captured at Marlborough, in 1870, by a boy at the College. Mr. Brande thinks it was an immigrant. Surely, considering the large number of pupæ that have been annually disposed of to British collectors by the dealers for nearly a century, it is ten thousand times more likely to have been an escape. One would suppose that any specimen caught, at least after 1820, when Stephens and Curtis became active entomologists, would, in all probability, be an "escape." Such specimens can have no value faunistically.

1.

2.

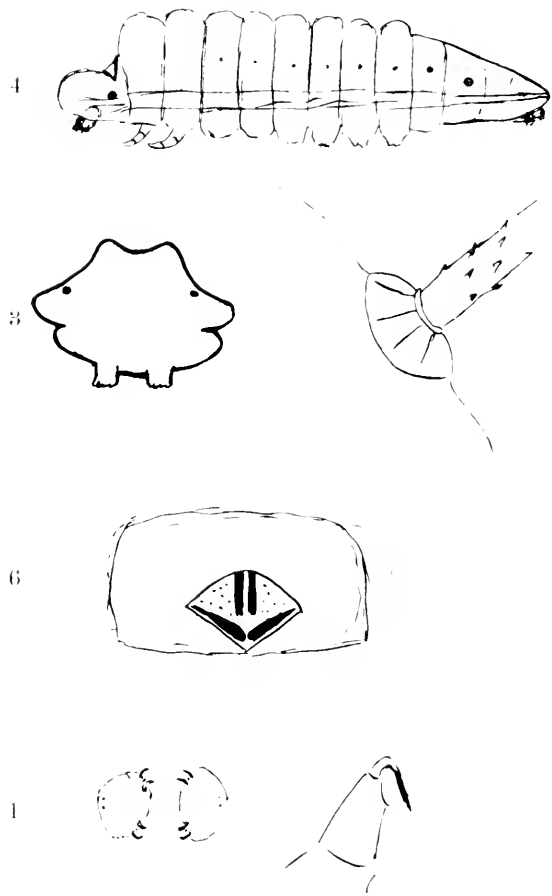


3.



4.

Pupa and Larva of Thestor ballus.



Details of Larva of Thestor ballus.

Notes towards a life-history of Thestor ballus (*with three plates*).

By T. A. CHAPMAN, M.D.

(*Concluded from p.* 260.)

May 31st.—Two specimens moulted, apparently into last skin, after resting nearly three days. The point that strikes one at once is the existence of two white processes just behind the 8th abdominal spiracle, apparently eversible glands. These disappear, leaving only a pale mark (from which they can be everted) after a few hours, and, on examining a larva in previous skin these same marks can be seen on it, but only as inconspicuous slightly paler spots. The chief difference between the two larvæ (in this and previous skin) is in the differentiation of the hairs. In the previous (penultimate) skin the hairs are much more uniform in size over the whole surface; in reality, they are triflingly longer and shorter, but not very noticeably. In this skin, the hairs may be described as occurring on the dorsal yellow bosses and on the subspiracular flange, and again at a lower level. The "slope" has only very short hairs, that look as if of a different series to the others. The depression of the 1st thoracic plate is still marked. The larva will probably be easier to describe when fullfed; meantime the row of dorsal (yellow) bosses stands out well as humps, and the lateral flange is very pronounced. This will probably be less so as the skin becomes more distended. The larva can put its head out, with mouth-parts straight forward, straightening out the "marginal flange" of prothorax, and making it vertical and not horizontal, making obvious to sight that the said flange goes over the dorsum of the segment, and has no real relation, morphologically, with the marginal flange, in spite of being, both apparently and functionally, continuous with it. In this stretched attitude these "marginal" front parts of prothorax rise to much the level of the rest of the larva, but the prothoracic plate remains at the bottom of a deep sulcus behind them, and reminds one most forcibly of the "neck" of the skippers. It is extremely probable that it is really related to the neck of the skippers; this and the "lenticles" are strong points to be added to others connecting the Hesperiids and Lycænids more closely together than either to the other butterfly families.

In the earliest part of its existence in its last skin the larva has still much of the colouring of the earlier stages. It is only 8mm. or 9mm. long (when at rest). The dorsal prominences are bright yellow, and the slopes below, if not quite so bright, are still yellow, and their other markings and colours are not much modified from those of the previous skin. The prominences are still very marked. The last two thoracic and first six abdominal (eight segments) have a large prominence (yellow) on either side of the dorsum, and carrying seven black and five white hairs, about 0·8mm. long, with a few others very short, that rather, perhaps, belong to the hairs of the general surface, but are actually intermediate in position, and are a trifle longer and straighter than the general surface hairs. Then follows the subspiracular flange, also yellow, well below the spiracle, and also carrying about five long white hairs, not quite 1mm. long, and more numerous but shorter black ones, that shade more gradually into the general surface hairs than do the dorsal ones. This flange appears to go round the prothorax and 9th abdominal segment; really, of course,

it goes across them dorsally. A continuous margin is thus made to the larva. This flange projects most at the middle of each segment, forming a series of humps or bosses. About half-way between the spiracular flange and the prolegs is a marginal flange. In the younger larva this is quite a ventral structure; in the fullfed one it is still so, but is a strong prominent projection with a very sharp angular margin, competing, on lateral view, with the subspiracular flange as to size and prominence. It has some trace of yellow colour along its margin (or angle). It ranges with the bases of the claspers behind, and meets the subspiracular (apparent) on front of prothorax; its allowance of white and black hairs is very much the same as that of the spiracular. The 2nd and 3rd thoracic segments have each a somewhat subordinate elevation, with longer hairs between the dorsal and subspiracular humps, and about the level of the spiracles. When the larva is really at rest the appearance of the front segments is remarkably like a boar's head, the large black spiracles being the eyes, the prothoracic plate the frontal hollow in front of the ears, and the lines of the "subspiracular" and "marginal" flanges marking the jaws, whilst the hairs well represent his shaggy eyebrows and whiskers, the black bit of head visible, looking sometimes like his opened lower jaw in shadow. [N.B.—I have no actual boar's head at hand to enable me to say that the boar's head it resembles is not an imaginary one.]

June 4th.—I came across a full-grown larva this morning, apparently at rest, and thought I would have another look at the "boar's head" attitude, but the outline of the prothorax was different, being almost convex, the hollow of the prothoracic plate being slight. On close examination, I found the larva was not at rest but busily eating. The front segments were raised (or in "sphinx" attitude, but without any "sphinx" appearance) from the stem of *Lotus* on which it rested, and in its paws (true legs) it held a flower-bud of the plant which it was munching vigorously, and which disappeared in about a minute; the prothorax forming a hood for the head, and the true legs being included under it and the continuation of the marginal flange on the 2nd and 3rd thoracic segments. The head was quite bent under, so that the mouth-parts were directed backwards. The marginal flange in this attitude is capable of hanging down all round like a curtain, so as completely to hide not only the head and legs, but also the small flower-bud that was being eaten; its pedicel had been eaten through so as to remove it from the flower-head. The motionless, reposeful appearance of the larva whilst eating rapidly was very striking. Started shortly after on another flower-bud, a rather larger one and undetached, it partially surrounded this with the flange, the actual point of attack being buried rather deeply, and the head itself more so, it was extremely difficult to detect the slightest movement of the larva; but an examination half a minute after showed that the bud had had a good bit eaten out of it. It holds the bud in much the same way before as after it is detached. When moving about, it always spins a good deal of silk. The claspers, viewed laterally, when holding on, present, first the columnar side with numerous hairs, and below this a fleshy pad occupying the central position and rather more than half the length of the foot in length, and on each side of this, and overlapped by it, so that they are larger than the portion seen,

indeed, they look as if they probably meet behind the pad, are two similarly shaped pads armed with crochets. The fullfed larva stretched out is 20mm., or even a little more (21mm.-22mm.). The general coloration is now a dark violet-purple, made up, however, of several distinct elements. The dorsal humps are still yellow, but they have not grown with the larva, and are now rather small warts on the middle of the dorsum of each segment, but, narrow from side to side; they tend to have a ridge running from each to the next, whilst the rest of the yellow colour at and beyond their bases is now modified towards violet. The marginal flange is also less yellow, and even pale and colourless at the forward segment. The dorsal line is still deep chocolate-red, but it spreads opposite the humps, invading them a little, and the rest of the dorsal area within the humps is pale transparent, with a central broad chocolate dash, giving a violet or lilac effect. The subspiracular flange stands out very prominently on each segment, almost as a (very rounded) point, so that the "slope" is still marked. The oblique stripe is very dark chocolate, with pale, hardly yellow, above and below. There is a very broad red-chocolate area below the spiracles, and the prominence of the subspiracular flange makes this area very flat (facing dorsally), and therefore very conspicuous. The black spiracles, in a narrow pale ring, are also very conspicuous. The pale area below the oblique stripe is still a little yellowish, and is divided into two portions by a dark shade going down behind the spiracle, and the lower margin in front is a little oblique, so that a casual view gives the whole "slope" as having alternate pale and dark oblique stripes. The 2nd thoracic segment is largely invaded by a rich vinous-red, which also occurs on the 1st, and also on the later, abdominal segments. The dorsal area of the 7th, 8th, and 9th abdominal segments has a curious effect, looking and being flat, in comparison with the high and angled segments in front. The 7th and 8th are really narrower than the 6th, but look broader, owing to the sudden narrowing to the 9th. The subspiracular flanges (or humps) are rather fuller and thicker than on segments in front, and are a little more dorsal, and they have a peculiar aspect from being apparently welded together into one double protuberance; the 9th is rather square, *i.e.*, it has two rather parallel sides and a square end. The prominences (subspiracular) of the 7th and 8th are red, of the 9th yellowish-reddish, and with a muddy overlaid transparency. The four black spiracles are conspicuous black spots, and the end still has something of the look of the back of a crocodile head. The dorsal coloration of the segment is a chocolate-red, with a somewhat darker dorsal line. On the 7th, the yellow of the dorsal prominence of the previous segments is represented by a short whitish oblique band, or stripe, on each side of the dorsum, stopping before the posterior margin of the segment, and with their ends joined by a transverse pale band. In the centre of this band is a transverse depressed line, looking like the opening of an eversible gland, of which I have not, however, seen anything more. Behind each posterior spiracle is a pale spot, and once, in the full-grown larva, I saw everted a white cylindrical tube with a domed summit, about 0·5mm. high, and 0·25mm. across, and with a finely spiculated surface. This description is rather the impression left by a short examination through a lens, though an actual description. The prothoracic plate has a width of less than $\frac{2}{3}$ that of the segment, its outer angles sharp, the front

somewhat rounded, hardly angulated in front, the posterior margin is straight on either side, meeting medially behind at about a right angle, the whole somewhat diamond-shaped. It is pale, with pale median line, a black line, broad at middle, runs outward, narrowing along each side of the posterior border, there is a black line on each side of the dorsum, not reaching the posterior margin, and numerous black (hair) spots, also several small ill-marked lenticles (pl. xiii., fig. 6). When the larva is sulky the plate sinks in and is overlapped by the margin of the segment round it, while just posterior to it is a small representative of the dorsal humps, yellowish. The area between the subspiracular and marginal flanges is reddish violet, below the marginal flange orange with violet tinting. The true legs are black, last joint brown. The head ochreous-brown, with a darker (hardly black) lower margin. First section of labrum pale (membrane), next brown, eyes black, outline of clypeus black, labium brown, trophi beneath pale. The general surface is clothed with short black hairs, not definitely distinguishable from those on the humps, as they grade into them. They are short and straight dorsally; in the spiracular region they are extremely short, and are curved into a hook, or acutely bent almost at right angles. They are not arranged in any lines definitely describable, but their numbers are about ten or eleven from the dorsum down to the spiracles, and eight or nine from back to front of a segment. Lenticles still exist, but are very minute and easily overlooked; they are most numerous on the outer "slope," above the oblique stripe. In the centre of the oblique stripe is still a depression, much as if the skin were here fastened down to something beneath, and there is a curious little white, buried-looking line running upwards from the incision (?) between the flanges on the first six abdominal segments. The depth of the incision (?) between the two flanges in the full-grown larva is very remarkable (pl. xiii., fig. 3). The spiracles consist of a black polished raised rim.

June 8th.—The two larvæ that were supposed nearly fullfed a few days ago are still eating voraciously, and have grown thicker, if not longer (pl. xi., fig. 3). The width is 6mm. and even 6·50mm., and the thickness 5·5mm. and even 7·0mm. when sulky, the length (slightly curled is then only 14mm.), stretched 24mm. The colours are a little different, the lower side has quite a greenish tone, and all over the prominences, especially the lateral flange, there is the appearance (and fact), visible in the larvæ of Cochlidids and other Lycænids, as if the skin was a nearly colourless pellicle, separated from the true coloured structure beneath by a layer of clear fluid. Seen dorsally he is a very harlequin; abdominal segments 2 to 6 are coloured in very much the same tints and patterns, and so are the thoracic segments 2 and 3, to a very close degree, but with more red, the 1st thoracic is essentially the same in some respects. The dorsal humps, seen dorsally, are yellow, seen laterally the yellow is within, the hump itself transparent, between them the dorsum has five longitudinal lines, a dark chocolate centre, and on each side a whitish and then a reddish-chocolate one, between the humps the red lines coalesce, blocking the pale ones, behind the humps the segment is right across (above the lateral flange) abruptly cut off, forming a steep slope facing backwards, and colourless except for the central dorsal line. The outer sides of the yellow dorsal hump have a faint reddish tint or may be bright red-orange, then a pale band above the oblique stripe

which is dark, then an oblique pale band, interrupted by a fine vertical (dark) line behind the spiracle, a certain rather colourless area continues upwards in front of the red upper surface of the marginal flange, and so makes the pale area below the dark stripe essentially a pale oblique stripe in most attitudes. In one larva, the front portion of this, which almost includes the spiracle, has the aspect of the tail of a comet extending upwards, the spiracle being a black nucleus. In some attitudes the sulcus between the subspiracular and marginal flanges is quite straightened out, the slope from the subspiracular to the prolegs being a regular slope, but usually the marginal flange appears as a definite fulness. The 7th and 8th abdominal segments are as already described. The subspiracular flange being here bent up dorsally and bright red, now with a transparent margin.

June 12th.—The third larva (youngest) is still as at last note (June 8th), but the two others have been eating until to-day, and seem now to be really fullfed, previously they may have been fullgrown, but have certainly eaten a deal since, without getting much fatter, and have no doubt replaced watery fluid by nutrient matter. These two are now getting greener and paler, the red colour largely fading. The red of the patches above lateral flange of the 1st and 2nd thoracic, and of dorsa of 7th, 8th, and 9th abdominal, segments, is no longer of a chocolate tint, but rosy-pink. The dorsal lines have not faded much, and the chocolate stripes are still dark, but the pink tops of the flange are now mere scraps of colour, and the rest of the dark colour having faded the slopes are chiefly greenish, giving the larva rather a washed-out look.

June 16th.—These two larvæ continued eating till yesterday, when they appear to have ceased. They are still full size, and are lazying about, without apparently thinking of pupating (weather very cold and damp). Towards mid-day one of these was found curled up in a curious ball, utterly unlike any attitude before observed. Though somewhat disturbed before accurate observation was suggested, it was found to be, as it were, climbing over its own back, an attitude very common in larvæ that often and easily curl up, *viz.*, with the head on the back of the posterior abdominal segments, but one of great difficulty in such a short, thick larva as this. It occurs to question whether it is not attempting to reach (or, before disturbance, had actually reached) the glandular opening in back of 7th abdominal. This question is suggested by Mr. Powell's statement that his larvæ have not done well, and that he thinks it is, perhaps, because they have not been attended by ants, as they probably were in their natural habitat. The larvæ are now very decidedly green above and below, with some washed-out brown and pink markings, but no yellow and no brown or pink where these were previously mere shadings.

June 19th.—Are nibbling a little, not attempting pupation; are greener than ever, making the black spiracles very conspicuous; are also much thinner, though not shorter. The cold weather probably does not agree with them (below 60° F.).

Pupation.—August 15th.—The two largest or, rather, most mature larvæ were left perforce, after last entry (June 19th), to their fate. Believing that they were unhappy for want of access to a dry place (under a stone probably) to pupate in, they were put with an oak-leaf or two into a small cardboard box, and left on the mantelshelf. How long they continued unhappy does not appear, but, on August 1st, they

were found side by side in a corner of the box as pupæ, quite loose; one with the larval skin attached to the tail, the other free from this, with quite rounded end, and without any cremastral armature. No particular observations were, however, made of them, under the idea (probably correct) that they would keep. To-day, however, it is found that the eyes look black, and that there is about the wings an aspect of underlying white density. No doubt the imago is maturing, whether normally for the spring emergence, or for an autumn emergence, not known.

Pupa.—The pupa (pl. xi., fig. 1; pl. xii., fig. 4) is of the same brown colour and appearance as any ordinary subterranean pupa (Noctuid, Sphingid, Geometrid, etc.), and not of the paler or varied tints one associates with butterfly pupæ. This suggests that the unhappy larvæ wanted to bury themselves even more literally than retiring beneath a stone would have been. The form of the pupa is that common in the Lycænids, short and rounded, flat ventrally, and with the abdominal segments wider than the thoracic; it is not, however, a very pronounced example. The length is 12mm.; underside (venter) nearly straight from between 2mm. from front to 1 mm. from anal end, these terminal portions entering into the rounding of the extremities; 3mm. from front the width is 4mm., and it is hardly more at 5mm., there being thus a tendency to a waist, which is quite obvious in a lateral view; 3·5mm. from posterior extremity the width is 5mm. The extreme ends of the pupa are only about 1·4mm. dorsal to the straight ventral line referred to. At 3mm. from front the antero-posterior diameter is 4mm., and it is nearly the same at 5mm. It then increases gradually to 4·5mm. at 8mm. from front, and then rounds off into posterior rounded extremity. The waist is more marked, where the sides of the 3rd thoracic and 1st abdominal sink a little. The pupa appears to have no movable segments, no cremaster, no hairs discoverable by an ordinary examination, or any other spines, processes, or other projections. The spiracles are each at the bottom of a shallow pit, in which the spiracle proper is a transverse slit at the summit of a little mound. The segmentation is very distinct. The whole surface is very finely rough, with minute points of equal size and much the same character all over (except the appendages). On a larger magnification this description still holds good, but is wofully defective, each point is a little prominence, with a central hollow at top, the margins rounded (probably primitively have points), and the several points connected together by lower rounded ridges in a complicated manner. On the mesothorax the points are arranged round a central point behind the middle of the thorax for a little distance, the lower ridges being perhaps more marked than usual on the 3rd abdominal (the others are much the same). The points may be taken as being in various rows, about ten to twelve in the width of the segment from front to back, but the most obvious rows start at the front of the segment (say, half-way between the spiracle and dorsal lines), and, proceeding obliquely, have afforded about twenty points before they (rather, the individual one we have been counting, the others being parallel with it) reach the dorsal line, where they are difficult to count further, but if they went on regularly would give five or six more before reaching the posterior margin of the segment. The antennæ, starting in front, proceed outwards and then

backwards, till at 2mm. from the front they are 3mm. apart; they then turn in to the middle line and meet together ventrally at 6mm. from the front; then, with a sharp bend, they change their direction, and proceed side by side for 3mm., terminating with the wings at the hind margin of the 4th abdominal segment, which is curved backwards to give them more room. The lozenge-shaped space between the antennæ before they meet is occupied by the face, the maxillæ, and the first and second legs. The first leg abuts against eye and antenna about equally, and extends down for about two-thirds of the space (about 2·3mm). The second leg (cut off from face by first) terminates between maxillæ and antenna; the maxillæ, slightly wider at their extreme bases, proceed as two parallel straight stripes to where the antennæ meet; they look rather as if dipping under them than terminating there. The wings are ample, but are only slightly visible dorsally. The hindwing is merely represented by an angle of metathorax, not reaching the 2nd abdominal segment. The sculpturing of appendages is of the same character as of the rest of the surface, but only in a general way; they are covered by transverse ridges which are finely convoluted, or, at least, curved or zigzagged; on the antennæ there are two to a segment, elsewhere they are less regular. They are just sufficiently pronounced to produce an effect much the same as elsewhere; on the wings the ridges are in fairly regular transverse order, and there only do they here and there look as if they might easily develop the points with their volcano-like craters, but never actually get so far. These pupæ preserved much the same aspect (of being in the initial stage of the maturation of the imago) till winter, when an attempt was made to force them, but without any effect. I then handed them to Mr. Tonge, but no butterfly appeared at the proper season, and it was supposed they had died. On July 30th, 1904, however, a ♀ imago appeared, but did not succeed in properly expanding its wings, apparently owing to being in a confined space. On October 1st, 1904, one remaining pupa is alive and one dead, judging by specific gravity.

As an addendum to the foregoing the following notes on the species made in the spring of 1904 may be interesting. *T. ballus* appears to exist around Hyères in almost all directions for a good many kilomètres, odd specimens being seen in various unexpected places, but it is abundant only at Carqueiranne. At Costebelle it is also common, but here the locality is more contracted, and possibly in some degree affected by the enthusiasm of collectors. At Carqueiranne its numbers seem to be sufficient to resist a good deal of entomological persecution, since it is common over a very wide area. Its chief resorts at Carqueiranne are amongst the terraced gardens, especially where different species of daffodils are grown. One fancies, before making investigation, that this cultivation must mean destruction to the butterfly. But apparently the truth is quite the contrary. Each butterfly here has special relations to the cultivation carried on, chiefly, of course, as that favours, or otherwise, the foodplant, and as the cultivation is in terraces, there are always walls or banks between the little plots, beside the numerous little paths, as well as plots temporarily out of cultivation, that seem especially provided to allow various wild plants to flourish. As regards *T. ballus*, this is not only so, but amongst the narcissi there seems to be usually time, whilst the crop is still there, for the foodplants of *T. ballus* to flourish and feed a brood of the

larvæ, which probably very largely wander off to the rougher ground to pupate before the ground is again disturbed. Some such condition as this seems to be what makes *T. ballus* so plentiful here. I was, however, a little surprised to find in one at least of the woods here that this insect was in fair numbers in the wood, a long way from cultivation, whenever there was any little open space beside a path. And a word as to the foodplant. Every one knows that the foodplant is *Lotus hispidus*, and there is much in a name. Mr. Raine knows the plant and its allies very well, and to him I am indebted for my knowledge of them. Some other entomologists, however, who have recently approached the question have fallen into an error, which is a very natural one, and may be really of much older date than I am aware of. The favourite food of *T. ballus* at Carqueiranne is a very hispid *Lotus*-looking plant, and so has been accepted as *Lotus hispidus*. It is, however, not a *Lotus* at all, but *Anthyllis tetraphyllus*. *Lotus hispidus* also grows freely at Carqueiranne. I have found eggs of *T. ballus* on both these plants, perhaps more abundantly on the *Anthyllis*. There are also many other allied leguminous plants at Carqueiranne on which, probably, *T. ballus* would be able to exist. The *Lotus hispidus* is very closely allied to *L. corniculatus*, so that it is clearly by no means a matter at all remarkable that it feeds so comfortably on that plant as a substitute. Apart from correcting the mistake fallen into by some recent investigators of *T. ballus*, I wish to call attention to the fact that *Anthyllis tetraphyllus* is *the* foodplant of *T. ballus*, not only equally with, but perhaps more especially than, *L. hispidus*, at least at Carqueiranne.

DESCRIPTION OF PLATE XI.

1. Pupa of *Thestor ballus*—dorsal, ventral, and lateral views (natural size).
2. Eggs of *Thestor ballus* on *Anthyllis tetraphyllus* (×22).
3. Fullfed larvæ of *Thestor ballus* on *Lotus corniculatus*, June 6th, 1903 (natural size).

DESCRIPTION OF PLATE XII.

1. Larva of *Thestor ballus* (1st stadium) ×28.
2. ,, ,, ,, ,, ×20.
3. ,, ,, ,, (2nd stadium) ×20. (Reproduced badly.)
4. Pupa of *Thestor ballus*—dorsal, ventral, and lateral views ×2.

DESCRIPTION OF PLATE XIII.

1. Diagram showing arrangement of hooks on prolegs of *Thestor ballus*.
2. Form of hook of true leg.
3. Transverse section of larva (diagrammatic) to show depth of division between two lateral flanges.
4. Diagram showing depressed position of prothoracic plate and eye-like effect of spiracles.
5. Structure of larval hair.
6. Markings of prothoracic plate.

[Plates XI and XII are from photographs by A. E. Tonge, Esq.]

On some northern Spanish Geometrides.

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

For a third time in succession (cfr. *Ent. Rec.*, xiv., pp. 198-202; xv., pp. 96-98) I have had the pleasure of working out a collection of Spanish Geometrides, Dr. Chapman having once again been kind enough to collect them for me during his visit to the north of the

peninsula in the summer of the present year (1903). Of the localities visited Dr. Chapman has already written (*antea*, pp. 122 *et seq.*, and pl. v, vi and vii); my part is merely to discuss the insects brought away, although I am aided in so doing by two or three interesting notes handed me by their captor.

The greater part of the collection was made in the district of Canales—101 specimens (33 species); from Moncayo come 56 specimens (31 species), or—including two from Agreda, a little town on the west foot of Moncayo, about 2000ft. elevation—58 specimens (32 species); the rest are from Soria, 3 specimens (2 species), and Barbadillo, 5 specimens (3 species). Thus the total is 167 specimens, and there were 47 different species represented. By a curious coincidence the former figure agrees almost precisely with that for 1902; I recorded (*Ent. Rec.*, xv., p. 96) the Bejar, etc., collection as numbering 169 specimens, but these only comprised 31 species, as against 47 for 1903. It may be that this difference is really correlated to the totals for the respective districts worked, or it may be that Dr. Chapman did more this year in pinning "samples" of *all* the species observed, including even the least striking ones; at any rate this year's collection contains several single specimens of widely distributed European species, such as "*Larentia*" *ocellata*, L., *alternata*, Müll. (=*sociata*, Bkh.), *bilineata*, L., etc.

As would perhaps be expected from the geographical position, there is a somewhat smaller proportion of characteristically Spanish species than in the two preceding years; general central European things and specialities of the Pyrenees are what we actually find chiefly in evidence. In 1901, I had to deal with about 53 species (Cuenca, Tragacete, etc.), 16 of which occur in Britain, while 37 do not; in 1902 with 31 species (Bejar, Piedrahita, etc.), 12 being British, 19 non-British; this year the numbers are 28 British, 19 non-British.

The "families," in the convenient (if not unimpeachable) Meyrick-Hampson system, which is now followed almost entirely in Staudinger's *Catalog*, are represented as follows:—*Geometridae* (*sens. str.*), 2 species; *Acidaliidae*, 16 species; *Larentiidae*, 13 species; *Oenochromidae*, 2 species; *Boarmiidae*, 14 species; thus the *Acidaliidae* are not so conspicuously dominant as on previous occasions.

As a small contribution to our knowledge of local faunæ, it is advisable to give a complete list of the species; and I shall then add notes on the most interesting of them.

Canales, June 27th to July 9th:—*Phorodesma* (*Comibaena*) *pustulata*, Hfn., larva, *Pseudoterpna coronillaria*, Hb., *Acidalia* (*Cleta*) *rittaria*, Hb., *A. luteolaria*, Const., *A. sericeata*, Hb., *A. rubiginata*, Hfn., *A. marginepunctata*, Goeze, *Zonosoma* (*Cyclophora*) *porata*, L., *Rhodostrophia calabra*, Pet., *Ortholitha plumbaria*, Fb., *Odezia atrata*, L., *Chesias spartiata*, Hrbst., *Larentia ocellata*, L., *L. pectinataria*, Knoch, *L. montanata*, Schiff., *L. spadicearia*, Schiff. (*ferrugata*, Stgr. *Cat.*), *L. galiata*, Schiff., *L. alternata*, Müll. (*sociata*, Bkh.), *L. bilineata*, L., *Eupithecia scopariata*, Ramb., *E. innotata*, Hfn., *Ellopia prosapiaria*, L., *Venilia maculata*, L., *Boarmia* (*Cleorodes*) *lichenaria*, Hfn., larva, *Pachycnemia hippocastanaria*, L., *Gnophos dilucidaria*, Hb., var. (?), *Fidonia famula*, Esp., *Eurranthis* (*Athroolopha*) *pennigeraria*, Hb., *Ematurga atomaria*, L., *Bupalus piniaria*, L., *Selidosema taeniolaria*, Hb., *Enconista miniosaria*, Dup., *Heliothea discoidaria*, Bdv.

Moncayo, mid-July (mostly at 4000ft.-5000ft.):—*Acidalia ochrata*, Scop., *A. subsaturata*, Gn., *A. asellaria*, H.-S., *A. alyssumata*, Mill. (?), *A. deversaria*, H.-S., *A. dilutaria*, Hb. (*holosericata*, Dup.), *A. fuscovenosa*, Goeze (*interjectaria*, Gn.), *A. humiliata*, Hfn., *Rhodostrophia vibicaria*, Cl., *Ortholitha plumbaria*, Fb., *Lythria sanguinaria*, Dup., *Larentia montanata*, Schiff., *L. bilineata*, *Eupithecia scopariata*, Ramb., *E. innotata*, Hfn., *Metrocampa margaritata*, L., *Boarmia repandata*, L., *Anthometra plumularia*, Bdv., *Fidonia famula*, Esp., *Eurranthis* (*Athroolopha*) *penniger aria*, Hb., *Ematurga atomaria*, L.

Agreda (west foot of Moncayo):—*Acidalia ochrata*, Scop., *Ortholitha chenopodiata*, L. (*limitata*, Scop.).

Barbadillo, June 27th:—*Eupithecia scopariata*, Ramb., *Fidonia famula*, Esp.

Soria:—*Acidalia ochrata*, Scop., *Rhodostrophia vibicaria*, Cl.

The *Thorodesma pustulata* is a fine large ♀, bred out on July 20th, from a larva taken at 4000ft. elevation. *Pseudoterpna coronillaria* was met with both in the imago (3 ♂ s taken) and in the larval state (1 ♀ bred). The larva was found on *Genista scorpius*, and Dr. Chapman writes, "larva and pupa identical with *P. pruinata*: on comparing Millière and Staudinger's *Catalog*, I am satisfied that my idea that these two are one is supported." *P. coronillaria* has been accepted as a good species ever since it was made known by Hübner, but this has been solely on its striking colour difference—the other slight differences mentioned by Guenée, namely, "les lunules terminales plus marquées, et les lignes médianes peut-être un peu plus écartées et plus dentées," etc., do not amount to much—and probably we cannot do better than bow to the Doctor's judgment, and write "*Pseudoterpna pruinata*, Hfn., var. *coronillaria*, Hb." It is interesting that Boisduval came very near this result more than 60 years ago; he gives (*Gen. et Ind. Meth.*, p. 180) a "var. *coronillaria*, Dup., non Hb.," under *cythisaria* (*pruinata*), and writes: "In Gallia centrali occurrent identidem specimina cinerea, primo intuitu *coronillariae* fere *similia*, sed a *corsicaria* et *coronillaria* genuina facile distincta, fronte fusco . . . . ut apud *cythisariam*." But Guenée points out: (1) that the fuscous frons is common to both; (2) that Duponchel's figure clearly represents the same thing as Hübner's; (3) that when he (Guenée) tried to obtain Boisduval's reputed var. from central France, he only received "la vraie *coronillaria*." The question remains whether in any parts of central France our insect becomes "ab. *coronillaria*," or whether it is always a fixed local race, as it certainly seems to be in southern Europe, Syria, etc.* It will also be interesting to learn whether *axillaria*, Gn., and *corsicaria*, Ramb., are likewise co-specific with our *pruinata*.

The single specimen of *Acidalia* (*Cleta*) *rittaria* is a pale aberration of exactly the colour of *perpusillaria*, Ev., which it much resembles, except in the sinuous central line and, of course, the more heavily pectinated antennæ. The *A. luteolaria*, also a single specimen, lacks the dark margin so characteristic of my Piedrahita specimens (*Ent. Rec.*, xv., p. 97); this species seems a somewhat variable one, if I may judge from the very slender material which has passed before my eyes,

* I see Guenée in his appendix (*Ur. et Phal.*, ii., p. 541) admits a var. *A.* of *coronillaria* of a "gris-verte-d'eau très-pâle," and adds that he has seen a slight greenish tinge in several other specimens of the species.

and I have another example, rather worn, of again a different form (larger) from Tragacete, which has not yet been recorded, as I failed to determine it at the time; it has apparently a fair distribution in Spain, though best known from the Pyrenees. The Moncayo *A. ochrata* is more richly-coloured than those which I have from any other Spanish localities, almost approaching the shade of *A. similata*, Thnb. (*perochraria*); in my series of 58 I have only two or three to match it, and these are from Turkey, Crete and Florac—the last-named kindly presented me by Mr. A. H. Jones. Our British race is also rather full-coloured, but not quite so bright as these.

A. asellaria (one ♂, one ♀) is interesting in that ova were obtained from the ♀, and larvæ therefrom have been raised to nearly full growth. They present some points of considerable interest, and as they have been in the hands of such masters of larval description as Dr. Chapman and Mr. Bacot, we may look forward to some additions to our scientific knowledge of them. I know of no existing account of the early stages excepting Millière's meagre one in *Ann. Soc. Ent. France*, 1885, pp. 115-116. If my determination of the single specimen of *A. alyssumata* is correct, I should be most strongly inclined to answer Staudinger's query "an spec. div." in the affirmative; the shape does not look to me precisely the same as that of *A. asellaria*, the bold dots before the fringes are very distinctive, and there are other minor differences. It does not seem to have struck Millière, who knew both larvæ, that *asellaria* and *alyssumata* could be identical.

The *A. derersaria*, like the small one which I recorded from Albarracin as "probably *inornata*" (*Ent. Rec.*, xiv., p. 200), comes so near certain strongly-marked British *inornata*, that one wonders whether it would not be more natural to view *derersaria*, Tr., as a local race of *inornata*, Haw., than as a "Darwinian species"—but after all, it is merely a difference of terms.

A. dilutaria (five specimens, Moncayo) is of the type form, not the var. *holosericata*, *i.e.*, the central dots are well expressed. I see Staudinger and Rebel except the Iberian peninsula in giving the range of this species, so I suppose we may regard this record as of some interest faunistically.

The "*marginepunctata* group" is only represented by a single specimen of its typical species. But this is very far from being a "typical" specimen. It is rather pale, the lines weakly expressed, but the discoidal spots quite exceptionally large and conspicuous, giving it a striking aspect, which perhaps justified a moment's hesitation as to its specific identity.

The *Rhodostrophia vibicaria* are both var. *strigata* of a rather advanced type—the lines slender and sharply-defined. The *R. calabra* are mostly bright and well-marked, but one is of a pale aberration—a weakly-marked ab. *separata*, Th.-Meig; Staudinger does not diagnose this form, but it nearly corresponds to var. *strigata* of *vibicaria*, the outer band being broken into two lines. In my example, which is altogether faintly marked, even the outer of these is quite indistinct.

The *Lythria sanguinaria* (seven ♂s, one ♀) appeared late, Moncayo, July 18th. All but one are of the type form, but that one (a ♂) is definitely of the var. *vernalis*, Stgr., and this fact, taken in conjunction with last year's experience at Bejar (*Ent. Rec.*, xv., p. 97), makes me doubtful whether the seasonal dimorphism in this species is quite so thoroughly perfected as in some others.

The *Larentia montanata* (one ♂, Canales; two ♂s, Moncayo) are all interesting, and give at least a hint of another local race in this very inconstant species. The ground-colour is less clear white (more tinged with brownish) than in the normal forms, as I know them from England, Germany, Switzerland, etc., and, in fact, in this respect they agree with var. *shetlandica*, or, at the least, with some of the more extreme specimens of the Scotch mainland. The size, too, is rather small (29mm. to 30mm.), and the central fascia uniformly narrow. The outer area and the hindwings are rather strongly marked, especially in the Canales specimen. The form evidently makes some approach to Staudinger's recently diagnosed var. *iberica*, from the mountain heights of Castile and Andalusia—"al. ant. albido-lutescentibus minus obsoletiusque signatis, fascia med. angustiore fuscescente." I hardly think it can be quite the same, but until I have seen examples of Staudinger's var. I abstain from naming mine. If the two should fall together, it would seem that var. *iberica* is not altogether confined to the highest elevations, though I have no proof that the Moncayo examples may not have been taken on one of the excursions to a considerable altitude.

Eupithecia scopariata was abundant at 4000ft. elevation amongst *Erica australis*. The series brought shows great variation. I think the specimens belong mainly to the "type" form in the comprehensive sense in which Staudinger understands it—*i.e.*, including the ab. *guinardaria*, Bdv., but I am not able to compare sufficient authentic material to work out the variation with any satisfaction.

The single specimens of *Venilia macularia*, *Cleorodes lichenaria* and *Selidosema taeniolaria*, are none of them absolutely typical; the first-named is very pale, but unfortunately a trifle worn, so that one cannot tell precisely how much of the pallor is natural. The *C. lichenaria* has a pale ground-colour and sharp markings. The *S. taeniolaria* has the central area broader than usual.

The *Ennomos*, which I have indicated as probably *dilucidaria*, is very different from any other specimen in my variable series, or in the still more variable series in our national collection. It seems to come close to "*glaucinaria* var. *etruscaria*" of Staudinger (*Iris*, v., p. 189) which is now referred with a query (Staudinger's *Cat.*, p. 346) to *crenulata*, Ramb.—which, again, in its turn, may be "praec. sp. [*dilucidaria*] var. obscurior." Rambur's figures do not fit perfectly with my specimen, being too brown and too sharply marked, but I gather from Staudinger's *Catalog* that one, at least, of them is not quite faithful to the type specimen which it depicts.

Fidonia famula, an interesting local species and new to my collection, was common at Barbadillo on June 27th, but rare at Canales, June 27th to July 9th. One, in fine fresh condition, turned up on Moncayo in the middle of July, and it is noteworthy that this is the only ♂ amongst the eight specimens brought (Barbadillo, four ♀; Canales, three ♀).

Eurranthis pennigeraria was made the speciality, so far as Geometrids are concerned. A grand variable series of 30 ♂ and 5 ♀ was brought from Canales, where, as Dr. Chapman tells me, "large but worn specimens occurred in lower levels—3000ft.—on June 28th; smaller specimens were found abundantly at 5000ft. on July 3rd, often a dozen or two flying at once within a small area." I cannot find any

constant difference in markings between the larger and the smaller specimens; two or three of the latter are exceptionally dark, having the white transverse bands very narrow and interrupted; there is, as usual, considerable variation in the amount of dark bordering on the upper- and dark freckling on the underside of the hindwings.

Ematurga atomaria was to be found everywhere, but nowhere abundant. I suppose it is getting near the extremity of its range in this direction, as I notice it is said to be wanting in Andalusia—as also in another southernmost part of Europe (Sicily), and in North Africa; on the other hand it reaches a long way north in Europe and probably in Asia. These Canales and Moncayo specimens are almost my first Spanish examples of the species; they are variable within moderate limits, but not so large and fine as the grand Cannes and Locarno forms—much nearer, indeed, to such as one might take in England.

The larvæ of *Enconista miniosaria* were not uncommon on a species of broom, but unfortunately only one was successfully bred—a fine male, which emerged on September 28th. This is well-known to be an extraordinarily aberrant species, not only in colour, but also in the position of the lines, and my specimen—a slightly pinkish-tinged aberration—happens to be so totally unlike any of the specimens in our national collection, that at first glance I did not even recognise the species.

Heliothea discoidaria was only just out when Dr. Chapman left Canales, one fresh male being taken on July 9th.

It will be seen from the above notes that I have found a great deal in the collection to interest me, and not a little to set me thinking and stimulate further research, and I cannot close without repeating how sincerely grateful I am to Dr. Chapman for his unstinting liberality, and all the encouragement it has given me in my studies.

Rare or Doubtful British Coleoptera.

By Prof. T. HUDSON BEARE, F.E.S., & H. St. JOHN DONISTHORPE, F.E.S.

Although the interesting article due to the pen of Mr. E. A. Newbery, which appeared in the July number of this journal, page 204, is not a direct criticism of the *Catalogue of British Coleoptera* which we have recently published, still it seems to us desirable to reply to the points raised by Mr. Newbery, and to point out that, in certain of the examples he quotes to illustrate his arguments, his data are not accurate. We fail entirely to see how we could draw attention in a catalogue to insects which Mr. Newbery puts in Class iii, *viz.*, those which are very rare, and as a rule rest on the authority of a single specimen. The records in all these cases are authentic, the insects exist in actual collections, and there is no possible means known to us of marking in a catalogue insects which are rare from insects which are common; in fact it is not the business of a catalogue to concern itself with such details, it is merely a list, or, as Mr. Newbery calls it, a census, and the beetle which is rare to-day may quite likely be, and very often is, taken in abundance to-morrow. Classes i and ii, however, namely, those which he considers should be deleted altogether, or those which should be placed in the doubtful list, require some further considera-

tion, and we propose to deal with the insects mentioned by Mr. Newbery in the order in which he has treated them.

Under Class i, insects which should be deleted, *Bembidium lampros*, Hbst., var. *celere*, F., this variety is given in Canon Fowler's *British Coleoptera*, and, after consideration, we decided to retain it as a distinct small variety. *Hybius obscurus*, Marsh, var. *sexdentatus*, Schiodt, this also is given in Canon Fowler's book, and is also given in Dr. Ellis's "Liverpool list," p. 211, having been taken at Little Brighton. *Megacronus formosus*, Gr., was taken in Northumberland, and is recorded in Hardy and Bold's *Catalogue of Northumberland Coleoptera*, p. 34; this appeared to us to be a trustworthy record. *Philonthus trossulus*, Nord., we do not consider this to be synonymous with *nigritulus*, Er.; one of us has taken the latter species fairly commonly in flood-refuse at Southport, and it is very distinct; it is also common in the north of Ireland; its specific differences are discussed in Johnson and Halbert's *List of Irish Coleoptera*, p. 654; it is treated as a variety in the European "Catalogue," but it appeared to us to have definite specific characters, and we, therefore, decided to retain it as a species. With regard to *Gnathoncus—G. nannetensis*, Mars., is not a British insect, and must be deleted, and *G. punctulatus*, Th., and *G. rotundatus*, Kug., are synonymous, and therefore *G. punctulatus*, Th., should have been omitted from the catalogue; we obtained this information, however, in regard to these points from Mr. Lewis too late to permit of any change in the new catalogue. With regard to *Cychramus fungicola*, Heer, and *luteus*, F., we fail to see that Dr. Sharp's note in the *Ent. Mo. Mag.*, vol. xxv., p. 404, has settled the question that these are sexes of one species, and we would refer coleopterists to a note by the late Mr. Janson in the *Entomologist's Annual* for 1861, p. 66; after weighing all the evidence and going very carefully into the matter, we came to the decision that these were not sexes of one species. As to the question whether or not *Cominomus carinatus*, Gyll., is a synonym of *constrictus*, Gyll., we were unable to come to any definite decision, and therefore decided to leave both names in the catalogue. In the European catalogue they are treated as synonymous, but Canon Fowler has kept them distinct, although he admits that the point is a doubtful one. In regard to *Bruchus viciae*, Ol., var. *fahraei*, Gyll., *fahraei* is given as a variety of *viciae* in the "European Catalogue" of 1891, p. 331, and not of *atomarius*, L. *Orchestes sparsus*, Fabr., rests in our catalogue on the authority of a specimen in the Power collection. Mr. Newbery contends that this specimen is only a small form of *ilicis*, F., but it may be pointed out that M. Brisout confirmed Dr. Power's original identification, and it would have been absurd for us, therefore, to have rejected a species when there is such a marked difference of opinion between two authorities; the same remark applies to the retention of *Apion opeticum*, Bach.

In Class ii, Mr. Newbery places insects which he says belong to ancient history, or rather which have not occurred for about fifty years, and the history of which he says is in many cases extremely doubtful. *Rhantus adspersus*, F., the first one, was taken in numbers according to the old records, and the great physical changes which modern drainage has brought about in the districts in which these insects were taken would quite account for its disappearance; it may be extinct, therefore, but it certainly was a British insect. *Bledius femoralis*, Gyll., is also an undoubted British insect, and was not erroneously named. Mr.

Waterhouse informs us there is no doubt about this, and that they were undoubtedly taken by his father, although the locality is not at present known. As regards this species, the extreme danger of taking up such a line of argument as that adopted by Mr. Newbery is strikingly shown by the fact that in the October number of the *Ent. Mo. Mag.*, p. 237, Dr. Joy records the capture of nine specimens of *Bledius femoralis*, at Wokingham, the identification being confirmed by Canon Fowler. Such a record as this is a complete justification of the policy we adopted in regard to these very rare beetles. *Oxytelus piceus*, L., was taken by several persons, and the late Mr. Rye gave its characters, see the *Ent. Annual* for 1863, p. 86; here again it was impossible for us to reject the insect. *Scraptia dubia*, Ol., the original record is again quite authentic, and although a long interval has elapsed without a recapture, we fail to see why it should be struck out of the catalogue. As regards *Rhynchites bacchus*, L., we have records of undoubted captures, one having been seen alive by Mr. Douglas, whilst *Rhynchites auratus*, Scop., rests on an equally trustworthy record: possibly, like *Rhantus adspersus*, they are now extinct, but there is no reason why, even if that is the case, they should be deleted from the catalogue. *Otiorhynchus morio*, F., var. *ebeninus*, Sch., the capture of this variety by Mr. Greville in the west of Scotland is recorded in Murray's *Catalogue of the Coleoptera of Scotland*, published in 1853, and, as Mr. Newbery states, there is a specimen in the Power collection; why, therefore, should we consider this to be a doubtful record? *Polydrusus planifrons*, Gyll., there is a specimen of this insect in the Bates' collection, it came originally from the collection of Mr. Harris, the Bates' collection being now in the possession of one of us; moreover, Dr. Ellis' record is, as far as we know, quite authentic, and the beetle is given in the "Liverpool List," p. 69. *Tapinotus sellatus*, F., there is a specimen of this insect in the Power collection, with the dates and all the other necessary records of its capture, and, therefore, here again there is no reason for assuming that the insect is not British. *Hypothenemus eruditus*, West., we see no reason to suppose that this is an introduced insect, as the only country in which it has occurred is England; the mere capture of it in a book does not in the least prove that it was introduced from abroad, and in the "European Catalogue" the locality given is "Britain" only; further, we would point out that it has been taken since Westwood's time by Mr. O. Janson.

With reference to Class iii, those which are inserted upon the authority of a single specimen, we do not propose to go in detail through the list given by Mr. Newbery. No doubt many of them do rest in our catalogue on the authority of a single specimen, but many of those he quotes have been taken for the first time only within the last year or two, and there is no reason to suppose they will not occur more commonly when the localities in which the single specimens have been taken are more thoroughly worked; certain of them are very rare on the continent, and, therefore, it is not surprising that they are very rare here, but we would point out that, in one or two cases, Mr. Newbery has failed to keep himself informed of recent records. *Oxypoda longipes*, Muls., has been taken since the original record by Mr. Chitty, see *Ent. Mo. Mag.* for 1900, p. 237, and by Mr. J. J. Walker, see *Ent. Mo. Mag.*, 1900, p. 24. *Medon dilutus*, Er., has also been taken since its first record by Mr. Collins, see *Ent. Mo. Mag.*, 1904, p. 14.

ORTHOPTERA.

APTERYGIDA MEDIA, HAGENB. (=ALBIPENNIS, MEG.), IN EAST KENT.—I have much pleasure in recording the recapture of this earwig in East Kent. It has occurred in four different spots, the earlier specimens being swept in the bank of a hedge adjoining a hop-field, about a quarter of a mile from my house, from which bank I have recorded the rare bee, *Andrena ferox*. Afterwards it occurred in the hop-bine in some numbers. I also swept it in the Pilgrim's Way, at Charing. The capture is due to Mr. H. Donisthorpe, who must have swept a specimen in the Pilgrim's Way last June, when collecting with me, but, owing to a misunderstanding, the specimen, which was thought to be *F. lesnei*, was not kept, so I proceeded to search for further specimens. Charing is six miles from Ashford, Westwood's original locality, as mentioned in Stephens, and the hop-field about ten miles as the crow flies. I have also a specimen from Doddington, and a few from Eastling. They were all swept or beaten from the hops, except two or three, which were under bark with *F. auricularia*. The insect was about from the end of July to October 10th, but was most common about the equinox.—A. J. CHITTY, M.A., Huntingfield, Faversham, Kent. *October 12th*, 1904. [The rediscovery of *Apterygida media*, Hagenb., by Mr. Chitty, is very interesting. It is far from rare in France, where it seems to be most frequent on clematis and other shrubs, especially near streams. The most northerly record to my knowledge is that of a pair taken by Mr. J. Edwards, near Norwich, about twelve years ago. Now that Mr. Chitty has rediscovered it, perhaps collectors will turn it up in other localities in the southern counties. Whenever I have looked for it in what seemed probable localities I have found *Forficula lesnei*, Bind., instead.—M. BURR.]

CURRENT NOTES.

A combined exhibition by the members of the Lancashire and Cheshire, and Manchester Entomological Societies, of entomological specimens, was held at the Royal Institution, Liverpool, on Monday, October 9th, and proved a great success. Among other exhibits series of *Melanargia galatea* from Northants and Dartmoor, were on view, as well as *Cidaria testata* from Epping and Dartmoor, to show the unusual size of the Dartmoor insects (no exact measurements, however, are given); *Anisotoma dubia*, captured at Crosby by Mr. Wilding; a series of *Leucophaea surinamensis*, an exotic cockroach, found breeding among turfs at Fallowfield, Manchester, by Dr. Hoyle and Mr. J. Ray Hardy; *Panchlora virescens* and *Periplaneta americana*, captured at Leyland by Mr. J. R. Charnley; *P. australasiae*, from Brixton, by Mr. J. Kidson Taylor, and many others.

The whole of the letterpress of Part III of *Practical Hints* is now in the printer's hands, and should be ready for subscribers by Christmas. It is only just in time, for Part I is practically cleared out, and the type has not been kept, whilst the stock of Part II is also reduced to small numbers. Part III should prove a worthy successor to the two previous parts, and as it will contain an index to all three parts, those who have the three parts bound together will be in possession of a summary of the practical observations published in our magazines for more than half a century.

Entomologists who have anything interesting in the way of entomological rarities, varieties, gynandromorphs, hybrids, monstrosities, etc., are reminded that the meeting of the South London Entomological Society, to be held on November 24th, will be devoted exclusively to the exhibition of entomological specimens. It would be a great convenience if intending exhibitors would notify the Hon. Secs. previous to meeting.

At the meeting of the Entomological Society of London, held October 19th, 1904, Dr. T. A. Chapman exhibited a series of *Lozopera deaurana*, Peyr., bred last spring at Hyères, a species regarded as lost, or mythical, until he rediscovered it three years ago at Ile Ste. Marguerite, Cannes. He said that he was pleased to find it by no means rare at Hyères, as it was in imminent danger of extermination at Ile Ste. Marguerite, where the stems containing the pupæ are collected, to use for firewood apparently, more sedulously every year.

Dr. Chapman also exhibited on behalf of Mr. Hugh Main a specimen of *Pieris brassicae*, the anterior, and in a less degree the posterior, wings of which had been symmetrically injured, probably by the girdle when in the pupal stage.

At the same meeting Mr. W. J. Lucas exhibited a ♀ specimen of the rare dragonfly *Agrion armatum*. He said that a ♂ and a ♀ were taken in the Broads by Mr. F. B. Browne last year, and this year about ten more, probably all ♀ s, were taken in the same district. It is everywhere scarce. The late Mr. McLachlan had a pair sent to him from abroad, probably by Dr. Hagen, but, besides these, there are apparently no other examples in Britain. It is quite distinct from our other six blue Agrionines in form and colouring.

NOTES ON COLLECTING, Etc.

Lepidopterological notes from the Pont du Gard.—A visit to the Pont du Gard, on May 11th, showed the surrounding country under somewhat different conditions from those observed on an earlier date some years ago (vol. x., pp. 181 *et seq.*). The day was rather windy, and insects were only seen in sheltered positions. Deciduous trees were in full leaf, the evergreen-oaks in flower and with new shoots some inches long, ripe cherries were being gathered in the gardens by the way. Amongst the butterflies *Gonepteryx cleopatra* was still conspicuous and frequent. *Pontia daplidice* and *Anthocaris belia* were seen, but were decidedly rare, as was also *Pieris brassicae*, of which larvæ more than half-grown were frequent on the tall bushy yellow *Lepidium*. The most abundant butterfly was *Euchloë euphenoides*, which was still in good condition, and of which any number might have been taken with a little time and hard work devoted to them. *Cupido minima* was common and very fresh. One *Polyommatus astrarche* was seen. The only fritillary verified was *Melitaea cinxia*, fairly common in places, but very *passée*. *Nisoniades tages* was frequent, and at one spot *Syrichthus sidae* was met with, and a few taken. In giving *Euchloë euphenoides* the first place for abundance I am overlooking *Coenonympha pamphilus*, which was really abundant everywhere in a very ordinary spring form and usually poor condition. *Pararge megaera* was seen, and in several places *Pararge aegeria* was frequent, usually in fresh condition, indicating a second brood. One *Eurauessa antiopa* was seen, and several *Limenitis*

camilla, fine and fresh. *Chrysophanus dorilis*, two males were seen. *Aporia crataegi* was in some numbers everywhere, and in good condition. No specimen of *Papilio* or *Thais* was seen, which was quite unusual. *P. podalirius* and *P. machaon* having been seen almost daily everywhere; *Polyommatus icarus* was common, and one *P. corydon* ♂ was taken. Specimens of *Aciptilia tetradactyla* were found amongst thyme.—T. A. Chapman, Reigate.

Entomological notes from Hants.—This is the worst season I ever remember. Sugar has been absolutely useless, and larva-beating equally bad. I bred one *Phycis abietella* only from all my cones. The rest refused to pupate, though they hybernated all right. I failed also to take any imagines in its haunts. I only saw one *Oxygastra curtisii*, which I missed, and most dragonflies were scarce. *Labidura riparia* was as common as ever, and I have now a nice colony feeding up on flies and earwigs. They are very interesting, make nests like swallows under the sandstones, have a bath nearly every day, and also drink the water; I have them of all ages, from babes-in-arms to full-grown, ♂ and ♀. It is fun to see their tails go up when you throw in a bluebottle fly and they hear the buzzing. *Agrius convolvuli* is common again this autumn, four or five dozen have been taken in Bournemouth. Mr. Hooker has taken about two dozen, the Rev. E. Hallett Todd a dozen, and several other collectors six or eight apiece. Unfortunately I have been suffering badly from rheumatism and could not go after them, but have had four or five brought me, not, however, worth setting. I tried to get eggs, but failed. I have already noted that the five larvæ of *Phryxus livornica*, I had, died in infancy. A few common moths, *e.g.*, *Caradrina ambigua*, *Noctua c-nigrum*, *Brotolomia meticulosa*, etc., are now coming to the honey-dew on a balsam-poplar tree I have in the garden, but they will not look at sugar. *Eupithecia expallidata* was taken by the Rev. E. H. Todd, at Westbourne. I think this is a new record for the locality. I saw several *Colias edusa* at the end of July and beginning of August, but, as they were going about fifty miles an hour, I did not get any. I have visited all the clover fields near here since, but have seen none. *Diasemia literalis* has been taken at Christchurch in the moth trap, also *Camptogramma fluviata*. I believe the former is now rarely taken. In North Cornwall, where I was for three or four days during the second week in July, and two of which were dull, I captured a few *Lycaena arion*, but there were, on the dull days, certainly more nets than butterflies. We tried sugar, but got only *Thyatira batis*, *Gonophora derasa*, *Aplecta nebulosa*, and one *A. herbida*.—(Major) R. B. Robertson, Forest View, Southbourne Road, Boscombe. *September 19th*, 1904.

Notes on Lepidoptera at Strood.—This season has been a most remarkable one, the earlier species being fully a month later, while, since July the reverse has been the case, and now, I may say, in this district the season is virtually over. With me nothing of note has turned up in numbers, possibly because most of my time has been spent on the earlier stages of the plumes, no fewer than twelve species having been found as larvæ. Sugar has been very unsatisfactory, but my most remarkable experience has been with *Nonagria arundinis* (*typhae*). A correspondent wishing for a few pupæ, I went to a spot where thirty or forty has been a not unusual return for an hour's work, but this year I found I had been forestalled by mice or voles, which had started at the entrance-hole of the larva, and had then

ripped up the rush until the pupa was reached. In this manner they had cleared the ditch, about 200 yards long, not a pupa was to be found. I have, however, been fortunate this year in finding about a dozen larvæ of *Apamea ophiogramma* and, as already recorded, *Senta maritima* and *Leucania obsoleta*. I thought it rather remarkable that, on the same evening in July, I should find half-grown larvæ, pupæ, and imagines of *Aydistis bennetii*, the former accounting for the fact that stragglers were met with till quite the end of August. The larvæ of *Eupithecia absynthiata*, *E. centaureata*, *E. subumbrata*, *E. linariata*, *E. isogrammata* and *E. satyrata* have been fairly numerous, whilst those of *Hadena suasa*, *H. chenopodii* and *Pelurga comitata* have been abundant. A few imagines of *Mamestra abjecta* were captured, but in nothing like the numbers of last year.—J. Ovenden, Frindsbury, Rochester. *August* 31st, 1904.

The bad season for Lepidoptera in Devon.—The season in my immediate locality has been, as for the last two or three years, most unsatisfactory: sugar a complete failure, and no signs of any of our local insects. I searched in vain for larvæ of *Amblyptilia acanthodactyla* and *A. cosmodactyla* and could not find one—in some parts the *Stachys* was less abundant than usual, in others growing in profusion. Have any of your readers bred from the black larvæ of *Abraxas grossulariata* from the north, and, if so, with what results? From between two or three dozen I received this year I only bred one slight variation, the black markings of the imago on the hind margin being radiated.—W. S. Riding, M.D., Buckerell, E. Devon. *September* 3*rd*, 1904.

Lepidoptera in the King's Lynn district.—The season here has been one of the worst I have ever experienced. Insects (and particularly lepidoptera) have been scarce, and the same may be said of the larvæ of many species, as *Vanessa io*, *Aglais urticae* and *Pyrameis atalanta*, have been comparatively scarce. I have seen a few each of the two former species, but only two specimens of the latter. I also observed only one ♂ *Gonepteryx rhamni* in August, also one *Pyrameis cardui*, in a lucerne field, and on two occasions during the same month saw specimens of *Colias edusa*, whilst I know of one taken at Hunstanton. Not a Theclid has been seen on the wing; certainly I have not seen one, and a search for larvæ of *Thecla w-album* resulted in a blank, and only two of *Zephyrus quercus* turned up. The common "whites" are an exception to the general scarcity, indeed so abundant are they now that I wonder if there has been an immigration to swell their numbers. Two years ago a swarm of *Pieris brassicae* was observed one day in August coming from the sea, at Hunstanton, and in such numbers that they resembled, to some extent, a snow-storm. Immigration on this particular occasion began about 10 a.m. or 10.30 a.m., and continued all day, without intermission, until about 6 p.m. *Agrius convolvuli* is also turning up in some numbers in King's Lynn and district. Several have been brought to me alive, but only three of them in a condition worth setting. Many of them I have no doubt are bred in the district, for the pupæ have been occasionally dug up in the potato-fields, where *Convolvulus arvensis* grows plentifully. I have also had larvæ brought me from such a source, but have failed to rear them. My best capture for the year has been a nice series of *Crambus alpinellus*, from the coast sand-hills, but I failed to get *C. fascelinellus*. On one occasion, at the end of June, I took 27 specimens of *Coremia quadrifasciaria* in an hour, many of them in fine condition. There

was much wind at the time, or the "bag" would have been at least fifty.—E. A. Atmore, F.E.S., King's Lynn, Norfolk. *September 7th*, 1904.

Notes on Lepidoptera in Southend district.—*Coleophora laricella*, from Thorndon Park larvæ, commenced to emerge June 1st. *Eupoecilia rupicola* in good order, but scarce, occurred on June 4th, among *Eupatorium* at North Shoebury, and *Leioptilus lienigianus* larvæ occurred at the same time on the mugwort. *Tephrosia punctulata* was taken on the birch-trunks, *Argyresthia conjugella* near mountain-ash, and *Phigalia pedaria* larvæ, all near Thorndon Park on the 5th. Near the same place, on the 7th, batches of larvæ of *Taeniocampa miniosa* were not uncommon; larvæ of *Marasmarcha phaeodactyla* occurred on rest-harrow, at Benfleet, on the 8th, and a pupa (fastened to a grass-stem) which I at first thought to be that of a butterfly, yielded on the 25th *Platyptilia pallidactyla* (*bertrami*). *Agdistis bennetii* larvæ, not yet adult, were found on *Statice limonium*. A visit to Thorndon Park on the 9th produced *Nola confusalis* on tree-trunks. *Thera variata* and larvæ of *Mimaseoptilus pterodactylus* on a fine growth of *Veronica chamaedrys* on a rubbish-heap. A few pupæ of *Leioptilus lienigianus* occurred at Shoebury, on the 14th. *Erastria reunstula*, much worn, was netted about eight o'clock on the evening of the 16th, near Thorndon Park. *Gracilaria omissella* and a few larvæ of *L. lienigianus* were found on mugwort at North Shoebury on the 19th. *Hedya lariciana* emerged on the 23rd; *Tortrix cinnamomeana*, one only on the 26th. *Agdistis bennetii* netted at dusk on the 28th, deposited ova on July 3rd, which were duly sent to Mr. Bacot, who will doubtless have something to say about them. *Eurrhypara urticata* emerged July 1st. *Leioptilus microdactylus*, one only, was netted at North Shoebury on the 7th, and a plume, new to me, which might have been *Amblyptilia acanthodactyla*, resting on *Stachys*, was lost in the attempt to box it. *Paedisca occultana* occurred on a fence near the railway station at Brentwood, on the 10th, and *Peronea comparana* at North Shoebury on the 13th. *L. lienigianus* commenced to emerge on the 14th. Near Thorndon Park, on the 22nd, *Penthina capreana* was beaten out of sallow. *Coremia propugnata* was on the tree-trunks, and larvæ of *Selenia lunaria* were beaten. *Thecla w-album* was on bramble-bloom at North Fambridge on the 24th, and *Thymelicus lineola* was observed at Childerditch on the 26th. My experience with *Mimaeseoptilus zophodactylus* seems to indicate that it is a difficult larva to locate. I gathered a bunch of the food-plant on July 16th, and examined it from time to time, but failed to find any plume larvæ, although *Eupithecia oblongata* larvæ were there in plenty. However, on August 17th I found three larvæ (two of which were fixed for pupation) and two pupæ of *M. zophodactylus*. I then closely examined the food-plant for larvæ or pupæ without adding to the number observed. Yet I bred from this bunch of centaury, between August 19th and September 4th, twelve specimens, whilst one specimen emerged to-day, September 15th.* One larva,

* This is most interesting, especially when compared with Mr. Bankes' note (*antea*, pp. 271-273). Mr. Bankes' imagines, bred July 17th-25th, laid eggs that produced imagines between the end of August and mid-September. Mr. Whittle, from heads collected July 16th, without observing larvæ, bred thirteen specimens between August 19th and September 15th. Possibly eggs only were on the flower-heads when he gathered them.—Ed.

with its head hidden in the base of a flower, and one pupa, were sent to Mr. Bacot. The "whites"—*Pieris rapae*, *P. brassicae*—have been unusually abundant in this district. I have not seen a single example of *Pyrameis cardui*.—F. G. Whittle, 3, Marine Avenue, Southend. *September* 10*th*, 1904.

Ennomos autumnaria (alniaria) and Epunda lutulenta at Lower Halling.—In the early part of this month I took a female *Ennomos autumnaria* (*alniaria*) whilst hunting the lamps near this district, which was identified for me by Mr. Ovenden. During the last week, by the same means, I have obtained a few very nice examples of *Epunda lutulenta*.—S. Foreman, Lower Halling, Rochester. *September* 26*th*, 1904.

Lampides boetica in the Channel Islands.—*Lampides boetica* has bred here again this year. Larvæ were taken (not by myself) during the summer. The imagines have appeared in some numbers in my garden from about September 22nd. I captured one or two for examination, which I, however, set free again. All I saw were undersized.—Frank E. Lowe, M.A., St. Stephen's Vicarage, Guernsey. *October* 4*th*, 1904.

Lepidoptera at Witherslack and Ambleside.—Looking through the magazines one finds many notes from Wicken, the Broads, and the New Forest, and, although kept rather quiet, one knows of many a trip to north Cornwall. Even Forres and Rannoch get their full share of attention, but a careful search reveals scarcely a note on the "mosses" from the pen of a south countryman. Moreover, I have only met one London man who knows anything about them. Mr. C. F. Johnson, of Stockport, whose acquaintance I had the pleasure of making last year, on the Deal sandhills (which, by-the-by, still retain much of their past richness), spoke so highly of Witherslack that I resolved to try it. The result was that July 6th found me settled at the Derby Arms, for six days' work. From the expense point of view one could scarcely have a cheaper holiday. The London and North-Western Railway runs a fast train to Grange-over-Sands every Wednesday, at cheap fares (22s.), returning Monday, Wednesday, Monday week or Wednesday week. Thence four-and-a-half miles of good road brings one to the Derby Arms, where the accommodation and catering are such as are rarely found in a country inn, albeit the tariff is the very moderate one of 5s. per day, inclusive of everything. The Lancashire collectors know a good thing when they get it, and have hitherto kept it pretty much to themselves. The lake district can easily be got at from here, as 3s. day excursions are run from Grange to Ambleside, the steam yacht trip down Windermere *en route* being delightful. Favoured with perfect weather, I was kept hard at it, in spite of treacle failing utterly. The moss commences some quarter of a mile back from the inn, and other fine collecting ground is situated immediately at the front door. The first morning on the moss was very windy, but, in the sheltered parts, I found *Coenonympha typhon* in great abundance and lovely condition. Great care is necessary in moving about, as one's leg frequently disappears well up above the knee, either into a large hidden crack or into a bog-hole, in either case a highly dangerous occurrence if on the run. A week could be devoted to *C. typhon* alone, as the variation shown is most interesting. With so many other things to do, however, I could not give up too much

time to the one species, but the 150 odd specimens I brought home with me are an extremely variable lot, several inclining strongly in the same direction as *Epinephele janira* ab. *lanceolata*. *Anarta myrtilli* swarmed, and were easier to catch than usual, owing to the depth of the heather. The form is very ordinary. Quite otherwise, though, with *Hyria auroraria*, the moss form of which is most striking. The nearest approach to the type among my captures has a rather large golden spot on each wing, but many are entirely purple, with no trace of gold anywhere. I took two or three most days, but, on one morning, without a breath of wind, I got two dozen. For such small insects they are strikingly conspicuous upon the wing. *Ematurga atomaria* was in countless numbers, but very ordinary, and *Acidalia fumata* and *Aspilates strigillaria* were also very plentiful. Some nice females of the latter occurred, with the transverse lines almost coalescing into a band. *Lasiocampa quercus* males were already flying freely, and several half-grown larvæ were found on the heather. I take it that these larvæ will feed up slowly and produce imagines next year. *Euthemonia russula* was just out, and about a dozen were walked up each morning, an occasional *Nemeophila plantaginis* among them. *E. russula* is a most ready species to lay in confinement, every female I took depositing ova before the day was out. I recollect that the last ova I obtained of this species were from a specimen impaled upon a thorn in Chattenden Woods. It was just alive, and laid a large and fertile batch of ova. A rather dark form of *Lycophotia strigula*, very ordinary *Eupithecia nanata*, and an occasional *Lithosia mesomella* complete the more interesting moss insects. *Carsia imbutata* I had hoped for, but, as I feared, I was a little too early. This species one would probably hit all right two weeks later, when *Erebia aethiops* would also be out in the neighbouring woods. Immediately opposite the inn is a high grassy bank, with patches of undergrowth. Here and in the meadow above many interesting species occur. *Polyommatus astrarche* ab. *salmacis* was in plenty, with a fair proportion of the type and all grades in between. These were in fair condition, but *Cupido minima*, although common, was very worn. I heard that this latter species had been almost exterminated here by some Lancaster dealers, but it is evidently now holding its own well. A fine race of *Polyommatus icarus* also occurs, one male being quite as brilliant as that of *P. bellargus*, and all large, with strongly marked females. An equally brilliant race of *Rusticus aegon* is said to occur about a mile away, but I failed to find the spot. This bank and meadow are also the home of *Phothedes captiuncula*. After four nights' vain search at dusk I found this little Noctuid flying in the sun in plenty one afternoon, about 4.30 p.m. to 5.30 p.m. They occasionally rested on the ox-eye daisies, and, although many were worn, I got a very decent series by careful selection. *Aciptilia tetradactyla* was very common in the meadow but was not seen on the bank, where *Leioptilus tephradactylus* occurred in its place. At dusk, on the same ground, *Hepialus velleda* flew for about ten minutes only, but was getting over. Very ordinary *H. humuli* were just commencing, and only began flying after *H. velleda* had done. There is none of *H. humuli's* swinging flight about *H. velleda*. It dashes along the hedgerows low down in the long grass, and is none too easy to catch. Noctuids were fairly common at dusk. A few netted casually included *Plusia chrysitis*, *Acylia putris*, *Aplecta nebu-*

losa, and *Xylophasia sublustris*, but the utter failure of treacle prevented my testing Witherslack's resources in this group. Several plumes, besides those mentioned, occurred at dusk, including *Mimaeseoptilus bipunctidactyla*, *Platyptilia pallidactyla*, and *Nudaria mundana*, literally swarmed round the stone walls. They were very rarely detected during the daytime, probably hiding in the crevices, but from the very earliest dusk they appeared in dozens, rarely straying many feet away from the walls. The only *Hypsipetes elutata* netted gave promise of a variable race—almost black, with scarcely any markings. Another week might have given me an interesting series. Other species at dusk were *Emmelesia alchemillata* and *Rivula sericealis* somewhat commonly, and a single *Eupithecia constrictata*. The habit of the latter of flying round the yews was not known to me at the time, or I might have had a good number. *Cidaria populata* and *Pseudoterpna pruinata* occurred singly, and *Eubolia palumbaria*, *Lomaspilis marginata*, *Melanthia ocellata*, and *Ebulea crocealis* somewhat commonly. *Fidonia piniaria* flew at dusk, as well as by day, among the pines. I only saw males, but these seemed to be of a much whiter ground colour than our southern form. Of course July is late for the species, but even in some fresh-looking specimens there was no trace of the yellow ground colour so familiar in Surrey and Hants. Dusking in a small wood, half a mile down the Grange Road, produced many of the same species, but nothing in addition, except a curious lot of *Cabera exanthemaria*. These were an ill-developed race, found at one spot only, where several fresh specimens were taken minus one or both hind wings. Everywhere else the species was quite normal. I met with, and recorded, a similar brood of *Cidaria testata* in Wicken Fen in 1899. What is the cause of this local failure to develop hindwings? The specimens fly quite readily, though of course somewhat feebly. Although the time was all too short, and much ground left untouched, I could not resist trying for *Erebia epiphron*. Two day trips were made to Ambleside, the first to the Kirkstone Pass and over the eastern and southern sides of Red Skrees, being a total failure. *Melanthia albicillata*, *Nudaria mundana*, and *Melanippe tristata* were taken off walls on the way up to the pass, and some strongly marked *Pieris napi* netted on the higher levels; *Erebia epiphron*, however, failed to put in an appearance. On the second trip (July 11th) I determined to go farther afield. Again ascending the Kirkstone Pass, I, this time, climbed right over Red Skrees, from opposite the Kirkstone Inn. For some three hours I wandered round on the high fells towards Grasmere and Helvellyn, without seeing a sign of my quarry, only getting some nice *Crambus furcatellus* and a single *Nemeophila plantaginis*. Late in the afternoon I found the species, its unmistakable sooty appearance being very conspicuous at quite a distance. It was exceedingly local, and confined to a few acres of rather marshy ground, to all appearance exactly like that over which I had been working all the afternoon. Probably early in the day it would have been abundant. As it was I got 24 very fair specimens, and a little later on three more, some 500 feet lower down. As nearly as I can ascertain the elevation of the first locality was 2300ft.-2400ft. An attempt to obtain ova proved successful, and with a view to the best chance of bringing the larvæ through hybernation I distributed them between Messrs. E. Joy and L. W. Newman. I do not know whether the full-grown larva has

yet been described, but do not recollect seeing a description. Given good weather, this trip to Ambleside makes as fine a day as one could wish for. The sail morning and evening down Windermere, and the marvellous views from Red Skrees, probably give one as good an idea of the English lakes and mountains as could be obtained anywhere in one day. Altogether Witherslack and its surroundings provide a rare change in every way from southern collecting, and should any be induced by these notes to try the experiment, I feel sure they will not be disappointed.—Russell E. James, 18, Onslow Gardens, Highgate, N. *September 28th*, 1904.

COLEOPTERA.

Coleoptera at Rydal.—By an unfortunate blunder (*antè* p. 246) Rydal is stated to be in Cumberland; it is, as a matter of fact, in the county of Westmorland, and as the local lists for these two counties are now being kept very accurately, it is desirable to correct at once this slip.—(Prof.) T. Hudson Beare.

Calosoma sycophanta near Epping.—Readers of the *Ent. Record* may be interested to know that a fine specimen of *Calosoma sycophanta* was taken near Epping, by Mr. E. Smith of Coopersale, who found it in an outbuilding at the early part of this month, and forwarded it alive to me.—W. Bevins, Hallsford Villas, Ongar, Essex. *October 10th*, 1904.

Cis bilamellatus, Wood, at Shirley.—On October 10th, when looking for Apions on Shirley Common, I found a small white fungus on the ground. On picking it up to examine it I noticed a small *Cis* on it, which I at once recognised as *Cis bilamellatus*, Wood, ♂. Further search revealed plenty of the species. In the *Ent. Mo. Mag.*, 1904, p. 238, Mr. Theodore Wood records the re-discovery of this species at West Wickham, where he first found it twenty years ago, a most remarkable discovery of a beetle new to science, and which has never been taken anywhere else in the world till now! I may mention that I was dining with Mr. Wood on September 30th, and he very kindly allowed me to beat eight specimens out of his fungus from West Wickham. These I had killed and set, so I was well acquainted with the insect. Shirley is, of course, very near to West Wickham, still it is a new locality for this extremely local insect. I may say that, as Mr. Wood has enough specimens for everyone who wants it, I only took my series, and left the fungus where I had found it, and hope the species will continue to spread.—Horace Donisthorpe.

Criocephalus polonicus, Mots.—In my "Retrospect of a Coleopterist for 1903," published in the February number, page 29, of the present volume, I accidentally omitted to state that the original discovery of this interesting addition to our fauna, was due to Mr. F. Gilbert Smith. That gentleman took larvæ of this longicorn in the New Forest, in Scots fir, in 1902, and it was not until the following year, 1903, that larvæ were taken by Mr. Ellis in paying a visit to the locality with Mr. Gilbert Smith. In my "Retrospect" the details of captures have to be very much condensed, though, in every case, a careful reference is given to the original records, and it is, I fear, owing to this attempt to condense the details of a year's work into two or three pages that Mr. Gilbert Smith's name was unfortunately left

out, and I must express my regret to him for the omission.—(Prof.) T. Hudson Beare, 10, Regent Terrace, Edinburgh. *September 25th*, 1904.

Notes on the Myrmecophilous habits of Cetonia aurata, L.—It is not, apparently, generally known that this species, like its nearest ally, *C. floricola*, Hbst., is myrmecophilous in its early stages. Having reared it from the larva in my observation-nest of *Formica rufa*, I now publish such notes as I made on the subject, and also such other records as I have been able to find. On August 22nd, 1903, Professor Poulton took several larvæ and a perfect insect of *Cetonia aurata* in a nest of *Formica rufa*, in Boldrewood enclosure in the New Forest, and sent them on to me. I introduced them all into my observation-nest. They were all attacked by the ants, but immediately commenced to bury themselves in the nest, boring their way into the hillock. The larva, which, as is well known, is like a "cockchafer" grub, only of a bluer colour, appears to have a very tough skin, and, by boring into the hillock, brushed off the ants attacking it. The beetle also was much attacked, but it is too hard for the ants to injure. I noticed that when attacked it always retracted the head, and was very careful that the ants should not get hold of its antennæ. It also went down into the nest and did not appear again till March 7th, 1904, when the sun shining brightly it came up for a short time. From then it came up, on and off, till July 5th, when it died. It used to climb up and suck the honey placed for the ants, and also into the small tree in the nest. I wrote in my notebook on March 27th "that, being much attacked, it walked along with the head just under the top layer of the nest, and brushed off the ants by partly burying itself." On May 1st it flew up, but fell down again, having knocked against the muslin over the nest. No doubt in nature, when quite mature, the beetle flies away from the nest. On March 14th I dug up four of the larvæ, to see how they were getting on. They had grown considerably, and all buried themselves again at once. On August 1st I dug up two cocoons, and breaking one of them open found a perfect insect inside. A perfect insect emerged from the second on August 4th, after I had taken it away with me to the forest. I let the first go, thus returning it to the place of its birth. A third beetle emerged in my nest whilst I was away; it has now gone to earth again, where I suppose it will remain till next year. I do not think that *Cetonia aurata* is always myrmecophilous, as I have taken it in places far away from any ants' nests, and Wasmann states it is the exception in this species. When this is the case, however, the life-history is briefly as follows:—The ♀ seeks a *Formica rufa* nest, into which it bores its way and lays its eggs, the larva feeds on the wood and vegetable refuse in the nest, and when fullgrown changes to a pupa in a cocoon, which it constructs of pellets of earth, vegetable refuse, etc., fastened together with its excrement; when mature, the beetle breaks its way out of the cocoon, and, leaving the nest, flies away. Janson (*Ent. Ann.*, 1857, p. 96) records the larva of *C. aurata* with *F. rufa*. In the *Ent. Mo. Mag.*, 1892, p. 288, Shipp records finding two cocoons in a nest of the wood-ant, on Shotover Hill, near Oxford, and on opening one found a specimen of *C. aurata* inside.—Horace Donisthorpe, F.E.S., 58, Kensington Mansions, South Kensington, S.W. *September 26th*, 1904.

VARIATION.

Notes on the imagines of Abraxas grossulariata bred from

BLACK LARVÆ.—With regard to Dr. Riding's query (*anteà* p. 295) as to the imagines bred from black larvæ of *Abraxas grossulariata*, I may say I have found a good many from time to time, but usually the resulting moths have proved quite typical. Black larvæ of this species appear quite common in some of the gardens about Durham, and one year I remember Mr. Maddison had a large number, haping to get something equally dark in the imagines. He quite failed in this, nothing unusual emerging. I have also reared from time to time many of the very light form of the larvæ of this species—I had a number of such this year—but they yielded ordinary moths. I have, however, bred about half-a-dozen aberrations of *Abraxas grossulariata* this year, suffused over all wings with rusty-red, as in an example figured by Barrett, also one beautiful specimen with the markings much reduced, on a creamy-yellow ground.—S. WALKER, 15, Queen Anne's Road, York. *September 28th*, 1904.

MELANIC LEPIDOPTERA TAKEN IN YORKSHIRE.—The season has been a very poor one on the whole, but a few very interesting forms have come my way for the first time. The best of these, perhaps, is the ab. *plumbata* of *Melanthia rubiginata*, of which Mr. Lofthouse and I beat out eight specimens from alder, on the Cleveland hills (North Yorks) on August 1st. I believe only one previous record for Yorkshire has been made of this aberration, and this was taken on the same ground as that we worked. I got ova from one ♀, so shall have an opportunity of breeding it. On the same day we were successful in taking the black aberration of *Venusia cambricaria*, which was, however, just past its best, in fair numbers. From eggs obtained I have now got pupæ, and hope to have the aberration next season in perfect condition.—IBID.

NOTES ON VARIATION OF COENONYMPHA DORUS.—*Coenonympha dorus* was simply in swarms on the hillsides at Digne the first week in July this year, perhaps more abundant than *Melitaea parthenie* was on the Jura a few weeks later, and that is saying a good deal. I took a fairly long series, and have now set the lot. They work out far better than I dared to expect, as Mr. Wheeler in his excellent little book only accords two lines to "Directions of Variety," *viz.*:—

(*a*) Size of eye-spots.
(*b*) Underside lighter in the mountains.

To these I venture to add—

(*c*) Increase of dark suffusion upperside fore- and hindwings—a step in the direction of var. *bieti*.

(*d*) Increase of spots upperside forewing. (1) Additional spot between iv_1 and iv_2. (2) Additional spots between iii_3 and iv_1, and between iv_1 and iv_2, to which I have given the name ab. *ornata*. (3) Apical spot large and distinctly double-pupilled, which I have named ab. *bipupillata*.

(*e*) Absence or presence of costal spot in hindwing upper side of ♂.

(*f*) Upper side forewing of ♂ more or less suffused with yellow.

(*g*) From five to one eye-spots (generally four) on lower wing upperside.

(*h*) Breadth of tawny band round apical spot upperside forewing of ♂.

(*i*) Decrease of eye-spots on underside hindwing, the first and fifth of series (not including apical spot), becoming very small and occasionally, but very rarely, failing altogether.

(*j*) Great variety in breadth of bands underside.

P. A. MUSCHAMP, 20, Chemin des Asters, Genève. *September 21st*, 1904.

ERRATA.—Page 208, line 17, for "oak" read "birch"; page 273, line 4, for IBID" read "EUSTACE R. BANKES, M.A."

Notes on the Variation of Larentia multistrigaria.

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

The fact that *Larentia multistrigaria* is a variable species, and one given to the production of melanic varieties, has long been a matter of knowledge to lepidopterists, and it is somewhat remarkable that, though several lepidopterists have specially reared and collected the species for many years, not one of them has taken the trouble to work it out in detail, nor give us even a summary of its range of variation. The only reason for this note is to fulfil an obligation of some years' standing, for, in *British Moths*, p. 267, I named the melanic form of this species ab. *nubilata*, but without description, and have further used the name in my "List of Species, Varieties and Aberrations so far only recorded from the British Islands" (*Ent. Rec.*, xiv., p. 203). It would, of course, have been much better if one of our well-informed northern lepidopterists had written a detailed paper on the species, and this must be only considered a stop-gap until some better qualified lepidopterist will deal with the species on broader and more scientific lines. For a species that has been so well worked, we note, in the *Ent. Rec.*, only two references to the variation of the species, *viz.*, (1) in 1891, Reid states (*Ent. Rec.*, ii., p. 57) that he collected the species at Pitcaple specially for aberrations, that he got some nice banded forms, and on the night of March 23rd three very dark, one as black as soot, with only a few light dots round the edge. (2) In 1902, Porritt exhibited (*Ent. Rec.*, xiv., p. 109) two bred black examples from Huddersfield, and said that "the dark form was rapidly increasing in Yorkshire," and that "of those already emerged and reared from the same brood three were normal and two dark." It has never been my good fortune to possess (or see) any black ones, the darkest I have seen, and those on which the ab. *nubilata* was founded, are of a deep fuscous-brown, sprinkled on the nervures with white dots. I should be glad at any time to receive more extreme specimens, and will then describe them.

Although I possess a long and very varied series of this species from English, Scotch and Irish localities, and feel tempted to draw some general conclusions from their examination, I recognise that the matter is outside my regular beat, and must be left to those who have more leisure than I for such work among the Geometrids, or till I get examples of the more extreme forms noted by Messrs. Reid and Porritt. I will only add that a banded form (ab. *virgata*, n.ab.), in which the ground colour, and the whole appearance of the insect, are more or less typical, except that the median area of the forewings is rather darker, and forms a distinct transverse band, appears to be very generally distributed with the type.

It appears to be a species with a very wide distribution, occurring along the Mediterranean littoral (among other places) in December and January, and presenting there a pale race, which Duponchel described (*Hist. Nat.*, supp. iv., p. 384, pl. lxxxi., fig. 2) and erroneously referred to the *nebulata* of Hübner, Freyer and Treitschke. Later it was described by Millière as var. *olbiaria* (*Icon.*, ii., p. 157). This Staudinger (*Cat.*, 3rd ed., p. 296) refers with doubt to *L. multistrigaria*, evidently thinking it might be a distinct species, but Millière appeared to have little doubt about it, and as he figures and describes

the early stages, a little attention on the part of those British collectors who breed the species, to the already published matter, would undoubtedly soon clear up any doubt that may exist.

Haworth first described the species, and his description (*Lep. Brit.*, p. 306, no. 98) from English specimens, reads as follows :—

Geometra multistrigaria (the mottled grey). Alis cinerascentibus, strigis fasciolisque numerosis saturatioribus, lente quasi ex punctis nebulisque compositis. *Habitat* valde infrequens apud nos, at frequentior in Norfolcia. *Imago* Mart. Ericetis. Communicavit ejus captor Rev. J. Burrell. *Expansio* alarum 1 unc. 2-4 lin. *Descriptio :* Margo ipse posticus ordine concinno et communi punctorum geminatorum atrorum. Posticæ albidæ strigis duabus saturatioribus evanescentibus pone medium. Fœmina mari simillima, antennis setaceis, quæ in mare minute pectinatæ sunt.

This, it will be seen, is the ordinary grey form of the species so well known to us, and, although I have implied above that the northern lepidopterists have specially failed in their entomological duty in not giving a good account of this species, this is simply because it is in certain northern localities that it tends markedly to vary. The dark form that I have previously named appears at present to be a purely northern form, and may be described as :—

ab. *nubilata*, Tutt, *Brit. Moths*, p. 267 (1896) ; *Ent. Rec.*, xiv., p. 203 (1902). —Forewings of a deep fuscous-brown, the typical pale bands restricted to double rows of spots on nervures, so as to replace the normal pale basal and angulated bands, the pale submarginal line sometimes broken up into spots or small lunules, faint marginal line with noticeable pairs of dark dots therein ; dark fuscous-brown fringes. Hindwings dark grey, shaded with brown on the outer half with darker transverse median submarginal and marginal lines, the slightly paler areas with a few scattered pale spots on nervures. The ♂ distinctly larger and broader-winged than the ♀, so that marked sexual difference is shown.

Our first examples of this form came from Morpeth and Aberdeen, but, of recent years, our collections have been more plentifully supplied from the Huddersfield district. Writing October 3rd, 1904, Mr. G. T. Porritt says, "The form seems to be rapidly increasing in the Huddersfield district, and this spring was almost abundant" (*in litt.*).

The distribution of the species throughout the southern, midland, and northern counties of England, as well as Ireland and Scotland, makes it possible for any lepidopterist who can breed the species to test whether Millière's *olbiaria* be in reality a variety (local race) of *L. multistrigaria*, or a distinct species. Duponchel, writing of the southern form (*Hist. Nat.*, supp. iv., p. 384), says that the insect he describes is found in the south of France, that Treitschke places it among the Cidarias . . . . but in his opinion its true place is next *Larentia viretata*. Treitschke's *nebulata* is, of course, a quite distinct species from the one Duponchel was considering.

Millière, as we have already noted, worked out this southern form in detail (*Iconographie*, ii., p. 157, pl. lxviii., figs. 5-9), naming it *olbiaria* (from Olbia, the Roman name of Hyères). He says that owing to Duponchel's blunder the insect had been distributed widely as *nebulata*, and he wished to clear up the muddle. He notes : "One is inclined at first to consider this race as distinct, from the appearance due to the pallid (more or less bluish-grey) tint of the ground colour ; and he was led to this erroneous opinion by the clayey (argileuse) tint and well-marked transverse lines of the British specimens, characters which never occur in the variety described, and one cannot be quite certain, until the life-history of the typical British *multistrigaria* has

been worked out, whether the southern form is really a southern race or distinct species." He himself worked out the life-history of *olbiaria* from eggs obtained from a ♀ taken at Hyères by M. Morton. The eggs are described as "oval, granulous, yellowish-white in colour, becoming, 48 hours after they were laid, dull red, and entirely brown the evening before the larvæ hatched, which event occurred January 20th." After several attempts, he found that the larvæ would eat the young leaves of *Galium*. He describes in detail the larva, pupa, and imagines bred therefrom. He had one ♂ and two ♀s out at the same time, and the ♂ paired with the two ♀s in succession. The two laid 153 fertile eggs. These were laid singly, the ♂ living eight days, the two ♀s twelve and fifteen days respectively, the imagines always appearing between 9 and 10 in the morning. The variety, he notes, has been recorded from Marseilles, the Nice district, Cannes, and Hyères. It is found commonly at Hyères on the rocks dominating the town, by daytime, and at night resting on plants, with the wings raised, like *Psodos alpinata* and *Strenia clathrata*.

So much for Millière's work. Thirty years have passed since Millière threw out this request for a critical comparison with the eggs, larvæ, and pupa of British *L. multistrigaria*. How many hundreds of examples have been bred in those 30 years for specimens, and without having had a scrap of scientific result or value, I cannot say. Will not someone who knows the species clear up the doubts definitely, by working up the life-history with the definite object of comparing it in detail with that of *olbiaria*, and thus wipe away the stigma on British lepidopterists involved in the "?" before *olbiaria* in the 3rd edition of Staudinger's *Catalog*? Millière describes the egg, larva, pupa, imagines (♂ and ♀), as well as the habits of the southern insect, so that comparison should be easy.

Some Butterflies of Macolin and Grindelwald.

By F. E. LOWE, M.A., F.E.S.

Macolin and Grindelwald do not appear to have received sufficient entomological notice. The former place is mentioned only for *Thecla acaciae* in Wheeler's recent book, who is evidently quoting from Kane. Grindelwald, given only as a locality for *Brenthis amathusia* and *Syrichthus fritillum* by Kane, is noticed by Wheeler among the haunts of *Polyommatus damon*. Indeed, one of these authorities facetiously confessed to me that he only knew Grindelwald as a locality for the "London Brown." Chance rather than choice brought me for a short stay at each of these places last summer, and I think it likely that others may be glad to hear that an entomologist may look for something of a "bag" at either of them. Macolin, or Magglingen, above Bienne, is reached by a funicular railway from the outskirts of the town, and overlooks the lake, with a magnificent panorama of mountains facing the visitor. In the list of butterflies to follow, the country exploited only embraces the short distance from the foot of the railway to the meadows, a mile-and-a-half behind the hotels. Some of the best ground is by the side of the funicular, but it is very rough and steep, and the thick growth of the underwood very much hinders the working of the net.

We arrived at Macolin on June 17th, remaining until the 23rd, but the 18th was wet, and on the 20th I went to Tramelin, on the 21st to Reuchenette, and on the 22nd to Aarberg. This only left the

19th and 23rd for testing Macolin itself. As we were slowly crawling up by rail nearly the first insect to delight the eye was a beautiful *Limenitis populi* ♂, sunning himself on the tip of a gently swaying branch, almost within reach of one's hand. I saw no others, and as the 17th was an early date for the species, this was not strange. *Limenitis camilla* was present not uncommonly, but I saw no *L. sibylla* during my stay. Hairstreaks were very much in evidence on the flowers of bramble as we ascended. But the visions of *T. acaciae* which rose before the mind afterwards proved as disappointing "as the image of a dream when one awaketh." The hotel is situated in a fine firwood, immediately above which are luxuriant flowery meadows, swarming with butterflies. Here, in perfect condition, *Coenonympha iphis* was in real abundance—at least males; females were a little commoner on the last day. I did not see *Papilio machaon*, but, on the authority of M. Waelly, the courteous proprietor (the hotel has since changed hands), it is a native of the place. "You chase butterflies, yes, we have many *très belles espèces*." "Had I yet taken the tail of the swallow?" On such scientific evidence we are assured that *P. machaon* or *P. podalirius*, or both, should be added to this list.

The females of *Aporia crataegi* were very busy ovipositing on isolated bushes of whitethorn in the meadows. *Melitaea cinxia*, almost over, was interesting as yielding one ♀ specimen, which, if not ab. *fulla*, Quens., is a very advanced stage of "transitio ad" that aberration. Among the alder bushes which skirted the meadows *Brenthis ino* was common, and of excellent colour, and *B. amathusia* just coming out, but all the latter were of small size. The following is a complete list of Rhopalocera taken or noticed during some six hours' work, divided between two days. Considering the early date there is every reason to think that the possibilities of Macolin are excellent. *Parnassius apollo* (just emerging), *Aporia crataegi* (worn), *Pieris brassicae*, *P. rapae*, *P. napi*, *Euchloë cardamines*, *Leptosia sinapis*, *Colias hyale*, *Thecla ilicis*, *Callophrys rubi*, *Chrysophanus hippothoë*, *C. dorilis*, *Nomiades semiargus*, *Cupido minimus*, *Polyommatus hylas*, *P. escheri*, *P. icarus*, *P. bellargus*, *P. astrarche*, *Limenitis populi*, *L. camilla*, *Polygonia c-album*, *Aglais urticae*, *Pyrameis cardui* (hybernated), *Melitaea cinxia*, *M. didyma*, *M. parthenie* (?), *M. athalia*, *Brenthis euphrosyne*, *B. amathusia*, *B. ino*, *Argynnis aglaia*, *A. adippe*, *A. niobe*, *Dryas paphia* (emerging, as also *Melanargia galathea*), *Erebia medusa* (3), *E. cyrgale*, *Pararge maera*, *P. megaera*, *P. egeria* (passing, but abundant), *Aphantopus hyperanthus* (abundant), *Coenonympha iphis* (very abundant), *C. arcania* (emerging), *C. pamphilus* (very abundant), *Hesperia alveus*, *H. cacaliae*, *Syrichthus malvae*, *S. sao* (abundant and fine), *Nisoniades tages* (abundant but worn), *Pamphila sylvanus* (abundant), *P. comma* (1).

On June 24th we left Macolin, arriving at Liestal in time for lunch. A week spent here was entirely disappointing. I can only suppose that I failed to discover the right ground. With the exception of a poor specimen of *T. acaciae*, I got nothing worthy of mention. In the afternoon of our arrival I made for Bubendorf, and certainly enjoyed at least two great sights. In a small opening in the wood, brambles had climbed over a strong hazel-bush to the height of six feet, and formed a mass of flower some 20 feet in circumference. On practically every bloom *Dryas paphia* was extended in the sun, or sipping nectar, with an occasional *L. sibylla* of more

restless mood. Again, a little below, where the woods drop down towards the main road and the railway, a narrow path runs to a little inn and the station. On one side the wood, on the other a narrow strip of meadows. Under a large chestnut is a wooden shed, or summer-house, open at each side, and traversed by the path. As I entered, I was astonished by a cloud of *D. paphia* coming out of the shed, disturbed by my approach, and wheeling round like swallows. I waited, and found that they mostly returned and took up places inside the shed. All were males as far as I could see. The day was one of tropical heat, which was broken by a tremendous thunderstorm in the evening, with heavy rain all night. I can only fancy that the butterflies found it too hot, and sought this retreat for coolness. They did not in any case rest on the ground, but on the sides and roof of the shed, and on a wooden bench which lined the back of the interior. But still another entertainment was prepared for me. At one corner, where a meadow ran up into the wood, so that two sides of it formed a right angle with young trees, chiefly beech, hanging over, *Limenitis sibylla* was sailing round in almost incredible numbers. It seemed to be the only butterfly present, but of this one species, so exquisite in its movements, there must have been scores. It was a sight never to be forgotten. I have referred to Liestal only to recount these two agreeable experiences, for the rest, my diary says, "found Liestal very unprofitable." On July 1st we went to Grindelwald, where I had two days' hunting. The first day I went up the path, leading to the Faulhorn, at the back of the post office, and in ten minutes the net was at work. Most unfortunately, I had to return for lunch, not having arranged with my party to be absent, and so, though I went back to my ground as soon as possible, I found that the sun was off. The "happy hunting-ground" was just below, and at the entrance of, wooded slopes, which are reached about an hour above Grindelwald. Insects were very abundant, and embraced, in addition to the common "whites," the following specimens:—*Papilio machaon* (larvæ), *Parnassius apollo*, *Aporia crataegi*, *Euchloë cardamines*, *Leptosia sinapis*, *Colias phicomone*, *C. hyale*: *Callophrys rubi*, *Chrysophanus hippothoë*, and *C. virgaureae*: *Polyommatus pheretes*, *P. astrarche* (leaning often towards ab. *allous*): *P. icarus*, *P. corydon*, *P. hylas*, and *P. damon* (this latter very small, dark, but brilliant, apparently the form var. *ferreti*, Fav.; it is noticeably different from all other specimens in my cabinet, both in size and colour); *Lycaena alcon* and *L. arion*: *Aglais urticae*, *Melitaea cinxia*, *M. dictynna*, *M. athalia*, *M. aurelia*, *Brenthis euphrosyne*, *B. pales* (very abundant), *B. dia*, *B. amathusia*, *Argynnis aglaia*, *A. niobe* var. *eris*, *A. adippe*, *Melanargia galathea*, *Erebia melampus*, *Erebia pharte* (1), *E. manto* (something of the transitional form noticed by Mr. Wheeler under the heading of var. *pyrrhula*); *E. ceto*, *E. medusa* (a fine pair), *E. oeme*, *E. stygne*, *E. ligea* (one of this latter, a ♀, is more brilliantly decorated underneath than ordinary; besides the central white band of underwings being continuous, there is a second white zigzag band near the base, and on the upper wings, underside, a large costal splash of white on the inner edge of the chestnut band); *Pararge maera*, *Epinephele jurtina* (strikingly handsome and very abundant); *Aphantopus hyperanthus*, *Coenonympha arcania* var. *darwiniana*, and *C. satyrion* (of which latter I took the rare aberration which is entirely without eye-spots

on the underside); *C. pamphilus:* and of "skippers," *Hesperia cacaliae*, *Syricthus sao* (abundant): while in the meadows of the lower half of the walk, *Pamphila lineola* was everywhere; *P. sylvanus* less common, but probably not fully out.

The next day I took the train up to the top of the little Scheidegg, returning on foot. Just above the new Jungfrau line I had capital sport with the pretty little *Plusia devergens*, otherwise, with the exception of *Colias palaeno* (abundant), I added nothing to the list.

Coenonympha mathewi, n.sp.

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

♂ Anterior wings fuscous, sprinkled with glossy, golden-brown scales, a faint, apical, ocellated spot. Posterior wings same colour as forewings; a pale, orange-brown patch from anal angle to middle of wing; 2 (or 3) faint ocellated spots from anal angle just outside orange patch; fringes white. Underside of forewings bright orange-brown, a distinct, black, small, white-pupilled, ocellated, apical spot, with dark marginal shade, including narrow, faint, metallic line parallel to outer margin; of hindwings golden-brown, a narrow, white, median, transverse band inside row of tiny ocellated spots, of which 1 and 5 (counting from anal angle) are nearly obsolete; outside area same colour as base (sometimes with faint metallic line parallel to outer margin). ♀ Forewings rather square at apex; orange-brown, with broad, fuscous, outer marginal band and ocellated spot. Hindwings with rather more orange than the male in centre of wing, 3 clear orange-ringed ocellated spots, and orange marginal line; fringes rather darker—grey; underside as in ♂.

Quite recently, Mr. G. F. Mathew sent for my inspection, four examples of a *Coenonympha* that he had taken near Vigo, in July, 1886, with the information that he doubted them being *arcanoides*, to which they had been referred. A casual glance showed at once that this reference had been made because of the narrowness of the pale band on the underside of the hindwing, whilst a closer examination showed that the insect belonged to the "*dorus*" and not to the "*arcania*" group of the Cœnonymphas, as does *arcanoides*—the dorsum of the antenna being less distinctly annulated, the club of the antenna less brown and not markedly annulated dorsally.

The four specimens examined are 3 ♂s and 1 ♀; wing expanse 33mm.-34·5mm.; on the upperside not at all dissimilar to a very uniformly coloured *C. dorus*, on the underside, on the contrary, both in tint and markings, very much nearer *C. corinna*. As I am inclined, largely on the evidence of the underside, to consider it distinct from *C. dorus* I propose naming it *mathewi*.

Comparing the specimens with the long series of *C. dorus* and *C. corinna* in the British Museum collection, one notices the following points:

Males: (1) The males have very slightly narrower forewings than *C. dorus*, rather more pointed at apex, are more uniformly glossy fuscous-brown (*i.e.*, more golden), the apical spot smaller (apart from the variation in its greater or less distinctness).

(2) The hindwings are more uniformly tinted with the forewings than in *C. dorus:* the paler brown area is restricted to a small patch extending from anal angle to middle of wing; the ocellated spots are small and ill-developed (not in the direction of obsolescence), and ringed with brown; the two (or three) spots showing are much nearer

to the margin of the wing; the pale marginal lines just within the outer margin is almost obsolete.

(3) The underside of the forewings of the same deep brown tint as that of *C. corinna*; the fringes clearly divided longitudinally as in *C. corinna* but the outside half whiter; the outer margin only slightly darker than the remainder; the metallic line parallel to the outer margin absent in two, and poorly developed in the third specimen; the apical spot small and only very weakly ringed with a tint not really paler than the ground-colour, and possibly nearer to apex than in *C. dorus*: the marked raised nervures of *C. dorus* wanting; the pale transverse line within the ocellated spot very narrow, straight.

(4) The underside of the hindwings bright orange-brown (not greatly different from that of forewings); the pale transverse line narrower than in *C. dorus*, the inner edge made of three curves, and, as in *C. corinna*, falling short of the row of ocellated spots, except the top spot, which is in two examples included in the narrow band; the outer margin of almost same orange-brown tint as basal area; the ocellated spots small, but with strongly-marked centres and very weak rings outside the black; these spots nearer margin than in *C. dorus* (the three lower ones much less markedly perpendicular), the first and fourth spots (counting from base) weakly developed, as in *C. corinna*: the metallic line parallel with outer margin, finely marked in one specimen, traceable in a second, and absent in a third (this line varies somewhat similarly in *C. corinna*).

Female: (1) The upperside of the forewings are more like those of *C. dorus*, but the costa is shaded with fuscous; the fuscous marginal band extends almost to the apical spot, but does not include it as in *C. corinna*: the apical spot is, in only specimen examined, double, the second one being very small and beneath the first.

(2) The upperside of the hindwings is much more tinted with fuscous, a small area, from the anal angle extending just above the three visible ocellated spots, alone being of the ground-colour, rings of which surround the spots.

(3) The underside of both fore- and hindwings is similar to that of the ♂, except that a tiny second ocellus is below the small (compared with that of *C. dorus*) ordinary apical spot; the whole of the underside of the forewings is uniformly brown, with ill-developed metallic line parallel to outer margin, and trace of faint transverse shade just inside ocellated spot. The underside of the hindwings is also golden-brown; the white transverse band narrow and its points (turned towards the base) sharp; the band not reaching to the ocellated spots; the outer area uniform with the base, the orange marginal line and the ill-developed metallic one being very like those of ♀ *C. corinna*.

The egg, larva, and pupa of this species are badly wanted for comparison with those of *Cœnonympha dorus* and *C. corinna*, with the former of which, in particular, it has very close affinity. It would be especially interesting to have the early stages worked out to see how they differ from the former species.

The specimens were taken on rough ground among olive orchards about three miles to the south of Vigo.

Aulonium sulcatum, Oliv. (trisulcum, Fourc.), a species of Colydiid Coleoptera new to Great Britain.

By C. J. C. POOL.

I have much pleasure in introducing this rare beetle to our list of indigenous coleoptera. On July 13th last, at Enfield, I found the insect in all stages, inhabiting the burrows of *Scolytus multistriatus*, Marsh., in elm bark. Two other species, *Scolytus destructor*, Ol., and *Hypophloeus bicolor*, Ol., were found in the same post, which is a portion of a prostrate bough, to be seen about two hundred yards away. The specimens at first taken were immature, so I kept them alive for several days. Mr. W. E. Sharp came here on a visit shortly after, and together we went to the post, from which another specimen was taken. Mr. Sharp took this specimen home, and I am indebted to him for recognising the insect as belonging to a genus not yet included in our list, and on my forwarding a specimen to the Natural History Museum Mr. Arrow identified the same as *Aulonium sulcatum*, Oliv., of which there are specimens from France in the museum collection. It may appear to be strange that the insect should for so long escape detection, but I think this is due to its rarity, as well as to the fact that, as a hunting-ground, Enfield does not appear to have been discovered by many coleopterists. The spot where it has now occurred would have been unapproachable a short time ago, but owing to building operations now going on I have been able to work at a number of fine old trees, which are doomed to destruction at an early date. Many dead elm trees and posts are in the vicinity, all showing very distinctly the result of the ravages of long past generations of *Scolytus multistriatus*, etc., making it an ideal spot for the habitation of the *Aulonium*, which is recognised as being parasitic upon the species of *Scolytus*. It would perhaps be interesting to mention a few of the beetles I have found this season within a quarter mile radius of the same post:—*Cychrus rostratus*, L., *Notiophilus rufipes*, Curt., *Stomis pumicatus*, Pz., *Mycetophagus quadriguttatus*, Müll. (abundant), *M. piceus*, F., *M. atomarius*, F., *M. quadripustulatus*, L., *M. multipunctatus*, Hell., *Triphyllus suturalis*, F., *Litargus bifasciatus*, F., *Tiresias serra*, F., *Athous rhombeus*, Ol., *Ptilinus pectinicornis*, L., *Ochina hederae*, Müll., *Cissophagus hederae*, Schm., *Symbiotes latus*, Redt., *Enmicrus rufus*, Müll., *Opilo mollis*, L., *Erya ater*, F., *Laemophloeus bimaculatus*, Pk., *Lissodema quadripustulata*, Marsh., *Hallomenus humeralis*, Pz., and some exceptionally large examples of *Dorcus parallelopipedus*, L. This list is sufficient to illustrate the fact that Enfield contains a spot which at present is very rich in good beetles, and that a splendid hunting-ground is about to be sacrificed to bricks and mortar. In a few years time, or perhaps months, there will be commenced a new line of trams connecting Enfield with the great metropolis, and some day, when seated on the roof of a County Council electric car, I may sorrowfully point to an off licence public-house occupying the spot where once occurred *Aulonium sulcatum*.

Note on Aulonium sulcatum, Oliv., a Colydiid Coleopteron new to Great Britain.

By Prof. T. HUDSON BEARE, F.E.S.

The following note in reference to this addition to our fauna may be of interest to British coleopterists. The genus *Aulonium* is placed

by Ganglbauer in his *Die Käfer von Mitteleuropa* under the tribe *Colydiini*, this being a tribe of the subfamily *Colydiinae*, a division of the family *Colydiidae*. The tribe *Colydiini* contains according to Ganglbauer two genera—*Colydium* and *Aulonium*—the two genera being separated by the following characters:—*Colydium*.—Thorax with a deep central furrow. The alternate (odd) interstices of the elytra raised in the form of ribs. *Aulonium*.—Thorax with two central furrows, which approach one another in the front. All the interstices of the elytra even. The genus *Aulonium* contains two European species, *sulcatum*, Ol., and *ruficorne*, Ol. The synonymy of *sulcatum* is as follows:—

Aulonium sulcatum, Oliv., *Entom.*, ii., 18, 4, pl. 1, f. 1; Erichs., *Naturg. Ins. Deutschl.*, iii., 276; Sturm, *Deutschl. Ins.*, xx., 43, t. ccclxvii. f. A; Reitt., *Verh. Nat. Ver. Brünn*, xx., 1881, 132; Fabr., *Ent. Syst.*, i., 116. *Trisulcum*, Fourer., *Entom. Paris.*, i., 1785, 23. *Bicolor*, Fabr., *Syst. El.*, ii., 555.

The following is a rough translation of the description given by Herr Ganglbauer in *Die Käfer von Mitteleuropa*, vol. iii., p. 852:—Orange-coloured, somewhat smooth and shining, the back of the head and the central part of the thorax brownish; the suture of the elytra, especially towards the apex, blackish; frequently the whole insect is orange-coloured. The head large and finely punctured, the hinder part being more strongly punctured. The thorax almost as broad as the elytra and about as long as broad, with fine and scattered punctures. The two central furrows of the thorax gradually run together as they proceed from the base to the centre of the thorax, and are then either parallel or slightly divergent. The two side furrows of the central portion of the thorax are united in the front by a deep furrow running close to the frontal edge of the thorax. The elytra have fine regular rows of punctures, the interstices being very finely and sparingly punctured. L. 4½-7mm. Localities:—Middle and southern Europe; under elm bark in the burrows of *Scolytus destructor* and *S. multistriatus*; rare.

The larva of this species is described by Westwood in his *Introduction to the Modern Classification of Insects*, vol. i., p. 147, and there is an illustration of the larva in fig. 12 on p. 146.

Our Immigrants of Phryxus livornica in 1904.

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

The account of the migrating habits of *Phryxus livornica*, so far as they have been ascertained, have been so recently published (*Nat. Hist. Brit. Lep.*, iv., pp. 158 *et seq.*) that there is no need to repeat the facts, and it would serve no purpose to recount all the years in which the fringe, as it were, of an immigrating band has reached Britain, as these are also readily available (*op. cit.*, pp. 161 *et seq.*). Suffice it to say that in 1858, 1860, 1862, 1867, 1879, 1888, 1892, and 1893, only the spring and early summer immigrants themselves were observed, no autumnal progeny having been noticed, and it must be assumed that these years were unsuitable to them in this country; in 1865 and 1868 the immigrants apparently did not come to Britain till the autumn, although the single spring capture in 1868 suggests that the autumn imagines may have been the offspring of overlooked spring arrivals, whilst in 1870, the spring immigrants appear to have done unusually well for

summer larvæ, and a fair number of autumnal imagines, progeny of these spring parents, was recorded. This year, 1904, the spring immigrants appear to have been fairly numerous, and a few autumnal examples resulting therefrom have been captured and bred. We have already localised the probable area whence our central European immigrants set forth, and this is well supported by facts that have come to hand quite recently.

In the *Revue de Viticulture*, 1904, p. 672, and the *Réveil agricole*, 1904, p. 404, Marès and Bedos give details of the swarms of this species that occurred in Algeria last spring (1904), the facts of which appear to be as follows: Owing to a very wet winter and spring the earliest imagines of *Phrygus livornica* did not appear till the middle and end of April, when they were driven from the higher lands by the sirocco into the lower cultivated areas. They laid their eggs on the vine, and in the neighbourhood of Ain-Bessem, Bir-Rabalon, Bertuille, Les Trembles, Medea, Loverdo, Gouraya, Berrouaghia, Ben Chicao, Hammam-Rhira, Marguerite, Sidi-Bel-Abbès, &c., the larvæ were in enormous numbers, and soon devastated the vineyards, stripping the vines of buds, leaves, and blossoms. Marès states that some children collected from 10-12 litres of larvæ in a day, and that after this the larvæ seemed as abundant as ever. Their polyphagous habits stood the larvæ in good stead, and, in due course, they pupated, and the imagines appeared at the end of July. In Tunis, where the species has been equally abundant this year, the larvæ have attacked the olives in preference to the vines.

One suspects that the movement in the spring, in Algeria and Tunis, from a higher to a lower level, was part of a large general dispersal movement, the most northerly edge of which touched our coasts. If this were so, it follows that our spring captures were full-blooded North African individuals, and our autumnal ones British-bred, and born from African parents. It is interesting to know that, owing to the greater interest now taken in the question of the distribution of our lepidoptera, we may get from current entomological literature facts that, pieced together, show us the origin and extent of migration movements in the Palæarctic lepidoptera.

The numerical relationship of the sexes in Lepidoptera.

By T. A. CHAPMAN, M.D.

Mr. Tutt's luminous analysis of the records of breeding lepidoptera given by Standfuss (*Ent. Rec.*, xvi., 193) is abundantly sufficient to give its quietus to the thoughtless generalisations founded on superficial and collecting-box observations, which one so frequently sees, and which, as the thoughtless are a majority, we shall continue to see, in periodicals and elsewhere from time to time. In reading it, several ideas occurred to me, as probably they would to most people, one or two of these are possibly worth noting. The first, perhaps, is that the records refer for the most part to more or less ordinary species (in this respect) and to normal breeding of them, and that the conclusions reached are not in any way invalidated by the fact that there are exceptional species, of which the most notable are those that are parthenogenetic, or are approaching that habit. There are also exceptional conditions, of which we know little, as in certain hybrids and certain strains occasionally met with in ordinary species.

I am not quite sure that all breeders of lepidoptera will agree with Mr. Tutt that the conditions of confinement are usually such, that the males will more easily survive, when broods are reared in captivity, than the females. I have very little experience myself on any large scale, but I had an impression that the females more readily defied the unnatural conditions imposed by captivity than the males. This would be a point on which the experience of some of those observers who now rear large numbers of species would be valuable, not merely their statistics, but their impressions of what befel the two sexes in cases where the imagines resulting were only a final remains, after losses of their brethren throughout the whole life of a brood.

Another point that struck me as curious was this. The excess of males over females bred by Standfuss, was, in the mass, very definite, and may perhaps be taken, from its averaging so many and varied experiences, to be not far from a real measure of the relative numbers of the two sexes in lepidoptera. This excess of about 5% is of quite a different order from the 50%, 500%, or 5000%, the absurdity of which Mr. Tutt points out, but is not only of the same order, but not very far from the same amount, as that of the excess of male over female births in the human species in these islands. It is a matter of speculation, at present, as to whether this correspondence has or has not some real common cause in both instances, for any really valuable conclusion on the matter further research is no doubt needed. The only common condition that unquestionably obtains in both instances, is that usually of the two parents the male is generally the older. But in the present position of our knowledge, to advance any such theory is much the same kind of philosophy as that of which Mr. Tutt's article exposes the absurdity.

Types in Natural History.

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

I am glad that my note has called forth Mr. Wheeler's ably-written article. I now understand his position, and apologise for insufficiently studying his lucid introduction, p. 3; he has only "not defined it" in the sense that his starting point is illusory—unpractical, as he almost admits himself; unscientific, as assuming the objective existence of natural "types." Mr. Wheeler believes in "distribution" types; Mr. Kaye tells us that the "man in the street" believes in "average types"; Dr. Chapman (*in litt.*) told me that all my four meanings are "species" in one "genus"; Mr. Kaye tells us that they are *two* genera; all of which is very illuminative. As I have already said, increasing knowledge will constantly modify our conceptions of numerical preponderance, whether of individuals of a form, or of localities producing a form. Mr. Wheeler has the courage of his opinions, for which I admire him, but I feel convinced the excellent work he is doing will compel him to modify them before he has "inundated us with many further changes." What is the "distribution type" of *argus*, Linn., or of *tiphon*, Rott.? What of *secalis*, Linn., or of *bicoloria*, Vill.? In my own special work I have come across many cases where there seem to be Mr. Wheeler's "miracle of ill-luck and monument of premature definition." Working chiefly among butterflies whose head-quarters are in Europe (where entomologists, too, have theirs), he has not appreciated the probabilities of trouble; scores

(nay, hundreds) of species, common and well-distributed in little-worked regions, are first discovered and named in the better-worked into which they straggle, and generally in modified forms.

I had not fully realised that Mr. Wheeler wanted species-names placed on quite the same footing as generic. To me there are differences; like other scientists, we seem to need some *unit*, even if artificial, and, moreover, I have long held that generic names are a delusion and a snare, and have pined for Amyot's *Méthode Monony-mique*, or something of the sort. But, in any case, the analogy which Mr. Wheeler draws only *supports* the accepted practice; when we group species into a genus we give the assemblage the oldest name, not that which covered most species, and this is just what we do when we group forms into a species. I cannot see that nomenclature *per se* ever enhances "scientific truth," though clearness of definition does; if A and B both call a certain species *Lasiocampa quercûs* it is a gain, and they can argue to their heart's content as to whether the form *quercûs* or *callunae* be the more widely distributed, but if one persists in writing of the *ensemble* as *quercus* and the other in writing of it as *callunae*, in order to support their theories, it is a distinct loss. And as for orthography, in proper names this simply means faithfulness to the first spelling; if my birth register made me "Loui" or "Jon," no one on earth would have the right to declare that the less eccentric spelling was "orthography" for me.

May I crave space for one paragraph more? I appreciate the editorial desire to curtail discussion on this arid subject, but Mr. Wheeler expressly asked for an explanation; and I would naïvely suggest that my communication does not "*exceed more* than one page of print." The expression, "type of a name," was perhaps clumsy. I am not much of a Greek scholar, and dare not "enter the lists" with Mr. Wheeler; but I fancy type really means "impress," or something of the kind, and, as I do not believe nature provides types, I go to *names* for them; and by "type of a name" I mean that phase of the species upon which the name (with its associated definition) sets its stamp.

Types in Natural History.

By T. A. CHAPMAN, M.D.

Mr. Wheeler says he regards a "stable nomenclature as of only trifling importance," this at once explains his whole position, and as there is probably a very small minority of naturalists who will here agree with him, the discussion seems hardly worth carrying further. If Mr. Wheeler has any valuable scientific fact to tell us about any insect, it is of supreme importance that he should tell us what insect it is; how can he do so unless he uses a name universally accepted, or as we have still to do too often, uses some explanation to say in what sense he uses the name he employs. If one speaks of *Lycaena argus*, one has to show whether one is an ancient or a modern. But some one will tell us something useful about *L. argus*, who is yet ignorant as to the necessity of telling us also on whose authority he applies the name *argus*. Strict priority is the only escape from these difficulties.

One word more as to "type." An author names a species, it is of great importance we should, with certainty, should it be necessary at

any time to solve a doubt, know what species it was to which he gave the name. A "type" is a useful accessory but not essential to this end. We will assume he has before him a long series with all sorts of varieties, the name belongs to all, then he fixes a "type" in one, or both, of two ways, he takes a specimen and says this shall be the "type" of my new species. Any one finding he has a specimen of the same species as that type, applies to it the author's name. There is nothing to prevent the author, if he chooses, selecting some extreme aberration as the "type" specimen, he might even reasonably do so, if it happened to exhibit more clearly some specific character he thought important. His other "type" would be by way of description, he ought to describe all the varieties he has, and he may leave them all under one specific name, or he may give varietal names to each, and in doing so may select any variety he chooses as the "type," *i.e.*, as one which he leaves without varietal name. It would be contrary to custom, but I see no reason why he should not give a varietal name to each form, leaving the specific name as equally belonging to all. I am not quite sure, but looking to p. 247, I imagine each recognised race of *Phragmatobia fuliginosa* is provided with a varietal name.

If it does not exceed the limit prescribed by the editor, I should like to call attention to an almost forgotten paper by Dr. Sharp, in which he suggests the *name* of a species shall be the *original name, generic and specific*, unchanged. You may then classify as you like. *Papilio coecajus* remains *Papilio coecajus*, though you may *classify* it as an *Ascalaphus*. The result, no doubt, would be rather cumbrous, and might be open to charges of trinomial heresy. But fixity of nomenclature would be more nearly attained, and classifications that became obsolete, could not hamper us more than once for each species. The aim is to separate nomenclature from classification, a quite unessential association, which is the source of many of our difficulties.

Notes on Papilio asterias, with particular reference to its earlier stages, and their difference from those of P. machaon.

By CECIL FLOERSHEIM, B.A.

In the winter of 1903-4 I bought some ten pupæ or so of *Papilio asterias*, the common eastern swallow-tail butterfly of North America, from Messrs. Watkins & Doncaster. At the end of March, 1904, I placed these, with other pupæ, out-of-doors, in my butterfly-house, a slight construction of wood covered with gauze, fifty feet long by fifteen feet wide. This house or cage has a door at either end, and a path a foot wide, running down the middle. On either side of this, for a space of two feet or so, I have planted *Erysimum*, pansy, and other such flowers as butterflies love to feed on; whilst the remaining ten feet of room are filled in with the foodplants of the various species I attempt to breed.

In this instance, however, the normal instinct of the butterfly failed it, for the ova, being laid without exception on the bracts underneath the flower-heads of wild chervil, which were already beginning to shed their petals, on the seed-pods, or on the bare stems high above the leaves, were so placed that when they hatched the young larvæ found no sustenance, and being of a sluggish habit, would have starved—which indeed they did in some instances—had I not transferred them to fennel and common garden car-

rot. The ovum when laid is of a straw colour, and under a fairly powerful magnifying glass (I, alas! had no microscope by me) is almost indistinguishable from that of *P. machaon*. In a few days it darkens in tint to a pale brown, and has often a well-marked horizontal band of dark brown about half-way between its middle and its base. Before hatching it turns to a leaden-black. Though the larva in its last stadium is often considerably larger, both in respect of length and of stoutness than that of any of *P. machaon* I have ever seen, I was unable to detect any corresponding difference in the size of the ovum. The young larvæ when hatched, and, indeed, until its last two instars, resembles so closely that of *P. machaon*, that I was unable to distinguish between the two species. In its last instars, however, the five orange spots on each of the black segmental bands in *P. machaon* are replaced in *P. asterias* by corresponding spots of a rich chrome-yellow, but of twice the size and of a rounder shape. The larva of *P. asterias*, in addition to differing from *P. machaon* in this respect, has a slightly bluer and less vivid green for its ground colour, and the black bands are broader and always continuous. Besides being bulkier than that of *P. machaon* it is much more sluggish, and rarely crawls the distance to pupate that the larva of *P. machaon* will. In its later stadia it is only with difficulty that it can be induced to protrude its orange-coloured osmaterium. I noticed also that some of my second-brood larvæ had much more black about them than those of the first.

The pupa of *P. asterias* bears a strong family likeness to that of *P. machaon*, but is generally larger and slenderer, tapering considerably more in the anal segments. All its silken attachments, particularly those of the wing-cases, are much more fragile than those of *P. machaon*, and it seems more fond of adopting a horizontal position than its English relation. In colour, though dimorphic, its difference from the latter is usually well marked enough, the white ground colour of the brown variety being replaced by a generally greyer tint, whilst the brown markings are lighter in hue. In the green and yellow variety, however, the opposite is the case, and the colours of *P. asterias* are more vivid than those of any *P. machaon* I have ever noticed. Nevertheless, in one or two cases the pupa so closely resembled a pale specimen of the brown variety of *P. machaon*, that I could only tell them apart with difficulty. Perhaps this is a reversion to a less specialised form of pupa. But perhaps this was due to the effect of cold upon the pigmentary cells of the larva, as I have noticed the same phenomenon in the larvæ of *Platysamia cecropia* during an English autumn. In case any captures of *Papilio asterias*, in Surrey, Berkshire, or Hants are recorded, I may state that I set at liberty some sixty or seventy specimens during the months of August and September.

The relationship between *P. asterias* and *P. machaon* seems in any case to be a very close one, but next year, when I hope to compare the ova and larvæ of the two species under a microscope, I shall be able to speak with more certainty regarding this. *P. asterias* seems to be in some respects the more highly specialised of the two, notably in its sexual dimorphism as an imago, and in its aversion from protruding its osmaterium during its last stadium. It is a curious fact that, whilst *Skimmia japonica* is the favourite foodplant of *P. machaon*, the larva of *P. asterias*, though taking readily to all the *Umbelliferæ* on which *P. machaon* feeds, cannot be induced to touch *Skimmia*. The female parent of my

first brood was still alive on July 5th, when I left the country, having enjoyed herself in the semi-captivity of the cage for six weeks. However, on my return on July 10th, I found that she had died during my absence. During the latter part of her existence she has taken no notice of me as I watched her, often from the distance of a foot or so only, feeding or ovipositing in the sunshine. The first larvæ appeared on June 25th, and, as the plant on which they were afforded no sustenance, I removed them to garden carrot and fennel. By July 15th these were mostly full-fed, some, indeed, having already pupated. During the first week in August the imagines began to emerge, and I noticed two or three females ovipositing, this time on fennel, which was just coming into flower, on August 8th. I have already some 150 pupæ from these ova, but as the larvæ were fed up in a greenhouse, the dates of their various stages would be no guide to their habits under natural conditions in our climate. In spite of the unwontedly fine and warm April which we enjoyed in the south of England this year, none of my *P. asterias* emerged until May 22nd, when the first, a male, made its appearance. On May 25th, a female came out, and another on the 27th. These were, unfortunately, all that emerged of my original ten pupæ, and, as the species seems to be an extraordinarily hardy one, I have no doubt that the untimely demise of the rest was due to some gross error of judgment on my part. Both the females were remarkably fine specimens, the first measuring no less than $4\frac{1}{4}$ inches across the expanded wings, and the second $\frac{1}{8}$ of an inch less. In spite of the inclement weather during Whitsun week the male paired with the first female before the end of the month, and, on June 5th, I noticed the latter ovipositing on a plant of wild chervil, which happened to be in full flower. The habits of *P. asterias* whilst laying its eggs are remarkably like those of *P. machaon*, the abdomen is curled round till it describes a semicircle, and three or four ova, seldom more or less, are deposited separately, then the insect, as though exhausted for the moment, flies off to feed on some neighbouring flower-head, returning in a few minutes to recommence its task. Like most of the Papilionids I have observed, it generally keeps its wings fluttering while feeding. Oviposition continued busily until the 13th, and spasmodically even after that date. Though there were some large plants of fennel growing close by (Holland says that fennel is a favourite food-plant of this species in the south of the U.S.A.), all the eggs were laid upon wild chervil. I think that this must have been due to some innate fondness of *P. asterias* for ovipositing on plants when in flower, as in August, when the fennel was flowering, the second brood laid freely enough on it.

Synopsis of the Orthoptera of Western Europe.

By MALCOLM BURR, B.A., F.L.S., F.Z.S., F.E.S.

(*Continued from* p. 231).

Division II: Acridiodea.

This large division includes the common grasshoppers of our fields and meadows, besides a large number of strange and often highly specialised forms, together with the various species of migratory locust, which become pests from time to time in different parts of the world. The division is characterised by the comparatively short antennæ, three-

segmented tarsi, auditory organ situated at the side of the 1st abdominal segment, by the short ovipositor of the female which consists of four short separate valves, and by the position of the stridulating apparatus, which is formed, with a few exceptions, by a ridge of minute teeth on the inner side of the posterior femora, which are rubbed against the hardened veins of the closed elytra. The Acridiodea fall into a number of families, of which six occur in Europe.

The characters employed to discriminate the genera and species of this division are somewhat difficult to understand at first. The frons, or face, viewed from the side, may be strongly inclined (oblique), or vertical; it is important to notice whether the frons makes an angle with the top of the head, or whether the limit between the two is rounded off; quite near the apex of the head there are often to be seen a pair of narrow grooves, called the foveolæ of the vertex; these offer important characters, according to their exact position, shape, depth, &c.; the frons itself may be almost smooth and rounded, or narrow and deeply keeled and sulcate. The venation of the elytra offers important characters, and the names of the various veins and areas between them should be learnt. Different authors have employed different terms for these parts, but the nomenclature of Brunner von Wattenwyl is the simplest. The elytra should be opened for examination, and the veins and areas are considered in order from the fore border backwards. After the costal margin, the first nervure is called the mediastinal vein; behind this is the radial vein, which is often divided from the base into three branches, known as the anterior radial ("vena scapularis" of Fischer), the middle radial ("vena externo-media" of Fischer), and the posterior radial ("vena subexterno-media" of Fischer). Next comes the ulnar vein, often of two branches, the anterior ulnar ("vena interno-media" of Fischer), the posterior ulnar ("vena subinterno-media" of Fischer); behind this still is the "vena dividens" of Brunner, which is the "vena analis" of Fischer, and finally the "vena plicata" of Brunner or "vena axillaris" of Fischer. For the last two veins mentioned, the names of Fischer are nearly as frequently employed as those of Brunner. The space in front of the mediastinal vein is the mediastinal area; the next area, between the mediastinal vein and the first radial, is the scapular area; between the first and middle radial vein is the externomedian area; between the posterior radial and anterior ulnar is the discoidal area, which is large and broad and prominent in many cases; in the middle of this there is often a small subsidiary vein called the vena intercalata; between the two ulnar veins is the interulnar area, and lastly, between the vena plicata or axillary vein and the hinder border of the elytra, is the axillary area. The wings themselves offer less important characteristics; they are divided into the front and posterior portion by the strong vena plicata or axillary vein; the hinder or axillary portion is large, always membranous; in the anterior portion we find the homologies of the veins of the elytra, and, in some genera, this anterior portion is hardened, and the veins strengthened, so that the insect makes a stridulating noise during flight owing to the rubbing of this hardened part of the wing against the hinder border of the elytra.

The feet offer few characters; the hinder tibiæ have a double row of spines above, the number of which is sometimes useful to observe;

the absence of a pad between the claws of the tarsi distinguishes the *Tettigidae* (among the Europeans).

The pronotum offers important characters: the form of the lateral ridges or carinæ is important, when they are present; the pronotum is cut by a main sulcus called the typical sulcus, and the relative position of this is important.

TABLE OF FAMILIES.

1. Tarsi with pad between the claws. Pronotum never produced backwards beyond the metanotum.
   2. Prosternum unarmed.
      3. Frons oblique; the top of the vertex forming an acute angle with the frons. Mediastinal and scapular areas of elytra reticulated with transverse parallel nervures .. 1. TRUXALIDÆ.
      3.3. Frons vertical; top of vertex forming rounded angle with frons; mediastinal and scapular areas of elytra irregularly reticulated .. .. 2. (EDIPODIDÆ.
   2.2. Prosternum armed with a spine between the anterior coxæ, or at least raised into a swelling or tubercle.
      3. Foveolæ of the vertex situated on top, contiguous, forming front border of vertex (frons strongly oblique) .. .. .. 3. PYRGOMORPHIDÆ.
      3.3. Foveolæ of vertex above, lateral, beneath, or entirely wanting.
         4. Costa of frons compressed, deeply sulcate; foveolæ of vertex above or lateral, open behind .. .. .. 4. PAMPHAGIDÆ.
         4.4. Costa of frons not compressed nor sulcate; foveolæ of vertex lateral or inferior, closed behind, or often entirely wanting .. .. .. 6. ACRIDIDÆ.
1.1. Tarsi with no pad between claws. Pronotum produced backwards over abdomen .. .. .. 6. TETTIGIDÆ.

Family I: TRUXALIDÆ.

This family contains the common field grasshoppers; it is rich in genera and species, and distributed throughout the world; the discrimination of the species is often somewhat difficult, especially in *Stenobothrus* and the allied genera. Attention must be made to the shape of the foveolæ and their position, and especially to the venation of the elytra.

TABLE OF GENERA.

1. Fastigium of vertex lobed at sides: head produced into a long slender cone; antennæ strongly compressed and ensiform; elytra narrow and pointed; hinder knees ending in a spine; hinder tibiæ with more than 20 spines on each side .. .. .. ACRIDA, L. (= TRUXALIS, Fabr.)

1.1. Fastigium not lobed at sides; antennæ generally filiform, rarely ensiform; elytra not lanceolate; hinder knees not pointed: hinder tibiæ with not more than 15 spines on each side.
   2. Fastigium of vertex without lateral foveolæ visible from above; or, if they are present, they are strongly inclined, and only visible from the side.
      3. Antennæ ensiform; foveolæ of vertex vertical or strongly inclined.
         4. Pronotum not constricted in middle, the lateral carinæ bent in middle; foveolæ oblong; antennæ broad .. .. OCHRILIDIA, Stål.

4.4. Pronotum constricted in middle, lateral carinæ bent in middle; foveolæ triangular; antennæ narrow. Oxycoryphus, Fisch.

3.3. Antennæ filiform; sides of fastigium of vertex without foveolæ.

4. Hinder tibiæ broadened towards apex, with a lateral keel in apical half; pronotum with typical sulcus situated before the middle, carinæ present only in prozona .. .. . Paracinema, Fisch.

4.4. Hind tibiæ cylindrical; pronotum with typical sulcus behind middle.

5. Pronotum cylindrical above, without lateral carinæ .. .. Parapleurus, Fisch.

5.5. Pronotum flat above, with lateral carinæ .. .. Chrysochraon, Fisch.

2.2. Fastigium of vertex with lateral foveolæ, or depressed spaces representing them, more or less visible from above.

3. Discoidal area of elytra with no true vena intercalata (sometimes a twisted false vein is formed by the union of the cross veinlets, but this is quite distinct from a true raised intercalate vein). Lobes of metasternum separated behind their corresponding foveolæ.

4. Carinæ of pronotum continued, only cut by the typical sulcus; foveolæ of vertex very narrow; body generally slender; tympanum of abdomen almost or entirely closed.

5. Antennæ filiform or very slightly depressed towards apex; tympanum shut.

6. Mediastinal area of elytra gradually narrowed towards apex, prolonged the whole length of elytra, not lobed at the base, so that the fore border of elytra is straight.

7. Valves of ovipositor of ♀ armed with a strong lateral tooth .. .. Stenobothrus, Fisch. (*sensu stricto*).

7.7. Valves of ovipositor with no strong lateral tooth Omocestus, Bol.

6.6. Mediastinal area of elytra rapidly narrowing towards middle of elytra, broadened out into a lobe near base, so that fore border of elytra is not straight, but convex near base.

7. Lateral carinæ of pronotum angled or bent in in prozona, diverging posteriorly .. .. Stauroderus, Bol.

7.7. Carinæ of pronotum straight and parallel, or very slightly bent in anteriorly.. .. Chorthippus, Fieb.

5. Antennæ clavate, especially in ♂; tympanum half open .. .. Gomphocerus, Thunb.

4. Carinæ of pronotum interrupted in middle, or rough and punctate there, cut by two sulci; yellow bands often

occupy the space where the carinæ would be if they were developed, and have the appearance of carinæ.

5. Foveolæ of vertex trapezoidal or rhomboidal, quite distinct; carinæ of pronotum obliterated in second half of prozona, represented by two yellow stripes forming a cross. STAURONOTUS, Fisch.

5.5. Foveolæ of vertex obtuse, filled in; carinæ of pronotum more or less angled, even in front of typical sulcus, covered with little tubercles .. .. .. ARCYPTERA, Serv.

3.3. Discoidal area of elytra generally provided with a thick intercalated vein, entire and distinct, very rarely feebly developed, in which case the metasternal lobes are united behind the corresponding foveolæ.

4. Metasternal lobes united behind; foveolæ of vertex represented by almost triangular spaces; carinæ of pronotum straight; wings rosy; vena intercalata of elytra variable .. .. RAMBURIA, Bol.

4.4. Metasternal lobes distant; foveolæ of vertex triangular; vena intercalata stout; wings hyaline, tinged with greenish or bluish.

5. Vena intercalata of elytra situated in middle of discoidal area, or at least nearer to the radial than to the ulnar vein .. .. .. EPACROMIA, Fisch.

5.5. Vena intercalata of elytra nearer to ulnar vein .. .. .. MECOSTETHUS, Fieb.

Genus I: ACRIDA, Linn., Stal. (= *Tryxalis* or *Truxalis*, Fabr., Brunner, et auctt.).

This genus, which is widely distributed in the Old World, is represented in southern Europe by two species, which are not difficult to distinguish. The genus is unmistakable, on account of the large size and curiously-shaped head, which is produced into a long and narrow elevated cone, at the extremity of which are the eyes, and sword-like antennæ.

TABLE OF SPECIES.

1. Elytra alike in each sex; mediastinal and scapular areas opaque, irregularly reticulated, not dilated; carinæ of pronotum straight and parallel; claws of tarsi short, the pad equal to them in length, large, dilated at the apex .. .. 1. NASUTA, Linn.

1.1. Elytra of ♂ with mediastinal and scapular area dilated, hyaline, the transverse veinlets parallel and regular; lateral carinæ of pronotum bowed; claws of tarsi a little shorter than the third segment, the pad compressed and very small .. 2. UNGUICULATA, Ramb.

1. ACRIDA NASUTA, Linn. (= *turrita*, Linn.).

In this species the wings are tinted with green in both sexes; the general colour is green, or brownish, variegated with darker bands. Length of body, 36mm.-46mm. ♂, 52mm.-64mm. ♀; of pronotum, 5mm.-8mm. ♂, 8mm.-11mm. ♀; of elytra, 28mm.-40mm. ♂, 45mm.-62mm. ♀.

Fairly common in south Europe, it occurs also in Asia, Africa and Australia. In the Iberian Peninsula it is found only on the east and

south coast. In France, it is common along the south coast, as at Marseilles, Nice, Hyères, Cannes, Amèlie-les-Bains, Toulon, Drôme, Porto Vecchio, Bagnols, Montauroux, Nîmes, Orange, Valence, &c. In Italy, it is common in the north, as at Genoa, Vintimiglia, Pegli, Spezzia, Savona, and probably also in the south and centre. In lower Austria it occurs at Königsberge, near Enzersdorf and in the Prater, and in Hungary it occurs as far as Pest.

2. Acrida unguiculata, Rambl.

Differs from the last in the points mentioned in the table, and also in the reddish-violet wings of the female. Length of body, 44mm.-47mm. ♂, 65mm.-74mm. ♀; of elytra, 38mm.-42mm. ♂, 55mm.-61mm. ♀; of pronotum, 7mm.-8mm. ♂, 10mm.-14mm. ♀.

This is less common than the preceding species. In France it is recorded from Nîmes (Finot suggests in error). In Spain it extends further towards the centre, and is found also in the east and south; Beja, Algarve, Alfeite, as far as Madrid; Brunner notes it from Malaga and Granada. It is found also in Italy and Sicily.

It occurs also in Crete, Algeria, Egypt, Syria and Senegal, Asia Minor, Persia.

Genus 11: Ochrilidia, Stål.

This genus is but little known, as several of its species are very rare; it is characterised by the pointed vertex, ensiform antennæ, narrow oblong foveolæ of vertex, by the metasternal lobes being closed behind, and by the dilated, regularly reticulated scapular area of the elytra of the ♂. The hind femora are very short.

Table of Species.

1. Vertex shorter than the length of the eye .. .. 1. tibialis, Fieb.
1.1. Vertex as long as, or longer than, the eye.
2. Pronotum cylindrical, with distinct carinæ; two smaller extra carinæ also present .. .. 2. boscæ, Caz.
2.2. Pronotum flat; carinæ nearly obsolete; only the two lateral and the central carinæ at all visible .. .. 3. tryxalicera, Fisch.

1. Ochrilidia tibialis, Fischer.

Pale yellowish or greyish; elytra easily extending beyond the apex of the abdomen. Length of body, 20mm. ♂, 30mm. ♀; of pronotum, 3·3mm. ♂, 5·8mm. ♀; of elytra, 19mm. ♂, 27mm. ♀.

This species is quoted from the eastern shores of the Mediterranean by Bolivar, and from Spain by Brunner. It also occurs in Algeria, Syria and Greece.

2. Ochrilidia boscæ, Cazurro.

Reddish; elytra extending slightly beyond abdomen. Length of body, 23mm. ♂, 30mm. ♀; of pronotum, 3mm. ♂, 5mm. ♀; of elytra, 18mm. ♂, 26mm. ♀.

This species seems peculiar to the eastern coast of Spain; it is recorded from Castell de Fels to Jativa and Montserrat.

3. Ochrilidia tryxalicera, Fischer.

Dark reddish; elytra slightly longer than abdomen. Length of body, 33mm. ♀. Only ♀ known.

This species is only known from Fischer's description of a single female from Messina.

Genus III : Oxycoryphus, Fischer.

This genus has only one species; the genus is characterised by the form of the head, which somewhat resembles that of *Acrida* on a very much smaller scale; the antennæ are flattened.

1. Oxycoryphus compressicornis, Latr.

Green or brownish, with a row of black spots on the elytra. Length of body, 14mm. ♂, 18mm. ♀; of pronotum, 3mm. ♂ and ♀; of elytra, 12mm. ♂, 16·5mm. ♀.

In France it occurs in the southwest, at Vias, Bordeaux, Nîmes, Biarritz, Île de Ré, Arcachon, Valence, Drôme. In Spain, at Madrid, Malaga, Santander, Fuentarabia, in fact, throughout the Peninsula; it has been recorded from Oporto in Portugal. It occurs in Algeria, Egypt, and Senegal.

It is found on dry, sandy places among rank grass, especially near the sea. It is excessively variable in colour, from green to almost pink, and the wings may have a darkish fascia, or this fascia may be pink, or absent. The wings are usually tinted with pink.

Genus IV : Paracinema, Fisch.

This genus has but a single species.

1. Paricinema tricolor, Thunb. (=*bisignata*, Stal.).

Large; green; pronotum marked with two brown bands. Length of body, 24mm.-27mm. ♂, 30mm.-36mm. ♀; of pronotum, 3·8mm. ♂, 4mm. ♀; of elytra, 21mm.-25mm. ♂, 28mm.-86mm. ♀.

This handsome insect is purely meridional. In France it is found occasionally in the centre, but is rare and local; it is recorded from Hyères, Cette, Nice, La Teste-de-Buch, Porto Vecchio, Tarbes, La Canau, Le Blanc, Valence, Drôme, Ardentes, and in Corsica. It occurs throughout the Iberian Peninsula, and in Italy is noted from Venice and from Naples. It is found also throughout Africa and from Madagascar. It is found in fields and on the banks of rivers, and is adult in the end of summer and in autumn.

Genus V : Parapleurus, Fisch.

A single species.

1. Parapleurus alliaceus, Germar (=*typus*, Fischer).

Pale emerald green and yellowish; a black band runs from the eyes down over the elytra, which are semi-transparent, and the wings hyaline. Length of body, 17mm.-21mm. ♂, 25mm.-28mm. ♀; of pronotum, 3mm. ♂, 4·8mm.-5mm. ♀; of elytra, 14mm.-19mm. ♂, 19mm.-25mm. ♀.

This pretty grasshoppper is found in similar localities to *M. grossus*, L., but is more locally distributed. It is common in swamps in some parts of France, Barèges, Strasbourg, Fontainebleau, Épisy, Moret, Malesherbes, Gavarnie, Hyères, Cauterets, Amélie-les-Bains, Drac near Grenoble, Bourg d'Oysans, Le Creuzot, Charente, Tarbes, Verdalle, and Tarn (where it was sufficiently numerous to do damage in 1888), Pertuis, Francheville near Lyon.

In Switzerland it is noted from the neighbourhood of Geneva; in Italy, at Cunes. In Spain, it occurs only in the north, as at Lugo; in Asturias and in Catalonia. It is found also in upper Austria, the Tirol, and Carinthia. It is possible that it may be discovered in Britain.

(*To be continued.*)

COLEOPTERA.

COLEOPTERA AT MICKLEHAM AND DEAL IN SEPTEMBER.—During the latter part of September I had some collecting in the south of England, one day being spent on Mickleham downs, and about a week at Deal and in its vicinity. Having now worked out the captures, with the kind assistance of Professor Beare, I append a list of the more interesting species taken:—*Harpalus serrus*, Duft., *H. serripes*, Sch., and *H. ignarus*, Duft., were obtained sparingly on the sandhills at Deal, as was also *Demetrias unipunctatus*, Germ. In some ditches near the golf clubhouse, the following water-beetles were obtained—*Noterus sparsus*, Marsh., *Laccophilus interruptus*, Panz., *L. obscurus*, Panz., *L. variegatus*, Germ., *Hydroporus lineatus*, F., *H. angustatus*, Sturm., and *H. rittula*, Er. On the pavement at Canterbury, one bright sunny day, I took an example of the var. *bimaculatus*, Grav., of *Philonthus varius*. At Deal, on a dead sea-bird, *Dermestes undulatus*, Brahm, was taken, and, on the road between Deal and Walmer, *Aphodius foetens*, F., *A. porcus*, F., and *Adimonia tanaceti*, L. *Psylliodes attenuata*, Koch, was obtained by sweeping, and *Heliopathes gibbus*, F., was plentiful on the sandhills, but I only captured one specimen of *Microzoum tibiale*, F. At Shepherdswell, by sweeping, I obtained *Apion subulatum*, Kirb., *A. ricinum*, Kirby, and at Mickleham, *Apion pubescens*, Kirby. By beating young oaks at Shepherdswell, I took three specimens of *Orchestes avellanae*, Don. *Sibinia primita*, Herbst, turned up singly at Mickleham, and *Gymnetron melanarius*, Germ., at Shepherdswell. *Ceuthorhynchus geographicus*, Goeze, was found sparingly at Deal by sweeping *Echium vulgare*, and of *C. euphorbiae*, Bris., I got one example at Mickleham, also one specimen of *Ceuthorhynchidius rufulus*, Duf., at Deal.—JAMES E. BLACK, F.E.S., Nethercroft, Peebles, N.B. *October 19th*, 1904.

DORYTOMUS MELANOPHTHALMUS, PK.—ERROR IN CATALOGUE.—In our catalogue (Beare and Donisthorpe, *Cat. Brit. Coleoptera*, 1904, p. 40), by a printer's error, we are made to represent that only the var. *agnathus*, Boh., of *Dorytomus melanophthalmus*, Pk., occurs in Britain, and not the type. The "v." should have been placed in front of *agnathus*, and not on the line above. *D. melanophthalmus* is, of course, British, as well as its var. There is a long series in the "Power" collection taken by that collector at Esher, and I have a specimen which I took at Shortlands on June 14th, 1890. *D. melanophthalmus* may be known from *D. pectoralis* by its longer rostrum, which is bent and rounded for its whole length. The var. *agnathus* has the suture of the elytra dark.—HORACE DONISTHORPE. *November 1st*, 1904.

COLEOPTERA IN SUSSEX.—On May 25th this year, Mr. Donisthorpe and myself had a trip to Ditchling, Sussex, in quest of *Dyschirius politus*, Dj. The day was ideal, and we started for our locality, which was a large sand-pit, with great expectations. We soon settled down to work, breaking up the lumps of sand near burrows made by *Bledius opacus*, in which place I had before taken it. Soon we had our first capture, which was followed by others, until we each had enough for our series. While at work, we came across a few other species, some of which are rather unusual, so I have added a short account of them. *Bembidium femoratum* and *B. littorale* were plentiful in the sand, with a few *Harpalus rupicornis*, *Pterostichus madidus*, etc.; *Aleochara cuniculorum* was in fair quantity in rabbit-burrows, where *Lestera longelytrata*

also occurred, the latter, of course, was also flying about, and settling anywhere; *Bledius opacus* was very profuse in the sand, which no doubt accounted for our *Dyschirius* being fairly abundant. We had the good fortune to secure one *Saprinus virescens*, which had a good try to escape from us, but without success; one *Lacon murinus* was taken, the only one I have yet seen in the district. *Plagiogonus arenarius* was about at the rabbit dung, accompanied by common *Aphodii: Stenus subaeneus* and *Cercyon unipunctatus* occurred very sparingly. Of the commoner species the following were taken:—*Trechus minutus*, *Demetrias atricapillus*, *Drusilla canaliculata*, *Homalota depressa*, the two common *Tachypori*, of course, were present; *Quedius rufipes*, *Ocypus olens*, *Philonthus politus* and *varius*, *Xantholinus longiventris*, in the sand; *Paederus littoralis*, *Stenus similis*, *Mycetoporus lepidus* and *claricornis*, *Clambus armadillo*, *Agathidium marginatum*, *Cholera cisteloides*, two or three in rabbit-burrows; *Micraspis* 16-*punctata*, *Corticaria elongata*, *Telephorus lividus* and *bicolor*, on wing, settling on sand, etc.; *Chaetocnema hortensis*, *Plectroscelis concinna*, *Apion miniatum*, *Hypera nigrirostris*, and *Metabletus obscuroguttatus*, the latter fairly plentiful. No doubt more species were to be had there, but we only had two or three hours to spare before returning to London.—HEREWARD DOLLMAN, Hove House, 14, Newton Grove, Bedford Park.

COLEOPTERA IN SUSSEX, 1904.—The following captures of coleoptera during the past season may prove interesting. I took an example of *Oxypoda spectabilis* in April, crawling down a rabbit-burrow in a sand-pit, at Ditchling; one *Cilea silphoides* beaten from "sallow" in same locality, in early September; one *Cychrus rostratus* from moss, in April, at Ditchling, in fact from moss off Ditchling Beacon itself; two or three *Taphria nivalis* in September, from moss at same locality; *Stilicus subtilis* fairly common in moss in spring and autumn, at Ditchling.—IBID.

LARVÆ AND OVA OF COLEOPTERA WANTED.—Will coleopterists who find any larvæ or pupæ of coleoptera which they do not require let me have them for figuring purposes? Also any ova which are not wanted would be most useful, as I wish to illustrate the metamorphosis of every species I can obtain. I will do my best in return in coleopterous imagines.—IBID. [We trust that any entomologists who can help in this direction will do so. It is really most desirable to have a coleopterist who is also an excellent artist, depicting the early stages of our coleopterous fauna.—ED.]

COLEOPTERA IN THE NEW FOREST IN 1904.—I have already recorded the species of coleoptera I took in the New Forest in May (*Ent. Rec.*, 1904, p. 245), and, having visited the Forest twice since, *i.e.*, four days in July and the whole of August, when I made my head-quarters at Lyndhurst, I now record the better species taken on these latter occasions. *Taphria nivalis* occurred at the roots of a "Cossus" tree, and *Notiophilus rufipes* was found on several occasions among dead leaves. In a small pool of water in the sand-pit at Brockenhurst, *Hydroporus flavipes*, *Hydraena testacea*, *Paracymus nigroaeneus* and *Hydrochus angustatus*, were fished out. *Tachyporus humerosus*, *Ocypus compressus*, *Myllaena kraatzii*, and a nice series of *Quedius nigriceps* were shaken out of moss. *Mycetoporus claricornis* was swept under beech-trees, and *Megarthrus hemipterus* was found in putrid fungi. Four specimens of the rare *Quedius ventralis* were taken by sifting very damp

wood-mould dug out of the hollows of beech-trees. *Staphylinus caesareus* and *S. stercorarius* were taken on roads. In the Clavicornia, *Diplocoelus fagi*, *Ditoma crenata*, and *Pediacus dermestoides* were taken under beech-bark, and the latter was also bred from pupæ taken in the same way. *Synchita juglandis* was swept under beech-trees. A "Cossus" tree yielded *Cryptarcha strigata*, *Ips 4-guttatus*, *Epuraea 10-guttata*, *Thamiaraea cinnamomea* and *Quedius mesomelinus*. My little boy found a nest of *Bombus muscorum*, near Lyndhurst, the comb was in a hollow in the ground and was covered over with bits of cut-up leaves and grass; this I dug up, not without a few stings, and out of it I took eight specimens of *Cryptophagus setulosus* (Fowler records it with *Bombus lucorum*), *Cholera watsoni*, *Bryaxis fossulata*, *Othius myrmecophilus* and *Antherophagus silaceus*, of the latter Fowler writes "probably associated with *Bombi*," so it was interesting actually taking it in the nest of a *Bombus*. The other two British species have also been taken with *Bombi*. A specimen of *Geotrupes pyrenaeus* was taken on the wing near Matley Bog. One of my best captures was a specimen of *Trachys troglodytes*, which I took out of *Sphagnum* in July, in the same place where I took *Trachys parvulus* and *Paederus caligatus* earlier in the year. *Dorcatoma chrysomelina* was taken out of rotten oak, in company, as is often the case, with *Mycetophagus piceus*. *Cis nitidus* was taken in plenty in a dry fungus, and *C. hispidus* occurred under beech-bark. In the Longicornia, a nice pair of *Strangalia 4-fasciata* was taken off *Spiraea ulmaria* in July, and I found the largest specimen of *Prionus coriarius* I have ever seen near Lyndhurst, in August, at the base of a stack of cord wood. Of the Chrysomelids, *Galeruca viburni* was plentiful all over the Forest wherever the guelder-rose occurred, and *Phaedon armoraciae* was swept in some numbers off *Polygonum* in a damp spot. *Crepidodera transversa* and *C. ferruginea* were swept in Matley Bog *in cop.* It is always of interest to record cases where different species are found *in cop.* in nature. The same two species were recorded as being taken *in cop.* at Chat Moss, by T. Morley (*Ent. Mo. Mag.*, 1881, p. 135). Of the Curculionids my best capture was *Nanophyes gracilis*, of which rare and very local beetle I swept a nice series, in company with plenty of *Phytobius waltoni* and the *Phaedon armoraciae* before mentioned. *Ceuthorhynchus cricae* was not uncommon on heath, as was *Orchestes iota* on *Myrica gale*. *Orchestes quercus*, *O. avellanae*, and *O. ilicis* swarmed on oak, and I beat one specimen of the very rare *O. sparsus* at Brockenhurst. A visit to Parley Heath, where Mr. Verrall, who was staying at Ringwood, took me on his motor-car, procured *Pissodes notatus*, swept off young pines, a new locality for this species. — HORACE DONISTHORPE, F.Z.S., F.E.S., 58, Kensington Mansions, South Kensington, S.W.

COLEOPTERA IN THE HASTINGS DISTRICT. — A few excursions early in the year, near Rye, yielded a few species worth recording, those marked * not having been previously recorded from the district. *Diglotta submarina** in some small numbers, running on the mud and under small shells and pieces of rubbish. *Bledius bicornis** and *B. arenarius** (dark form) common, *B. fracticornis**, *Actobius signaticornis*, and *Limnichus pygmaeus*. On June 2nd, Mr. Donisthorpe came down to take the two first-mentioned species, and besides these, which were plentiful, we took *Bledius crassicollis* and *B. unicornis*, *Hygrobates propinquus*, *Stenus geniculatus* and *S. canaliculatus*, *Platystethus cornutus*, *Trogo-*

phlœus elongatulus, etc. *Cillenus lateralis* was dug out of the burrows of *Bledius bicornis*, on which it was no doubt preying.—W. H. Bennett, F.E.S., 15, Wellington Place, Hastings. *November 18th*, 1904.

SCIENTIFIC NOTES AND OBSERVATIONS.

Stridulation of the male of Euprepia pudica.—The male of *Euprepia pudica* is capable of making a shrill whirring noise, very much like that made by a certain alpine grasshopper, but more regular and continuous. When out at night (in September) I have often heard this noise, but have, until recently, put it down to some nocturnal grasshopper or flying cricket. A few nights ago, however, I was out, and one of these supposed grasshoppers came flying round me, apparently attracted by the light. It had a whitish moth-like look, and I struck at it with my net, but missed it once or twice. It came back presently, whirring away as usual, and this time I caught it, and was very much astonished to find a ♂ *E. pudica* in my net. Thinking I might have taken the *E. pudica* accidentally and missed the grasshopper, I caught several more as they came whirring round, and, in every case, found them to be ♂ *E. pudica*, and some even went on stridulating in the net for some seconds after being caught. In one place three or four were observed flying round together, making a great noise. I stayed at the place about fifteen minutes and caught two of the moths. Evidently there must have been a ♀ not far away. The noise can be heard about seventy mètres away, if not more, and is kept up for thirty seconds or more at a time, while the moth is flying, but, so far as I can make out, the moth can stop it and still continue to fly, so that it is not made by the beating of the wings alone. I examined them when I got home and found a glassy-looking apparatus at the base of the thorax beneath, on each side. The appendage is not unlike French gelatine in thin sheet, or mica, and is crackling to touch. If the moth be taken between the finger and thumb, and the thorax pinched, a crackling sound is produced, but it is not nearly so loud as that made by the moth when flying, which is certainly a loud one and very penetrating. I do not think the frenulum arrangement can have anything to do with the production of the sound, but it may, although I should rather think that the legs may be rubbed against the glossy drums, or the abdomen moved up and down, so squeezing and releasing them alternately. I did not keep a moth alive, which I ought to have done, in order the better to observe it; if I get any more I will not kill them.—H. Powell, 1, Rue Mireille, Hyères.

British specimens of Hydrotaea wanted.—I propose to publish as soon as possible an account of the British species of *Hydrotaea* (Diptera—Fam. *Anthomyiidae*), and would be grateful if readers of this magazine would send me for examination any specimens belonging to this genus which happen to be in their possession. All help in this way will be fully acknowledged and the material returned *labelled with specific names*, as soon as practicable.—Percy H. Grimshaw, F.E.S., Royal Scottish Museum, Edinburgh.

VARIATION.

On variation in the larva of Orgyia antiqua.—With reference to Dr. Chapman's "query concerning the variation of the larva of *Orgyia*

antiqua," appearing in your issue of the 15th inst., I may state that, on July 24th, I took in our garden at Upper Clapton, upon a twig of aspen, a larva much larger and much paler than any *O. antiqua* that I had before taken, and the lateral tuft was also absent. It spun up on the following day, and, on August 3rd, a female emerged. On August 6th I took another on the trunk of the aspen-tree, and this one also spun up on the following day, so I had no opportunity of comparing them with any authentic work. This one pupated, but was parasitised by a Dipteron. The pupæ were much larger and conspicuously broader than those of any *O. antiqua* that I have before bred. I also took a similar pupa from the bark of the same tree, but unfortunately injured it. As I had a male *O. antiqua* emerge on August 5th, I put it with the female, and it mated at once. I have several eggs, and should I be successful in obtaining any larvæ therefrom without the lateral tufts, I will report on the matter.—Edward Harris, F.E.S., 2, Chardmore Road, Upper Clapton, N. *October 31st*, 1904.

Note on Aplecta nebulosa ab. robsoni, Collins.—I was pleased to see your note supporting the claim of *Aplecta nebulosa* ab. *robsoni*, also Mr. Porritt's protest against Mr. Arkle renaming this fine melanic form. Mr. Arkle asked me in June last for information about my type of *robsoni*, but I must confess I took no steps to prevent him renaming the aberration. At the Lancashire and Cheshire Society's exhibition in October, 1903, no fewer than five lepidopterists (Messrs. Crabtree, Johnson, Tait, Wallington, and myself) exhibited melanic specimens of this species, slightly variable in the matter of fringes—grey to ochreous-white—all of which were included by the exhibitors, and I think rightly, under the term *robsoni*. The present year appears to have been a specially good one for them, some twenty examples being then exhibited. There is, of course, a slight difference between grey- and ochreous-fringed specimens, but surely not sufficient to warrant naming them, and it does not seem wise to rename as new an aberration that had been already worked up a dozen years ago. It is most unfortunate that, when the form was named, the full description of the insect, as read at the meeting of the Lancashire and Cheshire Society, on October 12th, 1891, was not published. The paper that I then read recited how Acton and myself had taken the larvæ in Delamere Forest, that both of us had bred melanic specimens, the percentage of the melanic forms, &c. The five specimens exhibited and dealt with were not exactly alike, as they varied in intensity, one example showing the stigmata distinctly greyish-white, whilst those of the others were more obscured, and merged into the blackish ground colour; I also made an important point of the fringes, which I noted as "pale greyish-white." The description I read was as follows: "Anterior wings—ground colour rich black, orbicular and reniform stigmata greyish, in some specimens more or less obscured and merging into the blackish ground colour; a grey shade preceding the subterminal line; a series of three white dots on the costa; fringes pale greyish-white. Posterior wings—dark grey, lunule imperceptible. Head, thorax, and body somewhat of the tint of the hindwings, dark grey in colour; the thoracic lobes pale grey." I further noted the minor variation of the specimens, and that, whilst four of my examples had pale greyish-white fringes, the other specimens had them also white-margined.—Joseph Collins, 10, Pierpont Street, Warrington. *November 10th*, 1904.

NOTES ON COLLECTING, Etc.

MANDUCA (ACHERONTIA) ATROPOS AT CHICHESTER.—The larvæ of *Manduca* (*Acherontia*) *atropos* have been found not uncommonly in this district this year. The first noticed in my diary is July 29th. Others were found on August 1st, 2nd, 3rd, 6th and 8th, the last date for the larvæ being on the 22nd of that month. A pupa was dug up and brought me from a potato patch, on September 15th. I have no record of the imagines.—JOSEPH ANDERSON, Alre Villa, Chichester. *October 14th*, 1904.

COLIAS EDUSA AT CHICHESTER.—Several specimens of this butterfly have been noticed here, the first being a ♀ taken by my brother, Mr. Frederick Anderson, in a clover-field, on August 3rd, and a ♂ on August 9th. Unfortunately the weather changed in the middle of the month, becoming windy and cool, with heavy rain on some days, preventing, in all probability, what might have otherwise been an "*edusa* year."—IBID.

LEPIDOPTEROLOGICAL NOTES FROM STE. MAXIME, VAR, FRANCE.—After staying a further three weeks at Hyères (see *anteà*, pp. 160-161), during which little was observed requiring notice, I came on here on April 18th, staying till the end of the month. On the night of the 18th there was half a hurricane of wind, with a severe thunderstorm, and the weather, until the last day or two, was frequently dull and cool—excellent for getting about, but not giving those beautiful effects that depend here so much on the bright sunshine, nor supplying suitable weather for insects showing themselves freely. Ste. Maxime is on the coast, about three-fourths of the way from Hyères to St. Raphäel—not on the main line, but on the Sud de France railway. It differs a good deal from Hyères in its productions, much to the advantage of Hyères, I thought, at least during the first dull period, and I am still inclined to think this is so, though there are very probably some things wanting at Hyères. In the first place it seems to be some week or so later in season. It has no limestone, so far as I could see or learn. Yet, on April 30th, in one small spot in a thick pine wood, a most unlikely-looking place, I saw several *Polyommatus eorydon*, and took a pair for verification. No others were seen anywhere during my stay. Nowhere is there any *Asphodelus*, any *Dorycnium*, or any *Biscutella*. *Euchloë euphenoides* was not once seen. The grasses that Mr. Powell points out at Hyères as those affording larvæ of the Satyrids most freely, are not absent, but exceedingly rare, quite contrary to what they are at Hyères. There are, however, plenty of grasses of sorts, so that there are probably plenty of Satyrids, but of few (and common ?) species. No trace, of course, of *Thestor ballus* or its foodplant. *Thais polyxena* (*cassandra*) was seen in many different spots, but worn. No *T. medesicaste* were noted. The reigning Pierid, if we except, perhaps, *Pieris brassicae*, is *Pontia daplidice*, with *Pieris rapae* a good third. *Anthocaris belia* was also fairly common, but worn. On the 24th, I saw *Cyaniris argiolus* laying her eggs on flower-buds of *Cytisus junceus*, *i.e.*, on shoots which had as yet only a few flowers open. The first *Melitaea didyma* here was seen on this date, as also *Nomiades cyllarus*, which is rare, and *N. melanops* was not seen. On the 28th, the first *Pararge maera* was seen and captured, and, on the 29th, *Aporia crataegi*, a ♂, was taken; on the 30th, *Colias edusa* was common, but *C. hyale*

was not seen. One only was seen at Hyères, and as it was not taken it *might* have been *C.* var. *helice*. *Melitaea phoebe* was first taken April 28th. *Hemaris tityus* (*bombyliformis*) seems to be quite common here; an effort to see it oviposit proved a failure, but the only *H. fuciformis* seen was observed to lay eggs on April 30th. As regards egg-laying, I was able here to follow up an observation on *Gonepteryx cleopatra*, which is very abundant at Ste. Maxime, that I had believed I had made at Hyères and elsewhere, which amounts simply to this, that the ♀ butterfly finds her foodplant first by sight, or rather makes her first step towards finding it in that way. She very frequently flies straight up to a bush of *Phyllyrea*, evergreen-oak, or other plant, that happens to have some resemblance in growth and shape of leaves to the *Rhamnus*, and she flies round this and dodges under it for some little time before she is quite satisfied that it is not only not *Rhamnus*, but that it does not hide and protect some small piece of that plant. When, however, her choice by sight is correct, she at once proceeds to some suitable portion of the plant, and, after a selection, not always at first successful, by some more accurate sense, lays her eggs, only one at once, but often several on the same bush, and if *Rhamnus* is scarce just there, she may return and lay one or two more. After seeing how frequently she goes straight up to a bush that is not only not *Rhamnus*, but has no portion of *Rhamnus* amongst, under, or near it, I have felt it impossible to explain her procedure on any other hypothesis than sight. This seems less difficult to believe when we observe how *Euchloë cardamines*, *Pontia daplidice*, *E. euphenoides*, etc., all lay their eggs where they have first been attracted by the flowers, though it does happen that this is not always so, since, for instance, Mr. Sheldon and I found eggs of *Anthocaris belia* laid abundantly on heads of *Biscutella didyma*, which were difficult to find, since they had only unopened buds, still, as we found them, so also the butterfly may have done so, by sight, and not by any other sense.—T. A. CHAPMAN, M.D., Reigate.

BUTTERFLY-HUNTING IN SWITZERLAND.—On June 18th my wife and I arrived at Brigue, having travelled straight through from Newhaven, and a few notes of the insects taken may possibly be of interest to English collectors in Switzerland, as they usually go there later in the season. In the afternoon, a short stroll to a stone quarry introduced us to *Syntomis phegea*, which was just emerging, and was to be found, both ♂ and ♀, settled on the wormwood bushes, and a nice series was taken. *Anthrocera purpuralis*, *A. filipendulae* and *A. lonicerae*, were also on the wing, but were not plentiful. Among the chestnut-trees—which were in bloom and very attractive to butterflies—a few *Polygonia c-album* were met with, but were not in good condition, while specimens of *Melitaea didyma*, *M. athalia* and *M. dictynna*, were also taken. On June 20th, we went to Bérisal in high hopes, as this locality is so often mentioned by Mr. Wheeler in his valuable book as the home of good things, but, although the weather was perfect, the insects were rather disappointing, being by no means plentiful on the way up—*Melitaea phoebe* and *Erebia ligea* only appearing as solitary specimens. In a meadow at the back of the hotel, *Parnassius mnemosyne* was swarming, and a nice series was taken, it being the first time I had met with this species. On June 21st, we went up the pretty road towards Bel-Alp, but, owing to a late start and the intense heat, did

not get much beyond Platten. Insects, though not very plentiful, were interesting, and one *Limenitis camilla*, *Hipparchia alcyone*, *Satyrus actaea* var. *cordula* and *Eugonia polychlorus*, fell to the net, with one very dark specimen of *Lycaena arion*—the only one seen on our trip. *Erebia ceto*, *E. ligea* and *Brenthis dia*, were also taken, and one each of *Chrysophanus* var. *gordius*, *Melitaea phoebe* and *M. parthenie*. On June 22nd, we walked from Brigue down to Visp, most of the road being shadeless and the heat like a baker's oven. In one meadow were thousands of *Anthrocera carniolica* in good condition, but, with the exception of a solitary specimen on the Bel-Alp road, this was the only time we met with it. Near Visp a specimen of *Papilio podalirius* was taken, and another was haunting the platform at Visp station, in the aggravating manner that butterflies have when they know the net is packed up, or see you wearing a top hat. From June 23rd to 29th, we stayed at the Hotel Riederalp (6315ft.). This appears to be a very good collecting-ground, as the meadows were full of flowers and insects. The *Gentiana acaulis* were over except on the higher slopes, showing that the season was an early one, but the beautiful *G. bavarica* was at its best in the swampy places, and eight species of orchids were gathered in one meadow. A walk to the top of the Riederberg (7343ft.) gave us a magnificent view of the Mont Blanc range, Matterhorn, &c., in fact almost as fine as from the summit of the Eggishorn. On the top, two or three specimens of *Oeneis aello* were taken, along with *Argynnis lathonia*, while *Papilio machaon* was flying in its usual vigorous fashion. In the meadows *Coenonympha arcania* var. *darwiniana* was common, along with *Hesperia carthami*, *Erebia epiphron*, a few *E. melampus*, *E. lappona*, and a single specimen of *E. tyndarus*. The *E. epiphron* are the var. *cassiope*, and would be hard to pick out from a series which I took on Ben Cruachan, near Loch Awe. I note that Mr. Wheeler says the true *epiphron* does not occur in Switzerland. We moved on June 27th to the Jungfrau Hotel, Eggishorn (7195ft.), which is ably managed by M. Cathrein. On June 28th, I captured my first specimen of *Colias palaeno*, a ♂, in perfect condition, and hard work on very rough ground during the next four or five days produced a nice series of both ♂ and ♀, the latter, however, being scarce. *Colias phicomone* was not met with until June 30th, when a nice series was taken near Riederalp, where they were certainly not flying a few days previously. Some nice aberrations of *Parasemia plantaginis* were also taken in the meadows, one having the yellow of lower wings replaced by pure white. The ascent of the Eggishorn (9625ft.) was made on a perfect day, and the view from the summit was superb. A good deal of snow was left in places, and on the top three specimens of *Pieris callidice* were taken flying over the snow. I had taken this species last year on the summit of Mont Saxe, and found it a difficult insect to net on a windy day. What I did not expect to see was *Sesia stellatarum*, which was buzzing about not far from the top. *Brenthis pales* was very plentiful on the mountain slopes, along with a few *Melitaea aurinia* var. *merope*, much smaller and darker than any English specimens I have seen. *Hesperia cacaliae* and *H. carthami* were met with, and odd specimens of *Erebia melampus*, *E. gorge*, *E. manstra* and *Chrysophanus hippothoë*. July was devoted to an excursion to the Concordia Hut, and the net was laid aside, as the soft state of the snow on the glacier gave all the exercise

that was needed, and a net is a poor tool in a crevasse. *Pieris napi* var. *bryoniae*, *Polyommatus donzelii*, *P. astrarche* ab. *alpina* and *Adscita geryon*, were included in the Eggishorn bag, and no doubt another week or so would have added largely to the number of species on the wing, as we were early for such an altitude. Between Fiesch and Brigue, *Pontia daplidice*, *Melitaea phoebe*, *Thymelicus thaumas*, *T. lineola* and *Parnassius apollo* were taken, and one or two *Satyrus actaea* var. *cordula*, but a high wind made the latter difficult to catch. A most enjoyable holiday ended at Brigue station, and to anyone requiring absolute quiet and rest, undisturbed by even a cow-bell, the Riederalp and Hôtel Jungfrau can be strongly recommended. I am indebted to the kindness of friends for the naming of some of the more difficult species. If anyone can inform me where a copy of Kane's *Handbook* can be obtained, I shall be duly grateful.—Douglas H. Pearson, Chilwell House, Chilwell, Notts. *September* 21*st*, 1904.

Sphinx ligustri in the London district.—In the *Ent. Rec.*, xvi., p. 266, Mr. C. Pickett notes *Sphinx ligustri* at Raynes Park, and remarks on the nearness of the locality to London. Reference to one of the much-abused lists in *British Lepidoptera*, iv., pp. 327-328, shows a large number of London localities—"Hackney, Holloway, Stoke Newington, Chiswick, Bedford Park, Chelsea, Tottenham, Ealing, Shepherd's Bush, Kilburn, St. John's Wood, Hammersmith, Fulham, Hyde Park (the Marble Arch), Bethnal Green." On the other side of the water—"Rotherhithe, Brockley, Lewisham, Dulwich, Sydenham, &c.," are well in the London district, and so are "Wandsworth and Streatham." No doubt the old London localities are being destroyed by building operations, but it would appear that *Sphinx ligustri* is still well distributed in the London area.—J. W. Tutt.

Lepidoptera in Kincardineshire.—The season here has proved to be fairly good. Sugar worked very well during July, but during August it had no attraction whatever. I spent these two months, or rather the evenings of them, at Blackhall, on the western border of Kincardineshire. The district is thickly wooded, chiefly with birch, Scots fir, and oak. During the time we were there the weather was perfect, there was only one evening that would have been considered too wet for collecting. I had little time for day-work, consequently got few butterflies, although a second brood of *Pieris napi* produced some nice dark aberrations among the females. A second brood of *P. rapae* also showed a few strikingly yellow females. *Brenthis selene*, abundant; *Argynnis aglaia*, common, females very dark. *Anthrocera filipendulae* occurred on a moor near the bridge of Bogendreep, away from the coast; this insect with us is certainly extremely local. *Hepialus hectus* swarmed among the bracken; the males varied considerably in the number, size and shape of the golden spots. *H. velleda* abundant, and the ab. *carnus* occurred occasionally. *Trichiura crataegi*, a few full-fed larvæ on heather; larvæ of *Lasiocampa quercus* var. *callunae* was also common on the moors and on the hills up to nearly 2000ft. Larvæ of *Saturnia pavonia* also occurred with those of *L.* var. *callunae*, but they were not so common. Among the Geometrids the following were the chief captures:—*Ellopia fasciaria*, common in all the firwoods, not variable; *Amphidasys betularia*, one ♀ at rest, on the banks of the Dee, a nice intermediate between type and the ab. *doubledayaria*: *Boarmia repandata*, a long series of grey forms

approaching var. *sodorensium* ; *Dasydia obfuscata*, scarce on the higher moors, an ordinary typical grey form ; *Geometra papilionaria*, scarce in the birch wood along the Blackhall road ; *Zonosoma pendularia*, scarce ; *Venusia cambricaria*, abundant, all of the ordinary pale form ; *Bupalus piniaria*, abundant in fir woods, the males showed the usual pure white ground-colour which is characteristic of our northern race ; *Fidonia pinetaria* was discovered among bilberry, just as it was going over, this insect is always excessively local in these parts ; *Larentia caesiata* was abundant, and proved to be a most interesting insect on account of the great range of variation which it showed. I captured some lovely melanic forms, quite black, whilst one or two others were found exhibiting melanochroism in a remarkable degree, and one specimen had the ground-colour of the forewings creamy, with a deep black band, like a specimen of *Melanthia ocellata*, besides which, many curious mottled forms occurred ; *Larentia salicata*, common, but local ; *L. olivata*, abundant, but, as usual, difficult to get in good condition ; *Emmelesia alchemillata* was scarce ; *E. albulata*, common, a very ordinary form, showing no variation at all ; *E. ericetata*, also scarce ; *Eupithecia subfulvata*, not uncommon at ragwort-flowers, all were var. *oxydata* without the fulvous patch ; *E. satyrata* var. *callunaria*, common ; *E. lariciata*, *E. nanata*, *E. vulgata* and *E. pumilata*, also common ; *E. sobrinata* was abundant among juniper in the woods, and some nice melanic forms were secured ; *E. rectangulata* was represented by a single specimen found at rest on the bridge of Dee ; *Thera variata* swarmed, and was variable, and although dark forms occurred, none of them approached the black Paisley race ; *Hypsipetes elutata* also swarmed, and was most variable, ranging from very pale green, through reddish, to black forms ; *Coremia munitata*, common, and of the ordinary lowland typical race ; *C. propugnata*, scarce, a small poor form ; *Camptogramma bilineata*, abundant, a very ordinary lot, showing little or no variation ; *Cidaria russata*, common, and only varied slightly, the majority were of the usual dark form ; *C. immanata* was abundant on ragwort-flowers, appearing after *C. russata* was going over, this was another most interesting insect, it showed extraordinary variation in a most striking manner, from nearly white to black forms ; *C. testata*, common, all were dark and a few nearly black aberrations occurred ; *C. populata*, abundant, dark unicolorous forms occasionally among typical specimens ; *C. pyraliata*, common, a rather large form showing no variation ; *Eubolia palumbaria* swarmed, a darker race than the southern form ; *Anaitis plagiata*, scarce, and did not appear to vary ; *Thyatira batis*, common at sugar ; *Cymatophora duplaris*, common, and, as usual, came freely to sugar after they were getting worn ; *Acronicta leporina*, scarce, all were of the typical grey northern form ; *Pharetra rumicis*, a few at sugar, this insect is rather scarce here ; *Cuspidia menyanthidis* and *Arctomyscis* var. *myricae* were common as larvæ, the former on heather on the moors, and the latter by the roadsides, feeding generally on low plants, but chiefly on sorrel and plantain ; *Charaeas graminis*, common and variable on ragwort ; *Celaena haworthii*, also common on ragwort ; *Rusina tenebrosa*, abundant ; *Lycophotia strigula* (*porphyrea*), common ; *Triphaena comes* (*orbona*) ab. *curtisii*, several very fine forms on ragwort ; *Noctua glareosa*, common ; *N. sobrina*, scarce ; *N. neglecta*, scarce at heather-bloom ; *Orthosia suspecta*, common ; *Citria flarago* (*silago*), common ; *Polia*

chi, common, all were pale and typical; *Aplecta herbida* and *A. occulta* were scarce, and of *A. tincta*, one only; *Hadena adusta*, *H. thalassina* and *Hyppa rectilinea*, common, but getting over before we arrived; *Lithomia solidaginis* was common, and *Anarta myrtilli* abundant, whilst of *Plusia bractea*, several occurred at flowers; *P. c-aureum* was scarce, and *P. interrogationis* abundant, but difficult to catch flying in the afternoon sun on the higher moors. No doubt the list of Noctuids taken would have been greatly augmented had sugar proved attractive in August, which is usually the best month for it here. I did not work systematically among the micros, but dabbled among them occasionally. Probably the best captures in this group were a few fine large *Crambus myellus*.—ARTHUR HORNE, F.E.S., Aberdeen. *September* 12*th*, 1904.

LEPIDOPTERA IN CHESHIRE.—There is little of interest to report entomologically, except that sugar has been fairly attractive for the last two months, although nothing out of the common has come my way, I took a few *Noctua dahlii* and *N. glareosa* at Delamere Forest, on August 29th. Here, however, insects appeared to prefer the blossoms of ling to sugar. *Anchocelis rufina*, *A. pistacina*, *A. litura*, *Agriopis aprilina*, *Orthosia macilenta* and *Hadena protea*, have been unusually plentiful. The latter species put in an appearance at the end of August, and is still in evidence and in good condition.—G. O. DAY, F.E.S., Knutsford. *October* 3*rd*, 1904.

LEPIDOPTERA AT CASTLE MORETON.—During the last week in July and first fortnight in August, both light and sugar proved fairly good, but since then both have proved almost total failures, the latter, however, more so than the former, as, occasionally, solitary specimens have come to light in the house. With regard to particular species, *Cavadrina morpheus*, never a common species here, has been commoner than usual, whilst *Lithosia griseola* and *Abraxas grossulariata* have been unusually abundant, and, among the latter, were a few nice aberrations. I have had two specimens of *Agrius convolvuli* brought to me, one of which was taken in a dairy at the beginning of September, the other in a bed-room at the end of the month.—(REV.) E. C. DOBRÉE FOX, M.A., Castle Moreton, Tewkesbury. *October* 6*th*, 1904.

SCARCITY OF LEPIDOPTERA AT DEAL.—During August I spent a short time at Deal, but collecting was poor. I sugared on the sandhills and took only the commonest Noctuids, and not a great number of these. I did not see a single Agrotid of any kind, which seems remarkable, although, doubtless, I was too late for most of them. I saw two *Colias edusa* on the cliffs between Deal and Dover, but the day was too windy to be good for butterflies. *Polyommatus corydon* was worn out, and *Polyommatus bellargus* (*adonis*) had not arrived. There were a few larvæ of *Sesia stellatarum* to be found by careful searching, although I observed a great absence of the larvæ of the common Sphingids; I saw where one larva of *Sphinx ligustri* had been, but, with that exception, I saw no others of any kind, although I searched many sallow-bushes which ought to have produced *Smerinthus ocellata*.—A. W. MERA, 79, Capel Road, Forest Gate. *October* 17*th*, 1904.

SCARCITY OF LARVÆ IN THE CHISLEHURST DISTRICT.—The season in this district is closing as unsatisfactorily as it opened. Many of the larvæ of the commoner Lithocolletids and Nepticulids, which one expects to obtain just now in hundreds, are only to be found in

very small quantities after a long and careful search. Autumnal macro larvæ have also been very scarce, except those of *Mamestra persicariae*, which have proved a perfect pest in gardens, where no plant, shrub, or tree—except evergreens—has escaped their ravages.—B. A. Bower, Chislehurst. *October* 21*st*, 1904.

Autumnal emergence of Cerura furcula and abundance of Plusia gamma.—I have done so little entomological work this season that I have no matters of interest to note. Out of a brood of *Cerura furcula* that was sleeved out, two imagines emerged in September. I have worked a little for autumnal larvæ in the Norfolk Broads, but have not been successful, nor am I quite certain what the few I have still feeding are, but hope to have something to say of them if I get them through. *Plusia gamma* is unusually abundant here just now, and is very busy among my crocuses whenever the sun shines.—E. A. Bowles, M.A., Waltham Cross. *October* 24*th*, 1904.

Aglais urticæ chased and captured by wagtail.—At the end of July and the beginning of August, this year, I was spending a part of my holiday at Watchet, in north Somerset. One of my favourite walks was along the derelict mineral railway, to the Brendons, through very pretty scenery, and, no doubt, entomologically, one of the best collecting-grounds of the district. On August 1st, my son and I made an extended exploration of this Brendon railway. When we were passing near Cleeve Abbey, we noticed in front of us two birds assiduously pursuing a butterfly, which was dodging and doubling about to elude them. We got as close as we could without unduly disturbing the birds, and found that they were wagtails. One bird practically abandoned the pursuit, but the other was most persistent, and, at last, knocked the butterfly down, but failed to capture it. Upon our going forward to ascertain the species it rose and flew with a somewhat weak flight. The bird at once followed, at first behind, then by the side of the butterfly and level with it, then it curved round in front of it, as if to stop it, but at once dived down under and successfully caught it by the body. We stood still to watch the process further, and saw the bird fly to the iron rail and at once knock off the wings. Apparently the body was eaten as we only found the wings. We identified the species as *Aglais urticae*. There are one or two points which struck me as being particularly interesting. The bird's flight, instead of being in the customary straight or somewhat curved line, was in a very intricate curve, and evidently made with a very definite purpose in view, which was the seizure of the solid body part of the insect and the avoidance of the wings. This very definite method used by the bird proves that it was not a mere attack brought on by curiosity, but the result of experience, which had taught it that the body and not the wings was the desired tit-bit. Most field-entomologists have repeatedly met with detached wings of butterflies and moths. So far as my experience goes, if they are injured it is not by marginal gaps from pieces torn out, apparently by the beaks of birds, but by slits from the base caused by the violent rupture when the body was eaten. The suggestion seems to be that the gaps in the margins are mainly caused during the education of the more or less young birds, and that older birds, having learned where the eatable part is, as a rule go direct for it, yet, however, often hustling and snapping at the intended victim to disable it.—H. J. Turner, F.E.S., 98, Drakefell Road, Hatcham. *October* 28*th*, 1904.

EUPITHECIA INNOTATA, HFN., IN THE ISLE OF WIGHT AND NORTH DEVON.—I had the pleasure of breeding, on June 29th last, a specimen of this very rare (or overlooked) British species, from a larva taken on mugwort (*Artemisia vulgaris*), not far from Sandown, the previous September. It was obtained in exactly the same way as were those taken by Hellins, at Exeter, being beaten out in company with a few *E. absinthiata* and *E. castigata*, when I was working for *E. succenturiata*, and I supposed it (the larva) to be a variety of the first-named. By a curious coincidence, my friend and fellow-worker at "pug" larvæ, Mr. J. Gardner, has also bred a single *E. innotata* this season from an unknown larva taken near Brendon, north Devon, when we were collecting together last August. His larva was on a less orthodox foodplant, namely, *Crepis virens*, but, as the imago is most certainly either *E. innotata* or *E. fraxinata*, I think we are quite safe in recording it as the former—the larva of which has been observed on various flowers abroad.—LOUIS B. PROUT. *November 18th*, 1904.

SIREX JUVENCUS IN LANCASHIRE.—Another good insect captured by Mr. Sopp, and sent to me with the *Z. caerulea* mentioned *anteà*, p. 267, was a splendid ♀ of the above species.—OSCAR WHITTAKER, 39, Clarendon Road, Whalley Range, Manchester. *November 19th*, 1904.

NOTES ON LIFE-HISTORIES, LARVÆ, &c.

PRESERVATION OF COLOUR OF GREEN LARVÆ.—In reply to your correspondent Mr. Bell (*anteà*, p. 268) asking for information on the preservation of green colours in preserved larvæ, the following methods I have found to answer very well. Some larvæ turn more yellow than others after being rolled, due to the green colour being supplied by the internal organs, or the foodplant. When such is the case the green can be renewed with the aid of a fine dry green powder, poured into the larva by the glass-tube which holds it during the stoving operation; this process is greatly assisted by using a fine wire to help the powder through the aperture, which is often very small. When the larva is quite filled up with powder, a little methylated spirit should be poured down the tube to make the powder find its way into all the corners. Another method, and one which I find even more successful than the above, is to preserve and stove the larva, and, while warm, run a little paraffin-wax between the glass-tube and the anal segment; this is to prevent the dye coming out on the external surface. A filler, such as one uses with a fountain-pen, should then be taken, and as much colour (liquid dye) as will fill the larva, poured down the glass-tube, holding the larva on end so as to make it run to the head. Allow this to remain for a minute or two, then drain off. This can be most easily done by making a small hole in the spinneret below the mouth and gently blowing down the tube. Care should be taken to hold a piece of blotting-paper to the hole to catch any liquid which otherwise may run over the larva. Replace in stove for a few seconds to dry. This method works well for larvæ having an uniform green ground colour with no heavy lines or markings. For those which have, I prefer the following method: Roll out and stove as before, wax the anal end, and, while still warm, apply the colour externally by the aid of a fine camel-hair pencil, taking care not to run over any surface not requiring colouring, replace in stove and dry. Use the colours under strength, and repeat until

you get required shade. To ensure success in colouring larvæ use methylated spirit in place of water. This will dissolve, or partially dissolve, any ordinary aniline dye. A few points worth noting are: Always kill in spirits and leave larvæ in as long as possible. Roll out and insert on tube, then inflate to required size, leave for a minute or two, then immerse in spirits until needed. This last process, to remove any substance which may have collected on the skin, and also to take out all possible water. Stove quickly whenever possible, and only use your dyes after the stoving operation. By using methylated spirit throughout, your specimens will have a nice velvety and smooth appearance, free from any greasiness and glossiness; also, the spirit leaves the surface much better, and gives the colour a good hold of the skin. A faint wash of green colour over the ventral surface of almost every larva greatly improves the general appearance of the specimens. If Mr. Bell follows the above methods he will find that greens can be done very well and life-like. Maybe some other reader can further assist in the matter of showing how to preserve the green colours which are so fleeting under the action of heat.—David Rosie, 163, Hampstead Road, Benwell Grove, Newcastle.

Notes on Pygæra anachoreta, Fabr.—From pupæ obtained from the Rhine district, imagines emerged on June 27th, probably early in the morning. Pairing was obtained readily the same evening, moths remaining *in cop.* until the night of the 28th, when they separated, and the ♀s commenced egg-laying almost immediately. Egg.—The egg, which is flat at the base and well rounded, is, when first laid, of a bright purple colour. After a day or so it turns reddish-purple, and is crossed by two transverse bands of a paler colour. These bands have their origin close together on the circumference of the egg, but separate soon, circling round the apex and coming near each other again on the opposite margin. The general appearance, at a casual glance, is that of a horseshoe-like mark. Later on, the egg turns again purple, the bands become indistinct, and, just before emergence, it is of an uniform dull black. Larva.—The first larva emerged on July 9th, and fed up extremely rapidly on *Salix capræa*, the whole larval stage lasting, on an average, from 28 to 30 days. The young larvæ lived in colonies between two spun-together leaves. Later on, however, probably owing to confined quarters, they fed free, only drawing leaves together when about to shed their skins. *First instar:* The young larvæ have a round black head. The body is light chocolate-brown, covered sparsely with fine hairs. The broad, greyish, dorsal band is interrupted on the 4th and 11th segments by the usual black patches and contains three fine stripes of the same colour as the body. *Second instar* (First moult July 15th): Head as before; body deeper chocolate, dorsal band more distinctly yellow, inclined to orange on last segment; black patches slightly elevated, stripes as before. Bordering the dorsal band is a row of yellow tubercles more distinct on anterior segments. There are also slight traces of yellow markings laterally. Bordering the black patch on the 4th segment is a small, white, oblique dash. *Third instar* (moulted July 19th): Head round, shiny black; the colour of the body is still deeper brown; dorsal band light yellow with much more prominent black patches, the anterior one having, on the outside margin on both sides, a small white dot, almost in same line with the bordering row of tubercles. These are now orange in colour, and, on the first two

segments and the posterior one, in connection with the lateral rows, give the appearance of a transverse band across segment. The two lateral rows of tubercles are quite distinct, of an orange colour, the lower row tending to crescent shape; prolegs black; underside of the general body colour. *Fourth instar* (moulted July 24th and 25th): Very similar to last stage. The velvety-black spots are more raised and each contains two very small orange tubercles, corresponding in position with those of the dorsal rows. These are now bordered externally by a row of black spots. The three stripes in dorsal band are very distinct, and so precisely similar to the body colour that, at this stage, one almost gets the impression of four yellow dorsal stripes, instead of brown stripes on a yellow band. The central stripe is bordered by a row of small orange tubercles, slightly posterior to the outer rows of tubercles. Lateral tubercles as before, the upper row being preceded by slight black dashes. *Fifth instar* (moulted July 29th to July 31st): Head black, covered with fine yellowish hairs; body bluish-black, with traces of black dots and dashes. The dorsal band is much lighter in colour, and the black stripes are much interrupted. The main difference from the preceding stage is found in the velvety patches of the 4th and 11th segments, which have become deep red, and have, further, been partially subdivided, so that each now presents the appearance of two conical tufts arising from a common base. The apex of the tufts is tipped with orange. Tubercles as before. The row of black spots bordering dorsal tubercles much increased in size. As the larva approaches full size, there is a great tendency towards indistinctness of marking. PUPATION.—The first larva spun up on August 5th, the majority followed suit on the 8th and 9th, and the final stragglers fed on until the 12th. Actual pupation occurred in from two to three days. The web is of a brownish colour, differing from that of *P. pigra* in this respect, in which species it is quite white. PUPA.—The pupa itself is reddish-brown, much suffused with black. Thorax and wing-cases deep black.—J. MCDUNNOUGH, Berlin, W., Motzstr. 6. *September 18th*, 1904.

LIFE-HISTORY OF PHRYXUS LIVORNICA.—Dr. Chapman's suggestions (*anteà*, pp. 270-1) that the shallow dent in the side of the egg-shell of *Phryxus livornica*, that he received from me, is not the result of an accident, and that the small fragment of another egg-shell may have represented the whole remains of the three other eggs that came into my possession, are both correct. My friend, Major Robertson, when writing his note (*anteà*, p. 271), clearly misunderstood the editorial note (*anteà*, p. 240). The Editor did not suggest that "a life-history" was desired, but merely that "descriptions of the egg and first two instars" were badly wanted to complete our knowledge of the life-history. Major Robertson, although his larva "died young," had, therefore, as good an opportunity as myself of supplying descriptions of the egg (which I know he possessed), the first larval instar, and, unless all his larvæ died in their *first* skin, the second instar also. Fortunately, however, after learning from Mr. Tutt's *Nat. Hist. Brit. Lep.*, vol. iv., that our knowledge was so incomplete, I made detailed notes on the life-history, and hope to publish these presently, unless it turns out that Dr. Crallan, who very kindly sent me my four ova, and made, I believe, various notes himself, has something better to offer.—EUSTACE R. BANKES, M.A., Norden, Corfe Castle. *November 7th*, 1904.

Eggs of Lepidoptera.—On June 1st Mr. Sloper sent some butterfly eggs from Aigle. Unfortunately, by the time Mr. Tutt had received them and forwarded them to me (June 5th) they had hatched. The only notes that could be made were as follows :—

Cupido sebrus.—Three empty shells—two broken too much for description—laid on calyx of a bud (indeterminable). The perfect shell broken by emergence of larva at end opposite to micropyle. Ovum—circular, viewed from above—flattened from above downwards like shallow band-box. Vertical axis ·3mm., horizontal axis ·525mm. Surface honey-combed, giving a rough tuberculated appearance on edge. About four foveæ to ·15mm. Micropyle considerably depressed—in a basin, with very fine reticulations at the bottom. Diameter ·075mm.—circular, with rough edge from reticulations of surface. [Note by Mr. Sloper stating that these were laid on May 31st.]

Colias hyale.—Examined—half ovum, empty shell, pale straw-coloured—flask-shaped without neck. Vertical axis 1·35mm., horizontal axis—at apex ·15mm., at middle ·525mm., at base ·375mm. By calculation from part—8 vertical lines from apex to base, about ·15mm. apart, united by fine transverse lines, parallel and regular, about five lines in each ·15mm. [Too much broken for further description. Note by Mr. Sloper says that it was laid on the morning of June 1st].—W. S. Riding, M.D., Buckerell Lodge, Honiton. *June 5th*, 1904.

Satyrus hermione.—The egg is almost a sphere of just over 1mm. in diameter. Actually the height is $\frac{1}{20}$ greater than the horizontal diameter, and there is a narrowing upwards above the equator that is just detectable. Height 1·1mm., width 1·05mm., base hardly flattened. There are 22 vertical ribs, secondary ribs are too faint to be detected if they exist. The ribs are not very sharp, the furrows are smooth and regular, and about 0·024mm. deep. The micropylar area has various wavy ridges smaller than the ribs, but happens to be somewhat obscured by scales, etc. The surface of the egg is dull opaque, and of a dirty yellowish chalky tint. [♀ captured at Aix-les-Bains, August 23rd, 1900, described September 4th, 1900.]

Acidalia strigaria.—Of typical Geometrid form. Length ·48mm., width ·34mm., thickness ·26mm. at thick end, ·2mm. at thin end, as to the width, or rather the outline when looking down on the egg, the widest part is rather nearer the small end, whence the outline is a regular curve, towards the large end it does not narrow so rapidly, and the end is rather flatter. Remarkable from the boldness and knobbed character of the ribs, the longitudinal ribs are about 20 in number with little or no anastomosis. Each rib is separated from its neighbour by a distinct groove faintly marked by secondary ribs. The secondary ribs are, however, strongly illustrated by each having on the primary rib a distinct knob or mammilla, of which there are 15 or 16 on the length of the rib. At the thick end, and similarly, but less strongly, at the small end, these mammillæ are very large. The arrangement is not dissimilar to that on the egg of *A. immorata, viz.*, arranged in an engine-turned pattern. Above the last knob on a rib, the next knob occurs in an interspace (supposing the line of the rib continued) the next alternate again with these, so that they are arranged on a square pattern, to the extent of four or five rows, centrally they are smaller, more irregular

and subside to a sort of network. The larger outer knobs are hemispherical projections, with minute apical processes, the knobs have a faint square network connecting them. Micropyle not made out. The colour is orange with red spots. [Eggs laid August 23rd, 1900, by ♀ taken at Aix-les-Bains, described September 4th, 1900.]—T. A. Chapman.

CURRENT NOTES.

In the *Societas Entomologica*, xix., p. 115, Neuburger describes a new variety of *Acidalia immutata* from the Lebanon mountains. He names it var. *syriacata*.

We greatly regret to note the death of Mr. John W. Carter, of Bradford, recently. Mr. Carter has been an almost lifelong lepidopterist, and was 76 years of age at the time of his decease.

At a recent meeting of the Entomological Society of London, Dr. T. A. Chapman exhibited for Mr. Hugh Main, a specimen of *Arctia caja*, bred this year, which he said was a teratological specimen such as he had never seen or met with, or, so far as he could recollect at the moment, had ever heard or read of. The insect had a three-fold hindwing on the left side, not three wings of more or less imperfect development, as is not a very rare malformation, but the wing was at first glance a normal wing, and, so far as the costa was concerned, was apparently quite normal. Immediately below the costa, however, the wing divided into three layers, each of which was apparently a normal wing so far as form, colour, and markings went, but which, when the insect was alive, were so closely applied to each other as to look like one normal wing, till, by blowing between them or in some other way, they were separated. The larval and pupal skins had not been preserved with it. Mr. Main was placing the specimen in the teratological collection in the British Museum, South Kensington.

On the evening of November 10th a party of entomologists was invited by Mr. H. Rowland Brown, one of the popular Secretaries of the Entomological Society of London, and Mr. A. H. Jones, the newly-appointed Treasurer, to dine with them at the Savage Club. Among those present were Professor E. B. Poulton, Dr. F. Dixey, Lieut.-Colonel C. T. Bingham, Colonel J. W. Yerbury, the Rev. F. D. Morice, Commander J. J. Walker, Messrs. M. Burr, A. J. Chitty, J. Collin, H. St. J. K. Donisthorpe, H. H. C. J. Druce, M. Jacoby, A. H. Jones, W. Lucas, J. W. Tutt, and G. H. Verrall. The bonds of good fellowship existing between the Fellows of the Entomological Society have possibly never been so marked as at the present time, and the suppers given by the members of the Entomological Club, and occasional dinners by the leading Fellows, must do much to promote a sympathetic and friendly feeling among those who, working at the same subject, and sometimes holding diametrically opposite opinions, learn to respect each other's point of view, and criticise fairly and without acerbity the work of those who may differ widely from them. Besides which, such meetings encourage the formation of personal friendships between men of similar tastes and pursuits, which must go far to push on the scientific study of our subject, by a friendly combination of labour, or by the free interchange of opinion and criticism during the time that work is in hand, and before publication takes place. An excellent

dinner was served, and, thanks to the hosts, a most happy and enjoyable evening was spent.

Miss Mary E. Murtfeldt gives (*Can. Ent.*, xxxvi., p. 334) an account of *Eucnaemidophorus rhododactylus* found on roses in the gardens around St. Louis, U.S.A. She seems to accept it without question as an introduced species, and adds the remarkable statement to her description of the pupa, that "it is held in position by a fine thoracic band." Alucitid pupæ do not have, we think, thoracic bands.

At the meeting of the Entomological Society of London, held on November 2nd, 1904, Mr. J. E. Collin exhibited a specimen of *Platyphora lubbocki*, Verr., a species of *Phoridae* parasitic upon ants. No specimen has been recorded since the one originally bred by Lord Avebury in 1875, and described for him by Mr. G. H. Verrall in the Journal of the Linnean Society for 1877. The example exhibited was caught by Dr. Wood of Tarrington, Hereford, at Stokes Wood, on July 6th, 1904.

At the same meeting, Mr. J. Edwards sent for exhibition three specimens of *Bagous lutosus*, Gyll., one found by himself on Wretham Heath, Norfolk, on August 4th, 1900—the first authentic British example—and two taken in the same locality by Mr. Thouless, on May 22nd, 1903; also *Bagous glabriostris*, Herbst, from Camber, Sussex, for comparison.

At the same meeting Dr. T. A. Chapman exhibited bred specimens of *Hastula* (*Epagoge*, Hb. ?) *hyerana*, Mill., from larvæ taken at Hyères last March, and said that the fact that the pale forms only have hitherto been known, whereas of those bred nearly half are dark, suggests either that really very few specimens are in collections—which is the most probable case—or that melanism is now affecting the species. The larvæ are not uncommon at Hyères. Before he bred the species this year, a single dark specimen only was known, *viz.*, one taken by Lord Walsingham at Gibraltar, named by him in MSS. *marginata*, in doubt whether it was a var. of *hyerana*, or a new species. *H. hyerana* lives in *Asphodelus microcarpus*, and is interestingly parallel to, but very different from, *Tortrix unicolorana*, Dup., which feeds in various species of asphodels, to which its ravages are beneficial, unlike the havoc caused by *H. hyerana*. The latter, after spinning its cocoon in April, moults into an æstivating form of larva, of much the same colour as the moth, this æstivating larva eats the cast larval skin, except the head, which it puts on one side and covers with some further silk. It remains quiescent all summer and pupates in July, August, or September, emerging a few weeks later. The larvæ of *Xanthandrus comtus* eat the larvæ (of which a number usually occur on one plant), following them into their tubes and burrows when the larva gives them a chance. As the fly emerges in April and May, it must have an alternative way of living over to its next brood, as it is unlikely the flies live till late autumn, but as to the possibility of this he had no knowledge. Mr. J. W. Tutt remarked that the variation presented by the yellow type and leaden form of this species found a parallel in the variation common to the Lithosiids. The fact of a larva, having reached its full development, moulting without further feeding before pupation, had only been observed by him in connection with some of the Psychid larvæ, and the double moult at the end of the larval life was, therefore, very remarkable.

CONTENTS OF VOLUME XVI.

LOCALITIES, ETC.:—Aigle, 97, 157; Anthémoz, 15; Arolla, 149; Ambleside, 297; Barbadilla, 85; Bérisal, 15, 52, 98; Bortelalp, 14; Boscombe, 23; Breck district, 103; Brigue, 100; Burgos, 85; Burnley, 211; Cairo, 19; Canales de la Sierra, 85; Castle Moreton, 213, 242, 334; Chamonix, 34; Champéry, 15; Cheshire, 334; Chichester, 329; Chislehurst, 334; Col de la Forclaz, 98; Cornwall, 25; Co. Tyrone, 209; Cumberland, 135; Dalius, 68; Deal, 324, 334; Derwent Valley, 244; Devon, 295; Ditchling, 324; Dover, 266; Essex Coast, 241; Évolène, 148; Göschenen, 104; Grindelwald, 305; Haudères, 148; Hants, 240, 294; Hastings, 326; Hertford, 103; Herts, 101; Hyères, 160, 213; Kildale and Eston, 27; Kincardineshire, 332; Kings Lynn, 103, 295; Knutsford, 25; La Cueva de Agreda, 140; Laquinthal, 12, 99; Lavancher, 34; Lavey, 16; Lucerne, 105; Lyndhurst, 160; Macolin, 305; Majorca, 221; Market Drayton, 25; Martigny, 97; Mer-de-Glace, 34; Mickleham, 324; Middlesborough, 21, 212, 242; Middlesex, 101; Moncayo, 85, 122; Montanvert, 34; New Forest, 23, 25, 325; Norfolk Broads, 24, 50; Oxton, Exeter, 24, 240, 294; Patterdale, 18; Peebles district, 17; Pont du Gard, 293; Purley, 243; Roche, 113; Romsey, 22; Sierra-de-la-Demanda, 85; Simplon, 99; Skipwith, 50; Soria, 85, 124; Southend, 106, 160, 296; South Wales, 18; Ste. Maxime, 329; Strood, 294; Sudbury, 21; Switzerland, 12, 96, 104, 157, 330; Tarazona, 122; Thorndon, 23, 241; Tring district, 20; Useigne, 146; Varen, 17; Vex, 15, 148; Wigtownshire, 78; Witherslack, 297; York, 22; Zermatt 100

LIST OF ILLUSTRATIONS, &c.

LIST OF CONTRIBUTORS.

IMPORTANT NOTICE.

Twelve months' since, in taking over the financial part of the work connected with *The Entomologist's Record and Journal of Variation*, I took the liberty of calling the attention of subscribers to certain facts and suggestions which I thought would save much trouble, inconvenience, annoyance and unnecessary correspondence. Although a few subscribers seem never to have seen the notice, the general working of the suggestions has been so successful, that I repeat them for general information.

The subscription to the magazine is *Seven Shillings* per annum, with or without Special Index (not *Six Shillings*). Will subscribers please send the exact amount?

Subscriptions are *payable in advance.*

No odd *back numbers* are sold, except at *double the published* price, which should be sent with the order, or before delivery.

Copies obtained from the publishers are sold *net.*

Free copies are *not* sent to libraries, societies, or *contributors*, but an Exchange List is maintained against the most important British and foreign societies who send their publications.

Reprints of papers are supplied at the actual charge made by the printers, *provided a special request be drafted* on a separate paper when an article is submitted for publication. (Application is useless after an article has appeared, for by that time the type is distributed.)

Business communications should be addressed separately to me, and not mixed up with personal and friendly letters to the Editor.

Notice of the *withdrawal of any subscription* should be forwarded before December 31st.

The *Magazines are sent out* by Mr. H. E. Page, "Bertrose," Gellatly Road, Hatcham, S.E., to whom all "changes of address" should be forwarded, separately from notice to me.

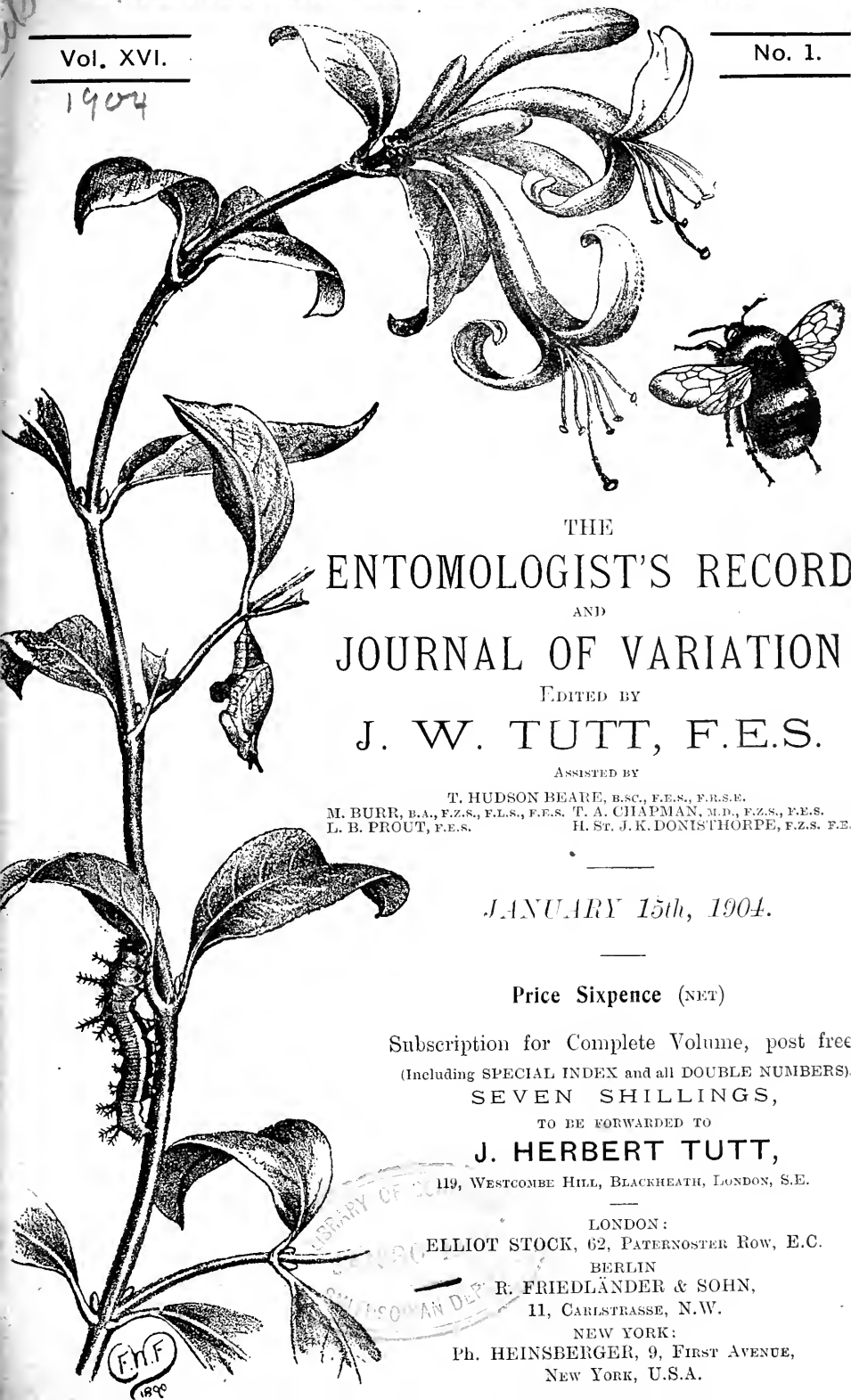
I shall be exceedingly pleased to receive subscriptions for vol. xvii (*Seven Shillings*) as early as possible.

J. Herbert Tutt, 119, Westcombe Hill, Blackheath, S.E.

SUBSCRIPTIONS FOR 1904 ARE NOW DUE.

Vol. XVI. No. 1.

1904



THE ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

EDITED BY

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

ASSISTED BY

T. HUDSON BEARE, B.SC., F.E.S., F.R.S.E.
M. BURR, B.A., F.Z.S., F.L.S., F.E.S. T. A. CHAPMAN, M.D., F.Z.S., F.E.S.
L. B. PROUT, F.E.S. H. ST. J. K. DONISTHORPE, F.Z.S. F.E.

JANUARY 15th, 1904.

Price Sixpence (NET)

Subscription for Complete Volume, post free
(Including SPECIAL INDEX and all DOUBLE NUMBERS)
SEVEN SHILLINGS,
TO BE FORWARDED TO
J. HERBERT TUTT,
119, WESTCOMBE HILL, BLACKHEATH, LONDON, S.E.

LONDON:
ELLIOT STOCK, 62, PATERNOSTER ROW, E.C.
BERLIN
R. FRIEDLÄNDER & SOHN,
11, CARLSTRASSE, N.W.
NEW YORK:
Ph. HEINSBERGER, 9, FIRST AVENUE,
NEW YORK, U.S.A.

NOTICE.

The **Back Volumes** (I-XV) of *The Entomologist's Record*, &c., can be obtained at 10s. 6d. per Volume. Complete set of 15 vols. £5 15s. net. "**Special Index**" to Vols. III., IV., V., VI., VII., VIII., IX., X., XI., XII., XIII., XIV. and XV., price 1/6 each. **Single Back Numbers** can be obtained at DOUBLE the published price from **J. Herbert Tutt, 119, Westcombe Hill, Blackheath, S.E.**

Subscribers who have not yet forwarded subscription for Vol. XV. are kindly requested to do so, to Mr. H. E. Page, Bertrose, Gellatly Road, Hatcham, S.E.

Subscribers are kindly requested to observe that subscriptions to *The Entomologist's Record*, &c., are payable in advance. **The subscription (including the Special Index) is Seven Shillings, and must be sent to Mr. J. Herbert Tutt, 119, Westcombe Hill, Blackheath, S.E.** [arrears to end of Vol. XV. to Mr. H. E. PAGE, Bertrose, Gellatly Road, St. Catherine's Park, London, S.E.]. Cheques and Postal Orders should be made payable to J. W. TUTT.

ADVERTISEMENTS of Books and Insects for Sale will be inserted at a minimum charge of 2s. 6d. (for four lines). Longer Advertisements in proportion. A reduction made for a series. Particulars of **Mr. J. Herbert Tutt**, 119, Westcombe Hill, Blackheath, S.E.

Subscribers who change their addresses must report the same to Mr. H. E. PAGE, "Bertrose," Gellatly Road, St. Catherine's Park, London, S.E., otherwise their magazines will probably be delayed.

Articles for insertion and Exchanges should be sent to J. W. TUTT, Rayleigh Villa, Westcombe Hill, S.E., except those relating to Coleoptera, which should be sent to Mr. H. DONISTHORPE, 58, Kensington Mansions, South Kensington, S.W., and those relating to Orthoptera, to Mr. M. BURR, 12, Fitzjames Avenue, South Kensington, S.W.

All Exchange Magazines must in future be forwarded to J. W. Tutt, Rayleigh Villa, Westcombe Hill, Blackheath, S.E.

Reprints of Articles or Notes (long or short) appearing in this Magazine can be arranged for by Authors at a very low price, on application to **Mr. J. Herbert Tutt, 119, Westcombe Hill, Blackheath, S.E.**

EXCHANGE BASKETS.—December 28th, 1903, No. **1** basket.—Messrs. Day, Bower, Ovenden, Woodforde, Riding, Studd, Robertson, Fox, Lofthouse, Mera, Bowles, Horne. December 30th, 1903, No. **2** basket.—Messrs. Atmore, Riding, Walker, Buckell, Adkin, Studd, Ash, Whittle, Robertson, Woodforde, Bower. [Members who wished to be missed must write to the name preceding their own on list, not to the Secretary.] The names of one or two new candidates for admission will be welcomed and room made as opportunity offers. **Some Members are not noting receipt to Secretary on Arrival.**

Duplicates.—Large numbers of Exotic butterflies. *Desiderata.*—Exotic butterflies.—(*Rev.*) *W. W. Flemyng, Coolfin, Portlaw, Co. Waterford.*

Duplicates.—A large number of Anthrocera exulans (English set) from the Dauphiny Alps. *Desiderata.*—Offers.—*J. W. Tutt, 119, Westcombe Hill, S.E.*

Duplicates.—Erebia neoridas. *Desiderata.*—Continental butterflies (with data).—*J. W. Tutt, 119, Westcombe Hill, S.E.*

Desiderata (good condition, with localities and dates).—Alexanor, Hospiton, Rumina (not from Riviera), Krueperi, Ergane, Chloridice, Belemia, Tagis (type), Gruneri, Damone, Pyrothoe, Eupheme, Chrysotheme, Myrmidone, Heldreichi, Nogelli, Ottomanus, Thetis, Thersamon, Telicanus, Balcanica, Fischeri, Trochilus, Pylaon, Bavius, Lysimon, Rhymnus, Psylorita, Pyrenaica, Anteros, Dolus, Coelestina, Celtis, Populi, Lucilla, Aceris, Xanthomelas, Vau-Album, Iduna, Maturna, Boetica, Arduinna, Trivia, Deione, Asteria, Aphirape (not Scandinavian), Thore, Frigga, Freija, Elisa, Alexandra, Laodice, Larissa, Pherusa, Melas (true), Anthe, Autonoë, Hippolyte, Neomyris, Roxelana, Clymene, Nurag, Œdipus, Hero, Leander, Thyrsis, Phryne, Nostradamus, Morpheus, Sylvius. A good pair (with data) would be very acceptable.—*J. W. Tutt, 119, Westcombe Hill, S.E.*

Desiderata.—Quantity of healthy pupæ of A. rumicis for scientific experimental purposes:—Will any collectors who have any for exchange or sale kindly communicate with me, even a few acceptable.—*L. W. Newman, Bexley, Kent.*

Duplicates.—Sibylla, Betulæ, Quercûs, Iris, Helice, Io, Cardui, Atalanta, Polychloros, Cassiope, Blandina, Paphia, Valezina, Sylvanus, Actæon, Lucina, Artemis, Egeria, Megæra, Comma, Semele, Davus, Galathea, Undulata, Glabraria, Undulanus, Quadra, Callunæ, Fuliginosa, Villica, Carpini, Neglecta, Exulans, Solidaginis, Suspecta, Dentina, Dahlii, Nictitans, Fimbria, Omicronaria, Porata, Punctaria, Pictaria, Contiguaria, Meliloti, Dolobraria, Ziczac, Salicis, Potatoria, Betularia and *var.* Doubledayaria, Rufina, Hispidus, Munda, Testacea, Miniosa, Grossulariata (good *vars.*), Illustraria, Consortaria, Cæsiata, Multistrigaria, Bidentata, &c. *Desiderata.*—To extend series—A. cratægi, Edusa, Hyale, W-Album, Pruni, T. rubi, Egon *var.* Corsica, Agestis, Salmacis, Adonis, Alexis (southern), Corydon, Argiolus, Alsus (southern), Arion, C-Album, Selene, Athalia, Cinxia, Tithonus, Alveolus, Linea, Paniscus, Tages, &c., varieties especially wanted.—*Arthur Horne, 58, Gladstone Place, Aberdeen, N.B.*

Duplicates.—Argiolus, Caniola, Griseola, Dominula*, Radiata*, Chrysorrhœa, Dispar*, Quercifolia, Curtula, Muralis, Putrescens, Persicaria, Nictitans, Ambigua, Puta, Fimbria*, Gracilis, Lota*, Rufina, Conspersa, Flavocincta, Lutulenta, Nigra, Suasa, Rhizolitha, Verbasci*, Testacea, Ænea, Angularia*, Pennaria, Obscurata, Viridata, Omicronaria, Scutulata, Promutata, Taminata, Strigillaria, Citraria, Decolorata, Unifasciata*, Tenuiata*, Procellata, Tersata, Lignata, Vetulata, Fulvata. *Desiderata.*—Numerous. Lists exchanged.—*W. R. Goodale, Oaklands, Paignton, South Devon.*

Duplicates.—A. cratægi (Kent, 1903) and Æ. chrysidiformis*. *Desiderata.*—Numerous. Accepted otiers only answered.—*Stuart S. Hills, 18, Claremont Road, Folkestone.*

Duplicates.—Neglecta*, Rufina, Sibylla*, Polychloros*, Rhizolitha, Variata*, Miniosa, Rubricosa, Instabilis, T. quercûs*, Fimbria*, Paphia, Palumbaria*, Monacha*, Aprilina, Hyperanthus, Cardui, Extersaria (few), Edusa (6), Obscuraria, Elinguaria* (5), Cervinaria* (4), Mi (6), Selene (7), Alveolus, Silago* (9), Libatrix (4), Derasa (4 fair), pupæ of Piniaria. *Desiderata.*—Numerous, also ova and pupæ of many species.—*L. F. Hill, 2, Freelands Road, Bromley, Kent.*

Duplicates.—Alveolus, Sibylla*, Edusa, Galatea, Adonis, Cinxia, Io, Quadra, R. quercûs, Fuciformis, Bombyliformis (1), Artemis* (4), Trifolii, Filipendulæ, S. populi*, S. ocellatus*, Semele, Blandina, Geryon, Ridens (3), and many otners. *Desiderata.*—Pupæ.—*G. Lyle, Brockenhurst.*

Duplicates.—Expolita (=Captiuncula), Grandævana*. *Desiderata.*—Fluctuosa, Impar, Strigosa, Vitellina, Albipuncta, Musculosa, Lorevi, Extranea, Ulvæ, Concolor, Cannæ, Sparganii, Exigua, Conspicillaris, Pyrophila, Ashworthii, Subrosea, Flammatra, Erythrocephala, Empyrea, Genistæ, Leucophæa, Semibrunnea, Conformis, Gnaphalii, Scrophulariæ, Armigera, Venustula, Bractea, Ni, etc.—*J. Gardner, 6, Friar Terrace, Hartlepool.*

Wanted.—British and European Tortricids, especially those species credited to both Europe and America in Meyrick's *Handbook* and Staudinger and Rebel's *Catalog*, pinned and set in English style acceptable. Will make liberal returns in any family of North American Lepidoptera named or other orders unnamed.—*W. D. Kearfott, 114, Liberty Street, New York City, U.S.A.*

Wanted Coleophorids.—As I wish to breed and record the life-history of all the species of *Coleophora*, I should be pleased to receive any cases and living larvæ which entomologists may meet with. I will do what I can in return.—*Hy. J. Turner, 98, Drakefell Road, St. Catherine's Park, New Cross, S.E.*

Wanted (to figure).—Examples of the following larvæ or pupæ: Antiopa, Lathonia, Daplidice, Edusa, Hyale, Livornica, Pinastri, Celerio, Gallii. Will any lepidopterist who collects abroad kindly remember my wants when opportunity occurs of obtaining any of them?—*J. C. Dollman, Hove House, Newton Grove, Bedford Park, W.*

Exchange.—I am desirous of obtaining butterflies from the Malayan Archipelago, and the Pacific Islands. For such I offer perfect diurnals from North and South America, North American Coleoptera.—*Levi W. Mengel, Boys' High School, Reading, Pa., U.S.A.*

Wanted.—Erycinidæ of the world. Offer for same Diurni from United States.—*Levi W. Mengel, Boys' High School, Reading, Pa., U.S.A.*

Parasitical Diptera wanted.—Will lepidopterists who may breed any dipterous parasites from larvæ or pupæ kindly forward such as they do not require to me? If so I shall be greatly obliged.—*C. J. Wainwright, 2, Handsworth Wood Road, Handsworth, Staffs.*

Changes of Address.—*Thos. Bainbrigge Fletcher, "St. Catherines," Salisbury Road, Wimbledon, London, S.W. J. E. R. Allen,* from *Egerton, Bolton,* to *194, Keighley Road, Colne. Irish address unchanged. John Cotton, "Simonwood," Prescot Road, St. Helens, Lancs. E. M. Chesman, Esq. c/o Mr. John Garson, 63, Railway Street, Durban, Natal, South Africa.*

MEETINGS OF SOCIETIES.

Entomological Society of London.—11, Chandos Street, Cavendish Square, W. 8 p.m. Annual Meeting, January 20th, 1904.

The City of London Entomological and Natural History Society. — London Institution, Finsbury Circus, E.C.—The first and third Tuesdays in the month, at 7.30 p.m.

Toynbee Hall Natural History Society.—Held at Toynbee Hall, Commercial Street, E., Mondays, at 8 p.m. Entrance Fee, 1s.; Annual Subscription, 1s.—Hon. Sec. G. E. Shaw, 45, Colworth Road, Leytonstone, N.E.

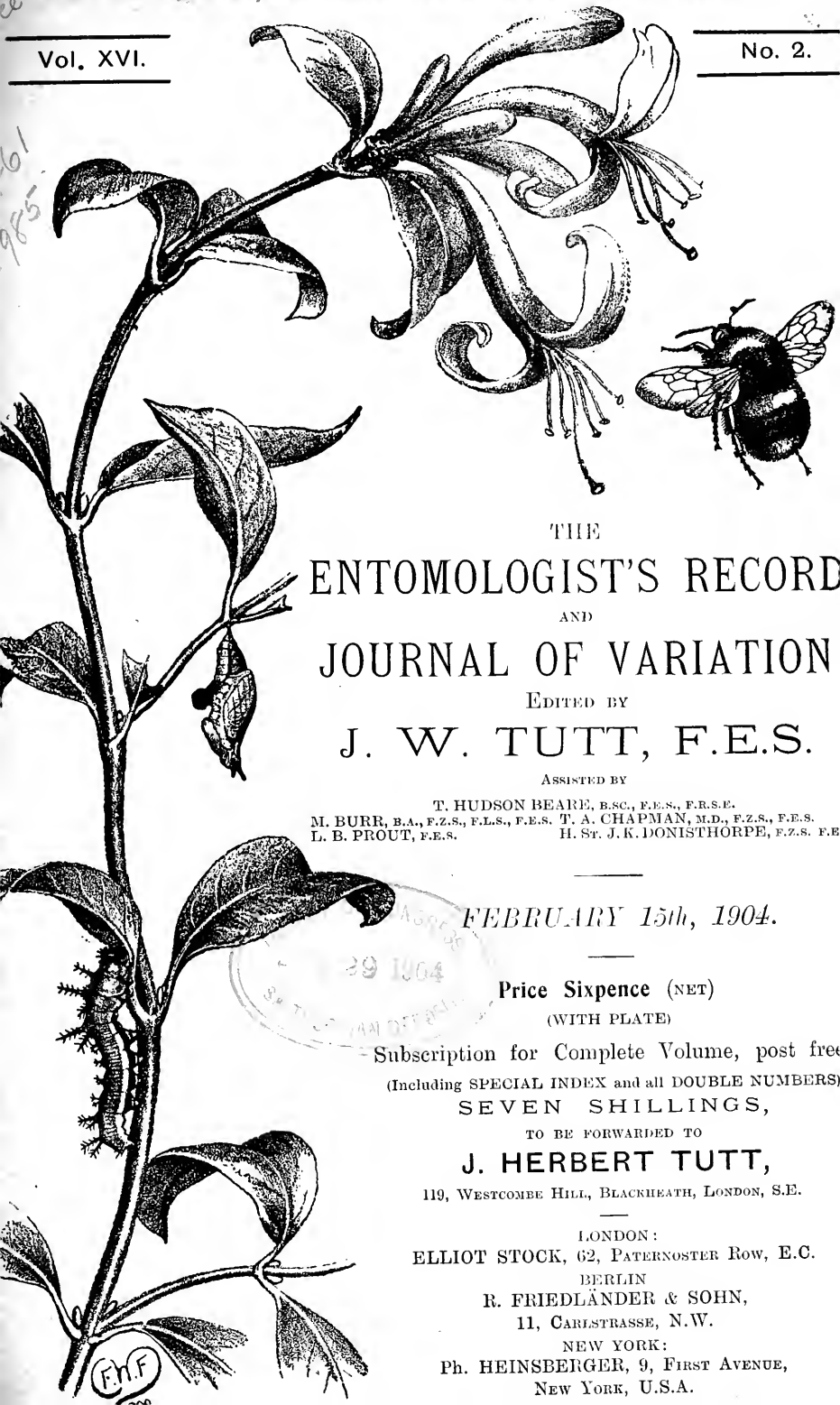
The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge.—The second and fourth Thursdays in each month, at 8 p.m. Meetings: January 28th, 1904, Annual Meeting (**at 7 p.m.**). February 11th, "Notes on

the Genus Coleophora," A. Sich, F.E.S. February 25th, Lantern Exhibition (those members who have slides are kindly requested to communicate with the Secretary).

North London Natural History Society, Hackney Technical Institute, adjoining Hackney Downs Stations, G.E.R.—Meetings 7.45 p.m., January 26th, February 2nd, February 9th. "Random Notes on the Eupithecias," J. E. Gardner, February 16th. February 27th, Annual Exhibition. Field meeting: February 13th, Waltham to Epping; train Liverpool Street to Waltham Cross, 2.15 p.m., fare 1s. 6d.

Carlisle Natural History Society.—Meetings held at Tullie House, Carlisle, 7.45 p.m.-9.30 p.m. Meetings: January 21st, "Some rare Cumberland Beetles," F. H. Day, F.E.S. February 4th, "The Flora and Fauna of the Eden Valley," by H. Britten. February 18th, "Notes on some Micro-Lepidoptera," by G. Wilkinson. April 7th, Special Exhibition of Specimens.

Vol. XVI. No. 2.



THE

ENTOMOLOGIST'S RECORD

AND

JOURNAL OF VARIATION

EDITED BY

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

ASSISTED BY

T. HUDSON BEARE, B.SC., F.E.S., F.R.S.E.
M. BURR, B.A., F.Z.S., F.L.S., F.E.S. T. A. CHAPMAN, M.D., F.Z.S., F.E.S.
L. B. PROUT, F.E.S. H. ST. J. K. DONISTHORPE, F.Z.S. F.E

FEBRUARY 15th, 1904.

Price Sixpence (NET)
(WITH PLATE)

Subscription for Complete Volume, post free
(Including SPECIAL INDEX and all DOUBLE NUMBERS)
SEVEN SHILLINGS,
TO BE FORWARDED TO

J. HERBERT TUTT,
119, WESTCOMBE HILL, BLACKHEATH, LONDON, S.E.

LONDON:
ELLIOT STOCK, 62, PATERNOSTER ROW, E.C.
BERLIN
R. FRIEDLÄNDER & SOHN,
11, CARLSTRASSE, N.W.
NEW YORK:
Ph. HEINSBERGER, 9, FIRST AVENUE,
NEW YORK, U.S.A.

MODERN WORKS ON BRITISH ENTOMOLOGY.

Our entomological magazines are largely filled with repetitions of already well-known facts made by lepidopterists who still appear to consider that books published almost, or quite, half a century ago, contain all the up-to-date information obtainable on the subjects they discuss. For advanced work of the most recent kind, the more scientific and educated lepidopterist should use the following work as his text-books.

The Natural History of the British Lepidoptera,

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

Vols. I, II, III.

Demy 8vo., strongly bound in cloth. Vol. I consisting of 560 pp., Vol. II, of 584 pp., Vol. III, of 558 pp.

Price £1 each Volume (net), Vols. I-IV, £3 7s. 6d.

This work is the most important that has ever been offered to working and scientific lepidopterists. It contains series of exhaustive monographs which no entomologist should be without, and if he be dealing with the same superfamilies, he will find in these volumes a mass of detailed information such as never has been got together before on all the branches relating to the species treated. At the same time, the discussion of general biological problems, and the great amount of detail relating to such problems, give the books a value for a class of workers quite apart from the British and Continental lepidopterists for whom they were primarily intended.

Vol. IV (shortly to be published).

Almost ready for publication. The price to Subscribers is **15s.** (**22s. 6d.** after publication).

This volume will contain, besides its own detailed index, a comprehensive *General Index* of Vols. I, II, III and IV, which is being prepared by Mr. G. Wheeler, M.A., who has kindly volunteered to do the work. The present publishers state that, having agreed to give booksellers more liberal terms than hitherto on net books, the price per volume will have to be raised (22s. 6d. per volume has been suggested). New subscribers are, therefore, urged to subscribe direct to Mr. H. E. Page, "Bertrose," Gellatly Road, Hatcham, S.E., before publication. Until the date of publication, Subscriptions for Vols. I, II, III and IV will be accepted (if sent direct) at £3 7s. 6d., *i.e.*, a discount of £1 2s. 6d. on the lowest price at which the volumes will be obtainable after the publication of Vol. IV.

"The three volumes which lie before us of this important work, we may safely say put all others of the kind in the shade. The work extends to spheres which are also of exceedingly great importance to the continental lepidopterist and which lend to the volumes an especial value. The work deserves our full attention and recognition and the opportunity for its study is not to be missed by collectors of European lepidoptera to whom it is not less valuable than to the Briton, indeed, one may say, it is almost indispensable. The price—distributed according to the time of appearance of the single volumes—is one that can well be borne, and continental lepidopterists, but more especially, institutions and societies, should make it their business, by procuring the books, to support and further the undertaking, and we wish the author success in bringing the gigantic work in due course to its close."—H. Stichel, *Berliner Entomologische Zeitschrift*. December, 1902.

SUBSCRIBERS who have not yet forwarded their SUBSCRIPTIONS for VOL. XVI. are requested to do so without delay.—J. HERBERT TUTT.

NOTICE.

The **Back Volumes** (I-XV) of *The Entomologist's Record*, &c., can be obtained at 10s. 6d. per Volume. Complete set of 15 vols. £5 15s. net. "**Special Index**" to Vols. III., IV., V., VI., VII., VIII., IX., X., XI., XII., XIII., XIV. and XV., price 1/6 each. **Single Back Numbers** can be obtained at DOUBLE the published price from **J. Herbert Tutt, 119, Westcombe Hill, Blackheath, S.E.**

Subscribers who have not yet forwarded subscription for Vol. XV. are kindly requested to do so, to Mr. H. E. Page, Bertrose, Gellatly Road, Hatcham, S.E.

Subscribers are kindly requested to observe that subscriptions to *The Entomologist's Record*, &c., are payable in advance. **The subscription (with or without the Special Index) is Seven Shillings, and must be sent to Mr. J. Herbert Tutt, 119, Westcombe Hill, Blackheath, S.E.** [arrears to end of Vol. XV. to Mr. H. E. PAGE, Bertrose, Gellatly Road, St. Catherine's Park, London, S.E.]. Cheques and Postal Orders should be made payable to J. W. TUTT.

ADVERTISEMENTS of Books and Insects for Sale will be inserted at a minimum charge of 2s. 6d. (for four lines). Longer Advertisements in proportion. A reduction made for a series. Particulars of **Mr. J. Herbert Tutt,** 119, Westcombe Hill, Blackheath, S.E.

Subscribers who change their addresses must report the same to Mr. H. E. PAGE, "Bertrose," Gellatly Road, St. Catherine's Park, London, S.E., otherwise their magazines will probably be delayed.

Articles for insertion and Exchanges should be sent to J. W. TUTT, Rayleigh Villa, Westcombe Hill, S.E., except those relating to Coleoptera, which should be sent to Mr. H. DONISTHORPE, 58, Kensington Mansions, South Kensington, S.W., and those relating to Orthoptera, to Mr. M. BURR, 12, Fitzjames Avenue, South Kensington, S.W.

All Exchange Magazines must in future be forwarded to J. W. Tutt, Rayleigh Villa, Westcombe Hill, Blackheath, S.E.

Reprints of Articles or Notes (long or short) appearing in this Magazine can be arranged for by Authors at a very low price, if ordered at the time of sending the article (minimum 25), on application to **Mr. J. Herbert Tutt, 119, Westcombe Hill, Blackheath, S.E.**

EXCHANGE BASKETS.—December 28th, 1903, No. **1** basket.—Messrs. Day, Bower, Ovenden, Woodforde, Riding, Studd, Robertson, Fox, Lofthouse, Mera, Bowles, Horne. December 30th, 1903, No. **2** basket.—Messrs. Atmore, Riding, Walker, Buckell, Adkin, Studd, Ash, Whittle, Robertson, Woodforde, Bower. [Members who wished to be missed must write to the name preceding their own on list, not to the Secretary.] The names of one or two new candidates for admission will be welcomed and room made as opportunity offers. **Some Members are not noting receipt of basket to Secretary on Arrival.**

Duplicates.—Eggs of any Lepidoptera (even common species) for rearing in the "insect room" of the Museum. Senders should enclose marked list.—*S. L. Mosley, The Museum, Keighley.*

Duplicates.—Butterflies from Darjeeling. *Desiderata.*—British lepidoptera.—(*Rev.*) *Arthur M. Downes, Bathealton Vicarage, Bath.*

Desiderata.—Quantity of healthy pupæ of A. rumicis for scientific experimental purposes:—Will any collectors who have any for exchange or sale kindly communicate with me, even a few acceptable.—*L. W. Newman, Bexley, Kent.*

Duplicates.—Sibylla, Betulæ, Quercûs, Iris, Helice, Io, Cardui, Atalanta, Polychloros, Cassiope, Blandina, Paphia, Valezina, Sylvanus, Actæon, Lucina, Artemis, Egeria, Megæra, Comma, Semele, Davus, Galathea, Undulata, Glabraria, Undulanus, Quadra, Callunæ, Fuliginosa, Villica, Carpini, Neglecta, Exulans, Solidaginis, Suspecta, Dentina, Dahlii, Nictitans, Fimbria, Omicronaria, Porata, Punctaria, Pictaria, Contiguaria, Meliloti, Dolobraria, Ziczac, Salicis, Potatoria, Betularia and *var.* Doubledayaria, Rufina, Hispidus, Munda, Testacea, Miniosa, Grossulariata (good *vars.*), Illustraria, Consortaria, Cæsiata, Multistrigaria, Bidentata, &c. *Desiderata.*—To extend series—A. cratægi, Edusa, Hyale, W-Album, Pruni, T. rubi, Ægon *var.* Corsica, Agestis, Salmacis, Adonis, Alexis (southern), Corydon, Argiolus, Alsus (southern), Arion, C-Album, Selene, Athalia, Cinxia, Tithonus, Alveolus, Linea, Paniscus, Tages, &c., varieties especially wanted.—*Arthur Horne, 58, Gladstone Place, Aberdeen, N.B.*

Duplicates.—Rufina, Polychloros*, Sibylla*, Rhizolitha, Miniosa, Variata*, Instabilis, Fimbria*, Paphia, Palumbaria*, Monacha*, Aprilina, Neglecta*, Cardui, Extersaria*, Obscuraria, Edusa (5), Cinctaria (5), Elinguaria* (5), Cervinaria* (4), Silago*, P. populi (3), Hepatica (3). *Desiderata.*—Numerous. Many species to renew; also ova and pupæ.—*L. F. Hill, 2, Freelands Road, Bromley, Kent.*

Duplicates.—Large numbers of Exotic butterflies. *Desiderata.*—Exotic butterflies.—(*Rev.*) *W. W. Flemyng, Coolfin, Portlaw, Co. Waterford.*

Duplicates.—A large number of Anthrocera exulans (English set) from the Dauphiny Alps. *Desiderata.*—Offers.—*J. W. Tutt, 119, Westcombe Hill, S.E.*

Duplicates.—Erebia neoridas. *Desiderata.*—Continental butterflies (with data).—*J. W. Tutt, 119, Westcombe Hill, S.E.*

Desiderata (good condition, with localities and dates).—Alexanor, Hospiton, Rumina (not from Riviera), Krueperi, Ergane, Chloridice, Belemia, Tagis (type), Gruneri, Damone, Pyrothoe, Eupheme, Chrysotheme, Myrmidone, Heldreichi, Nogelli, Ottomanus, Thetis, Thersamon, Telicanus, Balcanica, Fischeri, Trochilus, Pylaon, Bavius, Lysimon, Rhymnus, Psylorita, Pyrenaica, Anteros, Dolus, Coelestina, Celtis, Populi, Lucilla, Aceris, Xanthomelas, Vau-Album, Iduna, Maturna, Boetica, Arduinna, Trivia, Deione, Asteria, Aphirape (not Scandinavian), Thore, Frigga, Freija, Elisa, Alexandra, Laodice, Larissa, Pherusa, Melas (true), Anthe, Autonoë, Hippolyte, Neomyris, Roxelana, Clymene, Nurag, (Edipus, Hero, Leander, Thyrsis, Phryne, Nostradamus, Morpheus, Sylvius. A good pair (with data) would be very acceptable.—*J. W. Tutt, 119, Westcombe Hill, S.E.*

Wanted.—British and European Tortricids, especially those species credited to both Europe and America in Meyrick's *Handbook* and Staudinger and Rebel's *Catalog*, pinned and set in English style acceptable. Will make liberal returns in any family of North American Lepidoptera named or other orders unnamed.—*W. D. Kearfott, 114, Liberty Street, New York City, U.S.A.*

Wanted Coleophorids.—As I wish to breed and record the life-history of all the species of *Coleophora*, I should be pleased to receive any cases and living larvæ which entomologists may meet with. I will do what I can in return.—*Hy. J. Turner, 98, Drakefell Road, St. Catherine's Park, New Cross, S.E.*

Wanted (to figure).—Examples of the following larvæ or pupæ: Antiopa, Lathonia, Daplidice, Edusa, Hyale, Livornica, Pinastri, Celerio, Gallii. Will any lepidopterist who collects abroad kindly remember my wants when opportunity occurs of obtaining any of them?—*J. C. Dollman, Hove House, Newton Grove, Bedford Park, W.*

Exchange.—I am desirous of obtaining butterflies from the Malayan Archipelago, and the Pacific Islands. For such I offer perfect diurnals from North and South America, North American Coleoptera.—*Levi W. Mengel, Boys' High School, Reading, Pa., U.S.A.*

Wanted.—Erycinidæ of the world. Offer for same Diurni from United States.—*Levi W. Mengel, Boys' High School, Reading, Pa., U.S.A.*

Parasitical Diptera wanted.—Will lepidopterists who may breed any dipterous parasites from larvæ or pupæ kindly forward such as they do not require to me? If so I shall be greatly obliged.—*C. J. Wainwright, 2, Handsworth Wood Road, Handsworth, Staffs.*

Changes of Address.—*Geo. Wilkinson* to *Grahamston Grange, Rednock, Stirling, N.B.* *J. H. Day* to *27, Currock Terrace, Carlisle.*

MEETINGS OF SOCIETIES.

Entomological Society of London.—11, Chandos Street, Cavendish Square, W. 8 p.m. Meetings: March 2nd, 16th, April 20th, May 4th, June 1st.

The City of London Entomological and Natural History Society. — London Institution, Finsbury Circus, E.C.—The first and third Tuesdays in the month, at 7.30 p.m.

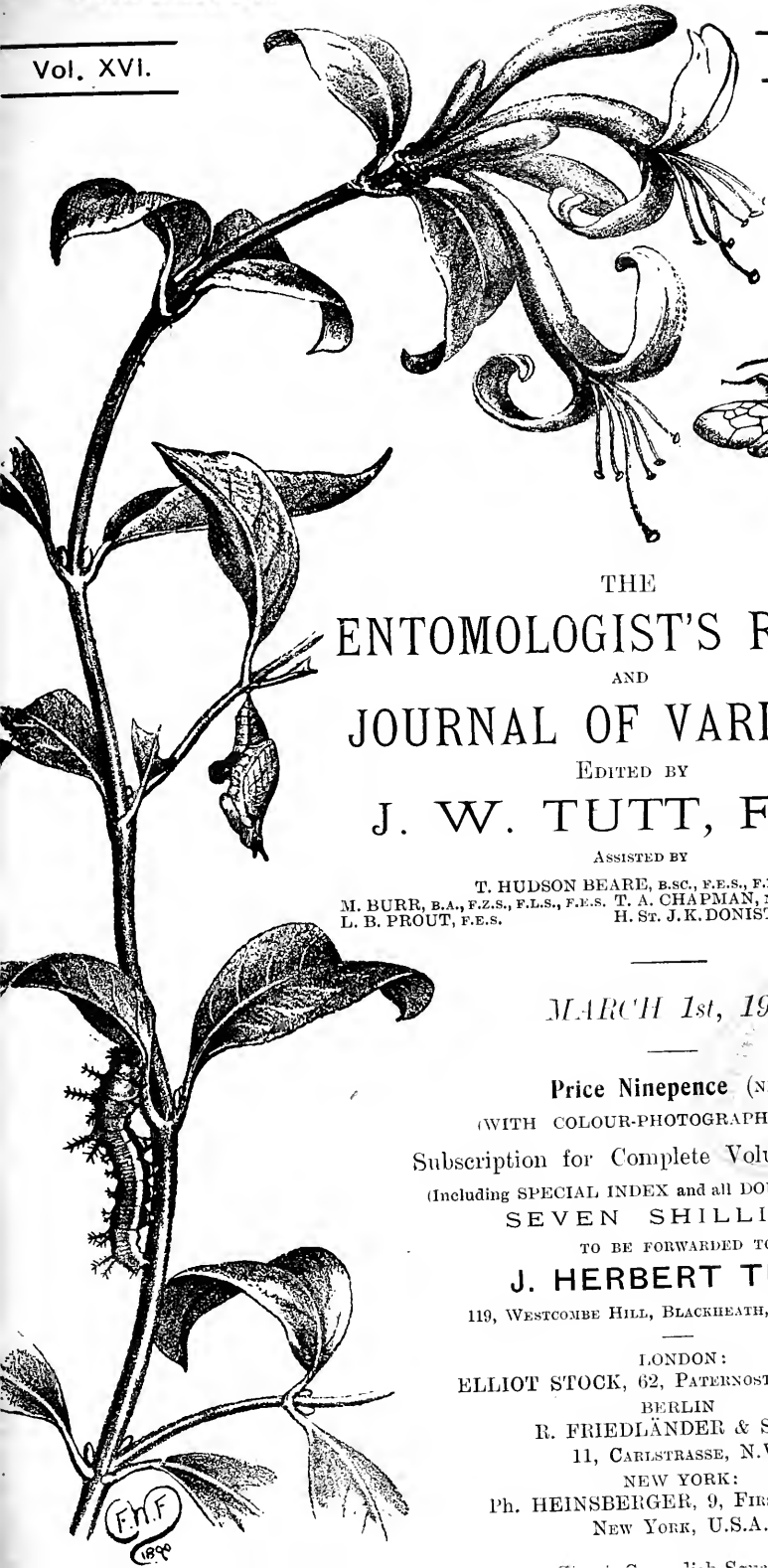
Toynbee Hall Natural History Society.—Held at Toynbee Hall, Commercial Street, E., Mondays, at 8 p.m. Entrance Fee, 1s.; Annual Subscription, 1s.—Hon. Sec. G. E. Shaw, 45, Colworth Road, Leytonstone, N.E.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge.—The second and fourth Thursdays in each month, at 8 p.m. February 25th, a Lantern evening. March 10th, "Some modern requirements in Oval and Larval description," by J. W. Tutt, F.E.S.; March 24th, "The Eastern Coast of the Adriatic," Malcolm Burr, F.E.S.

North London Natural History Society, Hackney Technical Institute, adjoining Hackney Downs Stations, G.E.R.—Meetings 7.45 p.m. February 16th, "Random Notes on the Eupithecias," J. E. Gardner. February 27th—Saturday—7.30 p.m.-10 p.m., **The 12th Annual Exhibition** will be held at Sigdon Road Board School, Dalston Lane (close to Hackney Downs Junction, G.E.R.). Information of C. B. Smith, Hon. Sec., 24, Rectory Road, Stoke Newington, N. Secretaries of other Entomological Societies should write to the Secretary for tickets.

Carlisle Natural History Society.—Meetings held at Tullie House, Carlisle, 7.45 p.m.-9.30 p.m. Meetings: February 18th, "Notes on some Micro-Lepidoptera," by G. Wilkinson. April 7th, Special Exhibition of Specimens.

Vol. XVI. No. 3.



THE ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

EDITED BY

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

ASSISTED BY

T. HUDSON BEARE, B.SC., F.E.S., F.R.S.E.
M. BURR, B.A., F.Z.S., F.L.S., F.E.S. T. A. CHAPMAN, M.D., F.Z.S., F.E.S.
L. B. PROUT, F.E.S. H. ST. J. K. DONISTHORPE, F.Z.S. F.E.S.

MARCH 1st, 1904.

Price Ninepence (NET)

(WITH COLOUR-PHOTOGRAPH PLATE)

Subscription for Complete Volume, post free

(Including SPECIAL INDEX and all DOUBLE NUMBERS),

SEVEN SHILLINGS,

TO BE FORWARDED TO

J. HERBERT TUTT,

119, WESTCOMBE HILL, BLACKHEATH, LONDON, S.E.

LONDON:
ELLIOT STOCK, 62, PATERNOSTER ROW, E.C.
BERLIN
R. FRIEDLÄNDER & SOHN,
11, CARLSTRASSE, N.W.
NEW YORK:
Ph. HEINSBERGER, 9, FIRST AVENUE,
NEW YORK, U.S.A.

MODERN WORKS ON BRITISH ENTOMOLOGY.

Our entomological magazines are largely filled with repetitions of already well-known facts made by lepidopterists who still appear to consider that books published almost, or quite, half a century ago, contain all the up-to-date information obtainable on the subjects they discuss. For advanced work of the most recent kind, the more scientific and educated lepidopterist should use the following work as his text-books.

The Natural History of the British Lepidoptera,

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

Vols. I, II, III.

Demy 8vo:, strongly bound in cloth. Vol. I consisting of 560 pp., Vol. II, of 584 pp., Vol. III, of 558 pp.

Price £1 each Volume (net), Vols. I-IV, £3 7s. 6d.

This work is the most important that has ever been offered to working and scientific lepidopterists. It contains series of exhaustive monographs which no entomologist should be without, and if he be dealing with the same superfamilies, he will find in these volumes a mass of detailed information such as never has been got together before on all the branches relating to the species treated. At the same time, the discussion of general biological problems, and the great amount of detail relating to such problems, give the books a value for a class of workers quite apart from the British and Continental lepidopterists for whom they were primarily intended.

Vol. IV (shortly to be published).

Almost ready for publication. The price to Subscribers is **15s.** (**22s. 6d.** after publication).

This volume will contain, besides its own detailed index, a comprehensive *General Index* of Vols. I, II, III and IV, which is being prepared by Mr. G. Wheeler, M.A., who has kindly volunteered to do the work. The present publishers state that, having agreed to give booksellers more liberal terms than hitherto on net books, the price per volume will have to be raised (22s. 6d. per volume has been suggested). New subscribers are, therefore, urged to subscribe direct to Mr. H. E. PAGE, "Bertrose," Gellatly Road, Hatcham, S.E., before publication. Until the date of publication, Subscriptions for Vols. I, II, III and IV will be accepted (if sent direct) at £3 7s. 6d., *i.e.*, a discount of £1 2s. 6d. on the lowest price at which the volumes will be obtainable after the publication of Vol. IV.

"The three volumes which lie before us of this important work, we may safely say put all others of the kind in the shade. The work extends to spheres which are also of exceedingly great importance to the continental lepidopterist and which lend to the volumes an especial value. The work deserves our full attention and recognition and the opportunity for its study is not to be missed by collectors of European lepidoptera to whom it is not less valuable than to the Briton, indeed, one may say, it is almost indispensable. The price—distributed according to the time of appearance of the single volumes—is one that can well be borne, and continental lepidopterists, but more especially, institutions and societies, should make it their business, by procuring the books, to support and further the undertaking, and we wish the author success in bringing the gigantic work in due course to its close."—H. Stichel, *Berliner Entomologische Zeitschrift*. December, 1902

The British Noctuæ and their Varieties.

(Complete in 4 volumes. Price 7/- per vol.).

(The price is being raised by the publishers to 30/- per set.)

These four volumes comprise the most complete text-book ever issued on the NOCTUIDES. The work contains critical notes on the synonymy, the original type descriptions (or descriptions of the original figures) of every British species, the type descriptions of all known varieties of each British species, tabulated diagnoses and short descriptions of the various phases of variation of the more polymorphic species; all the data known concerning the rare and reputed British species. Complete notes on the lines of development of the general variation observed in the various families and genera. The geographical range of the various species and their varieties, as well as special notes by lepidopterists who have paid particular attention to certain species.

Each volume has an extended introduction. That to Vol. I deals with "General variation and its causes"—with a detailed account of the action of natural selection in producing melanism, albinism, &c. That to Vol. II deals with "The evolution and genetic sequence of insect colours," the most complete review of the subject published. That to Vol. III deals with "Secondary Sexual Characters in Lepidoptera," explaining so far as is known, a consideration of the organs (and their functions) included in the term. That to Vol. IV deals with "The classification of the Noctuæ," with a comparison of the Nearctic and Palæarctic Noctuides.

The first subscription list comprised some 200 of our leading British lepidopterists, and up to the present time some 500 complete sets of the work have been sold. The treatise is invaluable to all working collectors who want the latest information on this group, and contains large quantities of material collected from foreign magazines and the works of old British authors, arranged in connection with each species, and not to be found in any other published work.

Monograph of the Pterophorina.

(Two copies only for sale.)

(Demy 8vo., 161 pp., bound in Cloth. Price 10/-).

This book contains an introductory chapter on "Collecting," "Killing" and "Setting" the Pterophorina, a table giving details of each species—Times of appearance of larva, of pupa and of imago, food-plants, mode of pupation, and a complete account (so far as is known) of every British species, under the headings of "Synonymy," "Imago," "Variation," "Ovum," "Larva," "Food-plants," "Pupa," "Habitat," and "Distribution." It is much the most complete and trustworthy account of this interesting group of Lepidoptera that has ever been published.

To be obtained from H. E. PAGE, "Bertrose," Gellatly Road, Hatcham.

Tuesday, March 8th,

IMPORTANT

COLLECTION OF BRITISH MACRO-LEPIDOPTERA.

MR. J. C. STEVENS will OFFER

At his ROOMS, 38, King Street, Covent Garden, W.C., as above, at Half-past Twelve o'clock precisely,

The COLLECTION of BRITISH LEPIDOPTERA,

Formed by F. C. WOODFORDE, Esq., F.E.S., of Market Drayton, Salop.

The collection contains long series of recently-taken specimens in fine well-set condition, all most carefully labelled.

On view day prior from 10 to 4 and Morning of Sale. Catalogues post free on application.

SUBSCRIBERS who have not yet forwarded their SUBSCRIPTIONS for VOL. XVI. are requested to do so without delay.—J. HERBERT TUTT.

NOTICE.

The **Back Volumes** (I-XV) of *The Entomologist's Record*, &c., can be obtained at 10s. 6d. per Volume. Complete set of 15 vols. £5 15s. net. "**Special Index**" to Vols. III., IV., V., VI., VII., VIII., IX., X., XI., XII., XIII., XIV. and XV., price 1/6 each. **Single Back Numbers** can be obtained at DOUBLE the published price from **J. Herbert Tutt, 119, Westcombe Hill, Blackheath, S.E.**

Subscribers who have not yet forwarded subscription for Vol. XV. are kindly requested to do so, to Mr. H. E. Page, Bertrose, Gellatly Road, Hatcham, S.E.

Subscribers are kindly requested to observe that subscriptions to *The Entomologist's Record*, &c., are payable in advance. **The subscription (with or without the Special Index) is Seven Shillings, and must be sent to Mr. J. Herbert Tutt, 119, Westcombe Hill, Blackheath, S.E.** [arrears to end of Vol. XV. to Mr. H. E. PAGE, Bertrose, Gellatly Road, St. Catherine's Park, London, S.E.]. Cheques and Postal Orders should be made payable to J. W. TUTT.

ADVERTISEMENTS of Books and Insects for Sale will be inserted at a minimum charge of 2s. 6d. (for four lines). Longer Advertisements in proportion. A reduction made for a series. Particulars of **Mr. J. Herbert Tutt,** 119, Westcombe Hill, Blackheath, S.E.

Subscribers who change their addresses must report the same to Mr. H. E. PAGE, "Bertrose," Gellatly Road, St. Catherine's Park, London, S.E., otherwise their magazines will probably be delayed.

Articles for insertion and Exchanges should be sent to J. W. TUTT, Rayleigh Villa, Westcombe Hill, S.E., except those relating to Coleoptera, which should be sent to Mr. H. DONISTHORPE, 58, Kensington Mansions, South Kensington, S.W., and those relating to Orthoptera, to Mr. M. BURR, 12, Fitzjames Avenue, South Kensington, S.W.

All Exchange Magazines must in future be forwarded to J. W. Tutt, Rayleigh Villa, Westcombe Hill, Blackheath, S.E.

Reprints of Articles or Notes (long or short) appearing in this Magazine can be arranged for by Authors at a very low price, if ordered at the time of sending the article (minimum 25), on application to **Mr. J. Herbert Tutt, 119, Westcombe Hill, Blackheath, S.E.**

EXCHANGE BASKETS.—December 28th, 1903, No. **1** basket.—Messrs. Day, Bower, Ovenden, Woodforde, Riding, Studd, Robertson, Fox, Lofthouse, Mera, Bowles, Horne. February 27th, 1904, No. **2** basket.—Messrs. Riding, Ash, Adkin, Walker, Studd, Buckell, Robertson, Whittle, Atmore, Bower. [Members who wished to be missed must write to the name preceding their own on list, not to the Secretary.] The names of one or two new candidates for admission will be welcomed and room made as opportunity offers. **Some Members are not noting receipt of basket to Secretary on its Arrival.**

Duplicates.—Very many ova and larvæ, also set insects. Send list of wants. *Desiderata.*—Ova: Æscularia, Leucophæaria, Hispidaria, Pulveraria, Piniperda, Miniosa, Gracilis, Vetusta, Unguicula, Spinula, Curtula, Populeti, Advenaria, Consonaria, Pendularia. Living ♀ s or Ova (former preferred): Leucographa, C-album, Cardui, Atalanta, Megæra, Rubiginea, Semibrunnea, Psitticata, Miata, Derivata, Lobulata, Hippocastinaria, Ridens, Flavicornis, Or. Larvæ: Artemis (except from West Meath and Cumberland), Plantaginis, Fascelina, Crataegi, Lanestris, Quercifolia, Prunaria, Repandata, also many other ova and larvæ.—*L. W. Newman, Bexley, Kent.*

Duplicates.—Eggs of any Lepidoptera (even common species) for rearing in the "insect room" of the Museum. Senders should enclose marked list.—*S. L. Mosley, The Museum, Keighley.*

Duplicates.—Butterflies from Darjeeling. *Desiderata.*—British lepidoptera.—(*Rev.*) *Arthur M. Downes, Bathcaston Vicarage, Bath.*

Desiderata.—Quantity of healthy pupæ of A. rumicis for scientific experimental purposes:—Will any collectors who have any for exchange or sale kindly communicate with me, even a few acceptable.—*L. W. Newman, Bexley, Kent.*

Duplicates.—Sibylla, Betulæ, Quercûs, Iris, Helice, Io, Cardui, Atalanta, Polychloros, Cassiope, Blandina, Paphia, Valezina, Sylvanus, Actæon, Lucina, Artemis, Egeria, Megæra, Comma, Semele, Davus, Galathea, Undulata. Glabraria, Undulanus, Quadra, Callunæ, Fuliginosa, Villica, Carpini, Neglecta, Exulans, Solidaginis, Suspecta, Dentina, Dahlii, Nictitans, Fimbria, Omicronaria, Porata, Punctaria, Pictaria, Contiguaria, Meliloti, Dolobraria, Ziczac, Salicis, Potatoria, Betularia and *var.* Doubledayaria, Rufina, Hispidus, Munda, Testacea, Miniosa, Grossulariata (good *vars.*), Illustraria, Consortaria, Cæsiata, Multistrigaria, Bidentata, &c. *Desiderata.*—To extend series—A. cratægi, Edusa, Hyale,

W-Album, Pruni, T. rubi, Ægon *var.* Corsica, Agestis, Salmacis, Adonis, Alexis (southern), Corydon, Argiolus, Alsus (southern), Arion, C-Album, Selene, Athalia, Cinxia, Tithonus, Alveolus, Linea, Paniscus, Tages, &c., varieties especially wanted.—*Arthur Horne, 58, Gladstone Place, Aberdeen, N.B.*

WANTED.—British and European Tortricids, especially those species credited to both Europe and America in Meyrick's *Handbook* and Staudinger and Rebel's *Catalog*, pinned and set in English style acceptable. Will make liberal returns in any family of North American Lepidoptera named or other orders unnamed.—*W. D. Kearfott, 114, Liberty Street, New York City, U.S.A.*

WANTED COLEOPHORIDS.—As I wish to breed and record the life-history of all the species of *Coleophora*, I should be pleased to receive any cases and living larvæ which entomologists may meet with. I will do what I can in return.—*Hy. J. Turner, 98, Drakefell Road, St. Catherine's Park, New Cross, S.E.*

WANTED (to figure).—Examples of the following larvæ or pupæ: Antiopa, Lathonia, Daplidice, Edusa, Hyale, Livornica, Pinastri, Celerio, Gallii. Will any lepidopterist who collects abroad kindly remember my wants when opportunity occurs of obtaining any of them?—*J. C. Dollman, Hove House, Newton Grove, Bedford Park, W.*

EXCHANGE.—I am desirous of obtaining butterflies from the Malayan Archipelago, and the Pacific Islands. For such I offer perfect diurnals from North and South America, North American Coleoptera.—*Levi W. Mengel, Boys' High School, Reading, Pa., U.S.A.*

WANTED.—Erycinidæ of the world. Offer for same Diurni from United States.—*Levi W. Mengel, Boys' High School, Reading, Pa., U.S.A.*

PARASITICAL DIPTERA WANTED.—Will lepidopterists who may breed any dipterous parasites from larvæ or pupæ kindly forward such as they do not require to me? If so I shall be greatly obliged.—*C. J. Wainwright, 2, Handsworth Wood Road, Handsworth, Staffs.*

MEETINGS OF SOCIETIES.

Entomological Society of London.—11, Chandos Street, Cavendish Square, W. 8 p.m. Meetings: March 2nd, Discussion—"What is a species?" Prof. E. B. Poulton, F.R.S., Mr. H. J. Elwes, F.R.S., Dr. F. A. Dixey, and others will take part in this Discussion; 16th, April 20th, May 4th, June 1st.

The City of London Entomological and Natural History Society. — London Institution, Finsbury Circus, E.C.—The first and third Tuesdays in the month, at 7.30 p.m.

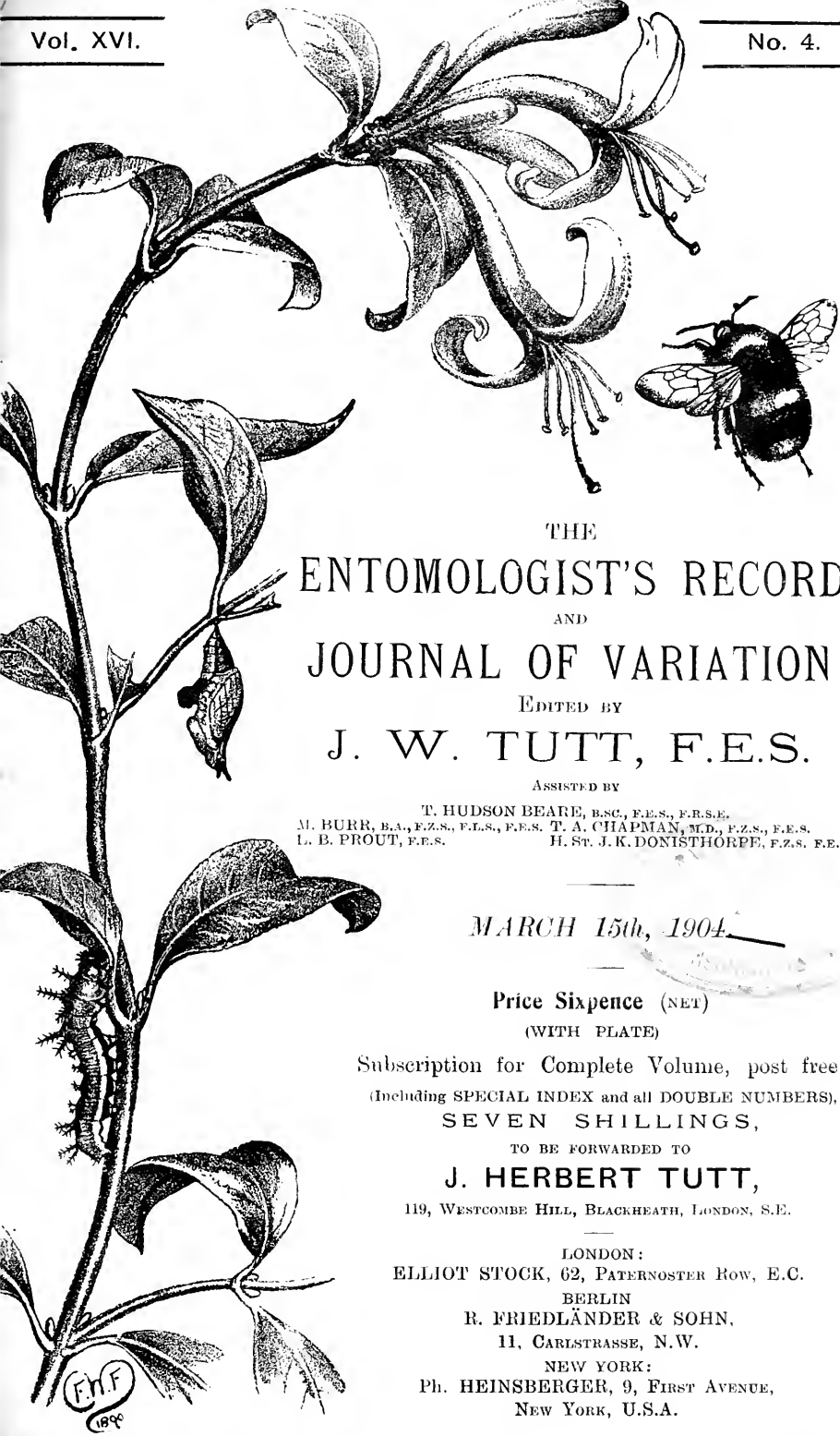
Toynbee Hall Natural History Society.—Held at Toynbee Hall, Commercial Street, E., Mondays, at 8 p.m. Entrance Fee, 1s.; Annual Subscription, 1s.—Hon. Sec. G. E. Shaw, 45, Colworth Road, Leytonstone, N.E.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge.—The second and fourth Thursdays in each month, at 8 p.m. February 25th, a Lantern evening. March 10th, "Some modern requirements in Oval and Larval description," by J. W. Tutt, F.E.S.; March 24th, "The Eastern Coast of the Adriatic," Malcolm Burr, F.E.S. April 14th, "Conchological Notes," W. Manger.

North London Natural History Society, Hackney Technical Institute, adjoining Hackney Downs Stations, G.E.R.—Meetings 7.45 p.m. March 8th, "Holiday Notes from Chamonix," C. B. Smith; March 19th, Excursion to Theydon Bois (Liverpool Street, 2.41 p.m., fare 1s. 4d.), Leader, A. W. Bacot, F.E.S.; March 22nd, "Some impressions of Italy," J. A. Simes; March 26th, Cycle run to Abridge (meet Waterworks, Woodford Road, 3.15 p.m.).

Carlisle Natural History Society.—Meetings held at Tullie House, Carlisle, 7.45 p.m.-9.30 p.m. Meetings: April 7th, Special Exhibition of Specimens.

Vol. XVI. No. 4.



THE ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

EDITED BY

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

ASSISTED BY

T. HUDSON BEARE, B.SC., F.E.S., F.R.S.E.
M. BURR, B.A., F.Z.S., F.L.S., F.E.S. T. A. CHAPMAN, M.D., F.Z.S., F.E.S.
L. B. PROUT, F.E.S. H. ST. J. K. DONISTHORPE, F.Z.S. F.E.S.

MARCH 15th, 1904.

Price Sixpence (NET)

(WITH PLATE)

Subscription for Complete Volume, post free

(Including SPECIAL INDEX and all DOUBLE NUMBERS),

SEVEN SHILLINGS,

TO BE FORWARDED TO

J. HERBERT TUTT,

119, WESTCOMBE HILL, BLACKHEATH, LONDON, S.E.

LONDON:
ELLIOT STOCK, 62, PATERNOSTER ROW, E.C.
BERLIN
R. FRIEDLÄNDER & SOHN,
11, CARLSTRASSE, N.W.
NEW YORK:
Ph. HEINSBERGER, 9, FIRST AVENUE,
NEW YORK, U.S.A.

s may also be obtained from R. H. PORTER, 18, Princes Street, Cavendish Square, London, W.C.

SUBSCRIBERS who have not yet forwarded their SUBSCRIPTIONS for VOL. XVI are requested to do so without delay.—J. HERBERT TUTT.

NOTICE.

The **Back Volumes** (I-XV) of *The Entomologist's Record*, &c., can be obtained at 10s. 6d. per Volume. Complete set of 15 vols. £5 15s. net. "**Special Index**" to Vols. III., IV., V., VI., VII., VIII., IX., X., XI., XII., XIII., XIV. and XV., price 1/6 each. **Single Back Numbers** can be obtained at DOUBLE the published price from **J. Herbert Tutt, 119, Westcombe Hill, Blackheath, S.E.**

Subscribers who have not yet forwarded subscription for Vol. XV. are kindly requested to do so, to Mr. H. E. Page, Bertrose, Gellatly Road, Hatcham, S.E.

Subscribers are kindly requested to observe that subscriptions to *The Entomologist's Record*, &c., are payable in advance. **The subscription (with or without the Special Index) is Seven Shillings, and must be sent to Mr. J. Herbert Tutt, 119, Westcombe Hill, Blackheath, S.E.** [arrears to end of Vol. XV. to Mr. H. E. PAGE, Bertrose, Gellatly Road, St. Catherine's Park, London, S.E.]. Cheques and Postal Orders should be made payable to J. W. TUTT.

ADVERTISEMENTS of Books and Insects for Sale will be inserted at a minimum charge of 2s. 6d. (for four lines). Longer Advertisements in proportion. A reduction made for a series. Particulars of **Mr. J. Herbert Tutt,** 119, Westcombe Hill, Blackheath, S.E.

Subscribers who change their addresses must report the same to Mr. H. E. PAGE, "Bertrose," Gellatly Road, St. Catherine's Park, London, S.E., otherwise their magazines will probably be delayed.

Articles for insertion and Exchanges should be sent to J. W. TUTT, Rayleigh Villa, Westcombe Hill, S.E., except those relating to Coleoptera, which should be sent to Mr. H. DONISTHORPE, 58, Kensington Mansions, South Kensington, S.W., and those relating to Orthoptera, to Mr. M. BURR, 12, Fitzjames Avenue, South Kensington, S.W.

All Exchange Magazines must in future be forwarded to J. W. Tutt, Rayleigh Villa, Westcombe Hill, Blackheath, S.E.

Reprints of Articles or Notes (long or short) appearing in this Magazine can be arranged for by Authors at a very low price, if ordered at the time of sending the article (minimum 25), on application to **Mr. J. Herbert Tutt, 119, Westcombe Hill, Blackheath, S.E.**

EXCHANGE BASKETS.—March 5th, 1904, No. **1** basket.—Messrs. Day, Woodforde, Bower, Studd, Riding, Ovenden, Robertson, Lofthouse, Fox, Horne, Bowles, Mera. February 27th, 1904, No. **2** basket.—Messrs. Riding, Hanbury, Ash, Adkin, Walker, Studd, Buckell, Robertson, Whittle, Atmore, Bower. [Members who wished to be missed must write to the name preceding their own on list, not to the Secretary.] The names of one or two new candidates for admission will be welcomed and room made as opportunity offers. **Some Members are not noting receipt of basket to Secretary on its Arrival to them.**

Duplicates.—Solidaginis. *Desiderata.*—Ova, almost any kind.—*Geo. Rose, The Museum, Keighley.*

Duplicates.—L. arion, Corydon, Lineola, Polychloros*, Paphia, Vinula*, Ligustri*, Populi*, Elpenor (2), Lanestris*, Fulvago*, Moneta*, Ditrapezium*, Augur*, Baja*, Megacephala*, Suffusa, Curtula, Australis, Croceago*, Palpina, Illunaria*, Autumnaria*, Syringaria*. Ova: Flavicincta. Pupæ: Albicillata. *Desiderata.*—Numerous.—*W. E. Shaw, Salisbury Road, Bexley, Kent.*

Duplicates.—Very many ova and larvæ, also set insects. Send list of wants. *Desiderata.*—Ova: Æscularia, Leucophæaria, Hispidaria, Pulveraria, Piniperda, Miniosa, Gracilis, Vetusta, Unguicula, Spinula, Curtula, Populeti, Advenaria, Consonaria, Pendularia. Living ♀ s or Ova (former preferred): Leucographa, C-album, Cardui, Atalanta, Megæra, Rubiginea, Semibrunnea, Psittacata, Miata, Derivata, Lobulata, Hippocastanaria, Ridens, Flavicornis, Or. Larvæ: Artemis (except from Westmeath and Cumberland), Plantaginis, Fascelina, Cratægi, Lanestris, Quercifolia, Prunaria, Repandata, also many other ova and larvæ.—*L. W. Newman, Bexley, Kent.*

Duplicates.—Butterflies from Darjeeling. *Desiderata.*—British lepidoptera.—(*Rev.*) *Arthur M. Downes, Batheaston Vicarage, Bath.*

Desiderata.—Quantity of healthy pupæ of A. rumicis for scientific experimental purposes:—Will any collectors who have any for exchange or sale kindly communicate with me, even a few acceptable.—*L. W. Newman, Bexley, Kent.*

WANTED.—British and European Tortricids, especially those species credited to both Europe and America in Meyrick's *Handbook* and Staudinger and Rebel's *Catalog*, pinned and set in English style acceptable. Will make liberal returns in any family of North American Lepidoptera named or other orders unnamed.—*W. D. Kearfott, 114, Liberty Street, New York City, U.S.A.*

WANTED COLEOPHORIDS.—As I wish to breed and record the life-history of all the species of *Coleophora*, I should be pleased to receive any cases and living larvæ which entomologists may meet with. I will do what I can in return.—*Hy. J. Turner, 98, Drakefell Road, St. Catherine's Park, New Cross, S.E.*

WANTED (to figure).—Examples of the following larvæ or pupæ: Antiopa, Lathonia, Daplidice, Edusa, Hyale, Livornica, Pinastri, Celerio, Gallii. Will any lepidopterist who collects abroad kindly remember my wants when opportunity occurs of obtaining any of them?—*J. C. Dollman, Hore House, Newton Grove, Bedford Park, W.*

EXCHANGE.—I am desirous of obtaining butterflies from the Malayan Archipelago, and the Pacific Islands. For such I offer perfect diurnals from North and South America, North American Coleoptera.—*Levi W. Mengel, Boys' High School, Reading, Pa., U.S.A.*

WANTED.—Erycinidæ of the world. Offer for same Diurni from United States.—*Levi W. Mengel, Boys' High School, Reading, Pa., U.S.A.*

PARASITICAL DIPTERA WANTED.—Will lepidopterists who may breed any dipterous parasites from larvæ or pupæ kindly forward such as they do not require to me? If so I shall be greatly obliged.—*C. J. Wainwright, 2, Handsworth Wood Road, Handsworth, Staffs.*

MEETINGS OF SOCIETIES.

Entomological Society of London.—11, Chandos Street, Cavendish Square, W. 8 p.m. Meetings: March 16th, April 20th, May 4th, June 1st.

The City of London Entomological and Natural History Society.—London Institution, Finsbury Circus, E.C.—The first and third Tuesdays in the month, at 7.30 p.m.

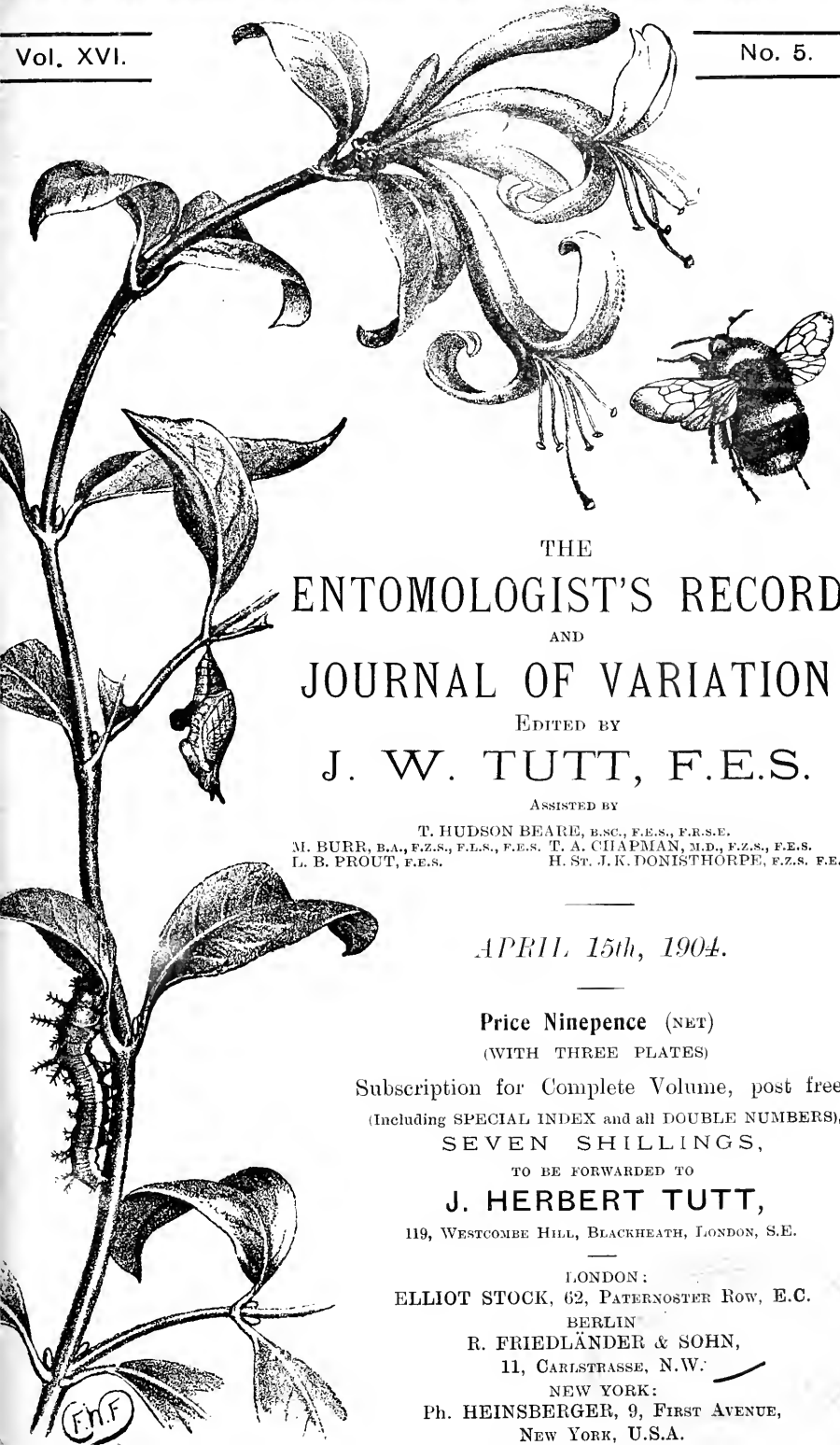
Toynbee Hall Natural History Society.—Held at Toynbee Hall, Commercial Street, E., Mondays, at 8 p.m. Entrance Fee, 1s.; Annual Subscription, 1s.—Hon. Sec. G. E. Shaw, 45, Colworth Road, Leytonstone, N.E.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge.—The second and fourth Thursdays in each month, at 8 p.m. March 24th, "The Eastern Coast of the Adriatic," Malcolm Burr, F.E.S. April 14th, "Conchological Notes," W. Manger.

North London Natural History Society, Hackney Technical Institute, adjoining Hackney Downs Stations, G.E.R.—Meetings 7.45 p.m. March 19th, Excursion to Theydon Bois (Liverpool Street, 2.41 p.m., fare 1s. 4d.), Leader, A. W. Bacot, F.E.S.; March 22nd, "Some impressions of Italy," J. A. Simes; March 26th, Cycle run to Abridge (meet Waterworks, Woodford Road, 3.15 p.m.); April 2nd, Excursion to Oxshott (Waterloo, 9.35 a.m., 2s. 6d.).

Carlisle Natural History Society.—Meetings held at Tullie House, Carlisle, 7.45 p.m.-9.30 p.m. Meetings: April 7th, Special Exhibition of Specimens.

Vol. XVI. No. 5.



THE ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

EDITED BY

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

ASSISTED BY

T. HUDSON BEARE, B.SC., F.E.S., F.R.S.E.
M. BURR, B.A., F.Z.S., F.L.S., F.E.S. T. A. CHAPMAN, M.D., F.Z.S., F.E.S.
L. B. PROUT, F.E.S. H. ST. J. K. DONISTHORPE, F.Z.S. F.E.S.

APRIL 15th, 1904.

Price Ninepence (NET)

(WITH THREE PLATES)

Subscription for Complete Volume, post free

(Including SPECIAL INDEX and all DOUBLE NUMBERS),

SEVEN SHILLINGS,

TO BE FORWARDED TO

J. HERBERT TUTT,

119, WESTCOMBE HILL, BLACKHEATH, LONDON, S.E.

LONDON:
ELLIOT STOCK, 62, PATERNOSTER ROW, E.C.
BERLIN
R. FRIEDLÄNDER & SOHN,
11, CARLSTRASSE, N.W.
NEW YORK:
Ph. HEINSBERGER, 9, FIRST AVENUE,
NEW YORK, U.S.A.

SUBSCRIBERS who have not yet forwarded their SUBSCRIPTIONS for VOL. XVI are requested to do so without delay.—J. HERBERT TUTT.

NOTICE.

The **Back Volumes** (I-XV) of *The Entomologist's Record*, &c., can be obtained at 10s. 6d. per Volume. Complete set of 15 vols. £5 15s. net. "**Special Index**" to Vols. III., IV., V., VI., VII., VIII., IX., X., XI., XII., XIII., XIV. and XV., price 1/6 each. **Single Back Numbers** can be obtained at DOUBLE the published price from **J. Herbert Tutt, 119, Westcombe Hill, Blackheath, S.E.**

Subscribers who have not yet forwarded subscription for Vol. XV. are kindly requested to do so, to Mr. H. E. Page, Bertrose, Gellatly Road, Hatcham, S.E.

Subscribers are kindly requested to observe that subscriptions to *The Entomologist's Record*, &c., are payable in advance. **The subscription (with or without the Special Index) is Seven Shillings, and must be sent to Mr. J. Herbert Tutt, 119, Westcombe Hill, Blackheath, S.E.** [arrears to end of Vol. XV. to Mr. H. E. PAGE, Bertrose, Gellatly Road, St. Catherine's Park, London, S.E.]. Cheques and Postal Orders should be made payable to J. W. TUTT.

ADVERTISEMENTS of Books and Insects for Sale will be inserted at a minimum charge of 2s. 6d. (for four lines). Longer Advertisements in proportion. A reduction made for a series. Particulars of **Mr. J. Herbert Tutt,** 119, Westcombe Hill, Blackheath, S.E.

Subscribers who change their addresses must report the same to Mr. H. E. PAGE, "Bertrose," Gellatly Road, St. Catherine's Park, London, S.E., otherwise their magazines will probably be delayed.

Articles for insertion and Exchanges should be sent to J. W. TUTT, Rayleigh Villa, Westcombe Hill, S.E., except those relating to Coleoptera, which should be sent to Mr. H. DONISTHORPE, 58, Kensington Mansions, South Kensington, S.W., and those relating to Orthoptera, to Mr. M. BURR, 12, Fitzjames Avenue, South Kensington, S.W.

All Exchange Magazines must be forwarded to J. W. TUTT, Rayleigh Villa, Westcombe Hill, Blackheath, S.E.

Reprints of Articles or Notes (long or short) appearing in this Magazine can be arranged for by Authors at a very low price, if ordered at the time of sending the article (minimum 50), on application to Mr. J. HERBERT TUTT, 119, Westcombe Hill, Blackheath, S.E.

EXCHANGES.—*The use of this column for the offer of Duplicates and Desiderata is open free only to those who subscribe direct, and so far as there is space available.*

EXCHANGE BASKETS.—March 5th, 1904, No. **1** basket.—Messrs. Day, Woodforde, Bower, Studd, Riding, Ovenden, Robertson, Lofthouse, Fox, Horne, Bowles, Mera. February 27th, 1904, No. **2** basket.—Messrs. Riding, Hanbury, Ash, Adkin, Walker, Studd, Buckell, Robertson, Whittle, Atmore, Bower. [Members who wished to be missed must write to the name preceding their own on list, not to the Secretary.] The names of one or two new candidates for admission will be welcomed and room made as opportunity offers. **Some Members are not noting receipt of basket to Secretary on its Arrival to them.**

Duplicates.—Solidaginis. *Desiderata.*—Ova, almost any kind.—*Geo. Rose, The Museum, Keighley.*

Duplicates.—Extersaria*, Strataria*, Betularia*, Miniosa, Artemis*, Fimbria*, Z. trifolii, Filipendulae, S. populi*, Brunnea*, Io*, Edusa, Galatea, Quadra, Monacha, etc., also larvæ of Fimbria, Repandata, Porphyrea, Variata, Fasciaria, Lichenaria, Brunnea, etc. *Desiderata.*—Ova, larvæ and pupæ of many species and ichneumons with data.—*G. T. Lyle, Brockenhurst.*

Duplicates.—Ova of Lobulata, larvæ of Tenuiata, Cerago, Silago, Rurea, Triangulum, Brunnea, Fimbria, Baja and Ianthina. *Desiderata.*—Numerous, ova, larvæ, pupæ, or living females.—*John Carrick, 5, Beckham Terrace, Gateshead-on-Tyne.*

Duplicates.—Larvæ of Fimbria, Brunnea, Festiva, Grossulariata (Bexley). *Desiderata.*—Numerous.—*W. E. Shaw, Salisbury Road, Bexley, Kent.*

Duplicates.—Larvæ: Tenuiata, Rurea, Brunnea, Baja, Triangulum, Lithargyria, Festiva, Ianthina, Fimbria, Silago and Cerago. Ova: Lobulata. *Desiderata.*—Larvæ: Syringaria, Prunaria, Papilionaria, Sambucata. Ova: Illustraria, Advenaria, Dolobraria, Lunaria, Prodromaria, Hirtaria, Opima, Gracilis, Miniosa, Vitalbata, Neustria, Lanestris, etc., also living ♀s of N. lucina.—*J. W. H. Harrison, The Avenue, Birtley, R.S.O. Durham.*

Duplicates.—Larvæ of Liparis dispar. *Desiderata.*—Other larvæ or pupæ.—*(Rev.) E. Grose Hodge, Holy Trinity Rectory, St. Marylebone, N.W.*

Duplicates.—Selene, Porcellus*, Agathina, Glareosa*, Brunnea*, Festiva*, Baja*, Sobrina*, Xanthographa*, Flavago, Alniaria*, Erosaria*, Pennaria, Repandata*, Obfuscaria* fine, Defoliaria*, Boreata*, Cæsiata*, Immanata. All Scotch insects on black pins. *Desiderata.*—Latonia, Iris, W-Album, Pruni, Argiades, Semiargus, Minima, Arion, Lucina, Actæon, Palæmon, Gallii, Livornica, Celerio, Elpenor, Chryson, and many others to extend and renew.—*E. Rogers Bush, 15, Strathmore Street, Perth, N.B.*

Duplicates.—Very many ova and larvæ, also set insects. Send list of wants. *Desiderata.*—Ova: Æscularia, Leucophæaria, Hispidaria, Pulveraria, Piniperda, Miniosa, Gracilis, Vetusta, Unguicula, Spinula, Curtula, Populeti, Advenaria, Consonaria, Pendularia. Living ♀s or Ova (former preferred): Leucographa, C-album, Cardui, Atalanta, Megæra, Rubiginea, Semibrunnea, Psittacata, Miata, Derivata, Lobulata, Hippocastanaria, Ridens, Flavicornis, Or. Larvæ: Artemis (except from Westmeath and Cumberland), Plantaginis, Fascelina, Cratægi, Lanestris, Quercifolia, Prunaria, Repandata, also many other ova and larvæ.—*L. W. Newman, Bexley, Kent.*

Duplicates.—Butterflies from Darjeeling. *Desiderata.*—British lepidoptera.—*(Rev.) Arthur M. Downes, Batheaston Vicarage, Bath.*

Desiderata.—Quantity of healthy pupæ of A. rumicis for scientific experimental purposes:—Will any collectors who have any for exchange or sale kindly communicate with me, even a few acceptable.—*L. W. Newman, Bexley, Kent.*

Information waeted.—Will any collectors who have made observations of Rhopalocera in France other than in the Alps, Riviera, or Pyreenees, kindly communicate with me, or refer me to any local lists.—*H. Rowland-Brown, Harrow-Weald.*

Wanted.—The *Entomologist* for 1882, second hand. Lowest price to—*(Rev.) C. R. N. Burrows, The Vicarage, Mucking, Stanford-le-Hope, Essex.*

Wanted.—British and European Tortricids, especially those species credited to both Europe and America in Meyrick's *Handbook* and Staudinger and Rebel's *Catalog*, pinned and set in English style acceptable. Will make liberal returns in any family of North American Lepidoptera named or other orders unnamed.—*W. D. Kearfott, 114, Liberty Street, New York City, U.S.A.*

Wanted Coleophorids.—As I wish to breed and record the life-history of all the species of *Coleophora*, I should be pleased to receive any cases and living larvæ which entomologists may meet with. I will do what I can in return.—*Hy. J. Turner, 98, Drakefell Road, St. Catherine's Park, New Cross, S.E.*

Wanted (to figure).—Examples of the following larvæ or pupæ: Antiopa, Lathonia, Daplidice, Edusa, Hyale, Livornica, Pinastri, Celerio, Gallii. Will any lepidopterist who collects abroad kindly remember my wants when opportunity occurs of obtaining any of them?—*J. C. Dollman, Hove House, Newton Grove, Bedford Park, W.*

Exchange.—I am desirous of obtaining butterflies from the Malayan Archipelago, and the Pacific Islands. For such I offer perfect diurnals from North and South America, North American Coleoptera.—*Leri W. Mengel, Boys' High School, Reading, Pa., U.S.A.*

Wanted.—Erycinidæ of the world. Offer for same Diurni from United States.—*Leri W. Mengel, Boys' High School, Reading, Pa., U.S.A.*

Parasitical Diptera wanted.—Will lepidopterists who may breed any dipterous parasites from larvæ or pupæ kindly forward such as they do not require to me? If so I shall be greatly obliged. *C. J. Wainwright, 2, Handsworth Wood Road, Handsworth, Staffs.*

MEETINGS OF SOCIETIES.

Entomological Society of London.—11, Chandos Street, Cavendish Square, W., 8 p.m. Meetings: April 20th, May 4th, June 1st. April 20th, Paper, "Nature's Protection of Insect Life," illustrated by Colour Photography, by Frederick Enock, F.L.S.; Discussion "On Specimens of the Dipterous Families *Stratiomyidae* and *Cyrtidae*," by Mr. G. H. Verrall, Colonel Yerbury, R.A., and others.

The City of London Entomological and Natural History Society. — London Institution, Finsbury Circus, E.C.—The first and third Tuesdays in the month, at 7.30 p.m. April 19th, Paper on "Leaf Miners," by Mr. A. Sich, F.E.S.

Toynbee Hall Natural History Society.—Held at Toynbee Hall, Commercial Street, E., Mondays, at 8 p.m. Entrance Fee, 1s.; Annual Subscription, 1s.—Hon. Sec. G. E. Shaw, 45, Colworth Road, Leytonstone, N.E.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge.—The second and fourth Thursdays in each month, at 8 p.m. April 28th, "Notes on Argyroneta aquatica and other Spiders," Rev. F. H. Wood, M.A. May 12th, "Notes on British Orthoptera" (lantern), W. J. Lucas, B.A.; May 14th, Field Meeting to Epsom, etc., L.S.W.R. and L.B.S.C.R., conductor, E. Step; May 26th, "Collecting Butterflies in Switzerland," H. Rowland-Brown, F.E.S.

North London Natural History Society, Hackney Technical Institute, adjoining Hackney Downs Stations, G.E.R.—Meetings 7.45 p.m. April 26th, "The Essex Marshlands," Rev. C. R. N. Burrows; April 30th, Cycle run to Shenley (Green Lanes Station, 3.30 p.m.). May 23rd, Excursion to Watford (Leader, C. Nicholson); May 28th, Cycle run to Aveley (Forest Gate Station, 3.30 p.m.).

FOR SALE.

Copies of HÜBNER'S

Tentamen determinationis digestionis atque denominationis singularum stirpium Lepidopterorum, etc.

PRICE 6d. EACH.

Only two copies of the original are known, one in Berlin and one in England. A reprint made by Scudder some years ago is also unobtainable except occasionally at a very high price. The copy used in the South Kensington Museum is a hand-written one. The 50 copies now on hand have been especially printed for museums and private students. The first 30 copies will be sold at 6d. each, the last 20 at a much higher price.

J. HERBERT TUTT, 119, Westcombe Hill, Blackheath, S.E.

TO BOOKSELLERS, LIBRARIANS, AND STUDENTS.

GREAT BARGAIN.

A Complete Set of

The Entomologist's Record & Journal of Variation.

VOLS. I.-XV.—New and Uncut.

Price £4 10s., or with **13 special indexes, £5.**

Also a Set of

The Natural History of the British Lepidoptera.

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

VOLS. I.-III.—Quite New and Unused.

Price £2 5s.

Also a Set of

The British Noctuæ and their Varieties.

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

VOLS. I.-IV.—New and Unused.

Price £1 2s.

A saving of more than 25 per cent. on the lowest published prices.

A. H., 41, Wisteria Road, LEWISHAM, S.E.

FOR SALE.—*NOTICE TO LIBRARIANS & STUDENTS.*

A New Copy of

BOMBYCINE MOTHS of NORTH AMERICA

By A. S. PACKARD, Ph.D., Hon. F.E.S., etc.

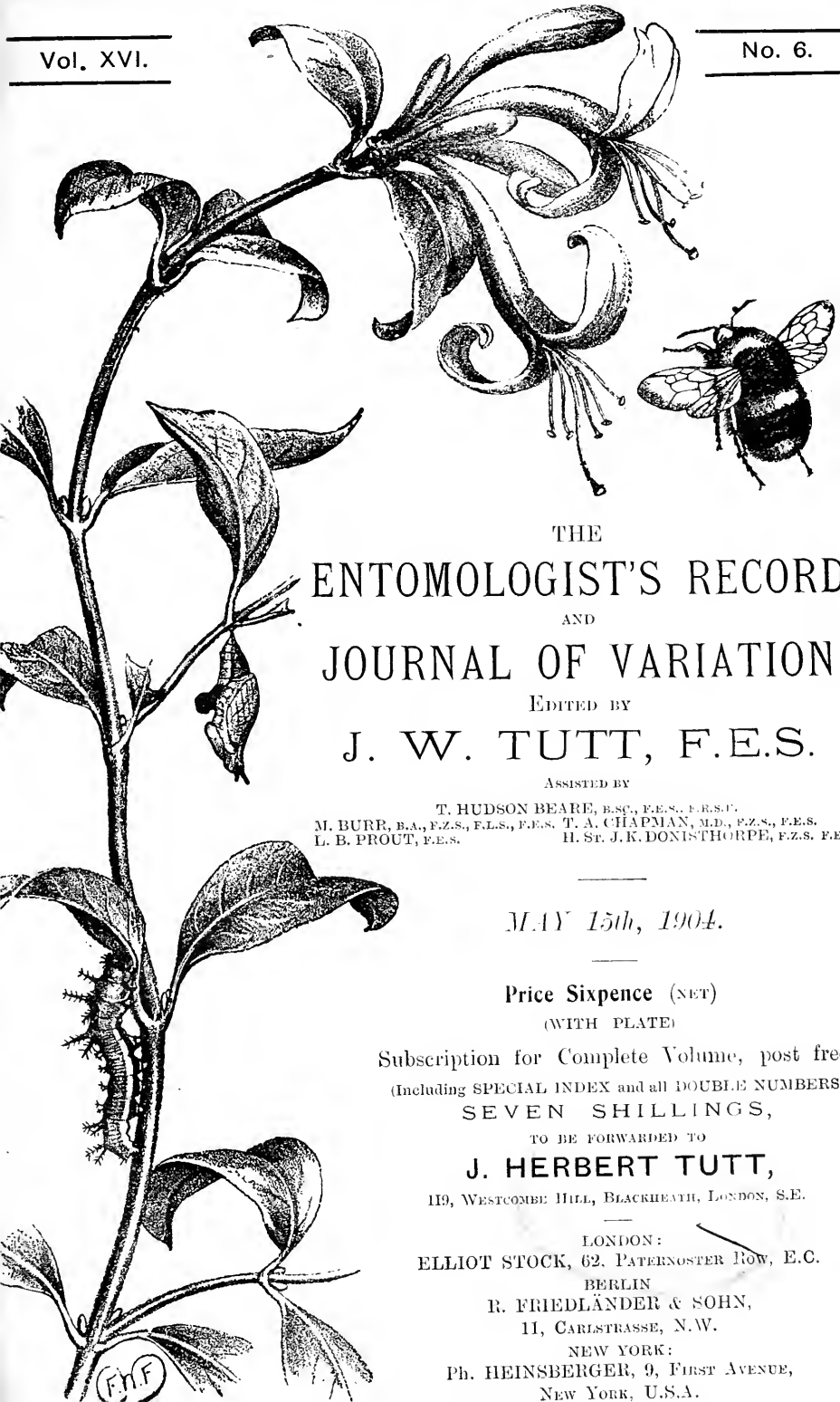
PRICE £2 15s.

Large quarto Volume. Forty-seven full-size chromo-lithograph plates of larvæ, imagines, neurations, etc., of the Notodontid moths; 10 maps, with letterpress, indexes, etc., etc.

This book, issued by the Smithsonian Institution, is not on sale in the ordinary way, and is only obtainable when occasional copies come into the market. The few copies sold at present have been priced at from £3 3s. to £3 15s. on the sale catalogues. The number of references to this work in the general chapters of Vols. I. and II. of Mr. Tutt's large work *A Natural History of the British Lepidoptera* suggests its great importance to scientific lepidopterists.

A. H., 41, Wisteria Road, LEWISHAM, S.E.

Vol. XVI. No. 6.



THE ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

EDITED BY

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

ASSISTED BY

T. HUDSON BEARE, B.SC., F.E.S., F.R.S.E.
M. BURR, B.A., F.Z.S., F.L.S., F.E.S. T. A. CHAPMAN, M.D., F.Z.S., F.E.S.
L. B. PROUT, F.E.S. H. ST. J. K. DONISTHORPE, F.Z.S. F.E

MAY 15th, 1904.

Price Sixpence (NET)
(WITH PLATE)

Subscription for Complete Volume, post free
(Including SPECIAL INDEX and all DOUBLE NUMBERS)
SEVEN SHILLINGS,
TO BE FORWARDED TO
J. HERBERT TUTT,
119, WESTCOMBE HILL, BLACKHEATH, LONDON, S.E.

LONDON:
ELLIOT STOCK, 62, PATERNOSTER ROW, E.C.
BERLIN
R. FRIEDLÄNDER & SOHN,
11, CARLSTRASSE, N.W.
NEW YORK:
Ph. HEINSBERGER, 9, FIRST AVENUE,
NEW YORK, U.S.A.

SUBSCRIBERS who have not yet forwarded their SUBSCRIPTIONS for VOL. XVI are requested to do so without delay.—J. HERBERT TUTT.

NOTICE.

The **Back Volumes** (I-XV) of *The Entomologist's Record*, &c., can be obtained at 10s. 6d. per Volume. Complete set of 15 vols. £5 15s. net. "**Special Index**" to Vols. III., IV., V., VI., VII., VIII., IX., X., XI., XII., XIII., XIV. and XV., price 1/6 each. **Single Back Numbers** can be obtained at DOUBLE the published price from **J. Herbert Tutt, 119, Westcombe Hill, Blackheath, S.E.**

Subscribers who have not yet forwarded subscription for Vol. XV. are kindly requested to do so, to Mr. H. E. Page, Bertrose, Gellatly Road, Hatcham, S.E.

Subscribers are kindly requested to observe that subscriptions to *The Entomologist's Record*, &c., are payable in advance. **The subscription (with or without the Special Index) is Seven Shillings, and must be sent to Mr. J. Herbert Tutt, 119, Westcombe Hill, Blackheath, S.E.** [arrears to end of Vol. XV. to Mr. H. E. PAGE, Bertrose, Gellatly Road, St. Catherine's Park, London, S.E.]. Cheques and Postal Orders should be made payable to J. W. TUTT.

ADVERTISEMENTS of Books and Insects for Sale will be inserted at a minimum charge of 2s. 6d. (for four lines). Longer Advertisements in proportion. A reduction made for a series. Particulars of **Mr. J. Herbert Tutt,** 119, Westcombe Hill, Blackheath, S.E.

Subscribers who change their addresses must report the same to Mr. H. E. PAGE, "Bertrose," Gellatly Road, St. Catherine's Park, London, S.E., otherwise their magazines will probably be delayed.

Articles for insertion and Exchanges should be sent to J. W. TUTT, Rayleigh Villa, Westcombe Hill, S.E., except those relating to Coleoptera, which should be sent to Mr. H. DONISTHORPE, 58, Kensington Mansions, South Kensington, S.W., and those relating to Orthoptera, to Mr. M. BURR, Royal Societies' Club, St. James's, W.

All Exchange Magazines must be forwarded to J. W. TUTT, Rayleigh Villa, Westcombe Hill, Blackheath, S.E.

Reprints of Articles or Notes (long or short) appearing in this Magazine can be arranged for by Authors at a very low price, if ordered at the time of sending the article (minimum 50), on application to Mr. J. HERBERT TUTT, 119, Westcombe Hill, Blackheath, S.E.

EXCHANGES.—*The use of this column for the offer of Duplicates and Desiderata is open free only to those who subscribe direct, and so far as there is space available.*

EXCHANGE BASKETS.—March 5th, 1904, No. **1** basket.—Messrs. Day, Woodforde, Bower, Studd, Riding, Ovenden, Robertson, Lofthouse, Fox, Horne, Bowles, Mera. April 23rd, 1904, No. **2** basket.—Messrs. Riding, Atmore, Ash, Robertson, Walker, Adkin, Studd, Whittle, Bower, Buckell, Hanbury. [Members who wish to be missed must write to the name preceding their own on list, not to the Secretary.] The names of one or two new candidates for admission will be welcomed and room made as opportunity offers. **Some Members are not noting receipt of basket to Secretary on its Arrival to them.**

Duplicates.—Edusa, Polychloros,* Bellargus, Miniata, Sororcula, Irrorella, Sphinx (Cassinea) ♂ ♂, Pisi, Porata, Bistortata, Angustalis, Nervosa, Humeralis (Lyelella), Alcyonipennella,* Badiipennella,* Bicolorella,* Fuscocuprella,* Wilkinsoni,* Lantella,* Lantanella,* Cerasicolella,* Insignitella,* Spinicolella,* Corylifoliella,* Conconiella,* Trifasciella,* etc. Larvæ of T. quercûs, Sphinx, Lichenaria, etc. *Desiderata.*—Numerous, especially larvæ for perservation.—*E. F. Studd, Orton, Exeter.*

Duplicates.—Ova, larvæ, pupæ of New Forest species. *Desiderata.*—Ova, larvæ, pupæ.—*E. Morris, Highbury House, Brockenhurst.*

Duplicates.—Larvæ of Smaragdaria. *Desiderata.*—Iris, Sesiidæ.—*G. R. Baldock, Oakburn Villa, Enfield Highway.*

Duplicates.—Butterflies from Darjeeling. *Desiderata.*—British lepidoptera.—(*Rev.*) *Arthur M. Downes, Bathcaston Vicarage, Bath.*

INFORMATION WANTED.—Will any collectors who have made observations of Rhopalocera in France other than in the Alps, Riviera, or Pyreenees, kindly communicate with me, or refer me to any local lists.—*H. Rowland-Brown, Harrow-Weald.*

WANTED.—Fertile eggs of Revayana (Undulanus). Good price given.—*J. A. Clark, 57, Weston Park, Crouch End, N.*

WANTED.—Menyanthidis, two each of the type, *ab.* obsoleta, *ab.* scotica, and *ab.* suffusa (as described in Tutt's *British Noctuæ*). Purchase or exchange.—*M. Gillmer, 2, Schlossplatz, Cöthen, Anhalt, Germany.*

WANTED.—British and European Tortricids, especially those species credited to both Europe and America in Meyrick's *Handbook* and Staudinger and Rebel's *Catalog*, pinned and set in English style acceptable. Will make liberal returns in any family of North American Lepidoptera named or other orders unnamed.—*W. D. Kearfott, 114, Liberty Street, New York City, U.S.A.*

WANTED COLEOPHORIDS.—As I wish to breed and record the life-history of all the species of *Coleophora*, I should be pleased to receive any cases and living larvæ which entomologists may meet with. I will do what I can in return.—*Hy. J. Turner, 98, Drakefell Road, St. Catherine's Park, New Cross, S.E.*

WANTED (to figure).—Examples of the following larvæ or pupæ: Antiopa, Lathonia, Daplidice, Edusa, Hyale, Livornica, Pinastri, Celerio, Gallii. Will any lepidopterist who collects abroad kindly remember my wants when opportunity occurs of obtaining any of them?—*J. C. Dollman, Hove House, Newton Grove, Bedford Park, W.*

EXCHANGE.—I am desirous of obtaining butterflies from the Malayan Archipelago, and the Pacific Islands. For such I offer perfect diurnals from North and South America, North American Coleoptera.—*Levi W. Mengel, Boys' High School, Reading, Pa., U.S.A.*

WANTED.—Erycinidæ of the world. Offer for same Diurni from United States.—*Levi W. Mengel, Boys' High School, Reading, Pa., U.S.A.*

PARASITICAL DIPTERA WANTED.—Will lepidopterists who may breed any dipterous parasites from larvæ or pupæ kindly forward such as they do not require to me? If so I shall be greatly obliged.—*C. J. Wainwright, 2, Handsworth Wood Road, Handsworth, Staffs.*

CHANGES OF ADDRESS.—*G. R. Baldock* to *Oakburn Villa, Enfield Highway, Middlesex. E. G. Broome* to *Sunset Villa, Hamilton, Bermuda. E. B. Bishop* to *2, Hunter Road, Guildford. C. A. Bird* to *The Mertons, Tintern, Monmouth. M. Burr* to *Royal Societies' Club, St. James's, S.W. W. G. Sheldon* to *Youlgreave, South Croydon.*

MEETINGS OF SOCIETIES.

Entomological Society of London.—11, Chandos Street, Cavendish Square, W., 8 p.m. Meetings: June 1st. October 5th.

The City of London Entomological and Natural History Society. - London Institution, Finsbury Circus, E.C.—The first and third Tuesdays in the month, at 7.30 p.m.

Toynbee Hall Natural History Society.—Held at Toynbee Hall, Commercial Street, E., Mondays, at 8 p.m. Entrance Fee, 1s.; Annual Subscription, 1s.—Hon. Sec. G. E. Shaw, 45, Colworth Road, Leytonstone, N.E. Meetings:—June 6th, July 4th. Excursions:—May 28th, Kingswood, Train 2.15 p.m., London Bridge, S.E.C.R.; June 5th, Chislehurst, Train 9.15 a.m., Cannon Street; June 11th, Esher and Oxshott, Train, 2.28 p.m. Waterloo.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge.—The second and fourth Thursdays in each month, at 8 p.m. May 26th, "Collecting Butterflies in Switzerland," H. Rowland-Brown, F.E.S. June 4th, Field Meeting at Bookham, L.S.W.R., conducted by E. Step, F.L.S.; June 9th, "Spring Notes," from various members; June 23rd, General Exhibits and Reports; June 25th, Field Meeting at Eynesford, S.E. & C.R., conducted by R. Adkin, F.E.S.

North London Natural History Society, Hackney Technical Institute, adjoining Hackney Downs Stations, G.E.R.—Meetings 7.45 p.m. May 23rd, Excursion to Watford (Leader, C. Nicholson); May 28th, Cycle run to Aveley (Forest Gate Station, 3.30 p.m.). June 4th, Visit to Broxbourne, Liverpool Street, 3.0 p.m., fare 1s. 6d.; June 14th, "Pond-life," with demonstrations, by C. Nicholson, F.E.S. Excursion to Caterham Valley, Cannon Street, 2.16 p.m., fare 1s. 9d.

Important Natural History Library.

MR. C. J. STEVENS

Will OFFER, at his Rooms, 38, King Street, Covent Garden, London, W.C., on

TUESDAY, MAY 17th, at 12.30,

The FIRST PORTION of the fine and

EXTENSIVE LIBRARY

Of the late PHILIP BROOKES MASON, Esq., M.R.C.S., F.L.S., F.Z.S., F.E.S., etc., of Trent House, Burton-on-Trent.

Comprising many scarce and valuable works on Entomology, Ornithology, Botany, long series of Natural History Journals, Publications of Learned Societies, etc., etc.

On view day prior 10 to 4 and Morning of Sale. Catalogues in course of preparation.

Important Collection of British Lepidoptera.

MR. J. C. STEVENS,

38, KING STREET, COVENT GARDEN, LONDON, W.C.,

Begs to announce that he will shortly SELL by AUCTION (unless previously Sold by Private Treaty) the Valuable and Extensive Collection of

BRITISH LEPIDOPTERA

Formed by the late PHILIP BROOKES MASON, Esq., M.R.C.S., F.C.S., F.Z.S., F.E.S., of Trent House, Burton-on-Trent.

In square crown 8vo., tastefully bound and fully illustrated. Price 6s. net.

A Gloucestershire Wild Garden.

WITH SOME EXTRANEOUS MATTER.

By "CURATOR."

A chatty account of the successful attempt to maintain a sub-tropical garden in perfection, the result being shown in lovely pictures of tropical secenery and picturesque corners illustrating the author's account of his labours and their result.

"The book is worthy the attention of all garden lovers. The author's style, chatty and diffuse, will attract some people more than others, but the numerous illustrations, which testify to the ample scope and splendid success of this experiment in sub-tropical culture in a West-Midland county, will excite envy and perhaps emulation."—*Western Morning News.*

Tastefully printed, crown 8vo., handsomely bound, with gilt edges, and illustrated price 5s.

Nature's Fairy Land,

RAMBLES BY WOODLAND, MEADOW, STREAM AND SHORE.

By W. H. S. Worsley Benison.

"A series of delightfully-written chapters. Mr. Worsley Benison is an enthusiastic naturalist, and we cordially commend his book to our readers."—*Science Gossip.*

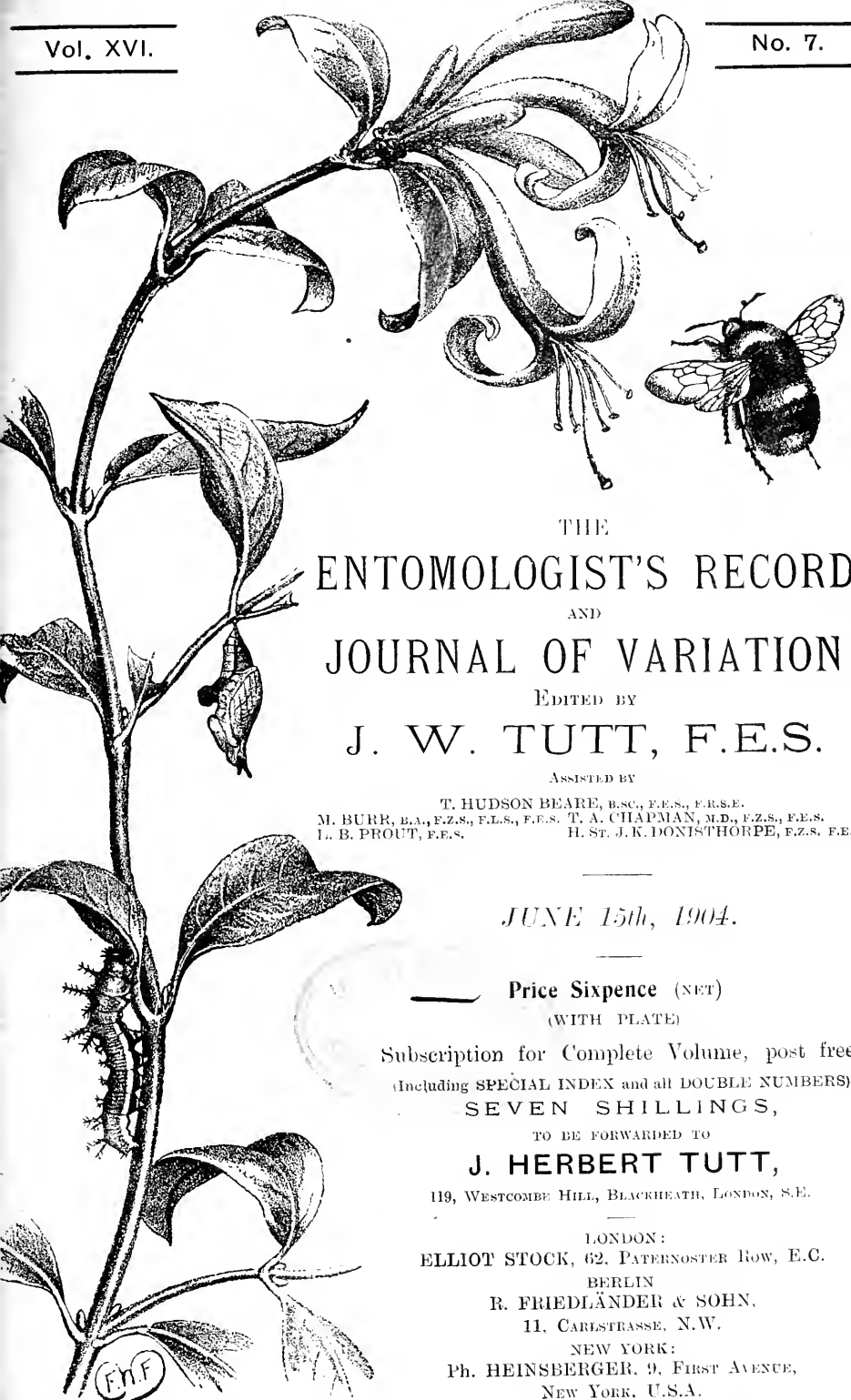
Companion volume to the above, by the same Author, crown 8vo., cloth, gilt edges, illustrated, price 5s.

Haunts of Nature.

Birds, Insects, Fishes, Flowers, Plants, and many other interesting objects of the country are introduced and chatted about in entertaining and instructive fashion.

ELLIOT STOCK, 62, PATERNOSTER ROW, LONDON.

Vol. XVI. No. 7.



THE ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

EDITED BY

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

ASSISTED BY

T. HUDSON BEARE, B.SC., F.E.S., F.R.S.E.
M. BURR, B.A., F.Z.S., F.L.S., F.E.S. T. A. CHAPMAN, M.D., F.Z.S., F.E.S.
L. B. PROUT, F.E.S. H. ST. J. K. DONISTHORPE, F.Z.S. F.E.S

JUNE 15th, 1904.

Price Sixpence (NET)

(WITH PLATE)

Subscription for Complete Volume, post free

(Including SPECIAL INDEX and all DOUBLE NUMBERS),

SEVEN SHILLINGS,

TO BE FORWARDED TO

J. HERBERT TUTT,

119, WESTCOMBE HILL, BLACKHEATH, LONDON, S.E.

LONDON:
ELLIOT STOCK, 62, PATERNOSTER ROW, E.C.
BERLIN
R. FRIEDLÄNDER & SOHN,
11, CARLSTRASSE, N.W.
NEW YORK:
Ph. HEINSBERGER, 9, FIRST AVENUE,
NEW YORK, U.S.A.

SUBSCRIBERS who have not yet forwarded their SUBSCRIPTIONS for VOL. XVI are requested to do so without delay.—J. HERBERT TUTT.

NOTICE.

The **Back Volumes** (I-XV) of *The Entomologist's Record*, &c., can be obtained at 10s. 6d. per Volume. Complete set of 15 vols. £5 15s. net. "**Special Index**" to Vols. III., IV., V., VI., VII., VIII., IX., X., XI., XII., XIII., XIV. and XV., price 1/6 each. **Single Back Numbers** can be obtained at DOUBLE the published price from **J. Herbert Tutt, 119, Westcombe Hill, Blackheath, S.E.**

Subscribers who have not yet forwarded subscription for Vol. XV. are kindly requested to do so. to Mr. H. E. Page, Bertrose, Gellatly Road, Hatcham, S.E.

Subscribers are kindly requested to observe that subscriptions to *The Entomologist's Record*, &c., are payable in advance. **The subscription (with or without the Special Index) is Seven Shillings, and must be sent to Mr. J. Herbert Tutt, 119, Westcombe Hill, Blackheath, S.E.** [arrears to end of Vol. XV. to Mr. H. E. PAGE, Bertrose, Gellatly Road, St. Catherine's Park, London, S.E.]. Cheques and Postal Orders should be made payable to J. W. TUTT.

ADVERTISEMENTS of **Books and Insects for Sale** will be inserted at a minimum charge of 2s. 6d. (for four lines). Longer Advertisements in proportion. A reduction made for a series. Particulars of **Mr. J. Herbert Tutt,** 119, Westcombe Hill, Blackheath, S.E.

Subscribers who **change their addresses** must report the same to Mr. H. E. PAGE, "Bertrose," Gellatly Road, St. Catherine's Park, London, S.E., otherwise their magazines will probably be delayed.

Articles for insertion and Exchanges should be sent to J. W. TUTT, Rayleigh Villa, Westcombe Hill, S.E., except those relating to Coleoptera, which should be sent to Mr. H. DONISTHORPE, 58, Kensington Mansions, South Kensington, S.W.

All **Exchange Magazines** must be forwarded to J. W. TUTT, Rayleigh Villa, Westcombe Hill, Blackheath, S.E.

Reprints of Articles or Notes (long or short) appearing in this Magazine can be arranged for by Authors at a very low price, if ordered at the time of sending the article (minimum 50), on application to Mr. J. HERBERT TUTT, 119, Westcombe Hill, Blackheath, S.E.

EXCHANGES.—*The use of this column for the offer of Duplicates and Desiderata and changes of address is open free only to those who subscribe direct, and so far as there is space available.*

EXCHANGE BASKETS.—June 4th, 1904, No. **1** basket.—Messrs. Bower, Riding, Studd, Horne, Robertson, Ovenden, Lofthouse, Fox, Mera, Bowles, Day. April 23rd, 1904, No. 2 basket.—Messrs. Riding, Atmore, Ash, Robertson, Walker, Adkin, Studd, Whittle, Bower, Buckell, Hanbury. [Members who wish to be missed must write to the name preceding their own on list, not to the Secretary.] The names of one or two new candidates for admission will be welcomed and room made as opportunity offers. **Some Members are not noting receipt of basket to Secretary on its Arrival to them.**

Duplicates.—Edusa, Polychloros,* Bellargus, Miniata, Sororcula, Irrorella, Sphinx (Cassinea) ♂ ♂, Pisi, Porata, Bistortata, Angustalis, Nervosa, Humeralis (Lyelella), Alcyonipennella,* Badiipennella,* Bicolorella,* Fuscocuprella,* Wilkinsoni,* Lautella,* Lantanella,* Cerasicolella,* Insignitella,* Spinicolella,* Corylifoliella,* Conconitella,* Trifasciella,* etc. Larvæ of T. quercûs, Sphinx, Lichenaria, etc. *Desiderata.*—Numerous, especially larvæ for perservation.—*E. F. Studd, Oxton, Exeter.*

Duplicates.—Ova, larvæ, pupæ of New Forest species.* *Desiderata.*—Ova, larvæ, pupæ.—*E. Morris, Highbury House, Brockenhurst.*

Duplicates.—Extersaria, Consortaria, Bombyliformis, Batis, and many others. *Desiderata.*—Ova, larvæ, and pupæ.—*E. Morris, Brockenhurst, New Forest.*

INFORMATION WANTED.—Will any collectors who have made observations of Rhopalocera in France other than in the Alps, Riviera, or Pyreenees, kindly communicate with me, or refer me to any local lists.—*H. Rowland-Brown, Harrow-Weald.*

WANTED.—Fertile eggs or larvæ of Revayana (Undulanus). Good price given.—*J. A. Clark, 57, Weston Park, Crouch End, N.*

WANTED.—Menyanthidis, two each of the type, *ab.* obsoleta, *ab.* scotica, and *ab.* suffusa (as described in Tutt's *British Noctuæ*). Purchase or exchange. *M. Gillmer, 2, Schlossplatz, Cöthen, Anhalt, Germany.*

WANTED.—British and European Tortricids, especially those species credited to both Europe and America in Meyrick's *Handbook* and Staudinger and Rebel's *Catalog*, pinned and set in English style acceptable. Will make liberal returns in any family of North American Lepidoptera named or other orders unnamed.—*W. D. Kearfott, 114, Liberty Street, New York City, U.S.A.*

WANTED COLEOPHORIDS.—As I wish to breed and record the life-history of all the species of *Coleophora*, I should be pleased to receive any cases and living larvæ which entomologists may meet with. I will do what I can in return.—*Hy. J. Turner, 98, Drakefell Road, St. Catherine's Park, New Cross, S.E.*

WANTED (to figure).—Examples of the following larvæ or pupæ: Antiopa, Lathonia, Edusa, Hyale, Livornica, Pinastri, Celerio, Gallii. Will any lepidopterist who

collects abroad kindly remember my wants when opportunity occurs of obtaining any of them ?—*J. C. Dollman, Hove House, Newton Grove, Bedford Park, W.*

EXCHANGE.—I am desirous of obtaining butterflies from the Malayan Archipelago, and the Pacific Islands. For such I offer perfect diurnals from North and South America, North American Coleoptera.—*Levi W. Mengel, Boys' High School, Reading, Pa., U.S.A.*

WANTED.—Erycinidæ of the world. Offer for same Diurni from United States.—*Levi W. Mengel, Boys' High School, Reading, Pa., U.S.A.*

PARASITICAL DIPTERA WANTED.—Will lepidopterists who may breed any dipterous parasites from larvæ or pupæ kindly forward such as they do not require to me ? If so I shall be greatly obliged.—*C. J. Wainwright, 2, Handsworth Wood Road, Handsworth, Staffs.*

CHANGE OF ADDRESS.—*F. Gayner, Orshott, Surrey. Ernest A. Elliott, 16, Belsize Grove, Hampstead, N.W.*

MEETINGS OF SOCIETIES.

Entomological Society of London.—11, Chandos Street, Cavendish Square, W., 8 p.m. Meetings : October 5th, 19th.

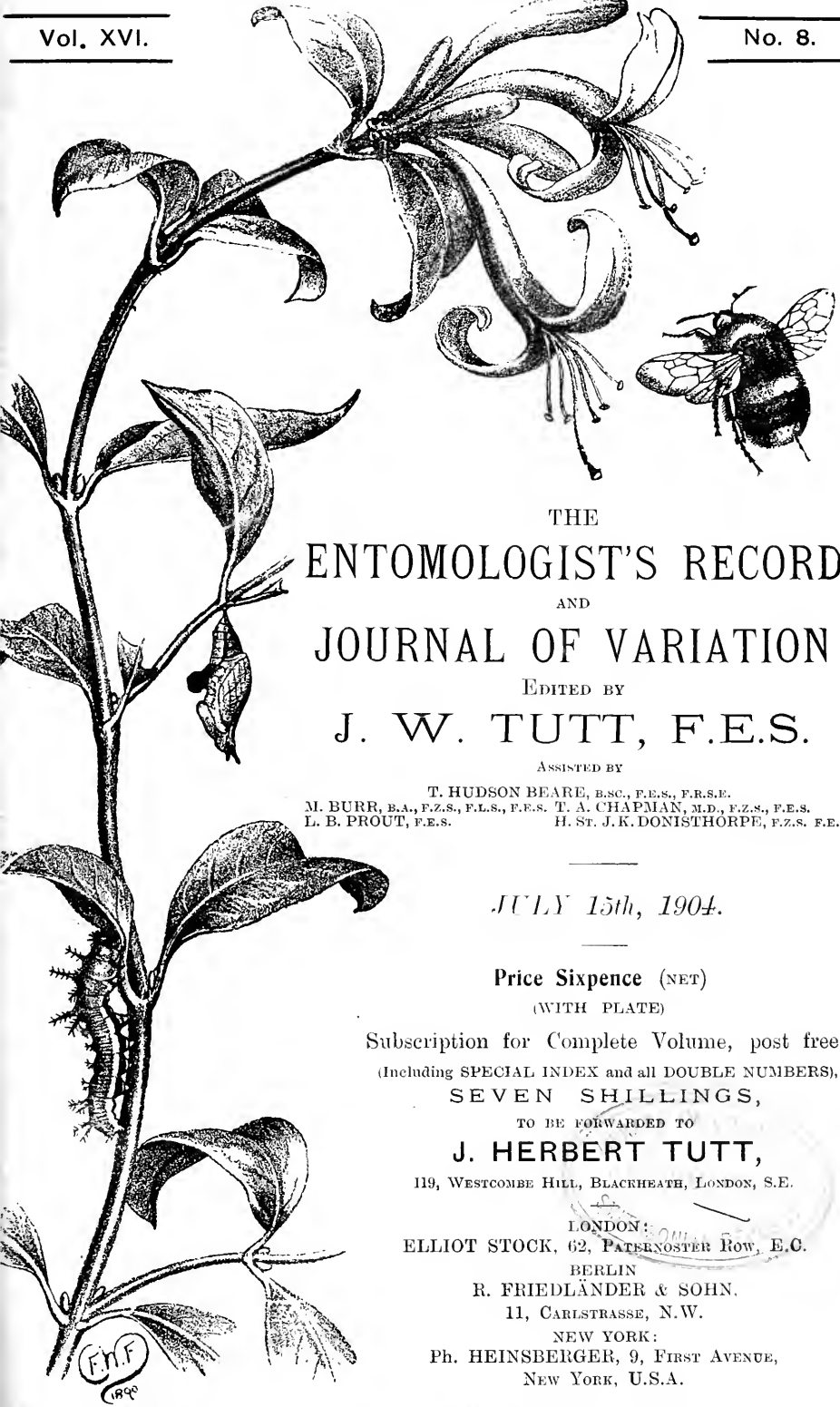
The City of London Entomological and Natural History Society.—London Institution, Finsbury Circus, E.C.—The first and third Tuesdays in the month, at 7.30 p.m.

Toynbee Hall Natural History Society.—Held at Toynbee Hall, Commercial Street, E., Mondays, at 8 p.m. Entrance Fee, 1s.; Annual Subscription, 1s.—Hon. Sec. Owen Monk, 8, Shooter's Hill Road, Blackheath, S.E. Meetings :—July 4th. Excursions :—June 19th, Sevenoaks, train 9.15 a.m., Cannon Street, 1s. 9d.; June 25th, Broxbourne, train 2.15 p.m., Liverpool Street, 1s. 9d. July 3rd, Amersham, train 10.7 a.m., Baker Street, 2s. 6d.; July 9th, Bookham, train 10.5 a.m., Waterloo, 2s.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge.—The second and fourth Thursdays in each month, at 8 p.m. June 23rd, General Exhibits and Reports; June 25th, Field Meeting at Eynesford, S.E. & C.R., conducted by R. Adkin, F.E.S.; July 9th, Field Meeting at Mickleham, L.B.S.C.R. and L.S.W.R., conducted by E. Step, F.L.S.; July 14th, general Exhibits and Reports; July 23rd, Field Meeting at Byfleet, L.S.W.R., conducted by W. J. Lucas, B.A.

North London Natural History Society, Hackney Technical Institute, adjoining Hackney Downs Stations, G.E.R.—Meetings 7.45 p.m. June 25th, Excursion to Caterham Valley, Cannon Street, 2.16 p.m., fare 1s. 9d.; June 28th, "Mountaineering Technique for Field Naturalists," Rudolf Cyriax.

Vol. XVI. No. 8.



THE ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

EDITED BY

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

ASSISTED BY

T. HUDSON BEARE, B.SC., F.E.S., F.R.S.E.
M. BURR, B.A., F.Z.S., F.L.S., F.E.S. T. A. CHAPMAN, M.D., F.Z.S., F.E.S.
L. B. PROUT, F.E.S. H. ST. J. K. DONISTHORPE, F.Z.S. F.E.S.

JULY 15th, 1904.

Price Sixpence (NET)
(WITH PLATE)

Subscription for Complete Volume, post free
(Including SPECIAL INDEX and all DOUBLE NUMBERS),
SEVEN SHILLINGS,
TO BE FORWARDED TO

J. HERBERT TUTT,
119, WESTCOMBE HILL, BLACKHEATH, LONDON, S.E.

LONDON:
ELLIOT STOCK, 62, PATERNOSTER ROW, E.C.
BERLIN
R. FRIEDLÄNDER & SOHN,
11, CARLSTRASSE, N.W.
NEW YORK:
Ph. HEINSBERGER, 9, FIRST AVENUE,
NEW YORK, U.S.A.

A few SUBSCRIBERS are giving very unnecessary trouble with their current SUBSCRIPTIONS. Those SUBSCRIBERS who have not yet forwarded their SUBSCRIPTIONS for VOL. XVI are requested to do so please without delay.—J. HERBERT TUTT.

NOTICE.

The **Back Volumes** (I-XV) of *The Entomologist's Record*, &c., can be obtained at 10s. 6d. per Volume. Complete set of 15 vols. £5 15s. net. "**Special Index**" to Vols. III., IV., V., VI., VII., VIII., IX., X., XI., XII., XIII., XIV. and XV., price 1/6 each. **Single Back Numbers** can be obtained at DOUBLE the published price from **J. Herbert Tutt, 119, Westcombe Hill, Blackheath, S.E.**

Subscribers are kindly requested to observe that subscriptions to *The Entomologist's Record*, &c., are payable in advance. **The subscription (with or without the Special Index) is Seven Shillings, and must be sent to Mr. J. Herbert Tutt, 119, Westcombe Hill, Blackheath, S.E.** Cheques and Postal Orders should be made payable to J. W. TUTT.

ADVERTISEMENTS of **Books and Insects for Sale** will be inserted at a minimum charge of 2s. 6d. (for four lines). Longer Advertisements in proportion. A reduction made for a series. Particulars of **Mr. J. Herbert Tutt**, 119, Westcombe Hill, Blackheath, S.E.

Subscribers who **change their addresses** must report the same to Mr. H. E. PAGE, "Bertrose," Gellatly Road, St. Catherine's Park, London, S.E., otherwise their magazines will probably be delayed, also to Mr. J. HERBERT TUTT, 119, Westcombe Hill, Blackheath, S.E.

Articles for insertion and Exchanges should be sent to J. W. TUTT, Rayleigh Villa, Westcombe Hill, S.E., except those relating to Coleoptera, which should be sent to Mr. H. DONISTHORPE, 58, Kensington Mansions, South Kensington, S.W.

All **Exchange Magazines** must be forwarded to J. W. TUTT, Rayleigh Villa, Westcombe Hill, Blackheath, S.E.

Reprints of Articles or Notes (long or short) appearing in this Magazine can be arranged for by Authors at a very low price, if ordered at the time of sending the article (minimum 50), on application to Mr. J. HERBERT TUTT, 119, Westcombe Hill, Blackheath, S.E.

EXCHANGES.—*The use of this column for the offer of Duplicates and Desiderata and changes of address is open free to those Entomologists who subscribe direct, and so far as there is space available.*

EXCHANGE BASKETS.—June 4th, 1904, No. **1** basket.—Messrs. Bower, Riding, Studd, Horne, Robertson, Ovenden, Lofthouse, Fox, Mera, Bowles, Day. April 23rd, 1904, No. **2** basket.—Messrs. Whittle, Atmore, Studd, Ash, Bower, Riding, Walker, Adkin, Ovenden, Robertson. [Members who wish to be missed must write to the name preceding their own on list, not to the Secretary.] The names of one or two new candidates for admission will be welcomed and room made as opportunity offers. **Some Members are not noting receipt of basket to Secretary on its Arrival to them.**

Duplicates.—Edusa, Polychloros,* Bellargus, Miniata, Sororcula, Irrorella, Sphinx (Cassinea) *♂ ♀*, Pisi, Porata, Bistortata, Angustalis, Nervosa, Humeralis (Lyelella), Alcyonipennella,* Badiipennella,* Bicolorella,* Fuscocuprella,* Wilkinsoni,* Lautella,* Lantanella,* Cerasicolella,* Insignitella,* Spinicolella,* Corylifoliella,* Concomitella,* Trifasciella,* etc. Larvæ of T. quercûs, Sphinx, Lichenaria, etc. *Desiderata.*—Numerous, especially larvæ for perservation.—*E. F. Studd, Oxton, Exeter.*

Duplicates.—Ova, larvæ, pupæ of New Forest species. *Desiderata.*—Ova, larvæ, pupæ.—*E. Morris, Highbury House, Brockenhurst.*

WANTED.—Larvæ or pupæ of Revayana (Undulanus). Good price given.—*J. A. Clark, 57, Weston Park, Crouch End, N.*

WANTED.—Menyanthidis, two each of the type, *ab.* obsoleta, *ab.* scotica, and *ab.* suffusa (as described in Tutt's *British Noctuæ*). Purchase or exchange.—*M. Gillmer, 2, Schlossplatz, Cöthen, Anhalt, Germany.*

WANTED.—British and European Tortricids, especially those species credited to both Europe and America in Meyrick's *Handbook* and Staudinger and Rebel's *Catalog*, pinned and set in English style acceptable. Will make liberal returns in any family of North American Lepidoptera named or other orders unnamed.—*W. D. Kearfott, 114, Liberty Street, New York City, U.S.A.*

WANTED COLEOPHORIDS.—As I wish to breed and record the life-history of all the species of *Coleophora*, I should be pleased to receive any cases and living larvæ which entomologists may meet with. I will do what I can in return.—*Hy. J. Turner, 98, Drakefell Road, St. Catherine's Park, New Cross, S.E.*

WANTED (to figure).—Examples of the following larvæ or pupæ: Antiopa, Lathonia, Edusa, Hyale, Livornica, Pinastri, Celerio, Gallii. Will any lepidopterist who collects abroad kindly remember my wants when opportunity occurs of obtaining any of them?—*J. C. Dollman, Hove House, Newton Grove, Bedford Park, W.*

EXCHANGE.—I am desirous of obtaining butterflies from the Malayan Archipelago, and the Pacific Islands. For such I offer perfect diurnals from North and South America, North American Coleoptera.—*Levi W. Mengel, Boys' High School, Reading, Pa., U.S.A.*

WANTED.—Erycinidæ of the world. Offer for same Diurni from United States.—*Levi W. Mengel, Boys' High School, Reading, Pa., U.S.A.*

PARASITICAL DIPTERA WANTED.—Will lepidopterists who may breed any dipterous parasites from larvæ or pupæ kindly forward such as they do not require to me? If so I shall be greatly obliged.—*C. J. Wainwright, 2, Handsworth Wood Road, Handsworth, Staffs.*

CHANGES OF ADDRESS.—*O. Whittaker*, to *39, Clarendon Road, Whalley Range, Manchester. L. G. Hills* to *9, Radnor Park Gardens, Folkestone. J. J. Walker* to *Aorangi, Lonsdale Road, Summertown, Oxford. W. H. Jackson* to *25, Princes Road, Wimbledon, Kent.*

MEETINGS OF SOCIETIES.

Entomological Society of London.—11, Chandos Street, Cavendish Square, W., 8 p.m. Meetings: October 5th, 19th, etc.

The City of London Entomological and Natural History Society.—London Institution, Finsbury Circus, E.C. The first and third Tuesdays in the month, at 7.30 p.m., except in July and August.

Toynbee Hall Natural History Society.—Held at Toynbee Hall, Commercial Street, E., Mondays, at 8 p.m. Entrance Fee, 1s.; Annual Subscription, 1s.—Hon. Sec. Owen Monk, 8, Shooter's Hill Road, Blackheath, S.E. Excursions: July 17th, Horsley (Train 10.5 a.m. Waterloo); July 23rd, Loughton (Train 2.41 Liverpool Street).

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. The second and fourth Thursdays in each month, at 8 p.m. July 14th, general Exhibits and Reports; July 23rd, Field Meeting at Byfleet, L.S.W.R., conducted by W. J. Lucas, B.A. July 28th, August 11th, 25th, September 8th, 22nd.

North London Natural History Society, Hackney Technical Institute, adjoining Hackney Downs Stations, G.E.R. Meetings 7.45 p.m.

About 40 more subscribers only wanted for Part III, at 4s. 6d. After full list of guarantors is obtained the price will be 6s. net.

Lepidopterists who have not yet obtained

Practical Hints for the Field Lepidopterist

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

Parts I and II, Price 6s. each.

(Interleaved for collector's own notes).

should do so without delay. Some 2500 hints culled from all the best field-workers will tell collectors how to get almost all their desiderata themselves. Dozens of lepidopterists have written to the author stating that by means of the hints contained in this work they have discovered many species of rare lepidoptera in their own collecting-grounds, which were quite unsuspected in the neighbourhood before.

It is further proposed to publish some time during the current year

A THIRD (and LAST) PART of

Practical Hints for the Field Lepidopterist,

WITH A DETAILED

Specific Index to Parts I, II and III

(By H. J. TURNER, F.E.S.).

This part will be about the same size as Part II. will be interleaved, will contain detailed chapters on the Egg, Larval, Pupal, and Imaginal stages, as well as about 1000 practical hints of the form now so well known to our field-workers. Those who think these books are reprints of the small section of hints that have appeared in the Magazine should see the books to discover their mistake. It was because there was no room in the Magazine for a tenth of the hints in hand that the books were published.

Part III and the Index will shortly be put in hand. At present about 40 more guarantors are wanted at 4s. 6d. each. The part will be sold at 6s. net after publication.

DEAR SIR,—

Please enter my name as a guarantor for copies of *Practical Hints for the Field Lepidopterist*, Part III., and the *Index* to Parts I., II., and III., for each copy of which I will send the sum of 4s. 6d. on publication.

Name .....

Address .....

Date .....

MR. J. HERBERT TUTT, 119, Westcombe Hill, S.E.

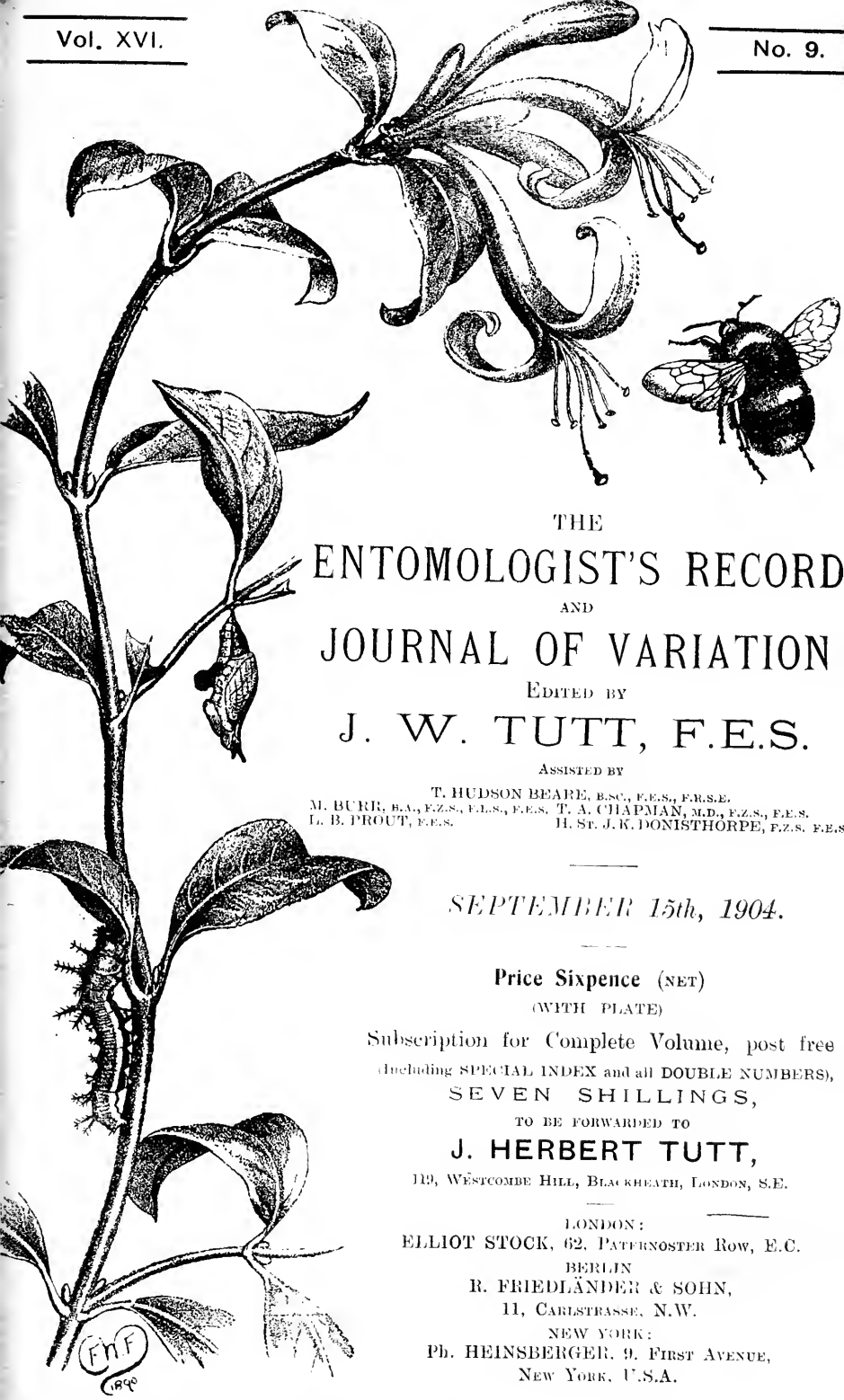
Melanism and Melanochroism in British Lepidoptera.

(Demy 8vo., bound in Cloth. Price 5/-.)

Deals exhaustively with all the views brought forward by scientists to account for the forms of melanism and melanochroism; contains full data respecting the distribution of melanic forms in Britain, and theories to account for their origin: the special value of "natural selection," "environment," "heredity," "disease," "temperature," &c., in particular cases. Lord Walsingham, in his Presidential address to the Fellows of the Entomological Society of London, says, "An especially interesting line of enquiry as connected with the use and value of colour in insects is that which has been followed up in Mr. TUTT's series of papers on "Melanism and Melanochroism."

J. HERBERT TUTT, 119, Westcombe Hill, Blackheath, S.E.

Vol. XVI. No. 9.



THE ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

EDITED BY

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

ASSISTED BY

T. HUDSON BEARE, B.SC., F.E.S., F.R.S.E.
M. BURR, B.A., F.Z.S., F.L.S., F.E.S. T. A. CHAPMAN, M.D., F.Z.S., F.E.S.
L. B. PROUT, F.E.S. H. ST. J. K. DONISTHORPE, F.Z.S. F.E.S

SEPTEMBER 15th, 1904.

Price Sixpence (NET)

(WITH PLATE)

Subscription for Complete Volume, post free (including SPECIAL INDEX and all DOUBLE NUMBERS), SEVEN SHILLINGS,

TO BE FORWARDED TO

J. HERBERT TUTT,

119, WESTCOMBE HILL, BLACKHEATH, LONDON, S.E.

LONDON:
ELLIOT STOCK, 62, PATERNOSTER ROW, E.C.
BERLIN
R. FRIEDLÄNDER & SOHN,
11, CARLSTRASSE, N.W.
NEW YORK:
Ph. HEINSBERGER, 9, FIRST AVENUE,
NEW YORK, U.S.A.

pies may also be obtained from R. H. PORTER, 18, Princes Street, Cavendish Square, London, W.C.

A few SUBSCRIBERS are still giving very unnecessary trouble with their current SUBSCRIPTIONS. Those SUBSCRIBERS who have not yet forwarded their SUBSCRIPTIONS for VOL. XVI are requested to do so please without delay.—J. HERBERT TUTT.

NOTICE.

The Back Volumes (I-XV) of *The Entomologist's Record*, &c., can be obtained at 10s. 6d. per Volume. Complete set of 15 vols. £5 15s. net. "**Special Index**" to Vols. III., IV., V., VI., VII., VIII., IX., X., XI., XII., XIII., XIV. and XV., price 1/6 each. **Single Back Numbers** can be obtained at DOUBLE the published price from **J. Herbert Tutt, 119, Westcombe Hill, Blackheath, S.E.**

Subscribers are kindly requested to observe that subscriptions to *The Entomologist's Record*, &c., are payable in advance. **The subscription (with or without the Special Index) is Seven Shillings, and must be sent to Mr. J. Herbert Tutt, 119, Westcombe Hill, Blackheath, S.E.** Cheques and Postal Orders should be made payable to J. W. TUTT.

ADVERTISEMENTS of **Books and Insects for Sale** will be inserted at a minimum charge of 2s. 6d. (for four lines). Longer Advertisements in proportion. A reduction made for a series. Particulars of **Mr. J. Herbert Tutt,** 119, Westcombe Hill, Blackheath, S.E.

Subscribers who **change their addresses** must report the same to Mr. H. E. PAGE, "Bertrose," Gellatly Road, St. Catherine's Park, London, S.E., otherwise their magazines will probably be delayed, also to Mr. J. HERBERT TUTT, 119, Westcombe Hill, Blackheath, S.E.

Articles for insertion and Exchanges should be sent to J. W. TUTT, Rayleigh Villa, Westcombe Hill, S.E., except those relating to Coleoptera, which should be sent to Mr. H. DONISTHORPE, 58, Kensington Mansions, South Kensington, S.W.

All **Exchange Magazines** must be forwarded to J. W. TUTT, Rayleigh Villa, Westcombe Hill, Blackheath, S.E.

Reprints of Articles or Notes (long or short) appearing in this Magazine can be arranged for by Authors at a very low price, if ordered at the time of sending the article (minimum 50), on application to Mr. J. HERBERT TUTT, 119, Westcombe Hill, Blackheath, S.E.

EXCHANGES.—*The use of this column for the offer of Duplicates and Desiderata and Changes of address is open free to subscribers so far as there is space available.*

EXCHANGE BASKETS.—August 27th, 1904, No. **1** basket.—Dr. Riding, Messrs. Horne, Bower, Robertson, Lofthouse, Studd, Day, Fox, Ovenden, Mera, Riding, Bower, Bowles. August 27th, 1904, No. **2** basket.—Mr. Ovenden, Dr. Riding, Rev. C. D. Ash, Messrs. Atmore, Whittle, Robertson, Adkin, Walker, Studd, Bower. [Members who wish to be missed must write to the name preceding their own on list, not to the Secretary.] The names of one or two new candidates for admission will be welcomed and room made as opportunity offers. **Some Members are not noting receipt of basket to Secretary on its Arrival to them.**

Duplicates.—Abjecta, Subtusa*, Ripæ, Albicolon, Littoralis, Lunigera, Absynthii*, Suasa*, Dolobraria*, Galiata*, Campanulata*, Jasioneata*, Dubitata*, Notha, Plumigera*. *Desiderata.* — Myopiformis, Ichneumoniformis, Scoliæformis, Muscerda, Complana, Gonostigma, Bifida, Albi, Albipunctata, Rufa, Furva, Caliginosa, Ravida, Simulans, Depuncta, Alpina, Ochroleuca, Dipsaceus, Melanopa, Cordigera, Hispidaria, Holosericata, Emarginata, Conspicuata, Filigrammaria, Viretata, Derivata, Fluviata, Lapidata, several Eupithecias.—*John Peed, Rose House, Worcester.*

Duplicates.—Three specimens of Livornica (Bournemouth), May, 1904, in good condition. Offers to—*W. C. Jackson, 18, Crescent Road, Bournemouth.*

Duplicates.—Pastinum larvæ, Asinalis, Testata, Apiciaria, Pastinum, and many Pterophorids. *Desiderata.*—Numerous.—*C. Williams, Penarth.*

Duplicates.—Imagines: Cribrella, Verbascalis, Bennetii, Lurideola, Phragmitidis, Paludis, Abjecta, fair. Larvæ or pupæ: Suasa, Chenopodii, Baja, Vitalbata, Comitata. *Desiderata.*—Very numerous.—*J. Ovenden, Frindsbury, Rochester.*

WANTED.—British and European Tortricids, especially those species credited to both Europe and America in Meyrick's *Handbook* and Staudinger and Rebel's *Catalog*, pinned and set in English style acceptable. Will make liberal returns in any family of North American Lepidoptera named or other orders unnamed.—*W. D. Kearfott, 114, Liberty Street, New York City, U.S.A.*

WANTED COLEOPHORIDS.—As I wish to breed and record the life-history of all the species of *Coleophora*, I should be pleased to receive any cases and living larvæ which entomologists may meet with. I will do what I can in return.—*Hy. J. Turner, 98, Drakefell Road, St. Catherine's Park, New Cross, S.E.*

WANTED (to figure).—Examples of the following larvæ or pupæ: Antiopa, Lathonia, Edusa, Hyale, Livornica, Pinastri, Celerio, Gallii. Will any lepidopterist who collects abroad kindly remember my wants when opportunity occurs of obtaining any of them?—*J. C. Dollman, Hove House, Newton Grove, Bedford Park, W.*

EXCHANGE.—I am desirous of obtaining butterflies from the Malayan Archipelago, and the Pacific Islands. For such I offer perfect diurnals from North and South America, North American Coleoptera.—*Leri W. Mengel, Boys' High School, Reading, Pa., U.S.A.*

WANTED.—Erycinidæ of the world. Offer for same Diurni from United States.—*Leri W. Mengel, Boys' High School, Reading, Pa., U.S.A.*

PARASITICAL DIPTERA WANTED.—Will lepidopterists who may breed any dipterous parasites from larvæ or pupæ kindly forward such as they do not require to me? If so I shall be greatly obliged.—*C. J. Wainwright, 2, Handsworth Wood Road, Handsworth, Staffs.*

CHANGE OF ADDRESS.—*Dr. R. Hamlyn-Harris to The Grammar School, Toowoomba, Queensland, Australia.*

MEETINGS OF SOCIETIES.

Entomological Society of London.—11, Chandos Street, Cavendish Square, W., 8 p.m. Meetings: October 5th, 19th, etc.

The City of London Entomological and Natural History Society.—London Institution, Finsbury Circus, E.C.—The first and third Tuesdays in the month, at 7.30 p.m., except in July and August.

Toynbee Hall Natural History Society.—Held at Toynbee Hall, Commercial Street, E., Mondays, at 8 p.m. October 3rd (Miss C. Von Wyss), November 7th (Mr. F. W. Rudler), December 5th (Rev. F. Morice). Excursions: September 18th, Dorking, London Bridge, 10.8 a.m.; October 1st, Esher and Oxshott, Waterloo, 9.30 a.m.; October 23rd, Burnham Beeches, Paddington. 10.15 a.m.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge.—The second and fourth Thursdays in each month, at 8 p.m. September 22nd. October 13th and 27th.

North London Natural History Society, Hackney Technical Institute, adjoining Hackney Downs Stations, G.E.R.—MEETINGS:—September 27th, "Variation and Death in relation to Natural Selection," by A. W. Bacot, F.E.S. October 4th, 11th, 18th, 25th, "Pocket box and Microscopical Exhibition." November 1st and 8th, "An entomological trip to British Guiana," by W. J. Kaye, F.E.S. November 18th, 22nd, "Notes on the Acidaliæ," by L. B. Prout, F.E.S. Excursions: September 24th, Epping Forest, Liverpool Street, 2.41 p.m.

THE
SOUTH-EASTERN NATURALIST

BEING THE

Transactions of the South-Eastern Union of Scientific Societies.

VOLS. for 1897, 1898, 1899, 1900, **2s. each.**

,, ,, 1901, 1902, 1903, 1904, **2s. 6d. each.**

1901. Price 2/6. Contents:—

Presidential Address—G. A. Boulenger, F.R.S. The Adaptation of Seedlings to their Surroundings—Ethel Sargant. Forms uf Moisture in the Atmosphere—Hon. Rollo Russell, F.R.Met.Soc. Cuckoo's Eggs—Oswald H. Latter, M.A., F.E.S. Origin of Deadnettles in Britain—S. T. Dunn, B.A. Total Eclipse of the Sun in 1900—G. F. Chambers, F.R.A.S. Nature Knowledge for Elementary Schools—(Miss) A. Buckton. Local Corresponding Secretaries of the Selborne Society—Edward A. Martin, F.G.S. The Influence of Use upon Structural Modifications—Jonathan Hutchinson, F.R.S., LL.D.

1902. Price 2/6. Contents:—

Presidential Address—Leprosy in the Middle Ages—Jonathan Hutchinson, LL.D., F.R.S., F.R.C.S. Mycorhiza, the Root Fungus—A. Lorrain Smith. Eolithic Flint Implements—E. R. Harrison. The preservation of our indigenous Flora, its necessity and the means of accomplishing it—G. S. Boulger, F.L.S., F.G.S., F.R.H.S. Protection and Preservation of Plants—Edward A. Martin, F.G.S. The Marine Aquarium without Circulation or change of water—Sibert Saunders. Kentish Wells and deep borings in the neighbourhood of Canterbury—W. Whitaker, B.A., F.R.S., F.G.S.

1903. Price 2/6. Contents:—

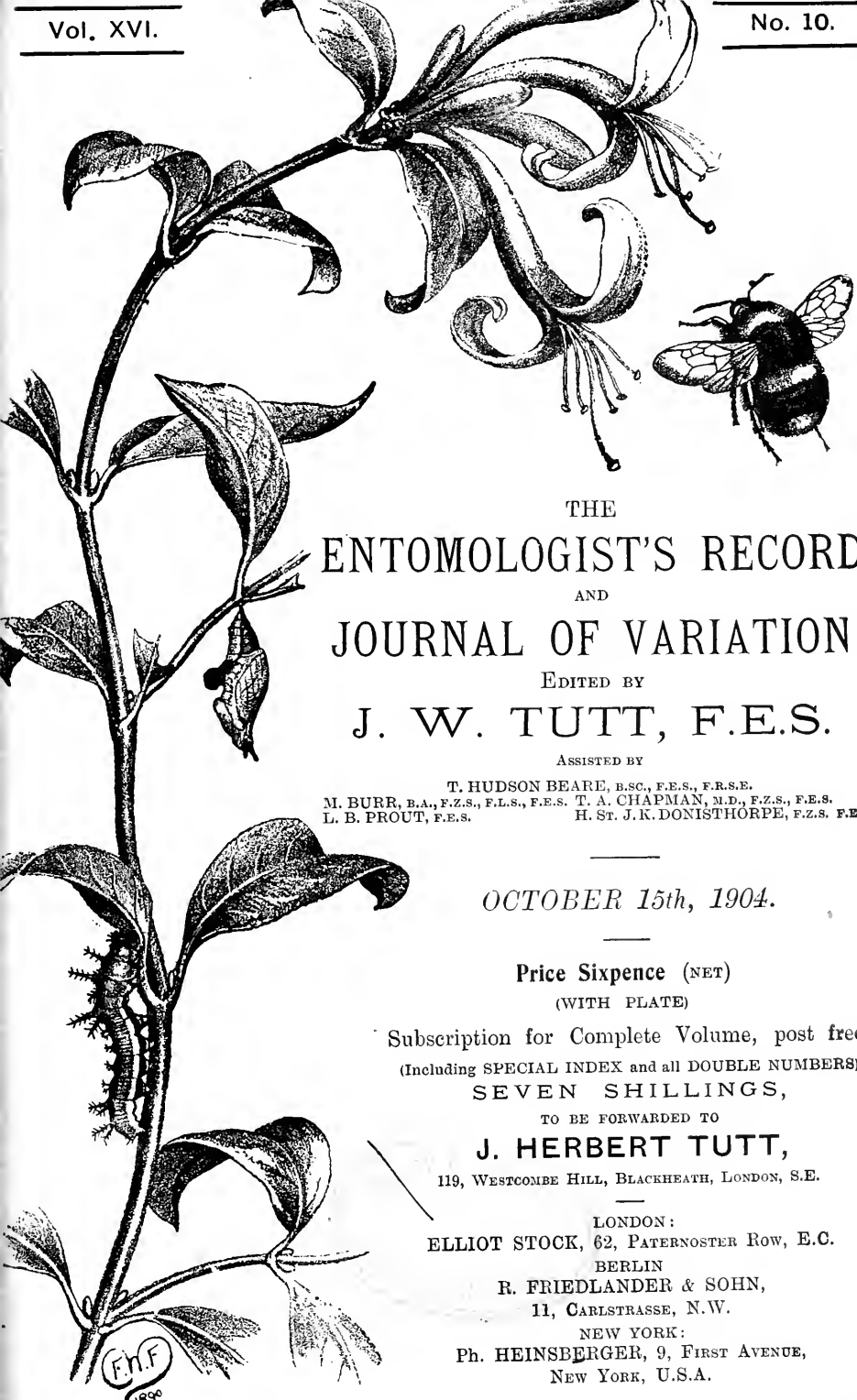
Presidential Address—The Uncertainties of Science—Sir Henry H. Howorth, K.C.I.E., F.R.S. The Seedlings of Geophytes—Ethel Sargant. A Late Keltic Cemetery at Harlyn Bay—R. Ashington Bullen, B.A., F.L.S., F.G.S. Atmospheric Moisture as a Factor in Distribution—Alfred O. Walker, F.L.S. The Diminution and Disappearance of the South-Eastern Fauna and Flora within the memory of Present Observers—Sydney Webb (assisted by Captain McDakin and George Gray). International Communication—A. T. Walmisley, M.I.C.E.

1904. Price 2/6. Contents:—

Presidential Address—F. W. Rudler, I.S.O., F.G.S. Allington Castle—Dudley C. Falcke. The Friars, Aylesford—(Rev.) C. H. Fielding, M.A. On the meridional position of Megaliths in Kent compared with those of Wilts, and also with those of Earth-works and Churches—F. J. Bennett, F.G.S. The Use of 25in. Ordnance Maps for Estate and Agricultural Purposes—F. J. Bennett, F.G.S. The Practicability of an Artificial International Language—P. Mathews, M.A. Ice Streams and Ice Caves—A. B. Harding, F.Phys.Soc. Lond. Notes on the Lepidoptera of Mid-Kent—Capt. Savile G. Reid, R.E., F.E.S. Note upon some interesting Neolithic weapons recently found on Blackdown, near Haslemere—E. W. Swanton. Memoranda respecting some late Keltic Pottery found at Haslemere, Surrey, in November 1903—E. W. Swanton. The Teaching of Nature-Study—Wilfred Mark Webb, F.L.S. The Abbey and St. Leonard's Tower at West Malling—(Rev.) G. M. Livett, B.A., F.S.A. List of localities, not recorded in recent Floras of Kent and Surrey, for some comparatively rare plants—W. H. Griffin. A few Notes on the Corporation Museum, Maidstone: Formerly Chillington Manor House—J. H. Allchin.

To be obtained from—the Editor, 119, Westcombe Hill, S.E., or the Hon. Secretary, Pyrford Vicarage, Woking, Surrey.

Vol. XVI. No. 10.



THE ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

EDITED BY

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

ASSISTED BY

T. HUDSON BEARE, B.SC., F.E.S., F.R.S.E.
M. BURR, B.A., F.Z.S., F.L.S., F.E.S. T. A. CHAPMAN, M.D., F.Z.S., F.E.S.
L. B. PROUT, F.E.S. H. ST. J. K. DONISTHORPE, F.Z.S. F.E.S.

OCTOBER 15th, 1904.

Price Sixpence (NET)
(WITH PLATE)

Subscription for Complete Volume, post free
(Including SPECIAL INDEX and all DOUBLE NUMBERS),
SEVEN SHILLINGS,
TO BE FORWARDED TO

J. HERBERT TUTT,
119, WESTCOMBE HILL, BLACKHEATH, LONDON, S.E.

LONDON:
ELLIOT STOCK, 62, PATERNOSTER ROW, E.C.
BERLIN
R. FRIEDLANDER & SOHN,
11, CARLSTRASSE, N.W.
NEW YORK:
Ph. HEINSBERGER, 9, FIRST AVENUE,
NEW YORK, U.S.A.

Copies may also be obtained from R. H. PORTER, 18, Princes Street, Cavendish Square, London, W.C.
WATKINS & DONCASTER, 36, Strand, W.C. H. GLAISHER, 63 & 65, London Street, Greenwich.

Lepidopterists who have not yet obtained

Practical Hints for the Field Lepidopterist

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

Parts I and II, Price 6s. each.

(Interleaved for collector's own notes),

should do so without delay. Some 2500 hints culled from all the best field-workers will tell collectors how to get almost all their desiderata themselves. Dozens of lepidopterists have written to the author stating that by means of the hints contained in this work they have discovered many species of rare lepidoptera in their own collecting-grounds, which were quite unsuspected in the neighbourhood before.

With the publication of Part III, the few copies of Part I that are now left will only be obtainable at an increased price.

It is further proposed to publish in the course of a few weeks

A THIRD (and LAST) PART of

Practical Hints for the Field Lepidopterist,

WITH A DETAILED

Specific Index to Parts I, II and III

(By H. J. TURNER, F.E.S.).

This part is to be put in the printer's hands at once and will be probably larger than either Part I or Part II, will be interleaved, will contain detailed chapters on the Egg, Larval and Pupal stages, and modes of collecting, &c., in these stages. Already considerably more than 1000 practical hints of the form now so well known to our field-workers have been accumulated. Those who think these books are reprints of the small section of hints that have appeared in the Magazine should see the books to discover their mistake. It was because there was no room in the Magazine for a tenth of the hints in hand that the books were published.

DEAR SIR,—

Please enter my name as a guarantor for copies of *Practical Hints for the Field Lepidopterist*, Part III, and the *Index* to Parts I, II, and III, for each copy of which I will send the sum of 4s. 6d. on publication.

Name .....

Address .....

Date .....

Mr. J. HERBERT TUTT, 119, Westcombe Hill, S.E.

Melanism and Melanochroism in British Lepidoptera.

(Demy 8vo., bound in Cloth. Price 5/-.)

Deals exhaustively with all the views brought forward by scientists to account for the forms of melanism and melanochroism; contains full data respecting the distribution of melanic forms in Britain, and theories to account for their origin; the special value of "natural selection," "environment," "heredity," "disease," "temperature," &c., in particular cases. Lord Walsingham, in his Presidential address to the Fellows of the Entomological Society of London, says, "An especially interesting line of enquiry as connected with the use and value of colour in insects is that which has been followed up in Mr. TUTT's series of papers on "Melanism and Melanochroism."

J. HERBERT TUTT, 119, Westcombe Hill, Blackheath, S.E.

NOTICE.

The **Back Volumes** (I-XV) of *The Entomologist's Record*, &c., can be obtained at 10s. 6d. per Volume. Complete set of 15 vols. £5 15s. net. "**Special Index**" to Vols. III., IV., V., VI., VII., VIII., IX., X., XI., XII., XIII., XIV. and XV., price 1/6 each. **Single Back Numbers** can be obtained at DOUBLE the published price from **J. Herbert Tutt, 119, Westcombe Hill, Blackheath, S.E.**

Subscribers are kindly requested to observe that subscriptions to *The Entomologist's Record*, &c., are payable in advance. **The subscription (with or without the Special Index) is Seven Shillings, and must be sent to Mr. J. Herbert Tutt, 119, Westcombe Hill, Blackheath, S.E.** Cheques and Postal Orders should be made payable to J. W. TUTT.

ADVERTISEMENTS of **Books and Insects for Sale** will be inserted at a minimum charge of 2s. 6d. (for four lines). Longer Advertisements in proportion. A reduction made for a series. Particulars of **Mr. J. Herbert Tutt**, 119, Westcombe Hill, Blackheath, S.E.

Subscribers who **change their addresses** must report the same to Mr. H. E. PAGE, "Bertrose," Gellatly Road, St. Catherine's Park, London, S.E., otherwise their magazines will probably be delayed, also to Mr. J. HERBERT TUTT, 119, Westcombe Hill, Blackheath, S.E.

Articles for insertion and Exchanges should be sent to J. W. TUTT, Rayleigh Villa, Westcombe Hill, S.E., except those relating to Coleoptera, which should be sent to Mr. H. DONISTHORPE, 58, Kensington Mansions, South Kensington, S.W.

All **Exchange Magazines** must be forwarded to J. W. TUTT, Rayleigh Villa, Westcombe Hill, Blackheath, S.E.

Reprints of Articles or Notes (long or short) appearing in this Magazine can be arranged for by Authors at a very low price, if ordered at the time of sending the article (minimum 50), on application to Mr. J. HERBERT TUTT, 119, Westcombe Hill, Blackheath, S.E.

EXCHANGES.—*The use of this column for the offer of Duplicates and Desiderata and Changes of address is open free to subscribers so far as there is space available.*

EXCHANGE BASKETS.—August 27th, 1904, No. **1** basket.—Dr. Riding, Messrs. Horne, Bower, Robertson, Lofthouse, Studd, Day, Fox, Ovenden, Mera, Riding, Bower, Bowles. October 15th, 1904, No. **2** basket.—Messrs. Ash, Riding, Whittle, Ovenden, Adkin, Robertson, Studd, Walker, Bower. [Members who wish to be missed must write to the name preceding their own on list, not to the Secretary.] The names of one or two new candidates for admission will be welcomed and room made as opportunity offers. **Some Members are not noting receipt of basket to Secretary on its Arrival to them.**

Duplicates.—Ova of Fuscantaria from dark parents, Erosaria. Pupæ: Dolobraria, Advenaria. *Desiderata.*—Ova, larvæ, and pupæ.—*H. Murray, Bank Buildings, Carnforth.*

Duplicates.—Arion, Agathina (Yorks). *Desiderata.*—Apiformis, Muscerda, Semibrunnea, fine specimens only.—*Rev. C. D. Ash, Skipwith Vicarage, Selby.*

Duplicates.—Galatea, Aglaia, Minima, Lucina, Thaumas, Lineola, Actæon, Comma, Camelina, Chrysorrhœa, Anachoreta, Lutosa, Serena, Moneta, Mi, Glyphica, Almaria, &c. *Desiderata.*—Numerous.—*A. T. Goodson, 18, Park Road, Tring.*

Duplicates.—Sinapis, Actæon, Ambigua, Galiata, Pyraliata, Geryon, Griseola, Suffusa, Saucia, Edusa. *Desiderata.*—Numerous, especially Agathina and Ditrapezium.—*Rev. E. C. Dobrée Fox, Castle Moreton, Tewkesbury.*

Duplicates.—Ophiogramma, Orichalcea, Conigera, Adonis. *Desiderata.*—Numerous.—*H. Field, 30, Hills Road, Cambridge.*

Duplicates.—Ashworthii, dark chocolate var. of Abruptaria, melanic Multistrigaria, and other good species. *Desiderata.*—Carnosa, Ilicifolia, Prataria, Innotata, Constrictata, Stevensata, Pendularia var. subroscata, Reticulata, Bicuspis, Ocellaris, Auricoma, Favicolor, Xerampelina var. unicolor, Pyrophila, Satura, Nebulosa var. robsoni, Gnaphalii, Dentalis, Terrealis, Stachydalis, Margaritalis, Unionalis, Literalis, Pulveralis, Myellus, Fascelinellus, Mucronellus, Farrella, Adelphella, Bistriga, Angustella, Cephalonica, Ceratoniæ, Alpina, Festaliella, Pilosellæ, &c.—*Geo. T. Porritt, Edgerton, Huddersfield.*

Duplicates.—Jasioneata* (few), Pupæ, Tiliæ, Campanulata (few), Valerianata, Plumigera* (shortly). *Desiderata.*—Numerous, especially Fraxinata, Virgaureata, Irriguata, Togata, Coronata.—*John Peed, Rose House, Worcester.*

Duplicates.—Exotic butterflies (fine specimens in papers from many parts) in exchange for other exotics.—*W. Dannatt, 75, Vanbrugh Park, Blackheath.*

Duplicates.—Chryson*, Moneta, Sponsa, Gilvago, Ocularis. *Desiderata.*—Single specimens of Gallii, Livornica, Formicæformis, Chrysidiformis, Ichneumoniformis, Cynipiformis, Muscerda, Molybdeola, Fluctuosa, Vitellina, Armigera, Peltigera, Scutosa.—*W. Dannatt, 75, Vanbrugh Park, Blackheath.*

Duplicates.—Acidalia contiguaria.* *Desiderata.*—Very numerous.—*R. Tait, Junr., Rosneath, Ashton-on-Mersey, Cheshire.*

Duplicates.—Verbasci*, Neglecta*, Nebulosa*, H. marginatus*, Brunnea*, Bidentata*, Davus, Actæon, Maculata, Antiqua*, Subfulvata*, Taminata, Oxyacanthæ *var.* capucina, Tincta, Valligera, Cursoria, Præcox (fair), Suffusa, Silago, Cerago, Rutina, Solidaginis, Flavicornis. *Desiderata.*—Senex, Globulariæ, Reclusa, Or, Ligustri, Menyanthidis, Sublustris, Saponariæ, Connexa, Iota, Arbuti, Serena, Dysodea, Citrago, Templi, Cheno-

podii, Suasa, &c. (good specimens to renew).—*B. H. Crabtree, The Acacias, Levenshulme, Manchester.*

Duplicates.—Rhamni*, Polychloros*, Urticæ*, Comma, Adonis, Semele, Cardui*, Corydon, Gilvaria, &c. *Desiderata.*—Hyale, Adippe, Cinxia, Athalia, C-album, Davus, Quercûs, Aegon, Salmacis, and many others. Lists exchanged.—*H. D. Stockwell, 56, Elms Vale Road, Dover.*

Duplicates.—Ocellatus*, Ziczac*, Festucæ, Paludata, Biundularia*, Chi, Loniceræ, Dilutata* and *var.* christyi, O. autumnata*, Filigrammaria*, ova of all the genus Oporabia. *Desiderata.*—Many local species.—*J. E. R. Allen, Portora, Enniskillen, Ireland.*

Duplicates.—Moneta, Haworthii, Cæsiata, Nanata, Bicolorata, Blandina, Senex, Minos, Diluta, Pudorina, Oleracea, Trilinea, Suffusa, Gemina, Chi, Argentula, Sericealis, Parallelaria, Apiciaria, Clathrata, Albicillata, Immutata, Amataria, Elutata (bilberry form), Variata, Cilialis. *Desiderata.*—Numerous.—*F. Emsley, 107, West Street, Leeds.*

Duplicates.—Rurea* (dark), Arcuosa, Fasciuncula, Furuncula, Haworthii (a few fine), Literosa, Baia*, Festiva* (vars.), Typica*, Chi, Pisi*, Iota*, Margaritaria, Multistrigata*, Cæsiata*, Subnotata*, Ruberata, Impluviata (dark), Populata, and Testata. *Desiderata.*—Lunaria, T. cratægi, Hispidaria, Abietaria, and Straminea, or offers.—*W. G. Clutten, 132, Coal Clough Lane, Burnley*

Duplicates.—Hectus, Asellus, Confusalis, Miniata, Aureola, Helvola, Rubricollis, Jacobææ, Russula, Monacha, Pudibunda, Potatoria, Fagi, Camelina, Dodonea, Batis, Derasa, Orion, Alni, Turca, Typhæ, Hepatica, Croceago, Undulanus var. ramosana, Extersaria, Consortaria, Dolabraria, and many others. *Desiderata.*—Ova, pupæ.—*E. Morris, Brockenhurst.*

Wanted.—British and European Tortricids, especially those species credited to both Europe and America in Meyrick's *Handbook* and Staudinger and Rebel's *Catalog*, pinned and set in English style acceptable. Will make liberal returns in any family of North American Lepidoptera named or other orders unnamed.—*W. D. Kearfott, 114, Liberty Street, New York City, U.S.A.*

Wanted Coleophorids.—As I wish to breed and record the life-history of all the species of *Coleophora*, I should be pleased to receive any cases and living larvæ which entomologists may meet with. I will do what I can in return.—*Hy. J. Turner, 98, Drakefell Road, St. Catherine's Park, New Cross, S.E.*

Exchange.—I am desirous of obtaining butterflies from the Malayan Archipelago, and the Pacific Islands. For such I offer perfect diurnals from North and South America, North American Coleoptera.—*Levi W. Mengel, Boys' High School, Reading, Pa., U.S.A.*

Wanted.—Erycinidæ of the world. Offer for same Diurni from United States.—*Levi W. Mengel, Boys' High School, Reading, Pa., U.S.A.*

Parasitical Diptera wanted.—Will lepidopterists who may breed any dipterous parasites from larvæ or pupæ kindly forward such as they do not require to me? If so I shall be greatly obliged.—*C. J. Wainwright, 2, Handsworth Wood Road, Handsworth, Staffs.*

Changes of Address.—*E. Rogers Bush* to *52, Bold Street, Altrincham, Cheshire.* *E. F. S. Tylecote* to *3, Castle Road, Deal.*

MEETINGS OF SOCIETIES.

Entomological Society of London.—11, Chandos Street, Cavendish Square, W., 8 p.m. Meetings: October 19th, November 2nd, 16th, December 7th, January 18th, 1905.

The City of London Entomological and Natural History Society.—London Institution, Finsbury Circus, E.C.—The first and third Tuesdays in the month, at 7.30 p.m., except in July and August.

Toynbee Hall Natural History Society.—Held at Toynbee Hall, Commercial Street, E., Mondays, at 8 p.m. November 7th (Mr. F. W. Rudler), December 5th (Rev. F. Morice). Excursions: October 23rd, Burnham Beeches; Paddington, 10.15 a.m. November 20th, Purley; Cannon Street, 10.25 a.m.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge.—The second and fourth Thursdays in each month, at 8 p.m. October 27th, "Reports of Field Meetings at Eynesford and Byfleet. November 10th, "The Pectens," Mr. W. Manger, F.E.S. November 24th, "Annual Exhibition of Varieties." December 8th, "Lantern Exhibition."

North London Natural History Society, Hackney Technical Institute, adjoining Hackney Downs Stations, G.E.R.—Meetings:—October 18th, 25th, "Pocket box and Microscopical Exhibition." November 1st and 8th, "An entomological trip to British Guiana," by W. J. Kaye, F.E.S. November 18th, 22nd, "Notes on the Acidalidæ," by L. B. Prout, F.E.S.

FOR SALE.

Fine genuine British specimens of—Ambigua, 6d.; Fasciaria, 3d.; Cinctaria, 4d.; Ochracea, 3d.; Cribrum, 9d.; Sinapis, 2d.; Valezina, 9d.; Cinxia, 2d.; W-album, 4d.; Betulæ, 4d.; Lucina, 2d.; Actæon, 4d.; Convolvuli, 1s.; Minos, 4d.; Undulanus, 3d.; Chlorana, 2d.; Aureola, 4d.; Deplana, 3d.; Quadra, 4d.; Hera, 8d.; Versicolor, 9d.; Cultraria, 2d.; Putrescens, 9d.; Geminipuncta, 4d.; Subsequa, 9d.; Suspecta, 3d.; Trabealis, 6d.; Sponsa, 4d.; Dolobraria, 4d.; Syringaria, 4d.; Fuscantaria, 5d.; Erosaria, 6d.; Roboraria, 9d.; Consortaria, 4d.; Papilionaria, 6d.; Vernaria, 4d.; Straminata, 6d.; Emutaria, 6d.; Ericetaria, 3d.; Firmata, 3d.; Unangulata, 2d.; Tersata, 3d.; Undulata, 3d.; and others at half usual prices.

Apply—**Mrs. FOWLER, Ringwood, Hants.**

FOR SALE, A SUPERIOR

Mahogany Entomological Cabinet

Of 40 Interchangeable Drawers.

Size 18in. by 16in., ebony knobs, sunk panelled sides to carcase, moulded top and plinth, and enclosed by 2 plate-glass panelled doors. Own make.

Price £40. T. GURNEY, 50, Broadway, London Fields, N.E.

Large Collection of Butterflies.

Eine grosse wissenschaftliche Schmetterlingssammlung (Talueorktische Falter) bestehend aus circa fünfunddreissigtausend Stücken, mit Hunderten von Originalen und vielen Raritäten und einer Menge neuer Aberrationen zu verkaufen.

Näheres unter—**F.D.E. 127, durch Rudolf Mosse, Frankfurt-a-M., Germany.**

Mr. BERNARD PIFFARD, Brockenhurst, New Forest, Hants.

NEW FOREST HYMENOPTERA.

Nomada sexfasciata (parasite on Longicorn bee)	1/6 each.
,, roberjeotiana..	2/- ,,
Agenia (Pampylus) bifasciata	4/- ,,
Methoca ichneumonides	5/- ,,
The New Forest Cicada	2/6 ,,

Selection of Lepidoptera and Coleoptera to visitors 2d. each.

Information on localities supplied by correspondence, or calling as above.

THE PTEROPHORINA OF BRITAIN.

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

A few copies of this book having unexpectedly come to hand from the original publisher, they are offered, so long as they last, at the published price of **5s. per volume.**

J. HERBERT TUTT, 119, Westcombe Hill, Blackheath, S.E.

Rambles in Alpine Valleys.

Bound in Cloth, with Map and Photographs of District.

Price 3s. 6d.

This book contains a series of essays dealing with the colours of insects, and suggestions as to the relation in past time between the Alpine and British fauna. Many new facts are brought forward, and entomological problems discussed from various standpoints.

J. HERBERT TUTT, 119, Westcombe Hill, Blackheath, S.E.

JUST PUBLISHED.

A Natural History of the British Lepidoptera,

VOL. IV.

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

With Synopsis of Contents of Vols. I and IV., and General Index of Vols. I to IV, by **GEORGE WHEELER**, M.A.

Price £1 net.

Thick 8vo., 533 and xvi. pp., Plates, etc., strongly bound in cloth, and gold-lettered.

Complete set, Vol. I-IV, for a few weeks will be sold for £3 7s. 6d., Single Volumes £1 net.

A detailed account of the British Sphingids, quite encyclopædic in its character, with general details of the whole group, their affinities and classification, their habits, early stages, distribution, etc.; full account of their hybridisation and gynandromorphism, their variation and local races. Every British entomologist ought to make it his business to see this work, if he sees it, he will buy it, even if he makes no other investment in entomological books. Every available detail that can be gathered, either from British records or abroad, has been accumulated to make up a huge collection of facts about each species, of which even the most advanced lepidopterist can have no conception till he has seen the work. The account of *Agrius convolvuli* occupies 63 pages, and that of *Manduca atropos*, 76 pages of detailed facts, whilst the accounts of *Sesia stellatarum*, *Eumorpha elpenor*, *Theretra porcellus*, *Hippotion celerio*, *Phryxus livornica*, *Celerio gallii*, *Hyles euphorbiae*, *Daphnis nerii*, *Hyloicus pinastri* and *Sphinx ligustri* must be held to be unrivalled. The older British lepidopterists who regret the decay of British entomology as they knew it, will see, by reference to this work, what they and their contemporaries have done, by their steady work, towards the grand total of knowledge that we now have of these species. Over a thousand different entomologists have been drawn on for material in connection with this work.

It is remarkable that, although entitled *A Natural History of British Lepidoptera*, the German lepidopterists have insisted on a German translation. Such a book must be more valuable to the British lepidopterist, and if every one would see it, no doubt he would want it.

The Hon. W. Rothschild and Dr. Jordan write in their standard *Revision of the Sphingidae*: "Tutt's work is the most intrinsic ever written on the Palæarctic Lepidoptera. There is nothing written anywhere on European Lepidoptera coming up to it in thoroughness." Mr. W. Bateson, F.R.S., writes: "The new British Lepidoptera is a fine scholarly piece of work, for which not only the entomological specialist, but naturalists of all orders, will be thankful to Mr. Tutt for many a year, etc."

Cheques or Postal Orders to be sent to—J. HERBERT TUTT, Rayleigh Villa, Westcombe Hill, Blackheath, S.E.

The Migration and Dispersal of Insects.

BY

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

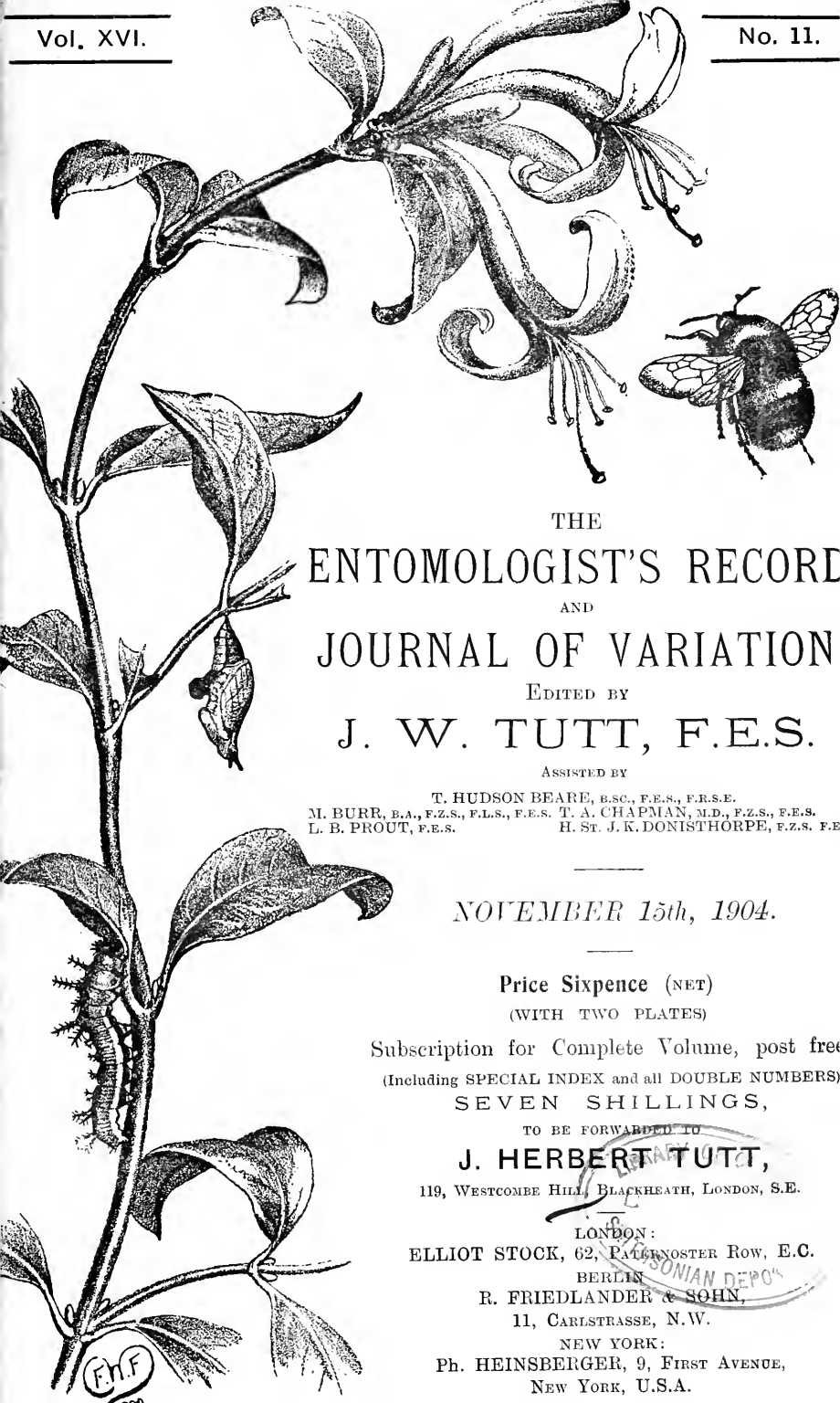
Demy 8vo., 182 pp. Price Five Shillings net.

This book, the only one published on this interesting subject, is of first importance to all students of the geographical distribution of animals, and contains the following chapters:—

1. General Considerations. 2. Coccids and Aphides. 3. Orthoptera. 4. Odonata. 5. Lepidoptera. 6. Coleoptera. 7. Diptera. 8. Social Insects—Hymenoptera, Termites. 9. Final considerations.

Only a very small number of copies has been printed. It is trusted that all entomologists will, besides supporting the book themselves, recommend it to any libraries in which they are interested or with which they are connected.

Vol. XVI. No. 11.



THE ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

EDITED BY

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

ASSISTED BY

T. HUDSON BEARE, B.SC., F.E.S., F.R.S.E.
M. BURR, B.A., F.Z.S., F.L.S., F.E.S. T. A. CHAPMAN, M.D., F.Z.S., F.E.S.
L. B. PROUT, F.E.S. H. ST. J. K. DONISTHORPE, F.Z.S. F.E

NOVEMBER 15th, 1904.

Price Sixpence (NET)
(WITH TWO PLATES)

Subscription for Complete Volume, post free
(Including SPECIAL INDEX and all DOUBLE NUMBERS)
SEVEN SHILLINGS,
TO BE FORWARDED TO
J. HERBERT TUTT,
119, WESTCOMBE HILL, BLACKHEATH, LONDON, S.E.

LONDON:
ELLIOT STOCK, 62, PATERNOSTER ROW, E.C.
BERLIN:
R. FRIEDLANDER & SOHN,
11, CARLSTRASSE, N.W.
NEW YORK:
Ph. HEINSBERGER, 9, FIRST AVENUE,
NEW YORK, U.S.A.

pies may also be obtained from R. H. PORTER, 18, Princes Street, Cavendish Square, London, W.C.

NOTICE.

The **Back Volumes** (I-XV) of *The Entomologist's Record*, &c., can be obtained at 10s. 6d. per Volume. Complete set of 15 vols. £5 15s. net. "**Special Index**" to Vols. III., IV., V., VI., VII., VIII., IX., X., XI., XII., XIII., XIV. and XV., price 1/6 each. **Single Back Numbers** can be obtained at DOUBLE the published price from **J. Herbert Tutt, 119, Westcombe Hill, Blackheath, S.E.**

Subscribers are kindly requested to observe that subscriptions to *The Entomologist's Record*, &c., are payable in advance. **The subscription (with or without the Special Index) is Seven Shillings, and must be sent to Mr. J. Herbert Tutt, 119, Westcombe Hill, Blackheath, S.E.** Cheques and Postal Orders should be made payable to J. W. TUTT.

ADVERTISEMENTS of **Books and Insects for Sale** will be inserted at a minimum charge of 2s. 6d. (for four lines). Longer Advertisements in proportion. A reduction made for a series. Particulars of **Mr. J. Herbert Tutt,** 119, Westcombe Hill, Blackheath, S.E.

Subscribers who **change their addresses** must report the same to Mr. H. E. PAGE, "Bertrose," Gellatly Road, St. Catherine's Park, London, S.E., otherwise their magazines will probably be delayed, also to Mr. J. HERBERT TUTT, 119, Westcombe Hill, Blackheath, S.E.

Articles for insertion and Exchanges should be sent to J. W. TUTT, Rayleigh Villa, Westcombe Hill, S.E., except those relating to Coleoptera, which should be sent to Mr. H. DONISTHORPE, 58, Kensington Mansions, South Kensington, S.W.

All **Exchange Magazines** must be forwarded to J. W. TUTT, Rayleigh Villa, Westcombe Hill, Blackheath, S.E.

Reprints of Articles or Notes (long or short) appearing in this Magazine can be arranged for by Authors at a very low price, if ordered at the time of sending the article (minimum 50), on application to Mr. J. HERBERT TUTT, 119, Westcombe Hill, Blackheath, S.E.

EXCHANGES.—*The use of this column for the offer of Duplicates and Desiderata and Changes of address is open free to subscribers so far as there is space available.*

EXCHANGE BASKETS.—October 27th, 1904, No. **1** basket.—Messrs. Horne, Day, Studd, Robertson, Ovenden, Fox, Bowles, Bower, Mera, Riding, Day, Horne. October 15th, 1904, No. **2** basket.—Messrs. Ash, Riding, Whittle, Ovenden, Adkin, Robertson, Studd, Walker, Bower. [Members who wish to be missed must write to the name preceding their own on list, not to the Secretary.] The names of one or two new candidates for admission will be welcomed and room made as opportunity offers. **Some Members are not noting receipt of basket to Secretary on its Arrival to them.**

Duplicates.—Arbuti, Pictaria, Badiata, Cassinea (♂ s), Cervinata*, Pennaria (♂ s), Erosaria*, Cardui, Cinxia*, Cardamines, P. Populi, Mendica, Maura, Iota (fair), Chrysitis, Ferrugata*, Oxyacanthæ, var. Capucina, Atropos (fair). Ova of Flavicincta and Cervinata. *Desiderata.*—Ova, larvæ, and pupa.—*Miss E. Miller, The Croft, Rainsford Road, Chelmsford.*

Duplicates.—Atalanta*, Dispar* and ova, Monacha* and ova, Autumnaria* and ova, S. populi*, Perla, Flavicincta*, and preserved larvæ of Atalanta, Dispar, Monacha, Caja, Lubricipeda, Psi, Alsines, Taraxaci, Xanthographa, Lucipara, Flavicincta, Typica, Antumnaria, Hirtaria, Grossulariata. *Desiderata.*—Numerous. Also land, freshwater, and marine shells.—*J. W. Boult, 50, Washington Street, Newland, Hull.*

Duplicates.—Geryon, Pennaria (few), Cucullatella, Versicolora* (bred from Wyre Forest ova), Oleracea, Leucophæaria, Dispar*, Notha, Pedaria* (♂), Juliaria*, Plumbaria, and Ulmata. *Desiderata.*—Numerous, on black pins only.—*H. Woodhead, Lyndon Villa, Somers Road, Worcester.*

Duplicates.—Cardamines, Edusa, Paphia, Euphrosyne, Selene, Aurinia (Sandwich), Polychloros, Io, Tithonus, Argiolus, Ocellatus, Ligustri, Elpenor, Dominula, Russula, Plantaginis, Chrysorrhœa, B. quercûs, Potatoria, Illustraria, Alniaria, Betularia *var.* doubledayaria, Obscurata, Gilvaria, Rubiginata, Badiata, Glandifera, Popularis, Verbasci (4), Promissa (4). *Desiderata.*—Numerous.—*Stuart G. Hills, Public Library, Folkestone.*

WANTED.—British and European Tortricids, especially those species credited to both Europe and America in Meyrick's *Handbook* and Staudinger and Rebel's *Catalog*, pinned and set in English style acceptable. Will make liberal returns in any family of North American Lepidoptera named or other orders unnamed.—*W. D. Kearfott, 114, Liberty Street, New York City, U.S.A.*

WANTED COLEOPHORIDS.—As I wish to breed and record the life-history of all the species of *Coleophora*, I should be pleased to receive any cases and living larvæ which entomologists may meet with. I will do what I can in return.—*Hy. J. Turner, 98, Drakefell Road, St. Catherine's Park, New Cross, S.E.*

EXCHANGE.—I am desirous of obtaining butterflies from the Malayan Archipelago, and the Pacific Islands. For such I offer perfect diurnals from North and South America, North American Coleoptera.—*Levi W. Mengel, Boys' High School, Reading, Pa., U.S.A.*

WANTED.—Erycinidæ of the world. Offer for same Diurni from United States.—*Levi W. Mengel, Boys' High School, Reading, Pa., U.S.A.*

PARASITICAL DIPTERA WANTED.—Will lepidopterists who may breed any dipterous parasites from larvæ or pupæ kindly forward such as they do not require to me? If so I shall be greatly obliged.—*C. J. Wainwright, 2, Handsworth Wood Road, Handsworth, Staffs.*

Duplicates.—Coleoptera: Anisotoma rugosa, A. ciliaris, A. furva, Anthicus bimaculatus, Ammoecius brevis, Bledius longulus, B. opacus, Dryocœtes alni, Ceuthorrhynchus punctiger, Ceuthorrhynchidius posthumus, Silis ruficollis, Agathidium varians, A. rotundatum, Trox sabulosus, Amalus hæmorrhous, Gymnetron linariæ, Saperda scalaris, Syncalypta hirsuta, etc.—*G. W. Chaster, 42, Talbot Street, Southport.*

Duplicates.—Pupæ: Rubricollis, Jacobææ, Batis, Orion, Prodromaria, Consortaria, Extersaria, Asella. Imagines: Selene, Euphrosyne, Sibylla, Paphia, Hectus, Rubricollis, Monacha, Pudibunda, Derasa, Batis, Orion, Turca (pair), Hepatica, Saucia, Porphyrea, Brunnea, Piniperda, Gothica, Miniosa, Rubricosa, Oxyacanthæ, Aprilina, Nebulosa, Rhizolitha, Moneta, Gamma, Pyramidea, Consortaria, Extersaria, Obscurata, Psittacata.—*E Morris, Brockenhurst.*

Duplicates.—Rhinomacer attelaboides, Hypera fasciculata, Elleschus bipunctatus, Apion limonii, Donacia nigra, D. menyanthidis, D. dentata, D. dentipes, Balaninus villosus, B. rubidus, Oxypoda lividipennis. *Desiderata.*—Many species of Coleoptera.—*E. A. Atmore, King's Lynn, Norfolk.*

MEETINGS OF SOCIETIES.

Entomological Society of London.—11, Chandos Street, Cavendish Square, W., 8 p.m. Meetings: November 16th, December 7th, January 18th, 1905, Annual Meeting.

The City of London Entomological and Natural History Society.—London Institution, Finsbury Circus, E.C.—The first and third Tuesdays in the month, at 7.30 p.m., except in July and August. November 15th, Nomination of Council. December 6th, Election of Council; Presidential Address by Mr. A. W. Mera. December 20th, "Notes on the Pterophoridæ," Dr. T. A. Chapman. January 3rd, Pocket Box Exhibition.

Toynbee Hall Natural History Society.—Held at Toynbee Hall, Commercial Street, E., Mondays, at 8 p.m. December 5th (Rev. F. Morice). Field Meetings: November 20th, Purley; Cannon Street, 10.25 a.m. December 18th, Chislehurst; Cannon Street, 10.0 a.m. January 15th, Leatherhead; London Bridge, 10.5 a.m.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge.—The second and fourth Thursdays in each month, at 8 p.m. November 24th, "Annual Exhibition of Varieties, etc." December 8th, "Lantern Exhibition." (Members and others are kindly requested to bring or send entomological slides.) January 12th, 1905, Lantern Demonstration—"Colour Photography in Natural History."

North London Natural History Society, Hackney Technical Institute, adjoining Hackney Downs Stations, G.E.R.—Meetings:—November 22nd, "The Geometrid Wave Moths—Acidaliids," L. B. Prout; November 29th. December 13th, "Holiday Paper," A. J. Rose, F.E.S.; December 20th; December 27th, Lantern Exhibition, J. A. Simes.

Lancashire and Cheshire Entomological Society.—Grosvenor Museum, Chester, at 7 p.m., November 21st. Hon. Sec., E. J. B. Sopp, 104, Liverpool Road, Birkdale.

THE NATURALIST.

A MONTHLY ILLUSTRATED JOURNAL OF

NATURAL HISTORY FOR THE NORTH OF ENGLAND.

EDITED BY

T. Sheppard, F.G.S., and T. W. Woodhead, F.L.S.,
Museum, Hull; Technical College, Huddersfield;

With the assistance as referees in special departments of

J. Gilbert Baker, F.R.S., F.L.S.; Percy F. Kendal, F.G.S.; T. H. Nelson, M.B.O.U. Geo. T. Porritt, F.L.S., F.E.S.; John W. Taylor; William West, F.L.S.

LONDON:

A. Brown & Sons, Ltd., 5, Farringdon Avenue, E.C.

PRICE SIXPENCE NET. BY POST SEVENPENCE.

Communications, etc., to be addressed to—The EDITORS, THE MUSEUM, HULL.

Second Edition, 1904. Price 6s. 6d.

Lepidopterists who have not yet treated themselves to this work should do so this Christmas.

A Natural History of the British Lepidoptera,

VOL. IV.

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

With Synopsis of Contents of Vols. I and IV., and General Index of Vols. I to IV, by **GEORGE WHEELER**, M.A.

Price £1 net.

Thick 8vo., 533 and xvi. pp., Plates, etc., strongly bound in cloth, and gold-lettered.

Complete set, Vol. I-IV, for a few weeks will be sold for £3 7s. 6d., Single Volumes £1 net.

A detailed account of the British Sphingids, quite encyclopædic in its character, with general details of the whole group, their affinities and classification, their habits, early stages, distribution, etc.; full account of their hybridisation and gynandromorphism, their variation and local races. Every British entomologist ought to make it his business to see this work, if he sees it, he will buy it, even if he makes no other investment in entomological books. Every available detail that can be gathered, either from British records or abroad, has been accumulated to make up a huge collection of facts about each species, of which even the most advanced lepidopterist can have no conception till he has seen the work. The account of *Agrius convolvuli* occupies 63 pages, and that of *Manduca atropos*, 76 pages of detailed facts, whilst the accounts of *Sesia stellatarum*, *Eumorpha elpenor*, *Theretra porcellus*, *Hippotion celerio*, *Phryxus livornica*, *Celerio gallii*, *Hyles euphorbiae*, *Daphnis nerii*, *Hyloicus pinastri* and *Sphinx ligustri* must be held to be unrivalled. The older British lepidopterists who regret the decay of British entomology as they knew it, will see, by reference to this work, what they and their contemporaries have done, by their steady work, towards the grand total of knowledge that we now have of these species. Over a thousand different entomologists have been drawn on for material in connection with this work.

It is remarkable that, although entitled *A Natural History of British Lepidoptera*, the German lepidopterists have insisted on a German translation. Such a book must be more valuable to the British lepidopterist, and if every one would see it, no doubt he would want it.

The Hon. W. Rothschild and Dr. Jordan write in their standard *Revision of the Sphingidae*: "Tutt's work is the most intrinsic ever written on the Palæarctic Lepidoptera. There is nothing written anywhere on European Lepidoptera coming up to it in thoroughness." Mr. W. Bateson, F.R.S., writes: "The new British Lepidoptera is a fine scholarly piece of work, for which not only the entomological specialist, but naturalists of all orders, will be thankful to Mr. Tutt for many a year, etc."

Cheques or Postal Orders to be sent to—J. HERBERT TUTT, Rayleigh Villa, Westcombe Hill. Blackheath, S.E.

The Migration and Dispersal of Insects.

BY

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

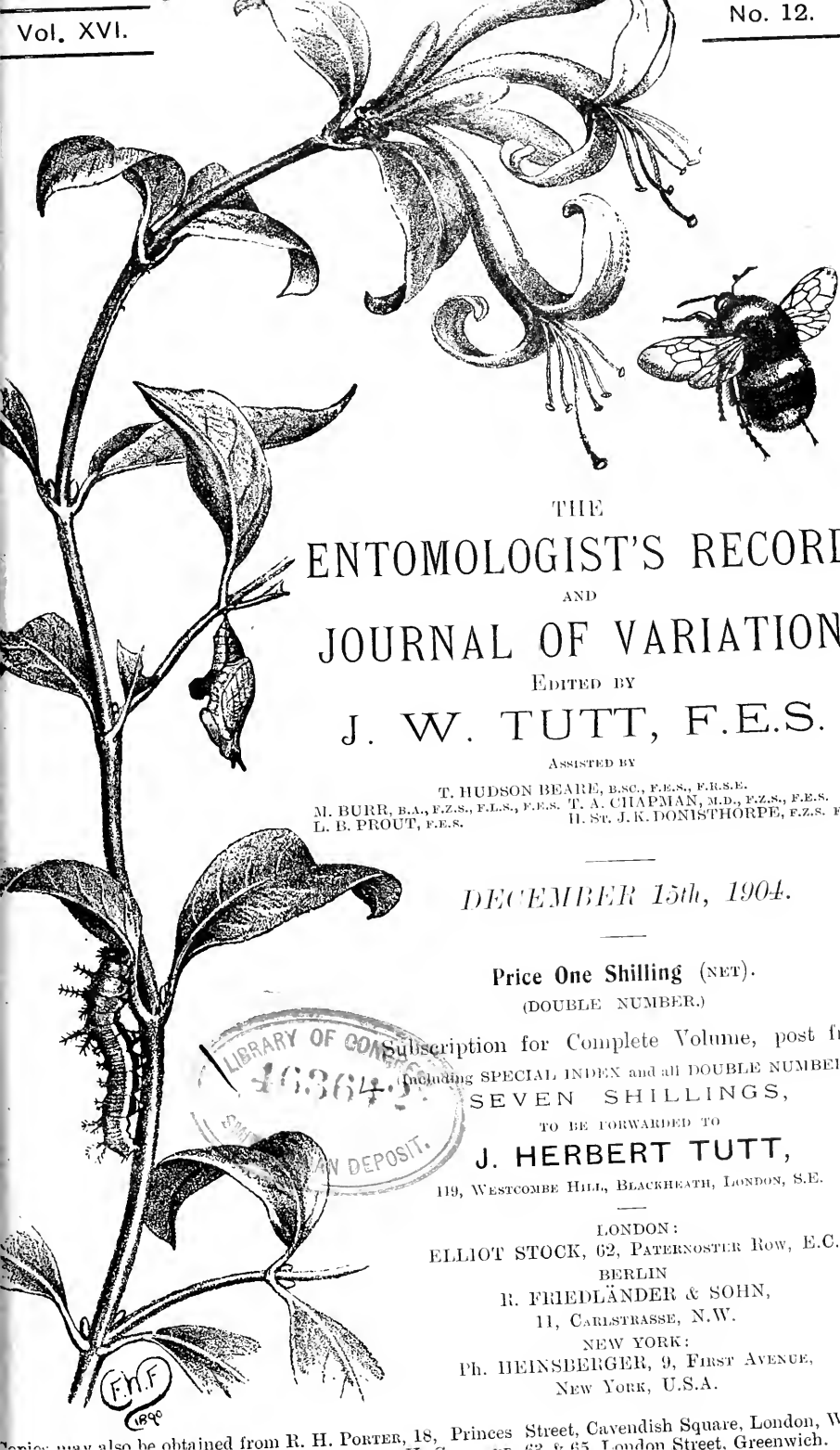
Demy 8vo., 182 pp. Price Five Shillings net.

This book, the only one published on this interesting subject, is of first importance to all students of the geographical distribution of animals, and contains the following chapters:—

1. General Considerations. 2. Coccids and Aphides. 3. Orthoptera. 4. Odonata. 5. Lepidoptera. 6. Coleoptera. 7. Diptera. 8. Social Insects—Hymenoptera, Termites. 9. Final considerations.

Only a very small number of copies has been printed. It is trusted that all entomologists will, besides supporting the book themselves, recommend it to any libraries in which they are interested or with which they are connected.

Vol. XVI. No. 12.



THE ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

EDITED BY

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

ASSISTED BY

T. HUDSON BEARE, B.SC., F.E.S., F.R.S.E.
M. BURR, B.A., F.Z.S., F.L.S., F.E.S. T. A. CHAPMAN, M.D., F.Z.S., F.E.S.
L. B. PROUT, F.E.S. H. ST. J. K. DONISTHORPE, F.Z.S. F.E.S.

DECEMBER 15th, 1904.

Price One Shilling (NET).
(DOUBLE NUMBER.)

Subscription for Complete Volume, post free (including SPECIAL INDEX and all DOUBLE NUMBERS), SEVEN SHILLINGS,
TO BE FORWARDED TO
J. HERBERT TUTT,
119, WESTCOMBE HILL, BLACKHEATH, LONDON, S.E.

LONDON:
ELLIOT STOCK, 62, PATERNOSTER ROW, E.C.
BERLIN
R. FRIEDLÄNDER & SOHN,
11, CARLSTRASSE, N.W.
NEW YORK:
Ph. HEINSBERGER, 9, FIRST AVENUE,
NEW YORK, U.S.A.

Copies may also be obtained from R. H. PORTER, 18, Princes Street, Cavendish Square, London, W.C.

A Natural History of the British Lepidoptera.

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

4 vols., Demy 8vo., thick, strongly bound in Cloth. Price £1 each volume net. Vols. I-IV, £3 7s. 6d.

Vol. I contains 560 pp.+vi pp. Vol. II, 584 pp.+viii pp. Vol. III, 558 pp.+xi pp. Vol. IV, 535 pp.+xvii. pp.

The most important work ever offered to British lepidopterists. The British fauna is merely taken as the groundwork for the thorough revision of each superfamily treated, and the work thus becomes of first importance to all lepidopterists in the world—systematists, biologists, synonymists, phenologists, &c. This important work puts all others of the kind into the shade. It deserves our full attention and recognition, and the opportunity for its study is not to be missed by any students of European lepidoptera to whom it is no less valuable than the Briton (*Berl. Ent. Zeits.*, December 1902).

The Migration and Dispersal of Insects.

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

Demy 8vo., 132 pp. Price Five Shillings net.

This book, the only one published on this interesting subject, is of first importance to all students of the geographical distribution of animals, and contains the following chapters: —

1. General Considerations. 2. Coccids and Aphides. 3. Orthoptera. 4. Odonata. 5. Lepidoptera. 6. Coleoptera. 7. Diptera. 8. Social Insects—Hymenoptera, Termites. 9. Final considerations.

Only a very small number of copies have been printed. It is trusted that all entomologists will, besides supporting the book themselves, recommend it to any libraries in which they are interested or with which they are connected.

Monograph of the British Pterophorina.

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

(Demy 8vo., 161 pp., bound in Cloth.)

A few copies having unexpectedly come to hand, will be sold as long as they last at 5/- per copy.

This book contains an introductory chapter on "Collecting," "Killing" and "Setting" the Pterophorina, a table giving details of each species—Times of appearance of larva, of pupa, and of imago, food-plants, mode of pupation, and a complete account (so far as is known) of every British species, under the headings of "Synonymy," "Imago," "Variation," "Ovum," "Larva," "Food-plants," "Pupa," "Habitat," and "Distribution." It is much the most complete and trustworthy account of this interesting group of Lepidoptera that has ever been published.

Rambles in Alpine Valleys.

Bound in Cloth, with Map and Photographs of District.

Price 3s. 6d.

This book contains a series of essays dealing with the colours of insects, and suggestions as to the relation in past time between the Alpine and British fauna. Many new facts are brought forward, and entomological problems discussed from various standpoints.

Melanism and Melanochroism in British Lepidoptera.

(Demy 8vo., bound in Cloth. Price 5/-.)

Deals exhaustively with all the views brought forward by scientists to account for the forms of melanism and melanochroism; contains full data respecting the distribut on of melanic forms in Britain, and theories to account for their origin; the special value of "natural selection," "environment," "heredity," "disease," "temperature," &c., in particular cases. Lord Walsingham, in his Presidential address to the Fellows of the Entomological Society of London, says, "An especially interesting line of enquiry as connected with the use and value of colour in insects is that which has been followed up in Mr. Tutt's series of papers on 'Melanism and Melanochroism.'"

Woodside, Burnside, Hillside and Marsh.

(Crown 8vo., Illustrated, 242 pp. and 103 woodcuts and full-page illustrations. Bound in Cloth. (Price 2/6).

Another series of collecting expeditions into well-known entomological and natural history localities, with description of botanical, geological, ornithological as well as entomological matters of interest to be found therein. The places dealt with include Cobham Woods, Cuxton Downs, the Western Highlands, Cliffe—all well known for their rich entomological fauna.

To be obtained from J. Herbert Tutt, 119, Westcombe Hill, Blackheath, S.E.