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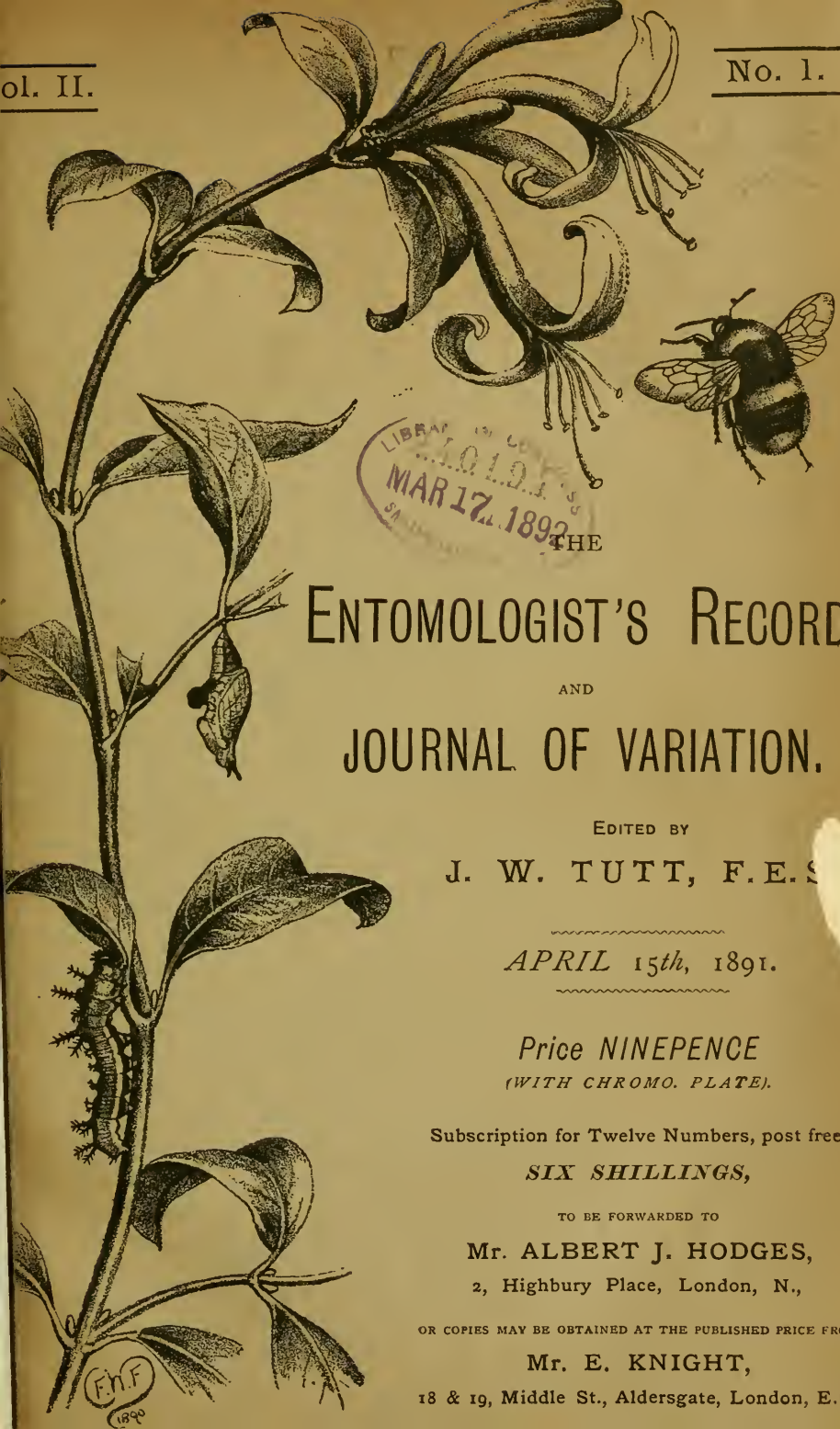

THE ENTOMOLOGIST'S RECORD

AND

JOURNAL OF VARIATION.

EDITED BY

J. W. TUTT, F.E.S

APRIL 15th, 1891.

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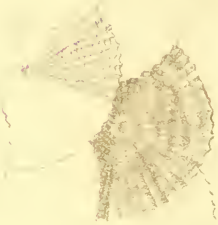


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The Entomologist's Record AND JOURNAL OF VARIATION.

No. 1. Vol. II. April 15th, 1891.

THE GENUS ACRONYCTA AND ITS ALLIES.

By Dr. T. A. CHAPMAN.

(*Continued from page* 228.)

Plate VII. Eggs of *Viminia*.—The eggs of *Viminia* have a close resemblance to each other; this is brought out in the plate perhaps rather too strongly, owing to the circumstance already alluded to that in warm weather, and to some extent at all times, the eggs possess their most typical and perfect colouring for only a short time, and the artist has not in all instances seized this moment. There is therefore something to desire in nearly all these figures. It is, however, to be borne in mind, that these eggs are perhaps as difficult subjects for pen and pencil as it is possible to desire, and that the success, though qualified, is not meagre, but the chief cause for regret is in not seizing the moment when the egg is at its best to make the drawing. This is most notable in the case of *auricoma*, fig. 4, which has a greater definiteness of marking than the other species, approaching in this respect the egg of *alni*, to which it has considerable resemblance. *Rumicis* also has as its most definite point a distinctly paler area round the dark summit, giving a characteristic dotted aspect to the egg. Curiously this character has been well seized in the drawing of *venosa*, where it is less prominent. In the case of *venosa* the crenulations of the ribs have been drawn more distinctly than in the others, which they are not in reality, except that the ribs being fewer they are on a slightly larger scale and therefore more evident, but they do *not*, as shown, form a distinct system of transverse ribs. The groups showing imbricated method of laying is very correctly displayed in 3*a*, *venosa*. In 6*a* and 4*b* the order is well shown, but it is comparatively rarely that an egg is out of its place as shown in one case in

each of these. This only occurs when the moth has been disturbed in laying and begins afresh, and there will often be 40 or 50 and, with *rumicis* and *venosa*, 100 or more eggs laid with perfect regularity.

The characters of the eggs may be most easily compared if shown in a tabular form :—

	Diameter, mm.	Height, mm.	Number of ribs.	Colour, etc.
myricæ	1.1 to 1.33	.5	66	Pale areas comparatively indefinite.
auricoma.....	1.1	.32	57 to 60	Pale areas large and few.
rumicis	1.0	.32	54	Pale areas very numerous, small, and forming a pale circle round a dark summit.
menyanthidis ...	1.1	.35	50	Pale areas more definite than *myricæ*, intermediate in size between *auricoma* and *rumicis*.
venosa.....	.95–1.1	.4	41.45	Very like *rumicis*, but dark summit less definite and whole egg paler.

The greater height of *myricæ* is due to its being a somewhat larger egg than the others and being more often laid singly. Such a specimen was selected for measurement and showed a greater height than could be found in them in an imbricated mass. The heights are given as actually recorded, but my impression is strong that the differences between the several species in this respect is trifling or evanescent.

It is curious that the number of ribs should vary as it does, and especially that the difference should be so great in the most allied species, *menyanthidis* and *myricæ* having respectively 66 and 50, and *rumicis* and *venosa* 54 and 44. This is quite parallel to what obtains between *psi* and *tridens*, and probably has some relation to the circumstance that, though these pairs occupy the same areas and emerge at the same times (or nearly so), hybridisation as to none of them has been recorded.

DESCRIPTION OF PLATE VII.

Fig. 1 and 2.—Egg of *Viminia rumicis* × 25 diam.
Fig. 3.— ,, ,, *venosa* × 25 diam.
Fig. 3a.—Sketch of group of *venosa* eggs shewing imbrication × 25 diam.
Fig. 4.—Egg of *Viminia auricoma* × 24 diam.
Fig. 4a.— ,, ,, ,, vertical section.
Fig. 4b.—Sketch of imbricated group of *auricoma* eggs × 25 diam
Fig. 5.—Egg of *Viminia myricæ* × 21 diam.
Fig. 5a.— ,, ,, ,, vertical section.
Fig. 6.— ,, ,, *menyanthidis* × 22 diam.
Fig. 6a.—Sketch of imbricated group of *menyanthidis* eggs × 17 diam.

MELANISM AND MELANOCHROISM IN BRITISH LEPIDOPTERA.

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

(*Continued from page* 325.)

In *The Entomologist's Record*, etc., vol. i., pp. 232, 233, I referred to a paper by Lord Walsingham, in which it was suggested that the dark coloration of insects was probably due to the rapidity with which these colours absorbed heat in high latitudes and altitudes; and although I quite admitted in my remarks, that a dark colour would be an advantage, under such conditions, to those insects possessing it, yet, since a dark coloration was not characteristic of high latitudes and altitudes, the advantage due to the rapidity of absorption could hardly be looked upon as a cause of melanism. Referring to this in his Presidential Address to the Fellows of the Entomological Society (*vide Trans. Ent. Soc. Lond.*, 1890, pp. liv., lv.), Lord Walsingham says:—"Mr. Tutt, referring to a paper of my own in which I called attention to the tendency to melanism exhibited by Arctic and Alpine Lepidoptera, points out that insects from high latitudes are not generally melanic. I think I may at once admit that I had used the term 'melanic' somewhat incorrectly in this connection; what I desired to point out was the general tendency of Arctic Lepidoptera to a certain suffusion of markings, and to an increase in the proportion of dull or dingy scales calculated more rapidly to absorb heat than the purer white of more southern varieties. Such a tendency will, I think, be admitted to exist, but I am aware it is far more conspicuous in many insular and Alpine districts; and, while I cannot agree that the arguments put forward in that paper are in any way undermined by this admission, or that the advantage secured to the species by the development of colour capable of rapidly absorbing heat has been in any way disproved, I am quite willing to accept Mr. Tutt's assertion that melanism does not habitually occur unless lower temperature is accompanied by increased humidity; qualifying the acceptance only by suggesting that anything which would have the same effect as increased humidity in diminishing the action of sunlight would probably be found to produce the same results."

I am very pleased that Lord Walsingham thus far admits the justice of my criticism. I quite agree with him that the

arguments in his "paper are in no way undermined" by his admissions, except so far as these arguments seek to bear out that dark coloration, owing to the rapidity of heat absorption is a *cause* of melanism; the arguments brought forward to show that dark coloration is in certain cases *an advantage* to the insects possessing it are certainly as potent as ever. I do not, however, altogether agree with his suggestion "that anything which would have the same effect as increased humidity in diminishing the action of sunlight would probably be found to produce the same results," unless indeed, it would have the same effect in influencing the surroundings, and thus promote the same course of development by "natural selection." For example, snow-clouds in the higher open Arctic plains of Europe, Asia, and America, obscure the sun's rays for the greater part of the year, for a much longer period of time certainly than do the rain-clouds, etc., of our own Islands; again, Nature shuts out the light of the sun from the greater part of these areas, with the exception of a very few hours, for the whole period from November to February, and yet the insects from these open Arctic plains show no tendency to melanism, as I have over and over again repeated, when attempting to show that cold in these regions does not produce melanic forms. Here we have insects brought up naturally with a minimum of sunlight affecting them, but Nature does not here produce melanic forms.

In a previous paragraph (*Entomologist's Record;* etc., vol. i., pp. 89, 90) I stated that I failed to see how the absence of sunlight could in any way account for any form of melanism or melanochroism in lepidoptera, but Lord Walsingham, as may be gathered from the preceding paragraph, appears to think differently, and opens up a new path in this direction. He says :—"There are many local circumstances which cause an interference with direct sunshine; dense forests occur where the full rays of the sun never penetrate, clouds and mist accumulate around the summits of high mountains, fog and smoke envelop the districts immediately surrounding our manufacturing towns, islands in a temperate climate are subject to condensation of moisture and sea-fogs, and under all these circumstances dark varieties of certain species are known to occur, although the same species when found under different conditions more favourable to the action of light, are usually less intensely coloured. But if moisture is to be taken as a direct, rather than an indirect, cause, we should expect to find

melanic variation occurring in the swamps of Tropical Africa, in the forests of the Amazon, on the banks of the Mississippi, and in many other damp climates, even within tropical regions, and I am not aware that this is the case. It has been pointed out that no variation in the direction of melanism has been found to occur in dry open level tracts, however far north these may be; and this fact, although it tends to show that cold is not by itself a potent cause of such variation, is perfectly consistent with the theory that diminished sunlight exercises a certain influence upon the direction in which colour may be expected to, and does, vary. The only conclusion that I would venture to maintain, in regard to this very wide subject, is that variation of colour in the direction of melanism, melanochroism, or such suffusion of markings as can appreciably affect the rapidity of heat-absorption by the wing-surface of any insect, is very generally proportionate to the degree of interference with the direct action of sunlight caused by climatic or other conditions to which the insect is exposed, and that such interference may have a more or less immediate, or only a very gradual effect, upon the variation of species. We have yet to ascertain how far such effect is assisted by a process of natural selection, and whether such natural selection is exercised for the sake of protective resemblance, or for the advantage derived from an increased power of heat-absorption, or whether it is produced by the direct chemical action of the visible or invisible rays of the solar spectrum.

"I sincerely wish that Mr. Poulton or Mr. Merrifield, or some of those gentlemen who have time and opportunity for studying this question, would carry out an experiment, originally put into my head by Sir John Lubbock, viz., the rearing of some of our variable GEOMETRIDÆ, such as *Gnophos obscuraria*, *Cidaria russata*, or some of the species of *Melanippe* or *Hybernia*, guarding them in the larval and pupal stages by hyposulphide of carbon or bichromate of potash from the action of the ultra-violet rays of the sun, which are supposed by many to have such a strong chemical effect upon the colouring matter in the scales, or on the chlorophyll in the pigment of the larvæ. If it were found that under such conditions any appreciable change could be made in the percentage of dark as compared with paler varieties, it would go far to prove that melanic variation cannot be attributed to the direct influence either of cold or moisture, but rather to the indirect influence of the two combined; and the facts, so far as they are at

present known, point, I think, somewhat forcibly to this conclusion" (*Trans. Ent. Soc. Lond.*, 1890, pp. liv., lv.).

These remarks suggest many ideas, and open up new standpoints from which the subject may be discussed, and the following suggestions at once presented themselves to me as I heard the address.

Although I certainly look on moisture rather as an indirect than a direct cause of melanism, I am not inclined to discount the probability of "melanic variation occurring in the swamps of Tropical Africa, in the forests of the Amazon, on the banks of the Mississippi, and in many other damp climates even within tropical regions." To a great extent our knowledge of the fauna of these districts is more or less confined to the larger and more conspicuous of the lepidoptera, especially diurnal lepidoptera, whose habits would render them less susceptible to these influences, their environment leading them to vary mainly in other directions. When the nocturnal lepidopterous fauna of these districts is as intimately known as our own, I feel satisfied that numerous cases of melanism will come to light proving that the combined influence (direct and indirect) of moisture and "natural selection" are of general application.

Lord Walsingham's idea as to the action of the actinic rays of the sun in producing colour, and the absorption of certain of these rays by clouds, etc., as a probable cause of melanism, is quite new to me, and has proved of great interest, although at present I cannot see my way clearly to accept the suggestions to which the idea leads. I suppose that since the solar spectrum consists of heat, luminous and actinic rays, we may perhaps assume that a lessened amount of luminous rays, after having filtered through clouds, etc., is accompanied by a fewer number of actinic rays, and that the clouds may have a corresponding absorptive and diffusive [1] power over these rays as they have over the luminous. Considering, too, the well-known phenomenon of the decomposition of carbon dioxide by the chlorophyll of plants in the presence of water, by the direct action of the actinic rays, there seems a superficial reason for considering that these rays may have, as is observed by Lord Walsingham, some action on the chlorophyll in the pigment of

[1] The absorptive and dispersive power of aqueous vapour on the ultra-red (or heat) rays of the spectrum is well known: see Ganot's *Physics*, par. 959. It becomes certain, therefore, that the influence of vapour is to increase the quantity of obscure (ultra-red or heat) rays, and to lessen the luminous and ultra-violet (or actinic) rays, in proportion to the increase in the ultra-red.

the larvæ. But I would ask what effect (direct or indirect) can the actinic rays of the sun have on those larvæ which have not the slightest trace of chlorophyll in their pigment. NOCTUÆ larvæ, which feed on roots and never come under the influence of sunlight at all; wood-borers as the *Hepialidæ*, *Sesiidæ*, etc., *Prays curtisellus;* richly-coloured, densely-haired larvæ as *Arctiidæ* and *Acronycta*, and so on, many of the species of which show melanic variation. I am afraid I must own that at present I am unable to see any connection between cause and effect in this direction, although it certainly is a matter worthy of the most careful consideration.

Although I thus still venture to differ from Lord Walsingham, I must candidly confess that his remarks have modified my previously formed opinions, and that I should not now feel inclined to give the probable action of sunlight the short shrift I gave it in a previous paragraph.

(*To be continued.*)

VARIATION.

VARS. OF HYPSIPETES ELUTATA.—I have had considerable experience with this species from various districts both among sallow and *Vaccinium*; the former specimens are, as a rule, much larger and the green of a paler hue, and nothing like as variable as the *Vaccinium* specimens. Of course the sallow ones vary. There is a form on our high moors that has an ocellated spot on the upper wing that does not appear so striking in the sallow feeders, if at all. Last season on the high grounds (moors) I paid special attention to the elevations, and started at the top of a very wet boggy place among the *Vaccinium*, here they were small and nearly black, some quite so; as I came down the hill where it was much drier, the species swarmed; these were nearer to the sallow form, in fact, some were mixed, but of an intermediate colour. Still lower, most of them were of the sallow type, larger and of the green hue, although there are no sallows within miles of the spot. The weather was bad and the species soon got worn, although, as it was, I got some charming varieties.—J. B. HODGKINSON. *March 17th*, 1891.

XANTHIA AURAGO var. FUSCATA.—I find this variety at the rate of about one in twenty. This species is occasionally abundant here, and in 1875 every patch of sugar was crowded with them, and I sent out hundreds about the country.—W. HOLLAND, Reading.

ASPHALIA DILUTA var. NUBILATA.—I sometimes get the var with three bands in the Basingstoke district.—ID.

VARIETY OF PHIGALIA PILOSARIA.—On February 7th, 1891, I took one specimen of a dark olive-green (nearly black) variety of the above species in a wood at Otley. I only obtained one other insect which was a rather light type of the same species. All the trees in the part of the wood where I took both insects were covered, even to the fine twigs,

with a light green lichen like growth; but the ground was like a soaked sponge, and bears evidence of being in this condition for a great part of the year: cryptogamous vegetation being especially abundant. I would suggest that entomologists when recording varieties should note also the environment, in so far as it is distinctive. Such a course would render records doubly valuable, and do much to clear up the question of the causes of variation.—W. MANSBRIDGE, Leeds.

DARK VAR. OF PHIGALIA PEDARIA (PILOSARIA).—On the 25th of February I found that a *P. pilosaria* had emerged in my pupa box. I obtained the caterpillar from oak last June. It was a male, very small and dark in colour. On the following day I caught a male specimen of the same species at rest on a post. It was much lighter in colour and a great deal larger than No. 1. Now during the whole of its pupal stage and part of the larval, No. 1 must have been kept much drier and warmer than No. 2, and yet No. 2 is much the larger and lighter-coloured insect. May not the greater abundance of food which No. 2 would have had in a state of nature have had something to do with it? —JOHN WILLIAMS VAUGHAN, JUN., The Skreen, Erwood R.S.O., Radnorshire. [I should say the darker colour was more probably due to a diseased condition, brought about by Mr. Vaughan's implied starvation diet, and thus the greater abundance of food No. 2 had in a state of nature, may have something to do with it.—ED.]

IS MIANA FASCIUNCULA A VAR. OF M. STRIGILIS?—I cannot help feeling that my friend, Mr. J. W. Tutt, has, on very insufficient evidence, come to the conclusion that these are only one species. What really is this opinion founded on? That Mr. Tutt has received from Armagh a few (probably only two[1] doubtful) specimens of this protean genus. That the nine[2] specimens sent by the Rev. W. F. Johnson from Armagh are all, what might well be called a "strong local form," is beyond dispute; but when seen by daylight, and the characteristic differential[3] points of these too well-known and generally common insects studied, I much doubt if any great difference of opinion would be found to exist about them. Of course, when seen by gaslight, a difference would very possibly be expressed on the spur of the moment. But looked at by daylight, as I have now had the pleasure of doing, I should have no difficulty or doubt in saying that seven of these Armagh specimens are *fasciuncula* and two undoubted *strigilis*. That all these specimens were taken together is not the slightest proof or indication that they were only one species. I have many times captured the two species on the same night, but I have never yet taken one that I had the slightest difficulty in determining, in fact, to my mind, *fasciuncula* and *strigilis* are the most readily separated species of the groups. Why Mr. Tutt can, on this extremely slight and superficial character of colouring[4] alone, jump at once to the conclusion that he has found the "missing link" of our long-believed-in two species is beyond me. I need not go into the characters by which we have always determined these species,

[1] This is, of course, only Mr. Tugwell's individual opinion.

[2] Twenty were sent, but only nine exhibited.

[3] I maintain that there is not one of what Mr. Tugwell calls differential points below, characterised in any of the specimens.

[4] Mr. Tugwell must have missed my article on the subject, p. 243, and my remarks on p. 315, or he could not have written this.

they are to my vision, structural, as well as superficial ; at least, I call a more robust thorax, and more truncate wings, structural ; of course, you may, and do get larger and smaller specimens of each, still, these respective differences exist. But Mr. Tutt finds these characters "superficial," and of no importance. I should like to ask Mr. Tutt if he ever saw what we know as *fasciuncula*, *in copulâ* with *strigilis*? because, if they are only one species, our mistake in thinking them two would in no way interfere with their free inter-copulation ! This, to my mind, points pretty conclusively the other way, and that they are two good species. It would indeed be "passing strange" that we should have had so common a species, with *three* divergent forms, taken and seen by thousands every year side by side, or otherwise, and yet that these three forms, say *strigilis* normal, *fasciuncula* normal, and var. *cana* should never pass the bound of recognition. I am not prepared to argue that you may not find a complete link, possibly, in *fasciuncula* and var. *cana* ; but fancy a species as prone to vary as is *strigilis*, stopping just short of a complete chain ; it is to say the least of it, hardly probable. In conclusion, Mr. Tutt says his "Armagh specimens will do for either" *strigilis* or *fasciuncula*. I agree[1] with him ! They may ; because he has both species amongst them, seven *fasciuncula* and two *strigilis*.—W. H. Tugwell, 6, Lewisham Road, Greenwich.

My friend, Mr. Tugwell, has formed such a decided opinion on the Armagh specimens, that I have great pleasure in printing his communication as his opinion. But this opinion differs from that of many other excellent lepidopterists who have attempted to draw the line. Of these I will only name one, our mutual friend, Mr. G. T. Porritt, who believes that of these nine queer specimens four are *strigilis* and five *fasciuncula*, The matter has now got to this point. By the pure *ipse dixit* of myself and other lepidopterists we consider that *strigilis* and *fasciuncula* may be one or two species. No one can prove or disprove either suggestion positively until the species is, or are, bred and differentiated in the larval stage. All our superficial arguments will not alter facts, and until some good lepidopterist has worked out the life-histories of *strigilis* and *fasciuncula* and placed beyond doubt their distinctness or otherwise, we must agree to differ on the exact amount of differentiation we allow *fasciuncula* to have undergone. For the purpose of directing attention to the matter I consider my evidence very sufficient. Mr. Tugwell's statement "I have never taken. . . . group," I quite agree with ; I have never taken one, but the Rev. Mr. Johnson has. I don't like to suggest carelessness to my friend, but has he read my article, p. 243, to write such a sentence as :—"Why Mr. Tutt can on this extremely slight and superficial character of colouring alone," etc.? I think he can never have seen what I have written, or he is writing from memory which has deceived him. I cannot help returning the compliment by asking Mr. Tugwell whether he ever saw *fasciuncula in cop.* with *fasciuncula*, or *strigilis* with *strigilis*. I certainly have never seen *fasciuncula in cop.* with *strigilis* (I don't know that I ever made a remark which might be construed as a suggestion that I had), but there is a good deal of this sort of thing we don't see. I am rather at sea, too, over my friend's

[1] This is funny. How can Mr. Tugwell agree with me? His seven *fasciuncula* are (in my opinion), to all intents and purposes, *strigilis*, and his two *strigilis*—*fasciuncula*.

three forms "*strigilis* normal, *fasciuncula* normal, and var. *cana*." To my mind there is no difficulty with these, it is with these indescribable vars. where *strigilis* var. *æthiops* runs into black forms of *fasciuncula* that the difficulty comes. I am rather surprised, too, to find that Mr. Tugwell does not know that there are distinct links between *fasciuncula* and var. *cana*, and I certainly think he is wise in not being prepared to argue that there may not be such links. Would it not have been wiser to have neglected mentioning these until certain, and then argue to the bitter end. I will finish by suggesting that if, as Mr. Tugwell says, "it is beyond dispute that the nine specimens sent by the Rev. W. F. Johnson from Armagh are *all*, what might well be called a strong local *form*," there is no need to separate the "all" which make up one "strong local form" into two species, "seven of which are *fasciuncula* and two *strigilis*."—J. W. Tutt.

Aberration of Arctia hebe.— I have in my collection of European Lepidoptera an aberration of *A. hebe*, L., ♀ *ex lar*, in excellent condition, which differs from the typical form in a highly interesting manner. The bands of the superior wings are ochreous instead of white, and not bordered with dark. The small round basal spot is wanting. The first band is small, unequal and in the upper part cut through by the ground colour. The second band begins at the upper margin with an oval spot, continues small and goes downwards, becoming gradually broader, the exterior margin being somewhat convex in the middle. The base of this band is formed by an equally broad spot of yellowish white colour. Instead of the third band there is near the upper margin of the left wing an oblong and vertical little spot, which is wanting on the right wing. The 4th and 5th bands are small, the transverse line is broad, the inferior half of the 4th band is not directed convexly inward, but goes almost straight to the inner angle, whereby the inferior black spot appears small. The edge equally narrow and black; the inferior wings black without any trace of red colour, the marginal spots and the middle band deep glossy black. The undersides of the superior wings black, last and upper half of the penultimate band and transverse line nearly as dark yellow as above; the rest of the delineation of the bands scarcely visible. Inferior wings exactly as above. Abdomen brilliant bluish-black with velvet-like black dorsal and lateral stripes, the space between the first and latter, coloured with light red, the margin of the lateral stripes above as below and have from the 2nd to the 6th segment a very small very red point on each of them. The size of this specimen is that of the common ♀.—E. Kautz, Coblentz-on-Rhine. *March*, 1891.

Varieties of Vanessa urticæ and Zygænidæ.—Some twenty years ago I called on a picture collector who bred large numbers of showy butterflies. He opened one box that had eleven pale yellow tortoiseshells, all perfect but one. This had three wings, one top wing being loose in the box. Before I could say a word, he took out this one and crushed it under his foot. I said something—low, no doubt—but he soothed me down, saying, take what is left. He did not value them, as he said they were not right ones. He never bred any more. Of the yellow burnets a friend of mine has four that he bred from the Sunderland district. He writes me the place is now destroyed. I had one bred by a boy near Thorley. I have a specimen more of an

orange than yellow, also a splendid *Z. loniceræ*. The top wings of a pale green, the under wings and spots of a yellowish white; those were both from the Wratislaw collection. By the way, my friend that had the yellow burnets has a fine black *urticæ* that he bred some thirty years ago, he wrote me a short time ago he had seen another in Scotland.—J. B. HODGKINSON.

CURRENT NOTES.

The "Special Index" to vol. i. of the *Entomologist's Record*, etc., consisting of 24 pp. (double columns) can now be obtained from Mr. A. J. Hodges, 2, Highbury Place, N. This is of such undoubted use for scientific work, that it is trusted all subscribers will obtain it.

Dr. Wood describes (*E. M. M.*, p. 100) a new species of *Micropteryx* from the birch. His provisionally-named *inconspicuella* with a pale larva turned out to be *semipurpurella;* so the new one with the grey larva, allied to *semipurpurella* is named *sangii*. The latter has shorter antennæ, the anal spot larger, more conspicuous, reaching fully to the middle of the wing and more upright. The spot in *semipurpurella* is frequently absent altogether.

A monograph of the British *Pterophorina* by J. W. Tutt, F.E.S., containing the original type description, extent of variation, full account of life history (so far as at present known), habitat, etc., of each species, making a most complete text-book (up to date) of this interesting group may now be obtained in 6d. parts (two parts now ready) from Mr. J. E. Robson, Hartlepool.

Mr. C. G. Barrett (*E. M. M.*, p. 103) points out that *Pempelia adelphella* has never occurred in Britain. He also states that it is most like *P. formosa*, and not *P. hostilis*, specimens of which get generally called *adelphella*.

Mr. W. H. B. Fletcher (*Record*, i., p. 352) exhibited hybrids obtained by crossing *Zygæna loniceræ* with *Z. filipendulæ*. The eggs from the hybrids proved infertile.

Mr. C. G. Barrett (*E. M. M.*, p. 103), points out that *Catoptria decolorana*, Frr. has no *locus standi* in the British fauna. He states that the *Solidago*-feeding *Catoptria* is *æmulana*, that the *Aster*-feeding species is *tripoliana*, and that the true *decolorana* which does not occur in Britain is "slightly smaller than *æmulana*, of an extremely pale yellowish-grey, almost without definite markings, but with a few brownish flecks, which become more abundant beyond the middle, costal streaks visible but very faint, and the ocellus or 'shield' is visible from being devoid of brown flecks and encloses two short faint brown lines. The wings have no trace of the distinct angulated fascia and basal markings seen in *æmulana*. Inhabits East and Central Germany, and North and East Russia.

The paper on the "Genital Armature of the species on the genus *Miana*," by Mr. F. N. Pierce (for which I am indebted to the author for a copy) is a most interesting and carefully prepared essay, and worthy of general perusal.

It is with the greatest regret that I have to record the death of Mr. Edmund Hanes, for some considerable time Secretary to the City of London Entomological Society, at the early age of 25 years.

As the collecting season is now drawing near, I would again call the attention of all collectors to the Rev. J. Seymour St. John's book on "Larva collecting and breeding," etc. No collector should be without it.

SCIENTIFIC NOTES.

PACHNOBIA AND TÆNIOCAMPA.—As no one enters a protest against Mr. Tutt replacing *leucographa* and *rubricosa* in the genus *Tæniocampa*, I should like to say a word or two on the matter. I have practically no knowledge of the literature of the subject, but I have reared all the species from the egg, except *gracilis*, of which I have, however, taken the larva very small, and *alpina*, which I have never seen alive in any state. (1). *Tæniocampa* lay the eggs in groups of from 20 to 50 or more, in regular order, like *Triphœna* and other *Noctuæ*. *Populeti* and *opima* sometimes lay them rather in a heap than in a proper manner. The eggs are flattened below and rounded above, the height being about $\frac{3}{5}$ of the diameter, as if they had been spheres, but had been soft and dough-like and sunk down with their own weight. They are ribbed, noctua-fashion; towards the rounded top the ribs fade into a more or less hexagonal flat network, the ribs number over 45, usually 50 to 60. In *Pachnobia* the eggs are laid solitarily, flattened below, they tend to be slightly pyramidal upwards and the bold ribs terminate above in a raised coronet around the micropylar area. The ribs number 40 to 44. (2). The larvæ of *Tæniocampa* feed on trees or bushes; they spin tents in which to moult and even to feed. *Miniosa* makes a net not unlike that of *Eriogaster lanestris* on a smaller scale; *gracilis* lives in a tent till its last moult; *instabilis* as a rule only makes a tent to moult in; *populeti* always lives between united leaves, but the others abandon this habit in the last skin. *Munda* and *cruda* have the least of it. The larvæ of *Pachnobia* live on low plants, never makes any tent and much resembles a *Hadena* or *Mamestra*. I have not sufficiently observed the pupæ to enable me to point to any decided differences of generic value; the two terminal spines arise more closely together in *Pachnobia* than in *Tæniocampa*. (3). The perfect insect differs in a very important respect,—one sufficient to place it in a separate family rather than merely in a separate genus, viz., the wings are held when at rest, deflexed in pent-house fashion by *Tæniocampa*. In *Pachnobia* they lie flat and cross one another. The outline of the wing is different, and in setting them the hind wing appears to be much more abundant and ample in *Pachnobia*.

Trachea piniperda is much nearer to *Tæniocampa* than *Pachnobia* is, the eggs are laid in groups, the moth sits with deflexed wings. Indeed it seems to be a true *Tæniocampa* somewhat modified in colouring to suit its especial food; the striping of the larva being like that of *gothica* or *instabilis*, and the markings of the moth being those of a *Tæniocampa*, but the colouring is such as to harmonise with the rich tints of the bark of the smaller branches of Scotch fir, and the shadows of the pine needles.—T. A. CHAPMAN, Firbank, Hereford. *February*, 1891.

I suppose the following brief summary of some remarks made at the

City of London Society's Meeting, October 16th, 1890, on "The genus *Tæniocampa*" (*Record* i., p. 216), is the reason for Dr. Chapman supposing that I wish to replace *leucographa* and *rubricosa* in *Tæniocampa*:—"The species *leucographa* and *rubricosa*, although very closely allied to each other, are very dissimilar to *hyperborea* (*alpina*), which seems to be an aberrant member of the *Agrotidæ*, and there appears no reason whatever for uniting these species in the genus *Pachnobia*." Dr. Chapman assumes that by this I mean replace *leucographa* and *rubricosa* in *Tæniocampa*,[1] and I suppose leave *alpina* in *Pachnobia*. What I stated at the meeting (the report is only the barest summary of my remarks) was—refer *alpina* to *Agrotis* or thereabouts, but leave *leucographa* and *rubricosa* (under *Pachnobia* or any other name) generically distinct from *alpina*. I certainly did not suggest replacing these species in *Tæniocampa* and practically agree with Dr. Chapman's remarks. The literature of the genus *Pachnobia* seems to be as follows:—Guenée created *Pachnobia* for the species *carnea*, *hyperborea*, *carnica*,[2] and *glacialis*[2] (*Noctuelites*, v., pp. 342, 343), Dr. Staudinger moved *hyperborea* with *carnica* and *glacialis* to *Agrotis* (*Catalog* p. 81); he also removed *leucographa* and *rubricosa* from *Tæniocampa* into *Pachnobia*, Gn., with *carnea* (*Catalog* 114). Our list-makers, leave *hyperborea* in *Pachnobia* (following Guenée) and then add *leucographa* and *rubricosa* (following Staudinger), and so mix the matter completely. I can only imagine that our list-makers in their wisdom have supposed that *carnea* = *carnica* (another synonym of *hyperborea*), and have thus become hopelessly muddled. Undoubtedly *carnea* has prior claim to *Pachnobia*, and as *leucographa* and *rubricosa* go with *carnea* they will retain *Pachnobia*, but what is *alpina* to do? Of course, if we only had our 3 (so-called) *Pachnobiæ* to account for, *alpina* would by priority take that generic name but *carnea* alters matters entirely, and I take it that Dr. Chapman has used (in his remarks above) the genus *Pachnobia* quite correctly, in so far as he includes *leucographa* and *rubricosa*. But we shall have to remove *alpina*; probably, it appears, make a new genus for it. For the remainder Dr. Chapman's careful differentiation is quite new matter for consideration. In the *Canadian Entomologist*, March 1891, p. 46, Mr. Grote writes:—"I referred to my *Check List* (1875) *Pachnobia* to *Agrotis*, but in deference to European writers have lately left it near *Tæniocampa*." I am sorry I don't know how Grote uses *Pachnobia*. Can any reader tell me?—J. W. Tutt, Westcombe Hill. *April 2nd*, 1891,

The Value of the Genitalia in determining Species.—The following note by Mr. W. H. Edwards, Coalburgh, West Va. U.S.A., taken from the *Canadian Entomologist*, xxiii., p. 55, appears so certain to interest British entomologists that I have no hesitation in reproducing it for their edification. It is as follows:—"Are the genitalia valuable in determining species? I doubt it much. We do not need to examine them to prove that two species plainly distinct in the imago, are really so as *Papilio turnus* and *philenor*. It is when the imagoes are puzzling that help from any quarter would be welcomed, as in the case of *Grapta c-album*, *G. comma*, *G. satyrus*, *G. faunus*. Will they help us

[1] I took the genus *Tæniocampa* in its most comprehensive form, as dealt with in our British text-books.

[2] *Carnica* and *glacialis* are vars. of *hyperborea*.

here? Looking at Mr. Scudder's plates, I see, that what I consider natural genera, as *Colias*, *Argynnis*, *Limenitis*, etc., have each their own type of these organs. It is not to be supposed that they are cast in moulds like so many iron pots; and knowing that every other organ varies, we have the right to believe that the genitalia vary also. How much, is the question. In the plates the figures are not drawn to a uniform scale, and the organs are differently exposed, probably drawn as they had dried. Some seem to have shrunk in the drying, others perhaps are done from green subjects, and are full and plump. But taking them as they stand: on pl. 33 all these species of *Limenitis* seem to be essentially alike, and I apprehend that the variation between them is no greater than would be found between individuals of each. So the three *Argynnids*, *atlantis*, *cybele* and *aphrodite* are essentially alike. *Grapta progne* cannot be distinguished from *G. comma*, though they belong to different sub-groups, while *G. faunus* differs conspicuously from *comma*, though these two belong to the same sub-group, and can be but one remove from a common ancestor. On pl. 35, the three *Colias*, *interior*, *philodice* and *eurytheme*, are as like as three marrowfats. My friends, why are things thus? If the test is not infallible it is not to be trusted. If it fails anywhere it may fail often. Now, on page 329, under the head of *Grapta interrogationis*, we read these words:—'The two forms (of this species, to wit, *fabricii* and *umbrosa*) *differ so greatly and so constantly* from each other, not only in the colouring but in the form of the wings, *and even in the abdominal appendages* (the genitalia), *that they have been considered distinct species!*' That is, if they had not, by breeding from the egg, been proved to be one species by the evidence of the genitalia, they would be considered as two! It seems to me this settles at once and for all the value of these organs as tests of species. The study of them may amuse an idle hour, the drawings of them are very pretty, but that they are of any value so far as concerns closely related species does not appear."—J. W. Tutt.

Sports in Venation.—Mr. A. B. Cordley in *Entom. News*, vol. i., p. 88, records two specimens of the Hymenopteron *Nomada maculata*, Cress., which had only two submarginal cells, the first transverse cubital nervure being obliterated in both anterior wings; also a specimen of *Nomada imbricata* in which the same peculiar modification occurs. Mr. Cordley also records one specimen of a species of *Colletes*, and one of a species of *Andrena* which have three submarginal cells to one anterior wing, but only two to the other. Mr. E. T. Cresson records a specimen of *Nomada maculata* with the first transverse cubital nervure obliterated in one anterior wing, but not in both. He also adds:—"Such 'sports' are frequent among the saw-flies, but rare among bees."—J. W. Tutt. *June*, 1890.

Fecundation before or after Hybernation.—Each year, during the months of September, October, and November, I find in a cave on Mont Salève, near Geneva, a beautiful geometer, *Triphosa subaudiata*, Dup. It is known that this species hybernates, and reappears in April and May of the following year, exactly like its congener *Triphosa dubitata*. I have strong reasons for believing that copulation in these two species takes place regularly only in spring, although I have not proved the fact myself. I think that it is so, not only because an analogy in

habit between all species which hybernate is natural enough, but above all because of all the numbers of *Triphosa subaudiata* and *dubitata* ♂ ♀, which I have found during the months of September, October, and November, resting against the interior walls of the cave; I have only once met a pair of *subaudiata in copulâ*. It was in the month of October. Having enclosed this pair in a roomy box I hoped to get a batch of eggs, but I was disappointed. The female died some weeks later without laying.—Ch. Blachier, Genéve. 30 *Mars*, 1891.

In the *Record*, vol. i., p. 236, Mr. Tutt has a note on this question more especially with reference to the British *Vanessæ* pairing in spring or autumn. In our New Zealand species (*Vanessa gonerilla*) the pairing, I think, invariably takes place in spring, as I have frequently observed them in September and October *in copulâ* on and about the native nettles, such being the foodplant of their larva. But I have not seen, or known, this species to pair in the autumn.—W. W. Smith, Ashburton, N.Z.

Imperfect Development of Wings of Bombyx mori.—With regard to Mr. Mackonochie's article on "Wing Development after Copulation," might I call his special attention to the fact that in the case quoted, the specimen of *Platypteryx falcula* was a female. Had it been a male, I very much doubt whether the development would have taken place, the latter being much more reduced than the former, never indeed long surviving the fulfilment of the purpose for which it was created. Several years ago I reared a number of larvæ of *Bombyx mori*, and many of the pupæ hatching simultaneously, several of the insects paired before developing their wings, after which, as far as I can remember, only a few females ever developed them at all fully.—D. H. S. Steuart, 66, Albert Hall Mansions, W. *February 27th*, 1891. [I do not think sex in any way influences the development, which proceeds during copulation in both sexes.—Ed.]

Retarded development of wings.—I never saw an insect develop wings at the same rate of speed which Mrs. Bazett noticed in her *Chesias spartiata*; but no doubt every one will have remarked the quickness with which the wings on one side often develop, compared with the other side. Insects often wander about for a long time before the wings commence to expand; for instance, last year, I had an *Acronycta* (*Viminia*) *myricæ* which emerged two days before the wings commenced to develop, and after so long they developed perfectly.—W. Reid, Pitcaple, N.B. *February*, 1891.

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Additions to the British List and Changes in Nomenclature.

Arachnida.

Oligolophus meadii, n. sp., Cambridge, *Proc. Dorset Nat. Hist. and Antiq. Field Club*, xi., 1890, p. 198, Pl. D., figs. 21a, 22. Bloxworth, Dorset. This species is described in a very interesting monograph of the British Phalangidea, which are now brought up to twenty-four in number. Several of the species described do not appear to have been previously recorded as British.

HYMENOPTERA.

Hedylus, nov. gen., for *H. habilis*, n. sp., Marshall, *Tr. Ent. Soc. Lond.*, March, pp. 14–16. Found by Mr. Bignell in South Devon.

Opius compar, n. sp., Marshall, t.c., p. 32, near Nunton, Wilts.

Opius zelotes, n. sp., Marshall, t.c., p. 40. Devonshire.

LEPIDOPTERA.

Smerinthus tiliæ varr. [aberr.] nov. *obsoleta*, *bipunctata*, *centripuncta*, *costipuncta*, and *suffusa*, J. A. Clark, *Ent. Rec.*, 328, 329. Pl. A.

Melanthia rubiginata var. nov. *virgata*, Tutt, *Ent. Rec.*, 321.

Melanippe fluctuata var. nov. *immaculata*, Tutt, *Ent. Rec.*, 322.—T. D. A. COCKERELL.

NOTES ON COLLECTING, Etc.

PHOXOPTERYX MYRTILLANA NEAR LONDON.—In labelling my last season's captures this winter, I came across one insect which I think should be recorded, viz., *Phoxopteryx myrtillana*. I found a single fine specimen at rest on a flower, on the evening of June 22nd last, at Temple Mills, about half a mile from this house. So little did I expect this species in this neighbourhood, that I did not recognise it until I was about to label and mount it for the cabinet. In order to be quite sure that there was no mistake, I showed it to Mr. Machin, who at once pronounced it to be *myrtillana*. As the G.E.R. runs trains to and from Doncaster it is possible that it may have been conveyed from Yorkshire by this means. I have never seen the foodplant in Essex, and, upon turning to Gibson's *Flora of Essex*, I find he only gives two localities for it—Danbury and Lower Forest, Epping. However it may have got here, I regard it as a very interesting capture.—A. THURNALL, 144, Chobham Road, Stratford New Town, E. *March 17th*, 1891. [*Myrtillana* is hardly a species one would expect to take a railway journey, and then be found in such fine condition near London.—ED.]

HYBERNATION OF XYLINA SEMIBRUNNEA.—In reply to Mr. Mason's remarks, *re X. semibrunnea* (*ante*, vol. i., p. 327), I may state that this insect certainly does hybernate, although it seem to be seldom met with in the spring. On looking over my notes for the year 1875, I find that I took a single ♀ in very fair condition on sallow bloom on March 31st of the above year. This was at Whittlesford, near Cambridge, where I was then residing. On mentioning the circumstance to Mr. F. Bond, he said (in a letter now before me, dated April 2nd, 1875) :—"I have taken *semibrunnea* at sallow bloom, once or twice, one was a fine specimen and one or two others were worn." This insect used to be quite common at times on ivy bloom in the above-named village. As an instance, on further referring to my notes for the same year, I see that in October and November I took no less than forty-four of which forty were on the ivy bloom, and four only at sugar. Every one of these was as good as bred, and all taken in my father's garden. *Xanthia gilvago* was equally common at sugar a short time before. I have never found or seen the larva of *semibrunnea*, but the late Mr. E. Newman gives a full description of it

in the *Entomologist* (vol. v., p. 161). He there states that it feeds on ash (*Fraxinus excelsior*), and is full fed early in July.—Id.

Colias hyale in the Spring.—The experience of my friend, Mr. Postans, with regard to this species, does not coincide with my own which dates back to the year 1867. I have never been lucky enough to meet with this species in the spring, and think that spring records are very rare. In 1875, a great *hyale* year, I took as many as seventy specimens near Maldon, and among them one so deformed that it could barely fly, thus proving conclusively that it had been bred in this country. One of the ♀ deposited (in *September*) eight eggs—seven in the bottom of a pocket-box, and one on a clover-head: these, however, proved to be infertile, shrivelling up in a few days. It seems to me highly probable that the majority of the specimens of *hyale* taken in England in ordinary years (when the species is not abundant) are of French birth, and cross over to England in August or September; but that when any considerable number of ♀'s happen to come over to us in May or June they deposit their eggs in our clover-fields, and the larvæ (thus avoiding the perils of hybernation) thrive and prosper, producing in the autumn a goodly number of imagines. Such a year comes only now and then, but, when it does, it is what our Yankee friends would call a "*hyale* boom" year!—Gilbert H. Raynor, Victoria House, Brentwood. *March 20th*, 1891.

Colias hyale in the Spring.—Like the Rev. G. H. Raynor, I have never met with spring *C. hyale* and have heard but rarely of their occurrence in Britain, and with him I agree that they must almost of necessity be immigrants. 1875 is my only experience of a *hyale* year. In that year, early specimens in poor condition were not uncommon, and in the August of that year our southern clover-fields were alive with freshly-emerged and emerging specimens. I remember with what delight, on entering a clover-field near Cuxton, I suddenly awakened to the fact that the numerous butterflies scudding about from flower to flower were *Colias hyale*, and I should be rather ashamed to own how many specimens I captured in the course of a very few days. The species lingered on into September, until it seemed that our approaching winter killed them off; and if the species regularly hybernated here, out of the many thousands in our south-eastern counties a few must have survived and appeared the following spring. But they did not, neither do I know of any actual record of such a fact, hence my editorial note, which I still consider quite correct.—J. W. Tutt. *March*, 1891.

Notodonta trilophus, etc., as Scotch Insects.—It may interest some of the (now many) beginners in Scotland to know that about the year 1850 the late Mr. E. C. Buxton had a lot of *Demas coryli* and *Notodonta ziczac* sent him for about twopence each. Among the latter there was a big one which turned out to be *trilophus*. Mr. Buxton told me at the time about it. He also used to get plenty of *Lobophora hexapterata* off the white poplars, at the place where he used to go salmon fishing in May. *Boarmia cinctaria* also occurred at the same place. It may also interest some of the Glasgow collectors to know that I saw a very fine specimen of *lapidata* in a collection, captured near Glasgow, when in Scotland two years ago.—J. B. Hodgkinson, Ashton-on-Ribble. *March*, 1891.

Pins and Verdigris.—My practice is to remove the pin when you think the worst is done, then clear away both in and out and replace a black pin with a little gum tragacanth on the pin, when no more trouble need be apprehended, with one exception; that is, *Catoptria aspidiscana*. In this species it seems never to be done, exceeding everything. My long series of the genus *Tinea*, that have been subject to this affliction, with wings twisted off, etc., are all now perfect. I reset and repinned a score of *Tinea imella* that Mr. Sydney Webb gave me some eight years ago, and all are now right.—Id.

Liparis dispar and Clostera anachoreta.—In vol. viii. of the *Young Naturalist*, pp. 213, 214, under the above heading, Mr. Gregson discourses of the latter as follows:—"Touching *Clostera anachoreta*, this species is generally associated with the name of a gentleman, who was once an entomological comet, who lost his tail, and passed into the shade as comets are wont to do; but to Old Weaver is due the honour of its first discovery, and I think it was announced by him in the *Zoologist* under the name of *C. anastomsis!* (sic). I purchased *specimens* from him long before the new light sent specimens north. I exhibited my original *specimens* side by side with his (Dr. Knagg's) at the Northern Entomological Society, and claimed for Weaver his right" (italics mine). It is probable that very many readers of the *Young Naturalist* do not possess the earlier volumes of the *Zoologist*, and it may interest them if I quote verbatim the history of *anachoreta* so triumphantly introduced by Mr. Gregson. In vol. x. (1852), p. 3399, appears the following notice:—"Last year I found *a* larva which I at once pronounced to be that of *Clostera anachoreta;* and I have the great gratification to announce that it produced *a* fine female moth on the 15th of February, which is now on my setting-board.—Richard Weaver, Pershore Street, Birmingham. February 17th, 1852." The two italics are mine. How then did Mr. Gregson purchase specimens from Weaver? No further public statement was ever made by Weaver as to his having captured more than this single specimen. However, be this as it may, in the same volume quoted above, at page 3715 will be found the following:—"I have seen the specimen of *anachoreta* recorded by Mr. Weaver (*Zoologist*, 3399), and find it is nothing but the common *reclusa;* it does not *differ in the least* from the ordinary appearance of the species, except perhaps in being a little more ferruginous. If I had bred it, I should have thought nothing of it [italics mine].—Henry Doubleday, Epping. November, 1852." Thus it appears that the specimen or specimens, if Mr. Gregson prefers the plural number, purchased by him as *anachoreta*, and exhibited by him at the N. E. Society meeting, and laid *side by side* with the true insect were—*reclusa!* "Parturiunt montes," etc. In the concluding portion of his paper Mr. Gregson remarks:—"In the old northern cabinets are full sets of purely British specimens of both these species." Let us hope that the *anachoretas* are not the descendants of Weaver's *reclusas*. In vol. ix. (*Y.N.*), p. 63, Mr. Tutt puts some pertinent questions to Mr. Gregson under this head. The above will, I think, be a sufficient answer to the second of them.—J. Greene, Rostrevor, Clifton. *March 26th*, 1891. [The original discussion on the species may not be in the memory of many of the readers of the *Record*, but I

wrote a short criticism on these two insects as British species. Mr. Gregson came down on my suggestions in his usual manner, but he seems to have allowed his memory to lead him astray. Surely, of all men, those who dabble in science, should thoroughly weigh their facts before writing them.—Ed.]

Vanessa atalanta attracted by the Sap of Elm.—Referring to Mr. Still's note in last month's *Record*, I have no recollection of ever observing *V. atalanta* at sugar, but I well remember, some fourteen years ago, whilst I was living at Witham in Essex, as I was walking along a lane just on the outside of the town, observing a large number of *V. atalanta* flying about the lane in front of me, and their mode of flight suggested to me that they had been disturbed in some way. I therefore halted and watched them for a few minutes, as I felt fairly certain if they had been disturbed they would, in a very short time, return to the same spot. I had not to wait long before I saw some of them returning to an elm tree, close to where I was standing. I at once got over the hedge into the meadow, and on approaching the tree, I saw a sight I shall ever recollect. The tree was a fair-sized elm, and from the trunk sap was exuding in several places and running down the tree. Upon this sap there were dozens of *V. atalanta*; the tree was completely covered with them. The sun was shining full upon them, and as their wings waved up and down, the picture was an exceedingly pretty one. I watched them a short time, and then with a smart tap on the lower part of the trunk with my stick, sent them all into the air again. They flew round about the tree for a few minutes in a terribly disturbed state, eventually returning to the tree for the juices of the sap.—W. D. Cansdale, London Road, Forest Hill, S.E. *March 28th*, 1891.

Ditula hartmanniana.—I should like to make an inquiry respecting this species, which Mr. Fenn informs me is taken commonly all round London. Although I have worked the London district a good deal, I have not yet been successful in taking it commonly. The only locality in which I have found it is Tottenham, and there very sparingly (6 being a good afternoon's work). I find it difficult to box, being very wary, and the tree must be approached cautiously or the insect will go before you get the chance to box it. I have only found it resting on willow trunks in the afternoon, and although I have worked for it at dusk, I have never taken it on the wing. I should be much obliged if any one can give me information about the larva. Does it feed at night?—A. J. Croker, 156, Tennison Road, South Norwood. *March 20th*, 1891.

Observations on Species of Tæniocampidæ.—*T. munda*, I find, prefers the sugar bait before the sallow catkins. Mr. Fenn, on page 342 of the *Record*, makes the same observation. I remember on one favourable evening, my friend Mr. Turner and myself were working at the sallows, and plenty of *T. cruda*, *T. stabilis*, *T. gothica*, and *T. instabilis* were taken, but only one *T. munda*; yet other entomologists, working the same locality, were taking *T. munda* freely from the sugar, although they were working so close as to enable us to see their lanterns. The ♂ and ♀ plants of the tall sallows, appear to be equally productive at Wimbledon. The tall species appear to be preferred by *cruda*, *stabilis*, and *instabilis*, the dwarf sallows producing *gothica*, *gracilis*, and *rubricosa*. I have visited the same trees for a fortnight before they have become unproductive. The dwarf sallows, at this time of the year, will well

repay searching by night for larvæ, and many species of the genus *Noctua* can thus be secured.—Id.

Errata.—*Record*, No. 11, p. 308, line 32, for *Fidonia carbonaria* read *atomaria*. P. 309, line 1, for *Acronycta menyanthidis* read *Cloantha solidaginis*. P. 309, line 2, for *Trachea piniperda* read *Charæas graminis*.—D. H. S. Steuart.

Societies.

Entomological Society of London.—*April* 1, 1891.—Capt. H. J. Elwes showed a small but very interesting collection of butterflies from Laggan Alberta, N.W. territory of Canada, taken by Mr. Bean at high elevations in the Rocky Mountains. Amongst them were *Colias elis*, Streck. (which seemed to be very close to, if not identical with, *C. hecla* of Europe), *Argynnis alberta*, W. H. Edw., and *Chionobas subhyalina*, W. H. Edw. The resemblance between the butterflies of this locality and those found on the Fells of Lapland was very striking, some of the species being identical, and others very closely allied. Capt. Elwes said that it was another proof, if one were wanted, of the uniformity of the butterflies found throughout the boreal region in the Old and New Worlds. Mr. G. C. Champion exhibited several insects recently received from Mr. J. J. Walker, from Hobart, Tasmania. The collection included a curious species of *Forficulidæ*, with asymmetrical forceps, from the summit of Mount Wellington; two mimetic species of *Œdemeridæ*, belonging to the genus *Pseudolycus*, Guér., and the corresponding *Lycidæ*, which were found with them; also specimens of both sexes of *Lamprima rutilans*, Er. Mr. N. M. Richardson exhibited a specimen of *Zygæna filipendulæ* with five wings; a second specimen of the same species with the middle legs on the right side much dwarfed; four specimens of *Gelechia ocellatella*, including a pink variety, bred from *Beta maritima*; four specimens of *Tinea subtillella*, a species new to Britain, taken last August in the Isle of Portland: also specimens of *Nepticula auromarginella*, a species new to Britain, bred from larvæ taken near Weymouth on bramble. Dr. Sharp and Mr. M'Lachlan commented on the structural peculiarities of the two specimens of *Zygæna*. Mr. C. Fenn exhibited a series of *Tæniocampa instabilis*, which had been bred out of doors during the recent severe weather. They were all bred from ova laid by the same female, and many of them were of an abnormally pale colour. Mr. Fenn said that, according to Mr. Merrifield's theory, these pale specimens, in consequence of the temperature to which they had been subjected in the pupal state, ought to have been very dark. Mr. Jenner Weir, referring to the pale specimens, said he had never before seen any of so light a colour. Mr. W. Dannatt exhibited a butterfly belonging to the genus *Crenis*, recently received from the Lower Congo. He said he believed the species was undescribed. Mr. G. A. J. Rothney sent for exhibition several specimens of an ant (*Sima rufo-nigra*), from Bengal, together with specimens of a small sand wasp (*Rhinopsis ruficornis*) and a spider (*Salticus*), both of which closely mimicked the ant. It was stated that all the specimens exhibited had lately been received from Mr. R. C. Wroughton, Conservator of Forests, Poona. Mr. Rothney also communicated a short paper on the subject of these ants and the mimicking

sand wasps and spiders, entitled "Further Notes on Indian Ants." Mr. G. C. Champion read a paper entitled "A List of the Heteromerous Coleoptera collected by Mr. J. J. Walker, R.N., in the neighbourhood of Gibraltar, with descriptions of four new species." At the conclusion of the meeting a discussion ensued, in which Mr. Kirby, Capt. Elwes, Mr. M'Lachlan, Mr. Jenner Weir, Dr. Sharp, and Mr. Crowley took part.—H. Goss, *Hon. Sec.*

City of London Entomological and Natural History Society.—*March 19th*, 1891.—Mr. Hollis exhibited a series of *Odonestis potatoria*, bred from larvæ taken at St. Leonards, some of the ♀ specimens being intermediate in colour between the typically dark males and pale females; also a long series of vars. of *Teras contaminana*. Mr. Battley, specimens of *Hybernia leucophæaria*, *Phigalia pilosaria*, *Nyssia hispidaria*, etc., taken in Richmond Park; also four specimens of *Smerinthus tiliæ*, bred this spring in a greenhouse. He pointed out that the specimens were very light in colour and almost entirely without the pink tinge generally seen in this species. Mr. Clark exhibited the specimens of *S. tiliæ* figured in the March number of the *Entomologist's Record*, Mr. Battley reading the notes in the *Record* (vol. i., pp. 327, 328) referring to these specimens. Mr. Tutt drew attention to the fact, that not only did the specimens show an almost perfect gradation from the unspotted form, to one with a complete band, but that the great interest of these specimens was in their asymmetrical character. He also referred to Dr. Buckell's notes in a previous number of the *Entom. Record* (vol. i. p. 183), calling attention to asymmetry in the markings of *Zeuzera æsculi* (*pyrina*), and suggested that the asymmetrical character of the markings of lepidoptera was worthy of further study and investigation. Mr. Clark also exhibited a box of Forres and Shetland lepidoptera, containing a large number of most interesting species. Mr. Tutt made some lengthy remarks on this exhibit, in which he drew attention to a perfectly melanic variety of *Larentia cæsiata*, *Hepialus humuli* var. *hethlandica*, melanic varieties of *Noctua glareosa*, *Pachnobia hyperborea* (*alpina*) and *Noctua festiva* var. *thulei*. Mr. Tutt also said that his attention had lately been drawn to the genus *Pachnobia*, and stated that *hyberborea*, although included in Guenée's genus *Pachnobia*, had been removed to *Agrotis* by Dr. Staudinger, and he thought its affinities were rather with *Agrotis* than *Tæniocampa*. He also remarked that the Shetland form of *festiva* was often referred to as var. *conflua* instead of var. *thulei*. Mr. Clark, on behalf of the members of the "*Record* Exchange Club," exhibited some very dark (almost melanic) specimens of *Liparis monacha*, belonging to Mr. Reid of Pitcaple and a dwarf form of *Anchocelis litura* belonging to Capt. Robertson, when Mr. Tutt made some remarks on the var. *eremita*, and the appearance of banded forms in the New Forest in certain years. Mr. Hodges exhibited a long series of fine pale forms of *Luperina testacea* from the Isle of Wight. Mr. Tutt exhibited a var. of this species taken by Mr. Baxter at St. Anne's-on-Sea—the same specimen by means of which Mr. South (*Entom.* xxii., pp. 271, 272) had attempted to sink the *nickerlii* of Freyer as a var. of *testacea*. Mr. Tutt, referring to Mr. South's article, said that that gentleman had linked the specimen with var. *guenéei* (*Entom.* xxii., p. 271), but that the specimen before the members, as might be seen, was wanting altogether in the black mark-

ings of that variety, and that therefore his connection of Mr. Baxter's specimen with *guenéei* was unwarranted, and as Mr. South used *guenéei* as a link between Mr. Baxter's specimen and *nickerlii*, this also was abortive. He then drew attention to Mr. South's description of Mr. Leech's so-called *nickerlii* from Bohemia. Mr. Tutt said that he would not argue that these specimens were not, as stated by Mr. South, vars. of *L. testacea*. Probably they were, and further than that, probably somewhat similar to Mr. Baxter's beautiful form. But if so, they could not be Freyer's *nickerlii*. Mr. Tutt then read a translation of Freyer's original description of *nickerlii*, and compared it with Mr. South's description of the Bohemian specimens. How, Mr. Tutt asked, could the specimens in question be referred to *nickerlii* which Freyer described as "reddish grey in colour," when the colour in the most distinctly marked Bohemian specimen, was "grey, tinged with ochreous," and in the Lancashire specimens, "pale grey"? The only characters common to *nickerlii*, Freyer, the Bohemian specimen described and the Lancashire specimen, appeared to be the pale edging of the transverse lines and white hind wings; characters present in many forms of *testacea* which differ endlessly in other particulars. Herrich-Schäffer's *nickerlii*, it was pointed out, is almost red-brown in colour (fig. 565), with distinct cuneiform spots outside the stigmata. These were not present in Mr. Baxter's specimen. When we considered, too, that Mr. South based his conclusion and suggested sinking an European species on this specimen of Mr. Baxter's which agrees with neither the published descriptions or figures, we got a tolerable idea of the value of these conclusions. Mr. South might have suggested the probability of *nickerlii* being a var. of *testacea*, but to sink it at once on such slender evidence appeared altogether out of reason. Mr. Clark and other members remarked on the nearness of some of Mr. Hodges' specimens to the Lancashire specimen.

Mr. Milton exhibited the following species of Coleoptera:—*Dichirotrichus obscurus*, *Ædemera lurida*, *Chrysomela gœttingensis*, *C. lamina*, *Donacia sagittariæ*, and *D. dentipes*, all from Needham Market. Mr. Heasler, *Cymbiodyta marginellus* and *Phylhydrus melanocephalus*, taken by digging in the banks of streams at Mitcham. He remarked that it was often stated that water beetles passed the winter in the mud at the bottom of ponds, and he had frequently found the carnivorous species in that situation, but the other kinds were usually embedded in the banks above water-line. Mr. Cripps, *Lathrobium multipunctum* from Mitcham.

Thursday, *April 2nd*, 1891.—Exhibits:—Lepidoptera. Mr. Smith, a pair of *Nyssia hispidaria* from West Wickham. Mr. Battley, a series of *Euplexia lucipara*, bred from larvæ taken at Stamford Hill. These specimens varied in the intensity of the black and yellow sub-marginal lines, and in the width of the central band. Mr. Hodges, pale forms of *Acidalia promutata* (*marginepunctata*) from the Isle of Wight; also, for comparison, specimens from Portland and other localities. Mr. Prout, long and variable series of *Bryophila glandifera*, from Sandown. Coleoptera: — Mr. Heasler exhibited a specimen of *Antemeles emarginatus* from Loughton. The Secretary read a paper by Mr. Ernest Anderson of Melbourne, entitled "A Trip to Corranwarrabool," which gave a very graphic account of an entomological expedition in Victoria. Mr. Cripps proposed that a vote of thanks be given to Mr.

Anderson for his paper. This was seconded by Mr. Simes, and carried. —G. A. Lewcock and A. U. Battley, *Hon. Secs.*

South London Entomological Society.—*March 12th*, 1891.—The Secretary read two extracts referring to the Society from *The Entomologist's Record and Journal of Variation*, vol. i., pp. 285, 286, and 305, 306. He then read a report which tended to show that the Society was in as flourishing a condition as ever, but the report was not put to the meeting. Mr Tutt, as the writer of the extracts in question, drew attention to the fluctuations which occurred in the early history of the Society, to the active state of the Society in 1888, to the gradual falling off in the number of scientific papers read, to the failure of the councils of 1889–1890 to publish the previous year's reports, to the fact that a series of papers was advertised by the Secretary almost immediately on the issue of his critique, and that the general result of the extracts quoted had been to awaken the council to a more active sense of its duties. Mr. Adkin then exhibited for Mr. Smith of Paisley, a very pale form of *Crambus prætellus* and other species; also specimens of *Triphœna orbona* illustrating Hübner's *comes* (pale reddish-brown), var. *adsequa* (pale greyish), var. *prosequa* (variegated form), var. *consequa* (which the exhibitor said should be referred to *orbona* rather than *subsequa*), and var. *curtisii* (dark form). Mr. South, an interesting series of *Vanessa urticæ*, its vars. and allies, including the type from European and Asiatic localities (the specimens from N. W. China being very large), *ichnusa* from Corsica, *kashmerensis* from Cashmere, *connexa* from Asia and Japan, and *ladakensis* from Cashmere. Mr. Tugwell exhibited parallel series of *Hydrocampa nymphæalis* from York and Kent, those from the former county being very dark. Mr. Adye, *Abraxas grossulariata* captured in Hampshire. Mr. A. Robinson, *Pygæra curtula* and two very dark vars. from Mr. Bird's collection. With regard to these latter, Mr. Robinson said that they were bred by a collector at Sittingbourne (Kent) some years ago and sold for a few pence, and he would be pleased to have an expression of opinion as to whether they were *curtula* or not. Some of the members thought they might be distinct, but Mr. Tutt pointed out that the transverse lines were identical, and that there was no similar continental species so far as he knew. Mr. Tugwell believed similar bred specimens were sent out from Dartford, and suggested that they were probably inbred from the same lot. Other members had noticed specimens in some of the older collections. Mr. T. R. Billups then read a paper on "Ichneumonidæ," in which a very large number of parasitic species, bred from larvæ by various members of the Society, were mentioned.—Ed.

March 26th, 1891.—At this meeting the minutes in which were recorded the reading of the protest to the *Record*, and the fact of Mr. Tutt having "spoken in reply" were read and confirmed. The attendance was small owing to the nearness of the Easter holidays. Mr. C. Fenn exhibited the long series of *Tæniocampa instabilis* with the parent ♀, and made a few remarks as to the extreme cold to which the pupæ had been subjected, and the predominance of pale forms amongst those bred. Although the black form is commonly taken at Lee (where the ♀ was captured), yet this form did not appear at all amongst the brood. Mr. Mansbridge exhibited a very fine dark form of *Phigalia cidaria* (*pilosaria*) taken in a very damp and boggy wood near Leeds.

In the discussion on Mr. Fenn's exhibit, Mr. Tugwell mentioned that in his own experience he did not find that, as a rule, the brood followed the particular form of the parent ♀; this was opposed by Messrs. South and Fenn, whose experience pointed to a contrary conclusion. Mr. R. South then referred to the recent exhibition by Mr. A. Robinson of a remarkable variety ascribed to the species *Clostera curtula*, and spoke of an analogous variety of *C. reclusa*, recorded by Mr. Whittick in vol. vii. of the *Entomologist*, and partly described. A figure is also given by Stevens of a similar variety in vol. ii., but this in vol. iv. he considers as a distinct species. The remainder of the evening was devoted to a microscopical exhibition, but owing to the reason mentioned above, only a few were in evidence; these belonged to Messrs. Adkin, Billups, Dennis and Turner.—A. J. Hodges.

April 9th, 1891.—Mr. South exhibited three vars. of *Miana strigilis*, one being of a distinct reddish colour; Mr. Adkin, Scotch specimens of *Pædisca sordidana* from Scotland, fed on alder; Mr. Cockerell read a note on Variation, and suggested that normal conditions would tend to produce what we consider ordinary tendencies, but that abnormal conditions would tend to develop some latent tendency, and hence there would be a general tendency to vary under abnormal conditions. He referred to *Pieris rapæ* in America, and a series of pale varieties of *Tæniocampa instabilis* recently exhibited by Mr. Fenn. Mr. Fenn said that a large proportion of his *instabilis* tended to follow the ♀ parent, and he was more inclined to suppose the result due to heredity than any condition of temperature. He also remarked how completely it overthrew Mr. Merrifield's suggestion that exposure to great cold, just before emergence, tended to produce dark coloration, as these were exposed to very extreme cold. Mr. Tutt considered that Mr. Merrifield's varieties were not produced by temperature, but were the result of heredity and probably disease due to interbreeding. Mr. H. Moore exhibited two specimens of Heterocera-Lep.—*Caligo memnon*—from S. America. Mr. Edwards then read a paper on "Papilionidæ." The anatomical structure was first of all pointed out by reference to diagrams, and the different genera were then dealt with seriatim. *Parnassius* consisted of species inhabiting mountains up to 15,000 feet. The ♀'s of these when freshly emerged had no chitinous pouch at extremity of abdomen, but after copulation, if sufficiently prolonged, a pouch was found. The pupæ were enclosed in a slight web. *Thais*, a genus inhabiting the Mediterranean littoral also had the pupa enclosed by a few silken threads. Plates showing the neuration of these were then exhibited. In the genus *Leptocircus* reference was made to certain species mimicking the neuropterous genus *Libellula*. In connection with the true Papilionidæ, the sexual dimorphism of *Ornithoptera* was pointed out, the ♀'s being larger, the ♂'s more brightly coloured. *O. brookiana* was referred to as the connecting link between *Ornithoptera* and *Papilio*. The fleshy, retractile scent-organ of the larvæ of *Papilio* was then mentioned, and the sub-division of *Papilio* by various authors. The mimicking power of certain species of *Papilio* was noticed—*Danais* being one of the genera mimicked. The powerful flight of some species, and the fact that they had been seen at some distance from land was remarked. The paper was illustrated by Mr. Edwards' very extensive collection of this group. A vote of thanks to Mr. Edwards brought the meeting to a close.—Ed.

The Entomologist's Record AND JOURNAL OF VARIATION.

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THE GENUS ACRONYCTA AND ITS ALLIES.

By Dr. T. A. CHAPMAN, F.E.S.

(*Continued from page* 2.)

ACRONYCTA (*Cuspidia*) *tridens*.—We begin here that section of the genus in which the eggs are laid solitarily, the moth in the wild state probably taking a flight after the deposition of each egg. The egg (Pl. VIII., fig. 2) of *tridens* is nearly colourless, almost glassy when first laid, but acquiring a certain whitish opalescence as the young larva within is developed. Its greater size, and, to a slight degree, the ribbing, render it only slightly less favourable for the observation of the embryonic development than those of *Botys hyalinalis*, for the opportunity of observing which species I am indebted to Mr. Jeffrey, of Ashford. The egg being solitary takes the very regular form of a portion of a sphere, less than a hemisphere, or roughly, that of a bun. The diameter is ·83 mm., and height ·38 mm. The ribs are 38 in number; in all the *Acronyctas* this number varies, and the numbers I give are either the average or the actual number of a particular specimen counted. The egg of *tridens* rarely, if ever, exceeds 44 ribs, that of *psi* as rarely has less than 45. In colour, or rather want of colour, secondary ribbing, form, etc., they seem to be identical. When about to hatch, the young larva is very conspicuous inside, the head forming a central black spot.

The newly hatched larva (Pl. VI., fig. 2) is paler than it shortly becomes, but the head is already black, and the pale and dark segments are clearly pronounced. Each tubercle is a large flat plate, somewhat angulated, so as to fit against and amongst the others; this feature is common to a number of *Acronyctas*. The trapezoidals are thus somewhat pear-shaped, the anterior with the narrow end backwards, the posterior with

the narrow end forward, between the anterior trapezoidals and the supra-spiracular. The dorsal tubercles of 3 and 4, being apparently fused trapezoidals, have each two hairs, all the other tubercles have each one long black hair. The plate of the 2nd segment has four hairs on either side. The trapezoidal and supra-spiracular tubercles of 11 are very small, and not so markedly angulated. The trapezoidals of 12 are large, rounded, and the posterior set immediately behind the anterior, again a common arrangement in *Acronycta* and many other larvæ. The tubercles are fuscous rather than black, the head black. Below the sub-spiracular there is a small ventral or " marginal " tubercle in 5. 6, 11 and 12. The colour of the segments, that is the skin of the larva, is reddish brown on the 5th, 8th, 9th and 12th, pale or whitish on the others. In *psi*, which is also somewhat larger, the 13th segment belongs to the coloured series.

In the 2nd skin, the tubercles are large and black, and still present in a marked degree the form due to apparent mutual pressure, being flattened towards each other and angular. They have developed, as regards the number of hairs each carries, and certain coloured markings are already manifest. The trapezoidals are conical in form, terminating in a long and strong hair and possessing half-way up a circle of four to seven small short hairs. On the 11th segment these tubercles are still simple, with only one hair each, and are remarkably small in contrast with those of the other segments, in the 5th segment there is already a tendency to a hump, due to the large size and tendency to coalescence of the anterior trapezoidal tubercles; all the trapezoidals are also of large size on 12. A lateral view of the larva gives a very echinate appearance, due to the pyramidal tubercles, with the raised bases of the secondary hairs. The secondary hairs of the supra-spiracular are less pronounced and the post-spiraculars dwindle, but are still obvious, with one hair. The sub-spiraculars are linear longitudinally, and possess two hairs, whilst the marginal tubercle possesses a similar form.

When somewhat grown in this (2nd) skin, the larva is already more brilliantly coloured than *psi* at the same stage; the dorsal band is orange, instead of whity-yellow, and is not interrupted except in the 5th segment, where the large black anterior trapezoidal tubercles stand up as a hump in its way, and, on the 12th, it runs as a narrow white line between the tubercles and forms a white cross; the 13th segment is rich

orange red. The richness and continuity of the dorsal line make the larva much more like full-grown *psi* than the larva of *psi* itself is at this stage. There is also, most distinctly on 5, 6, 7, 8 and 9, a diagonal white mark between the trapezoidals, and a pale mark below the sub-spiracular tubercles, and the side is more marbled than in *psi*; these marblings consist, in a well marked specimen, of two short vertical white marks behind, a spot above, and a patch in front of the sub-spiracular tubercle. The sub-spiracular and marginal tubercles are much less conspicuous and pronounced than in *psi*.

In the 3rd skin, the larva is now very brilliant, the row of white spots between the trapezoidals on 6 to 10, and the white cross on 12, contrast with the rich orange of the dorsal band and the black below, so as to give the effect of gems richly set.

The 13th segment is entirely orange, the 5th has the anterior trapezoidals united into a hump, and the 12th has its four separate tubercles raised into a hump; 14 is fuscous. White spots also exist below the trapezoidals, that is below the chief series (between trapezoidals) on 3, 4, 5, 11 and 12, but are obscure in most individuals. The sub-spiracular tubercles and those on 13 are orange, the rest are black, they carry several long black hairs; the post-spiracular is still distinct with one hair. There are pale orange spots on either side of the sub-spiracular tubercle. The "*rumicis* attitude" is often assumed in an exaggerated manner, the head being laid prone on the surface on which the larva rests, with the jaws thrown forward and the 5th segment arched upwards and raised off the surface.

In the 4th skin, the markings are the same as in the 3rd, but are fuller and more detailed. The hump on the 5th segment is large, surmounted by a rough (from short black hairs) black cap, consisting of the fused anterior trapezoidal tubercles, and with a tuft of white hairs behind it. The ground colour is dark fuscous, dorsal band broad, orange, from 3rd to 11th segment, omitting 5th, continued as a white cross on 12, where the four tubercles form a hump, but are not fused. There is a distinct lateral line running through and including the sub-spiracular tubercles, which, with the line, are orange, except that those of 3 and 4, and also, but less markedly, of 2, are almost red, as well as the 13th segment, which continues the lateral line across the dorsum from one side to the other. The head and 2nd segment are black, except a fine dorsal line white (continuation of orange dorsal band) and the orange (or

red) sub-spiracular tubercles. The tubercles of 13 are orange (or rather red) like the rest of that segment; all the other tubercles are black (trapezoidals, supra-spiracular, and post-spiracular, which is still distinct). There is a white spot in front of the posterior-trapezoidal, and a smaller below it, accompanied by two minute satellites, and in front of these a vertical yellow streak, and two behind them.

In the 5th skin, the larva is when well grown 18 mm. in length, so abundantly marked as to be difficult to describe at all accurately except at somewhat inordinate length, it now has a good deal of the appearance of the adult larva. The tall dorsal hump on 5th has the appearance of an excrescence, rather than a portion of the segment, which in itself is very little larger than the others in size, and in shape resembles them. Thence the segments diminish in size to 11, which is decidedly small, the 12th large, dropping suddenly to 13. Thirteen may still be described as red, except a trace of marbling at posterior margin, 14 black, with dirty white marbling. Head black. On 6–11 a broad pale dorsal band, with irregular margin, narrowing between the tubercles, broadening towards the incisions and running outwards in pale marblings. On the middle of segments it is orange yellow, nearly white at the incisions, where a darker central line is most evident. The next area, including the trapezoidal and supra-spiracular tubercles, is black, velvety black in front of trapezoidals, the white spot between the trapezoidals looks raised and polished like a boss of white porcelain, as is also the smaller one between the posterior-trapezoidal and the supra-spiracular; in front of this is a square, reddish orange patch, and behind it a vertical redder streak and a small spot behind this. The next lower zone, the spiracular region, is fuscous, marbled with dirty or reddish white, forming circles round the spiracles and post-spiracular tubercles. An orange-red line runs below this, including the sub-spiracular tubercles, which are also red, is continuous over 13th segment, and breaks into great red patches on 3 and 4 (and less on 2), separated by marbled fuscous. The lower surface is marbled fuscous. The prolegs have black lateral plates. The tubercles, except the sub-spiracular, are black. The dorsal band on 3 and 4 is uniformly orange, narrowing to a white line on 2; the globular hump of 5th segment carries a few long black hairs and a thick pile of very short black ones covering the globe, and behind it is a tuft of yellowish white hairs arising

from the general surface (*i.e.*, not from a tubercle). The other tubercles have each one or two long (one to three times the diameter of larva) black hairs and numerous shorter ones. The dorsum of 3rd segment, and still more of 4th, carries a number of whitish hairs, and similarly some pure white hairs arise from the white cross on 12th segment. These non-tubercular hairs exist also, but less evidently, in many larvæ in the previous (4th) skin.

In the last (6th) skin, the larva is from 16–35 or 40 mm. in length. On first assuming this skin, the great length of the hairs, arising one each from the tubercles, is remarkable. They are 10 mm. in length (nearly two-thirds the length of the larva), black with white wavy tips. These appear to get broken or injured as the larva feeds up, and in any case would not be proportionally so long.

The hump on the 5th segment, consisting really of the fused anterior trapezoidal tubercles, looks like a separate appendage, an egg-shaped mass attached by its narrow end to the summit of the segment; the non-tubercular hairs now form a whitish-yellow brush behind this boss and an orange one in front, growing from 4th segment; the 12th segment has a thinner white brush, and there are laterally numerous yellow hairs of the non-tubercular series. When first changed, the colours are much more brilliant than they become when the larva is full-fed, the dorsal line is a rich orange-red, the white spots are most crisp on a black ground; the white of 12th segment is especially bright, the red spots and the red lateral tubercles of 3, 4 and 13 are very vivid. When full-fed, the markings and details are more evident, but the colours are paler and duller, the dorsal band is white and yellow, the red spots dull brick or dirty orange, the lateral line no longer red but nearly white. These changes occur as a result of growth. When the larva is looking for a place to pupate, it becomes much more dingy. A long description I have seems unnecessary to recite of so well-known a larva. I note the persistence of the post-spiracular tubercle, and the curious circumstance that it and the spiracle form a pair of almost exactly identical twin spots, black with a white eye and surrounded by a pale ring, with a white circumflex mark above both. The *rumicis* attitude is still often assumed to a degree equal to or exceeding *rumicis* itself.

The pupa (Pl. III., 2, 2*a*, 2*b*, 2*d*) is of a usual NOCTUÆ type, *i.e.*, of a polished brown corneous texture, more semitransparent than usual, though not so much so as *strigosa*, still less

as compared say with *Hadena chenopodii* or *Cucullia* : the abdominal segments tapering, 5th and 6th being as usual free; length 19 mm., width 5 mm., no hairs or bristles, though the double hairs at the antennal bases exist in little more than microscopic form. The sculpturing is in the form of very minute pits, which are most numerous dorsally, and do not exist on the leg and wing cases or thorax, which are finely wrinkled, but not so as to interfere with the shining polished character. The transparency permits, especially on the abdominal segments, certain markings due to the interior structure to be seen, and including a darker dorsal line (dorsal vessel ?) a paler lateral one, with darker and lighter (fat masses ?) marbling between, the ventral aspect being paler. The prothoracic spiracle is a very slender slit, almost obsolete, indeed I am inclined to say that no aperture exists, those of the 2nd to 7th abdominal segments each being marked, being raised on a slight conical projection followed by a depression. The 8th abdominal spiracle is visible but obsolete. The anal armature consists of a wrinkled projection of the dorsal half of the extremity, armed dorsally by two central spines, and ventrally by three similar spines on either side. All this group have a similar armature, but vary, especially in the number of ventral spines on either side and in the curvature of the hooks, which they often form or terminate in. In *tridens* there is a very slight curvature, and the hold taken of the silk of the cocoon is slight. In *tridens* their number is very usually three, but a considerable proportion of pupæ have four, or, not unfrequently, four on one side only. When this occurs, the extra spine is often very slender and close to the outer side of the outer one, as if split off it. It is curious that the name *tridens*, given no doubt on account of the trident or psi (ψ) mark of the imago, should be so applicable to this typical point in the pupal structure. The curvature of the ventral set is inwards, of the dorsal pair downwards (ventrally) more decidedly than the others (see Pl. III., 2*a*, 2*b*, 2*d*). Certain flattenings of the dorsal surfaces of the first four abdominal segments, which are more evident in some other species, are easily observed in this species when carefully looked for.

To form its cocoon this species appears to prefer to get behind a piece of loose bark or into a chink of rotten wood, where it hollows out a suitable cavity, which it completes into a cocoon with some white silk and the removed chips, very slightly, if at all, lining the excavated hollow. It will, however,

very readily accept an already prepared tubular hollow, or will perform all the work of excavating one for itself in rotten wood or in the pith of a piece of elder twig, and in this case closes the opening with the top of the cocoon. In default of a more suitable nidus it will go down into sawdust or even earth, forming an ordinary cocoon of silk and the surrounding material.

I have already referred to the fact that on one occasion half of a certain brood emerged in August as an autumnal brood, in time enough for a second brood to have occurred, but that on no other occasion among hundreds of moths has an autumnal specimen shown itself. This shows that it is very unsafe in the matter of habits of this sort to regard as invariable in a species, any habit, which we may have found to be so, in even a very large experience.

This consideration prevents my saying that *tridens* never has four-moult larvæ, so frequent in some species, but I have never detected one.

Tridens occurs here at precisely the same seasons, and in precisely the same places as *psi*. Wherein they differ in habit, why there is room for the two species, why the one does not displace the other, are matters on which I have still everything to learn. *Tridens* like *psi*, will eat almost anything arboreal, but I think it has a closer relation to rosaceous plants than *psi*, especially fruit trees, and is perhaps commonest here in pear orchards; whilst *psi* is at least equally at home on forest trees, and may be met with on oak, birch, etc., on which I never happen to have taken *tridens*. I have a suspicion that the fine pink tinge that has characterised some of my broods, and which occurs in several *Acronyctas* as a variety, is here related to cherry as a food, but I have instituted no special experiments to test the point.

(*To be continued.*)

MELANISM AND MELANOCHROISM IN BRITISH LEPIDOPTERA.

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

(*Continued from page* 7.)

ALTHOUGH not directly bearing on British lepidoptera, I referred (*Entomologist's Record*, etc., vol. i., pp. 122–125) to an article by Mr. W. W. Smith, of Ashburton, New Zealand, "On the Variation of *Argyrophinga antipodum*," to show that my theory of excessive moisture producing melanism, and *vice*

versa, was of general application. With regard to this, Mr. Smith now writes:—"The last three exceedingly hot and dry seasons in succession in New Zealand, which have been more severely felt on the plains of Canterbury, have been productive of remarkable colour variation in some species of lepidoptera, the variation in all cases developing in the form of much paler colours. The variation of *Chrysophanus boldenarum* was recorded by Mr. R. W. Fereday, of Christchurch, N.Z., twelve years ago, who published two papers on "The Genus Chrysophanus in New Zealand" (*Transactions N. Z. Institute*, vols. ix. and x.). Mr. Fereday, in the papers referred to, figured the type of the species together with several well-marked varieties, and gave an interesting account at the time of the known habits of the genus, in the same volume (x.). Mr. A. G. Butler published a valuable paper on N. Z. Rhopalocera. Mr. Butler's paper was also accompanied with figures and descriptions of both sexes of all the known species. The figures given by Mr. Butler, although smaller than the majority of specimens, are typical of the species. Apart, however, from the types and varieties figured by these gentlemen, there are many other well-marked varieties occurring, besides a very striking and general variation not equalled by any other species in the genus. Although *C. boldenarum* is in ordinary seasons a very variable species, it has never previously varied to the extent it has done in the present season. I have already referred to its variation in a melanic direction in humid seasons (*Entom.*, xxii., 38). But last season, and more so in the present one, the variation is in the opposite direction, several of the female specimens exhibiting a decided tendency to gynandromorphism, and the males an abnormal arrangement and development of paler colours. The cause of these phenomena is, I think, easily understood. For three years there has been an exceedingly light rainfall on the Canterbury plains, and that, at long intervals, while the weather has been exceedingly hot and dry, and was accompanied for several months this season with hot north-west winds, the blighting effects of which are well known and dreaded by the settlers. It would therefore appear clear that the absence of moisture in all stages of development during several generations of the species, is the chief factor in developing the pale phase of variation. These remarks apply with equal force to numerous other species of both diurnal and nocturnal lepidoptera I have collected here this season, as all species (some of course more than others)

exhibit a decidedly lighter deviation of colours from the normal types.

"By way of adding a few facts in support of these remarks, I may state that even in the most favourable seasons, lepidoptera collected on the plains here are invariably paler than individuals of the same species occurring on the lower hills or in wooded districts near the Ranges. The rainfall is in all seasons much greater on and around the base of the Ranges than out on the open plains. The higher we ascend the Alps the more humidity we meet with, and the greater the darkening of the lepidoptera, until we reach the summit, when they become perfectly black. *Percnodaimon pluto*, *Erebiola butleri*, and occasionally *Ltathmonyma hectori* are cases in point, and doubtless many more species that yet remain to be discovered. Most entomologists will naturally suppose that all mountain forms of lepidoptera are endowed with a more hardy constitution than other or allied species occurring at lower altitudes; but the cause of melanism at high altitudes is not so much a question of cold or heat as its great advantage over other colours in a wet or humid region. Doubtless Lord Walsingham's theory of the greater absorption of heat by dark-coloured lepidoptera would occasionally be advantageous to certain melanic forms as well as in a protective sense, but as Mr. Tutt has shown (*Ent. Record*, vol. i., 232), it leaves the origin of melanism wholly unexplained. Again, we know that melanism is prevalent in some seasons that are at the same time both mild and moist. A certain degree of moisture is necessary in the egg, larval, and pupal stages to perpetuate the typical colours of a species, and we know it is only in exceptional seasons or under exceptional conditions that lepidoptera vary most. Still, we must allow that in hot, dry seasons, the colours of many species of lepidoptera are rendered paler, or obsolete, by the sun's absorption, or bleaching of the colours affected; but we are not so much interested in this question at present as we are in the origin and causes of melanism. One remarkable instance which would appear to oppose Lord Walsingham's theory occurs in the habits of *Nyctemera annulata*, a jet-black diurnal moth with two white marks on each forewing and one on the hindwing. The moth in a natural state, or when bred, almost invariably emerges from the cocoon and flies about on dull and drizzly days. It may sometimes be seen soaring in the cool early morning, but at all times it shuns the hot sunshine. It would therefore appear that the theory of absorption of heat

will not apply in all cases. The imagines of our dark Alpine species appear in January and February, which are the clearest and hottest months in the year. Nothing is absolutely known of their economy and habits, yet we may surmise that the eggs are deposited soon after emergence, and the larvæ feed up in March and April. In the latter months the autumnal rains set in, which are greater and more prolonged on the Ranges than in the lower country. It must be admitted that larvæ feeding on high altitudes are subjected to a lower temperature; but it will also be observed that they are subjected in our climate to a much greater degree of moisture than other or allied species existing on the lowlands. About the end of April or beginning of May, the snow begins to cover the higher parts of the Ranges, and continues, more or less, to fall until September, when the warm north-west wind generally begins to blow and melt it off the Ranges. The pupæ thus deeply buried in snow through the winter, would experience no more cold on those high regions than other pupæ exposed to all weathers on the plains, on which snow scarcely ever falls. The north-west winds which begin to blow in September, are at first slightly chilly, owing to their traversing the snow-fields of the Alps. As the snow lessens in quantity, the wind blows hotter and drier across the plains, causing the snow-fed rivers to flood, although the wind is cool before it impinges on the western summits of the Ranges. It absorbs great moisture in crossing the snow fields, which is frequently condensed in heavy rain showers over the lower hills and downs, and along the bases of the mountains; here the lepidoptera are invariably darker than on the open plains, where the warm north-west rains rarely ever reach. The physical features of the country I have described, namely, high mountain ranges and extensive plains occurring contiguously, differ greatly from any districts as yet mentioned by Mr. Tutt, where he states melanism occurs. Nevertheless the cause of melanism and melanchroism appears to be identical in all cases. The very reverse meteorological conditions of climate are frequently observed here on the same day, for, although the day may be dry and hot on the plains, the Ranges are at the same time enveloped for days together in dense aqueous clouds condensing great moisture (see remarks by Professor Schöyen of Christiania, quoted by Mr. Tutt, *Ent. Record*, vol. i., 53).

"The elucidation of any cause producing variation in animals requires very careful study, and any theory advanced to

account for the variation of certain groups or species, should be done with extreme caution, but the main line of argument on which Mr. Tutt continues his series of papers on 'Melanism and Melanchroism in British Lepidoptera' is well supported by the same natural causes and effects in New Zealand. Where the variation of any species in a given direction develops under certain conditions, we may safely assume that it is due to certain natural causes operating in the direction the form of variation assumes. The result of my experience with variable New Zealand lepidoptera so far favours the moisture theory of melanism" (*In litt.*, Feb. 25, 1891).

(*To be continued.*)

CURRENT NOTES.

The "Special Index," which we have been at much trouble and expense to produce, and which our subscribers do not seem to understand is very comprehensive and complete, will be a distinct financial failure unless our subscribers take it up more generally. It consists of 24 pp., contains every reference to each species mentioned in the volume, and has occupied a great amount of time in its production. It will be sent free for 12 stamps by Mr. A. J. Hodges, 2, Highbury Place, N.

The Annual Exhibition of the South London Society reflected great credit on the Society, and brought together a number of rare species and instructive exhibits. A photograph of the committee of management appeared in the *Sporting and Dramatic News* for April 25th.

Another of the very old collections (that of the late Mr. W. Bennett) came under the hammer on April 29th. *Chrysophanus dispar* brought the following prices:—male, £2 15s.; male, £2 10s.; female (nearly perfect), £3; pair (damaged), £3 10s.; pair (much damaged), £3; male (underside), £2. A dark var. of *Venilia maculata* with the yellow spots only on the outer margin, was sold for 18s.

Mr. T. D. A. Cockerell has, we hear, been appointed Curator of the Museum of the Institute of Jamaica, at Kingston, Jamaica, and leaves us in about three months.

The Report of the South London Entomological Society for 1888 and 1889 has now been published, and those entomologists who are not members of the Society cannot do better than send 3s. 6d. to the Secretary. They will find a great deal of interesting and useful matter. It is to be hoped that those few members of the Council called the "Report Committee" will soon justify their existence by commencing on the 1890 Report.

VARIATION.

RETARDATION IN THE PUPAL STAGE PRODUCING VARIATION.—I think I can quote one case in which an insect has become darker in the pupal stage. In 1887 I had a batch of ova of *Dianthœcia capsincola* which hatched early in May, the larvæ all grew up together there being no appreciable difference in the length of their larval stage. About half the batch emerged the following August, and were of the usual bright orange yellow. The other half of the batch emerged in May, 1888, and were all unusually dark in colour. I have them side by side in my cabinet and the difference is striking.—A. W. MERA, 79, Capel Road, Forest Gate. *March 23rd*, 1891.

VARIETY OF GONEPTERYX RHAMNI.—I was to-day shown a specimen of *Gonepteryx rhamni*, having a large portion of the upper wings suffused with a reddish-orange colour, shading off to white near the tips, the lower wings having also a narrow band of the same tint around the edge, and with the markings not quite uniform. The specimen is also rather under the usual size and minus the antennæ. The insect was captured in the lane leading to Darenth Wood two years ago by a working man, who knocked it down with his hat, mistaking it for an orange-tip as it was flying along. Is not this an unusual variety in this country?—CLEMENT T. YOUENS, Tower Cottage, Dartford, Kent. *April 9th*, 1891.

CLOSTERA CURTULA VARS.—I have some (to me) most extraordinary insects, supposed to be varieties of *C. curtula*. They are rather smaller than *C. curtula*, and the whole wing is chocolate-brown instead of only the tip, as in *C. curtula*. The lines are, however, almost identical with *C. curtula*. They (six in all) were bought from a man named George Rae, of Sittingbourne in Kent, in 1876. He advertised them as *C. curtula* vars. They do not appear to be any European insect, and, as they were bought for a few pence, there is probably nothing wrong about them. My friend, Mr. Bird, to whom they belong, obtained a large number of *C. curtula* in succeeding years from the same man, but could not obtain any more of these vars. On showing them last night at the South London meeting, I obtained the valuable information from Mr. Carrington that Mr. Farn possesses a specimen with one pair of wings normal *curtula*, and the other representing this variety. It is further a hermaphrodite, and must be a most extraordinary insect. It appears to have been figured in the *Entomologist* some twelve years ago.—A. ROBINSON. *March 11th*, 1891.

VARIETIES OF THE LARVÆ OF MACARIA NOTATA.—*Type:* Uniform shining hazel-brown, with a series of pale green blotches in a line with and surrounding the inconspicuous brownish spiracles. Head and legs black, face whitish. A faintly paler ventral band. Ventral spots blackish. *Var.* 1. Bright green shaded with light yellowish brown on each segment. Ill-defined hazel-brown or gray sub-dorsal lines, between which and the spiracular line is a series of oblique brown blotches. Head and legs black, face green; belly greenish, clouded with pale brown, and with a faintly paler central band. Sides of 2nd and 3rd segments purplish brown. *Var.* 2. Yellowish green with very faintly indicated paler dorsal, sub-dorsal, spiracular and ventral bands. Head

green, with a black dash on the summit of each lobe. Legs purplish black. First pair of prolegs purple; anal prolegs green. *Var.* 3. Pale green, the sides broadly shaded with hazel-brown, forming an irregular series of pale green dorsal and lateral blotches. Head and legs black, face green. Both pairs of prolegs tinged with dark purplish brown. Belly purplish or hazel-brown with a paler or greenish central band. All the varieties graduate into each other.—C. FENN. *March 2nd*, 1891.

DIANTHŒCIA CARPOPHAGA AND D. CAPSOPHILA.—I think this latter was claimed as a species in 1868, bred specimens were given me by Dr. Warren Wright in 1869, and the insect challenged as a species the same year. Mr. Gregson entered very warmly into the matter, and his series now before me is so thoroughly graduated that I will defy anyone to point out the border-line between one and the other. I bred specimens identical with the darkest Manx *capsophila* from sweet-william heads out of my garden last year. Where we find one species of lepidoptera, corresponding with the larva and imago of another so-called species, I am content to consider them identical.—SYDNEY WEBB, Dover. *February*, 1891.

EUPITHECIA ALBIPUNCTATA var. ANGELICATA.—Last September I took a fair quantity of larvæ of this species at Bishop's Wood, which are now coming out. A large percentage of them are the var. *angelicata*. It is strange that there are no intermediate forms; the two are quite distinct, and had the larvæ not been carefully examined, I should be inclined to think that it is a separate species, but no difference was noticed, except the usual variation in colouring.—GEORGE JACKSON, 115, Nunnery Lane, York.

I am now breeding *Eupithecia albipunctata* var. *angelicata* from larvæ collected in Askham bog. So far, about one-third are of the variety. The old idea of its having been confined to Bishop's Wood has therefore proved to be incorrect. The variety is figured in the *Entomologist*, vol. xi., August, 1878.—G. DENNIS, 11, Tower Street, York. *May 7th*, 1891. [The figure in the *Entomologist*, taken from a specimen bred by Mr. Prest, who obtained the larvæ at Bishop's Wood, Selby, is not at all a satisfactory one, and until bred by Mr. Dennis from Askham, was supposed by the York collectors to be restricted to Bishop's Wood. A parallel black variety of *E. virgaureata* is, I believe, bred at Burton-on-Trent, and similar melanic vars. of this latter species are occasionally taken by the Paisley collectors.—ED.]

ERRATUM.—Page 7, line 11 from bottom, for *Xanthia aurago* var. *fuscata*, read "*Xanthia aurago* var. *fucata*."

NOTES ON COLLECTING, Etc.

EARLY SPRING NOTES.—*Wisbech.*—In company with a young friend —Mr. F. Glenny—I left Wisbech early on Easter Monday, for a day's pupæ digging just over the boundary of the adjoining county of Norfolk. We had not gone far before we found we had got a tough job before us, and one which would require a little enthusiasm to help us through: the wind blowing a gale from the north, with oc-

casional driving showers of snow and hail. Slight misgivings as to the possibility of our being able to do anything began to force themselves unpleasantly upon us, especially as on tackling our first trees—willows—we found the wind so boisterous that we had to strain every nerve to hang on with the left hand, while we worked with the right. I should explain here that we were working especially for *Hypsipetes ruberata*, whose favourite places of concealment are the angles caused by the junctions of the arms of the tree with the trunk. But, notwithstanding the difficulties of the situation, we obtained three or four at these trees. This success caused our spirits to rise, so we tramped along the road and in about half-an-hour came to a row of willow trees, and set to work. After a time, the sun shone out brilliantly, and after luncheon we took to the trees again, and had only just recommenced when a blinding snowstorm overtook us. It was the fiercest and heaviest storm of a stormy day, and the fields were soon covered with snow. We stuck to the trees, working the sheltered sides as well as we were able under the circumstances, with an occasional pause to scrape the snow off the bottoms of our trousers with our trowels. The storm left one side of the trees covered with snow, which made them very cold and unpleasant to handle. But we stuck to our work for three or four hours longer, with varying success, in a hurricane of wind, and amidst alternate snowstorm and sunshine; then we returned, and reached home about 5 p.m., having passed—if not a very pleasant day—at least an eventful and profitable one. A good wash, a change of clothes, and a cup of tea, soon put us right again. Forty-three *Hypsipetes ruberata* and eight miscellaneous pupæ was the result of the day's work.—GEORGE BALDING, Ruby Street, Wisbech.

Kingstown, Ireland.—So far, February has been remarkable here for the early emergence of *Larentia multistrigaria*, which I saw on the 19th, flying in fair numbers, on a cold night with S.E. wind. Larvæ of *Stilbia anomala* are now nearly full-fed, and by no means rare if searched for in the right localities, larvæ of *Epunda lichenea* are about three-quarters of an inch long, those of *Noctua xanthographa* a pest. *Endromis versicolor* also has been emerging with me since February 25th, kept outside an E. window, and several species of *Depressaria* (*costosa* and others) are now flying.—W. F. DE V. KANE, Kingstown. *February*, 1891.

Pitcaple.—In Scotland we have also been taking *Larentia multistrigaria* in February. Larvæ are abundant, and several of the hybernating *Tortrices* and *Tineina* are flying.—W. REID, Pitcaple. *March*, 1891.

Winchester.—Until the heavy snow, my things were emerging nicely in a cool conservatory, *Selenia illunaria* led the way. February 26th or 27th I captured one *Anisopteryx æscularia* on palings; March 5th saw three *Asphalia flavicornis* and one *Eriogaster lanestris* emerge; 6th, one *Tæniocampa instabilis*, followed by more of the two last-named species; they then stopped, which is strange, as there are several more of each species to emerge. *Endromis versicolor* on March 13th. My larvæ of supposed *Trichiura cratægi* and *Geometra papilionaria* are feeding, and having been exposed to the full severity of the weather, it appears that a hard dry winter suits them.—G. M. A. HEWETT, Winchester. *March 14th*, 1891.

York.—At the end of February *Hybernia rupicapraria* and *H. pro-*

gemmaria were flitting along the hedges here, whilst *Phigalia pilosaria* appeared almost daily in my breeding cage, the first emergence being February 13th.—S. WALKER, York. *March*, 1891.

Swansea.—Sallows are not nearly out yet (snow still on the ground); this time last year they were in full bloom, and by the end of the month I had taken many of the common species that frequent them. I have so far had only *Tæniocampa gothica* and *Selenia illunaria* out in my breeding cages, kept in a rather warm conservatory. Moths usually due in October and November came to light the first and second weeks of February: such as *Cheimatobia boreata*, *Hybernia defoliaria*, etc. A beautiful variety of the latter was taken by Sir John Llewellyn in a moth-trap; it is quite black with red nervures; I have never seen anything like it in *defoliaria* before, although a var. of *Tephrosia biundularia* taken in the same district approaches it in colour, and I am informed by Sir John that melanism is of common occurrence in the neighbourhood.—R. B. ROBERTSON, Swansea. *March*, 1891.

Newbury.—*Hybernia progemmaria* is out here, and *H. rupicapraria*, nothing else is showing at present out of doors; but some *Endromis versicolor*, which have been in the pupa state for two years, are now emerging.—M. KIMBER. *March 3rd*, 1891.

West Wickham.—A specimen of *Notodonta camelina* having made its appearance indoors (not forced) last week, and one of *Halias prasinana* a day or two after, I thought I would run down to West Wickham yesterday (it being fine and warm, with a southerly breeze), to search for *Notodonta carmelita*. I walked from Croydon through Shirley and Addington, and examined the tree trunks and fences wherever I could, but saw no trace of the insect. All I obtained were some species of *Hybernia* (*leucophæaria*, *progemmaria*, and *æscularia*) which I could have obtained equally well in town, and a few *Depressariæ*. One fence had been freshly pitched (as I found to my cost), and several distorted and mutilated individuals of the latter genus were writhing and twisting about in the sticky mess. I should like to know whether any of your readers have been more lucky in finding *N. carmelita*. To-day the wind has got into the east. Perhaps this may account for nothing having "shown up" yesterday.—GEORGE HOLLIS, London. *April 7th*, 1891.

Farnboro', Kent.—This late severe weather has for a time put a damper on my looking out for the earlier species—previous to it, however, I have noticed the usual common things, but not in any quantity—*Phigalia pilosaria* at light being the most plentiful so far.—HOPE ALDERSON. *March 21st*, 1891.

Reading.—There is nothing stirring here yet; it is still winter, frost, snow, and east winds. The 24th of March was a warmer day, and a number of *Tæniocampa populeti* and one *Asphalia flavicornis* emerged in my pupa box, but I have had none out since.—W. HOLLAND. *April 3rd*, 1891.

Chester.—The entomological outlook, so far, is a poor one owing to the continued spell of cold weather. Here and there we have a few sallows out in bloom—the wonder is how they do it! From the Hawarden district I have, in glass jars, an interesting lot of *Tæniocampa stabilis*, *T. cruda*, and *T. gothica* taken from the catkins at night—all alive—and undergoing "a period of examination and inquiry,"

with what ultimate results it would be difficult to say. Every evening, at dusk, they wake up and regale themselves upon the fresh catkins I place daily in the jars. I have not seen a single micro yet, and the only geometers I notice at night about the sallows, thorns, and briars, are *Selenia illunaria*, *Hybernia progemmaria*, and *Anticlea badiata*, the two latter, especially *A. badiata*, being abundant.—J. ARKLE, 2 George Street, Chester. *April 16th*, 1891.

King's Lynn.—Notwithstanding the continued cold weather during the last few weeks, there seems to be some indication here of a better season. At any rate, the few species which I have looked for have been decidedly more plentiful than I have known them to be for several years. For instance, pupæ of *Fidonia piniaria* are common enough beneath moss to enable me to collect some 200 or more with very little trouble, from which I hope to breed a few varieties. Whilst searching for these, I came across an odd pupa or two of *Macaria liturata*, and a nice sprinkling of those of *Trachea piniperda*. Amongst the few imagines of the latter which have at present emerged, are some beautiful varieties. Recent examinations of the shoots of young Scotch fir trees has resulted in my finding numbers of pupæ of *Retinia turionana*. This is the first time in my experience that this species has been fairly abundant here. Of course the larva of *R. turionana* continues to serve as a host for several species of ichneumon-parasites, and I confess that I felt less surprise than annoyance at the fact that for every healthy pupa found, at least four times the number of these ruthless destroyers were observed, and I will not apologise for taking steps to prevent their power for mischief upon the future brood. In common with several other species of lepidoptera, *Cymatophora flavicornis* has been late in making its appearance. I looked for them as usual, about the middle of March, but, as I expected, not a single specimen could be found. However, on the 2nd of April, two specimens turned up at rest upon the stems of birch, and in the same locality on the 5th inst., I had no difficulty in finding a dozen specimens in fine condition. The sallows have been in full bloom here for some days, but up to the present time not a single suitable evening has turned up for working them.—E. A. ATMORE, King's Lynn, Norfolk. *April 10th*, 1891.

Hereford.—Sallows have been in bloom for perhaps five weeks, and are not yet over. I have only visited them twice, and on perhaps as favourable nights as there have been, and the success was very meagre indeed. The weather has been continuously cold and bleak, and the sallows exhibit one curious result. In a fine season, the season is short, each tree bursts into a mass of bloom and is soon over, other trees may be a few days earlier or later; but this year, each sallow tree has developed a few blossoms at intervals, and trees may be seen with some catkins dead and withered, a few in full bloom, others developing, and some perhaps hardly beginning to swell, so that each tree lasts in a miserable way for some weeks. The moths appear to suffer in a similar manner, instead of coming out in good numbers at once, each species seems to appear in driblets, as may be guessed from their small numbers, and the presence of fine and worn specimens together. All the *Tæniocampas* put in an appearance except *gracilis* and *opima*, nor was *Hoporina croceago* seen. *Petrificata*, *vaccinii*,

and *satellitia* also occurred. One or two fine dark *instabilis* and *populeti*, and dark and rich coloured *stabilis* were observed. *Leucographa* was very scarce.—T. A. CHAPMAN, Firbank, Hereford. *April*, 1891.

FLOWERS ATTRACTIVE TO MOTHS.—Mr. Percy Russ, having in this month's *Record* mentioned some flowers attractive to moths, it occurs to me that I should draw attention to a plant which appears to have hitherto been little noticed in this country, but which, during my early experience in Germany, has proved more attractive than all others, not even honeysuckle excepted. This is the common soapwort (*Saponaria officinalis*). In an abandoned bed of the river Lahn near my native town, this plant grows in large patches where many of us used to collect nightly, and at twilight captured most of the *Sphingidæ* notably *Deilephila elpenor*, *D. porcellus*, *Sphinx pinastri* and *S. convolvuli*, the two latter appearing season after season, often in surprising numbers ; also some of the *Cucullia* and many other NOCTUÆ. With the exception of the Isle of Man, I have no recollection of having seen this plant in cultivated gardens in England, but I think those who possess suitable grounds should give it a trial. It is very easily transplanted. I have seen it growing in profusion on the railway bank in front of the signal-box at the Stamford Hill Station, London.—J. JÄGER, 180, Kensington Park Road, Notting Hill. *March 21st*, 1891.

NOTES ON COLEOPTERA IN THE HASTINGS DISTRICT.—At the beginning of the recent winter I took several good species of Coleoptera in moss. At Hollington Wood in a small patch of moss bordering a pathway I found seven *Cænopsis fissirostris*, six *C. waltoni* and one *Tropiphorus carinatus* besides a number of common species including *Olophrum piceum*, *Othius fulvipennis*, *Tachyporus brunneus*, *Apteropeda graminis*, etc., and, in a tuft, a single specimen of *Plinthus caliginosus*. At Ore, in moss, I took about a dozen *Tropiphorus carinatus*, five *Cænopsis waltoni*, and numerous common species including *Philonthus marginatus*, *Stenus declaratus*, *Liosomus ovatulus*, *Otiorhynchus ligneus*, etc. After the severe weather, Coleoptera were hard to find, and the few species I managed to turn up were of the commonest description.—A. FORD, Claremont House, Upper Tower Road, St. Leonards-on-Sea.

RECENT EXPERIENCE ON HYBERNATING LARVÆ.—A difference of opinion seems still to exist as to whether hybernating larvæ, feeding on low growing plants, such as plantain, dandelion, *Glechoma*, *Lamium*, etc., should be placed out of doors exposed to all weathers, or on growing plants in a conservatory or some such house which is necessarily at a higher temperature than the external atmosphere. Having just successfully wintered a brood of *Callimorpha hera* from ova, I will state how I succeeded, as well as failed on a former occasion. Three seasons ago I placed some young larvæ of this species on a plant of *Lamium purpureum* out of doors, which in due time died off. Out of that lot only four per cent. survived, the rest having evidently succumbed to the cold. Having objection to place my present contingent of larvæ on a growing plant, for reasons given later, I put them into my conservatory on cut bunches of *Lamium purpureum*. The food being kept in water remained fresh during the winter months, until it could be replaced early in the year, the

temperature never having been below freezing point. By this means eighty-five per cent. of my larvæ survived, while a friend of mine who put them on a growing plant lost over seventy per cent. In the same place I successfully reared some larvæ of *Stilbia anomala*. On the other hand a large brood of *Epunda nigra* were unfortunately put on a growing dock plant, and have all died. My reasons for objecting to this method are several. First, you can never exclude mould, which is one of the principal enemies of young larvæ, to say nothing of the depredations made frequently by the appearance of a coleopterous larva. Next, we find the foodplant under a glass shade generally in an unhealthy forced state and invariably producing aphides, which, if not detrimental to young larvæ, must necessarily worry them considerably. It does not follow, however, that all larvæ will thrive under these conditions, as the following case will prove. Some larvæ of *Phorodesma smaragdaria* I had two years ago were kept indoors and died, whereas last autumn I placed another lot of the same in an open cupboard out of doors, but sheltered, and although they were exposed to fog and severe frost, not one of them, I am happy to say, perished.—J. JÄGER, 180, Kensington Park Road, Notting Hill. *March 21st*, 1891.

DEPOSITION OF OVA BY XYLINA PETRIFICATA (SOCIA).—In response to Mr. Mason's query as to the time of ovi-deposition of *Xylina socia* I send the following:—Having been asked for some ova of the above I boxed two females on the 11th of April, and three days after one laid three eggs, and I posted the moth and eggs to my correspondent. Subsequently the second one laid about twenty ova which hatched out on May 8th. I gave them some half-opened birch leaves and one of lime. They preferred the latter and fed up well upon it, keeping to the underside of the leaves. I have frequently taken the species on sallow in the spring, and think that they always lay their eggs at that season, and not in autumn. I know nothing of *Xylina semibrunnea*, having never taken it. The young larvæ of *socia* are whitish maggot-like creatures, delicate in constitution, but subsequently acquire the bright green coloration of the more mature stage.—W. F. DE V. KANE, Sloperton Lodge, Kingstown. *April 3rd*, 1891.

NOTE ON HOMŒOSOMA CRETACELLA (*senecionis*, Vaughan).—As Mr. Tutt's footnote (*Ent. Record*, vol. i., p. 326) is calculated to throw grave doubts on my assertion, which he quotes from one of my letters to him, that the larva of *H. cretacella* "feeds in seedheads both of ragwort *and tansy*," I should like to say at once that the statement is perfectly accurate, and would not have been made unless known to be quite correct. Although, to the best of my belief, ragwort is the only foodplant on which the larva has been met with in England as yet, in Scotland it has been found in the seedheads both of ragwort (*Senecio jacobæa*) and tansy (*Tanacetum vulgare*). Mr. Tutt's footnote to the effect that, according to Mr. Reid, of Pitcaple, "ragwort is usually called tansy in Scotland," is quite beside the point; and I learn on excellent authority, that, whatever may be the case round Aberdeen, ragwort is certainly *not* called tansy in the Perth district.—EUSTACE R. BANKES, The Rectory, Corfe Castle. *March*, 1891.

CAPTURE OF HISTER MARGINATUS NEAR KING'S LYNN.—Amongst some Coleoptera captured last season, and sent to Mr. E. A. New-

bery for determination, is a specimen of *Hister marginatus*, which I picked up one fine afternoon in June on a roadside near this town. Having been told it is a rare insect, I have thought that its occurrence here might be worth recording.—E. A. Atmore, King's Lynn, *April 9th*, 1891.

Hybernation of Xylina semibrunnea.—I can endorse Mr. Thurnall's note as to hybernation of *Xylina semibrunnea*, as in March, 1889, I took one at sallow; and on April 15th, this year, a friend and myself visited the sallow, when my friend took one in fairly good condition. — A. H. Hamm, 46, Granby Gardens, Reading. *April 25th*, 1891.

Exhibition of the South London Entomological and Natural History Society.—Perhaps the South London Entomological and Natural History Society shows its inherent strength better at the Annual Exhibition than at any other time. The last of these, held on the 15th and 16th April, at the Bridge House, London Bridge, S.E., was in every way as successful as its predecessors, and the Society is to be congratulated on the magnificent lot of things collected together by its members. How much good such exhibitions do is perhaps open to question; that they do good certainly is not, and those visitors who were not specialists, but who heard Mr. F. Enock's lecture on "The Hessian Fly" must have gathered some new ideas on insect life which had never occurred to them before. It is impossible to deal with anything here except the strictly Entomological part of the Exhibition, nor indeed with the whole of that, but a few of the more important exhibits will be noticed. The bulk of the Entomological exhibits were Lepidoptera, but Messrs. Lewcock and Billups exhibited several drawers of Coleoptera from their collections, the former gentleman making a special exhibit of the genus *Donacia*. Mr. Billups also exhibited his magnificent collection of Hymenoptera, Diptera, and Hemiptera, the setting and arrangement of which are excellent throughout. Still another interesting exhibit was referable to Mr. Billups, *viz.*, a collection of Ichneumonidæ, bred during the last four years by members of the Society, together with the imagines of their respective hosts, and frequently with the larvæ. This was perhaps one of the most generally interesting exhibits, and attracted a great deal of attention. Mr. W. West also exhibited a most interesting box of Homoptera, collected in 1891. Among the Lepidoptera, Mr. R. Adkin exhibited his collection of British butterflies, and a very long series of varieties of *Triphæna orbona* (*comes*). Messrs. W. H. Tugwell and J. R. Wellman exhibited some of their cabinet drawers, the cleanliness and arrangement of the series being much admired. In Mr. Tugwell's exhibit, one noticed fine varieties of *Arctia mendica*, *A. caia* and *Boarmia repandata* var. *nigra*, from the Huddersfield district. Messrs. Gregson and Sydney Webb exhibited varieties of *Abraxas grossulariata*, the three drawers of the latter gentleman containing some remarkable forms; as also did his drawer of varieties of *Vanessa urticæ*. Mr. C. A. Briggs exhibited his drawer of lovely *Colias* vars., and Mr. C. Fenn, besides the series of pale *Tæniocampa instabilis*, mentioned in last month's *Record*, exhibited three drawers of his beautifully set Crambidæ and Tortrices, his vars. of the true *Crambus contaminellus* being noticeable. Mr. S. J. Capper exhibited a fine series of *Cœnonympha davus*;

whilst Messrs. Smith, Joy, Adye, and Collings made interesting exhibits. Mr. F. W. Hawes exhibited vars. of *Pieris rapæ*, *Argynnis euphrosyne*, etc.; whilst some excellently mounted life-histories were shown by Messrs. Croker and Quail. Mr. A. H. Jones exhibited British specimens of *Hydrilla palustris*, *Leucania vitellina*, and other rarities. Perhaps one of the most interesting exhibits in the room was that of Mr. Leech. His *Papilios* were indeed fine, and a perfectly black *machaon* attracted a great deal of attention, as did his hybrids of *Smerinthus ocellatus-populi*. The large drawer of *S. tiliæ*, however, contained fewer striking vars. than those exhibited by Mr. J. A. Clark and figured in the March number of the *Record*. The varieties of *Callimorpha dominula*, *Nemeophila plantaginis*, and *Arctia caia* were also exceedingly fine. The species of *Abraxas*, too, were very beautiful and attractive, and the difference in size in *Liparis dispar* from different parts of the world, showed what food and environment can do in this direction. Some of the Japanese species, labelled *nov. sp.*, however, teach a lesson. As a case to point. Our European *Lygdia adustata* was exhibited, and directly below it a series of the same insect from Japan. Our European specimens, besides the typical dark markings, have a more or less (generally less) developed central band. This band in the Japanese specimens becomes dark in coloration, hence we get a new species according to the label. Similar examples of other species were also exhibited. If this be the way new species are determined, the synonymists of a century hence will complain of those who name Japanese insects in the present day. But still the exhibit was a splendid one, and it is to be hoped that Mr. Leech will exhibit more of his entomological treasures. Another most interesting exhibit was the Society's Canadian collection, lately presented by Messrs. A. and L. Gibb, and arranged by Mr. W. West. New names are here tacked on to old faces, and *Tephrosia biundularia*, *Arctia caia*, with at least a dozen other species are happy (?) in having troubles ahead in the way of synonymy. Mr. R. McLachlan was kind enough to lend his collection of British Trichoptera, with the cases of the larvæ, and I noticed that Messrs. H. Moore, T. R. Billups and A. E. Cook exhibited nests of wasps. A fine educational collection was exhibited by Mr. S. L. Mosley, and Exotic Rhopalocera were well cared for by Messrs. J. Jenner Weir and S. Edwards. Of other matters not strictly entomological I must leave others to speak.—J. W. TUTT.

PRACTICAL HINTS.

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

Look at last year's "Hints" for this and the previous month. Collect larvæ and pupæ of *Sesia culiciformis*, *S. cynipiformis*, *Aciptilia galactodactyla*, *Geometra papilionaria*, *Xanthiæ*, etc. as per instructions there given. Collect sallow and birch catkins and keep in separate bags. Collect a bag full of the rolled leaves and terminal shoots of hawthorn. Many good TORTRICES will be bred.

Drooping shoots of spindle contain larvæ of *Yponomeuta plumbellus*, and the webs on the branches larvæ of *Y. cagnagellus*.

The large twisted bunches at end of bramble shoots contain *Aspis udmanniana*; the twisted tops of fleabane (*Inula*) contain larvæ of *Ebulea crocealis*; the twisted shoots of honeysuckle, larvæ of *Gelechia mouffetella*; the twisted shoots of *Genista tinctoria*, larvæ of *G. lentiginosella*.

Coleophora cases should be collected now. Each species should be kept in different little glass jars, and the cases mounted with the imago for reference—*Coleophora troglodytella* makes blotches on fleabane and *Eupatorium*; *C. palliatella* on oak; *C. ibipennella* on birch; *C. genistæcolella* on *Genista anglica*; *C. vibicella* on *G. tinctoria*; *C. laricella* on larch; *C. saturatella* on broom; several species on elm, rose, sallow, etc. Those on heath must be swept.

BIBLIOGRAPHY.

ADDITIONS TO THE BRITISH LIST AND CHANGES IN NOMENCLATURE.

DIPTERA.

Micropalpus hæmorrhoidalis, Fln., Meade, *Ent. Mo. Mag.*, 91. A supposed British specimen was obtained from Mr. F. Walker, but the precise locality is unknown.

HEMIPTERA.

Lecanium distinguendum, n. sp., Douglas, *Ent. Mo. Mag.*, 96. Delamere Forest, found by Mr. R. Newstead on *Vaccinium myrtillus*.

Pulvinaria betulæ, Linn., Douglas, *Ent. Mo. Mag.*, 98. Delamere Forest, found by Mr. R. Newstead on *Betula alba*. It had been recorded before as British, but on insufficient grounds.

P. betulæ var. nov. *alni*, Douglas, *Ent. Mo. Mag.*, 100. Lewisham, on *Alnus glutinosa*.

LEPIDOPTERA.

Micropteryx sangii, n. sp., Wood, *Ent. Mo. Mag.*, 101. The species formerly named *M. inconspicuella*, turns out to be *M. semipurpurella*.

Catoptria decolorana, Frr. Mr. Barrett shows in *Ent. Mo. Mag.*, pp. 101–103, that this species has no right to a place in the British fauna.

Pempelia adelphella. Mr. Barrett also throws this species out of the British fauna, *Ent. Mo. Mag.*, p. 103.

COLEOPTERA.

Anaspis septentrionalis, n. sp., G. C. Champion, *Ent. Mo. Mag.*, 104. Inverness-shire.—T. D. A. COCKERELL.

SOCIETIES.

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY. —*Thursday, April 16th*, 1891.—Mr. Battley exhibited fine specimens of *Bombyx rubi* bred from larvæ taken at Reigate, one of the females having a light circle on the right fore-wing between the two transverse lines. On the left hind-wing one of the rays ended abruptly in the centre of the wing. Messrs. Clark and Tutt exhibited long series of LITHOSIIDÆ, and Mr. Tutt read the following notes on parallel variation

in certain species of the genus *Lithosia* :—"The genus *Lithosia* consists essentially of the following groups in their normal forms: (1) Spotted species as *muscerda*, (2) unicolorous golden species as *aureola*, (3) unicolorous yellow-ochreous species as *deplana*, (4) grey species with lighter costa as *griseola*, and (5) grey species with distinct yellow costa as *complana*. If we simply study our well-known varieties, we notice that what is the typical or general form in one species, becomes varietal in another; thus *griseola* has an unicolorous yellow variety *stramineola*, and a form in which the yellow costa is almost as distinct as in *complanula*. Again *deplana* exhibits a bright yellow costa variety, and also a dark ochreous form. But *pygmæola*, generally considered a var. of *lutarella*, exhibits this parallel variation—or rather an attempt to follow the general forms of other species in its variation—in a most striking manner." The first batch of these specimens exhibited showed an unicolorous pale yellow form of the same shade as *griseola* var. *stramineola*, the second batch of the golden colour of *aureola*, a third set was of a dark grey colour with a pale costa like typical *griseola*, whilst another batch were leaden grey with a distinct yellow costa like *complanula* and *complana*. In addition, an almost melanic specimen was exhibited, and Mr Tutt remarked that Mr. Bird had taken a specimen spotted somewhat like *muscerda*. The named varieties of Dr. Staudinger's *Catalog* were then noticed as also the fact that *pygmæola*, though really subject to a great range of variation in itself, was treated as a simple varietal form by Staudinger. Mr. Tutt drew attention to other genera where the tendency for varietal forms of a species, to follow other species is very marked, and suggested that among those NOCTUÆ which he had worked out, it was almost universally so. Mr. Heasler exhibited a series of *Agathidium nigrinum* from Highgate Woods.

Thursday, May 7th.—Exhibits: Mr. Tutt, a box of lepidoptera from Dr. Chapman, including a hybrid between *Amphidasys betularia* and *A. prodromaria*, a very dark specimen of *Tæniocampa populeti*, almost exactly resembling *T. instabilis*, a fine banded *T. instabilis*, series of *Cuspidia tridens*, *Viminia rumicis*, *Cuspidia leporina* var. *bradyporina*, *Botys terrealis*, etc., from Hereford. Mr. Quail, very light cocoons of *Saturnia carpini*, from Wicken, with the imagines bred therefrom, three being very good vars. Mr. Prout, bred series of *Coremia ferrugata* and *C. unidentata*. With reference to the differentiation of these two species, he pointed out that *unidentata* has a small V-shaped notch in the outer margin of the central band, near the costa, but this could not be traced in his series of *ferrugata*. Messrs. Clark, Tutt, Huckett, Hodges, and Milton exhibited series of the species of *Triphænidæ*, Mr. Clark reading the following account of the life-history of *Triphæna subsequa* :—

"In the autumn of last year (1890) I obtained a few eggs of this species from Forres. The first hatched on August 30th, and I reared the larvæ through the late autumn on knotgrass (*Polygonum aviculare*). and dock leaves (*Rumex pratensis*) in a warm room, to avoid the large percentage of loss which usually occurs when one attempts to hybernate larvæ.

"When first hatched, they are semi-loopers, of a yellowish drab colour, with minute brown spots round each segment, from each of which protrudes a tiny brown hair. Head dark brown. September 6th.—*1st*

moult. They are now of a dull olive green colour, with a very pale yellowish stripe down each side, no trace of hairs, but still half loop as they walk. *2nd moult*. Dull brownish colour with distinct yellowish lateral lines below the spiracles, with a fine yellowish line above, also a very fine centrally dorsal one, and a minute yellowish line round the segments. Head pale brown, with three tiny lines down it, anal segment with one dark patch in centre. On being disturbed the larva falls to the ground and curls up. Legs and under side olive green. *3rd moult*. There is now a drab line down each side with a slender black one underneath and a brown one above. There are also three pale lines down the back, the side ones are yellowish and the central one white with two rows of small black spots on either side, those on the 10th, 11th and 12th segments being wedge-shaped and smaller towards the head; two black lines down the head and a V-shaped white mark. Underside drab. *4th moult*. The lateral stripes of a very light brown, with a darker one above and below each of them, the three pale dorsal lines are very distinct, the central one being white, whilst on either side of it is a row of very black oblong spots, each of which alternates with a similar spot of very pale brown. The head has two distinct dark brown stripes, continuations of the dark markings on the back. The legs and underside are of a pale greyish brown. *5th moult*. It has now a very light greyish brown stripe down each side, with minute black spots down its centre. Both above and below this, is a dark brown stripe. The three lines down the back are more distinct, being very light brown edged with black; the spots on the segments are oblong in shape, and brown and black alternately. (In all the stages the larva tapers towards the head). Two distinct black lines on the head and V-shaped marking on the anal segment. *6th moult*. Same as last, but the three lines are yellower, the centre one ending in a V-shaped marking on the head, and the dark spots down the back are squarer, the light ones much darker, and a distinct wedge-shaped marking on the anal segment. The larvæ pupated in October, and emerged from November 15th to December 27th."

Mr. Milton exhibited *Eupithecia extensaria*, *E. pulchellata*, and *Ephestia kühniella*; also the following Coleoptera:—*Oxyporus rufus*, *Silpha 4-punctata*, and *Cleonus sulcirostris*; and in Diptera, *Stratiomys riparia*, and *Gastrophilus equi*, bred from the larvæ. Mr. Battley exhibited *Silpha lævigata* and other Coleoptera from Southend. Mr. Heasler, series of *Liosomus ovatulus*, and the var. *collaris*, from Highgate. Mr. Lewcock, living specimens of *Dinarda mærkeli* from Penzance; also a number of beetles received from Mr. Jarvis, of Cape Town, on which he read some notes.—G. A. Lewcock and A. U. Battley, *Hon. Secs.*

South London Entomological Society.—*Thursday, April 23rd.*—Mr. South exhibited for Mr. Leech a series of *Chrysophanus phlæas*, containing vars. *schmidtii* and *eleus*; also an Indian form, *titiana*, with the ♂ like *eleus*; a China form with a dark ♂, the ♀ being almost typical, and a strange ♀ from the Canaries. Mr. Adkin exhibited *Emmelesia albulata* just bred from Shetland pupæ obtained in 1888; from these pupæ four emerged in 1889, twenty in 1890. He also exhibited mines of *Lithocolletis vacciniella* and pupæ of *Cedestis gysseleniella*, *in situ* in pine shoots from Rannoch. Mr. Tugwell, series

of *Larentia olivata* from Portland and elsewhere, the former being excessively pale. Mr. Tutt referred to *Heliophobus hispidus* and *Epunda lichenea* from the same localities as varying in the same direction. Mr. Tugwell also exhibited vars. of *Oporabia dilutata* from Tilgate and London. Mr. Billups exhibited the collection of parasites with their hosts which drew so much attention at the South London Exhibition. Messrs. Carrington, Adkin and Tutt made remarks on the excellence of this exhibit and its great value. Mr. Billups also exhibited cocoons of *Cetonia aurita* with the pupæ *in situ* together with the imago. Mr. Carrington said that these cocoons were sent from near Banbury, and were formed in old thatch mixed with clay, in which various plants were growing. Mr. Billups suggested that the larvæ fed on the roots of these plants, and became gregarious as pupæ. The larvæ lived for three years and the imago did much damage to roses.—Ed.

NOTICES, REVIEWS, Etc.

The British Noctuæ and their Varieties, by J. W. Tutt, F.E.S. —The first volume of this work is now ready, and contains a full description of the original type, of the range of variation, and the named varieties of every British species to the end of the *Caradrinidæ*. The general introduction on Variation and its causes extends to 12 pp. The articles on *Acronycta*, especially that on *Cuspidia tridens* and *C. psi*, and those on *Hydræcia*, *Nonagria*, *Miana*, and *Apamea* are very complete and full. The subspecific value of *Hydræcia paludis*, *H. lucens*, *Miana fasciuncula*, and *Caradrina superstes*, Tr., are treated at length, and the probability of the latter, if distinct, being a British species. The matter runs out altogether to above 180 pp. I beg publicly to thank all those entomologists who so kindly subscribed to the work as soon as I suggested taking it in hand, and thus guaranteed me against financial loss. That most of the leading entomologists, not only of England, but of North America and Australia did so, is ample proof of the general interest in the subject, and that a systematic work on variation is much needed. Those who have not previously sent in their names as subscribers can obtain copies direct from me, or from Messrs. Swan, Sonnenschein and Co., Paternoster Square, London, E.C. Price 5s. 6d. nett.—Ed.

Annual Reports of the Fruit Growers' Association and Entomological Society of Ontario, 1890.—This Report, printed by order of the Legislative Assembly of Canada, deals so far as the first part is concerned with a series of comprehensive discussions and a report on Fruit Culture. The second part is almost entirely confined to Economic Entomology, and, although the reading will be found interesting enough to specialists, its use to the agriculturist far transcends its interest to the specialist. To those Entomologists interested in agriculture, or to those who have friends so interested, no more instructive volume could be obtained. Lepidopterists will be specially interested in the graphic account of the destructive habits of *Leucania unipuncta*, whilst Hymenopterists and Dipterists will find much in their special groups to interest them. It is printed by Messrs. Warwick and Sons, 68 and 70, Front Street West, Toronto.

The Entomologist's Record AND JOURNAL OF VARIATION.

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MELANISM AND MELANOCHROISM IN BRITISH LEPIDOPTERA.

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

(*Continued from page* 35.)

THE earliest explanations of melanic forms were generally physiological or had a physiological basis, and the supposition was, that the exciting cause had a phytophagic origin, and that the larva was affected in some unknown way by the chemical elements in its food, or by certain external substances taken with its food. Thus peaty soils, soils impregnated with iron, leaves covered with soot, etc., have all been supposed in some mysterious manner to have affected lepidoptera in the direction of melanism. Now it is well known that a plant takes the same inorganic and organic substances for food wherever it may be grown, and that the proportions of these substances vary only in the very narrowest degree. Any deficiency of a food-substance in the soil is at once visible in the vegetation, and stunted growth is the first result of deficiency. Total deficiency means "barrenness" for any plant requiring the absent substance. Now, whether a plant be grown on a "sandy" or a "calcareous" soil, the chemical analysis will prove that the plant has its tissues made up of the same substances and in almost exactly the same proportions on either soil. I would ask therefore:—How can the food influence colour? If a soil has large supplies, in a soluble condition, of all the necessary foods that a particular plant requires, we get a luxuriant growth. On the other hand, if a soil has but a small quantity of the available foods, then that particular plant will be stunted and sparse in its growth, but the plant on either soil will still be composed of the same chemical substances. Phytophagic

varieties in this way would generally be variations in size, as in the case of the before-mentioned species, *Hypsipetes elutata*, and not variations in colour.

My friend, Dr. Chapman, I know, always connects the beautiful var. *rosea* of *Cuspidia tridens* with cherry (*Ent. Rec.* ii., p. 31), but I do not know that he has formed any idea as to the way in which the colour may be produced by this food, and I simply mention the fact to show that other lepidopterists consider that food does influence colour. Exact experiment on the matter is undoubtedly needed.

There is one way, however, in which food may more or less indirectly produce a dark coloration. A plentiful supply of succulent and nutritious food will generally produce insects of large size, whilst an insufficient supply of food, or even a plentiful supply of innutritious food will act in the opposite direction. In these specimens, however, the smaller size is often accompanied by the markings being pressed much more closely together, thus giving the insect a darker appearance. This is especially the case if the ground colour be pale and the markings dark, for then the area of the pale ground colour becomes lessened, and the darker markings are developed in a smaller space. It becomes hard to dissociate this form of development from an indirect tendency to disease, or rather to a change of constitution as Dr. Chapman terms it; but all instances of this kind appear to be only very indirectly caused by food, and will be found, generally, to be governed by the environment of the particular species.

In the *Ent. Mo. Mag.*, vol. xiii., p. 132, we find Mr. Birchall attempting to show us that "there are great constitutional differences in animals and plants, which are correlated with differences of colour," and he refers to chaps. xxi. and xxv. of Darwin's *Animals and Plants under Domestication*, where he states it is shown "that black and dark-coloured animals escape many diseases, are less liable to the attacks of parasites, and will stand changes of temperature, which prove fatal to the lighter coloured varieties." Unless in the case of true albinisms, I should challenge this statement. We must bear in mind that true "albinisms," which must not be confounded with "leucochroisms," are generally looked upon by scientific men as being a certain form of disease, or rather due to certain conditions of disease, and we can readily understand that, if this be so, the white varieties would necessarily be constitutionally weaker than their darker brethren. Mr. Birchall then

quotes at length from Mr. A. R. Wallace's recent *Address to the Biological Section of the British Association at Glasgow*, but the conclusions of Mr. Wallace are more or less open to question, and I doubt altogether, both his conclusions and the one at which Mr. Birchall arrives :—"As it thus appears certain that greater strength of constitution and more powerful and acute perceptive faculties are, from some yet unknown cause, associated with dark colours in the vertebrata, may we not presume that insects are subject to the same law, and that dark varieties of lepidoptera are able to spread and increase under adverse conditions, whilst the lighter coloured types fail to do so, and are consequently eliminated in the struggle for life, and that the occurrence of melanic forms may be thus reasonably explained as a simple case of the 'survival of the fittest'?"

Taking man as the highest of the vertebrata, such a conclusion as this seems to force us on the horns of a dilemma. Either the pale Anglo-Saxon race, which has shown its strength over all other races, and has fixed itself as the predominant race of the world, must still be looked upon as inferior to the races under its sway, or we must look upon the predominant race as a great exception to what above is called "the rule," although I do not follow out the application of "the rule." Dr. F. Buchanan White, dealing with this question (*Ent. Mo. Mag.*, vol. xiii., p. 149), writes :—"That melanochroic (or melanic) insects are peculiarly favoured with stronger constitutions and more acute senses, there is not, I think, any reason for supposing. Frequently, in fact, melanochroic (and more frequently, melanic) individuals are of smaller size than the typical form." I think decidedly, variation in size in lepidoptera, has its origin essentially in phytophagic causes, and that where melanic forms are small, the size is due to phytophagic, the melanism, to other causes. Mr. S. Radcliff Fetherstonhaugh also discusses Mr. Birchall's conclusion in the same volume of the *Ent. Mo. Mag.*, p. 215, and writes :—" Mr. Birchall quotes from learned writers, who assert as fact that dark coloured animals, from the lower orders up to the superior animal, man, have advantages in freedom from disease, less liability to parasites, superior acuteness of the senses, etc., which their paler coloured fellows do not possess; I must say, I do not see any foundation for this doctrine. In the races of men it certainly does not appear to hold good, as the fair-haired Saxon is able to hold his own physically and intellectually against the

darker races. The single instance in which the rule holds being the albino in all animals, but this is, after all, a diseased type. If Mr. Birchall's theory of survival of the fittest be true, and that the darker races in insects, animals, and the superior animal, man, are the fittest, the inevitable conclusion to which it points is, that the darker forms in insect and animal life, and the negro in man, would, after so many ages of 'natural selection,' largely predominate in the world, the contrary being, however, the fact." This is exactly my own position with regard to this subject, and I think that such a theory is altogether unsupported and entirely contrary to fact.

But then Mr. Fetherstonhaugh, to account for melanism, propounds another physiological theory, which is apparently very far-fetched, but which it would be altogether out of reason to assume has no effect. He says:—"Dr. White appears to reject Mr. Birchall's notion that cold, damp climates, with the absence of sunshine, may be the cause of the origin of variations of colour, and suggests meteorological causes."[1] He then goes on "May we not then very easily suppose that variations of colour in insects may be, so to speak, accidentally produced by external objects present to their acute vision during the process of generation, and this may occur again and again. It seems to me a less far-fetched theory than to assert dogmatically that dark-coloured insects are endowed with stronger constitutions, and are therefore perpetuated by natural selection."[2] This suggestion of Mr. Fetherstonhaugh is supported by my friend, Mr. Tugwell, in the *Ent. Mo. Mag.*, pp. 256 and 257, where he writes:—"I am far more inclined to believe in the suggestion of Mr. R. Fetherstonhaugh, that the change is produced by a vivid impression of the colour of the surrounding objects on the female insects during the *period of generation*, and a strong tendency to reproduce in their progeny the same colours among which they themselves have lived; and, as we know that this phenomenon of nature has been accepted, we may fairly be permitted to consider it as a probable cause of melanism or leucochroism under suitable conditions." Mr. Tugwell then refers to manufacturing districts, London and the New Forest, in illustration of his idea, and gives as examples,—

[1] This is hardly my reading of Dr. White's paper. He rejects parts of Mr Birchall's paper, certainly, but can scarcely reject "cold and damp," etc., when he suggests "meteorological causes."

[2] It must be noted that Mr. Birchall deals with "natural selection" in a physiological and constitutional way, Dr. White as selection from protective causes.

Boarmia rhomboidaria var. *perfumaria* and *Gnophos obscuraria*. He then goes on to say :—" Aberration of colour in an insect may be occasional and purely accidental, but when we see, not single specimens, but a constant and invariable prevalence of this harmonizing with the surrounding soil, I cannot but think that the cause may be mainly the powerful impression of surrounding objects on the female during the all-important period of life, *viz.*, that of propagation, coupled with an instinctive provision for the protection of its future progeny ; at any rate, the subject merits a further and deeper investigation." I do not know that this theory has ever been carried further, and I am inclined to think that Mr. Tugwell is now more in favour of the " natural selection " theory from Dr. White's point of view than any other. I think, myself, with regard to this, that it would account for very few cases of variation, and then only such as appear to me to be better explained in other ways. (*To be continued.*)

BIBLIOGRAPHY.

ADDITIONS TO THE BRITISH LIST AND CHANGES IN NOMENCLATURE.

COLEOPTERA.

Heterocerus britannicus, n. sp., Kuwert, *Verhandlungen der kaiserlich-königlichen zoologisch-botanischen Gesselschaft in Wien*, Dec , 1890, p. 535. The Rev. W. W. Fowler, has a specimen from Dumfries (*E.M.M.*, 133).

H. fusculus, Kies. The species known by this name in Britain = *H. pulchellus*, Kies. (W. W. Fowler, *E.M.M.*, p. 133).

DIPTERA.

Gonia ruficeps, Fln. becomes *Germaria ruficeps* (R. H. Meade, *E.M.M.*, p. 125).

Bigonicheta spinipennis, Mgn. = a var. of *B. setipennis*, Fln. (R. H. Meade, *E.M.M.*, p. 128).

Bigonicheta, Rnd. and *Actia*, Dsv. = subgenera of *Thriptocera*, Mcq. (R. H. Meade, *E.M.M.*, p. 128).

HEMIPTERA.

Scolopostethus grandis, Horv. = *S. punctatus*, Edw. *S. adjunctus*, D. and S. = *S. affinis*, Schill. *S. adjunctus*, Edw. = *S. thomsoni*, Reut. *S. neglectus*, Edw. = a slight var. (with the first antennal joints partly black) of *S. thomsoni* (Horvath, *E.M.M.*, p. 117).—J. W. TUTT.

CURRENT NOTES.

If any of the promised subscribers to my work on *Varieties of British Noctuæ* have not yet received a copy of vol. i., I shall be

pleased if they will communicate at once with me. Further subscribers are also needed for what is the only published text-book on the subject.

As will be seen in the Report of the Ent. Soc. of London printed this month, parcels of insects may now be sent abroad by sample post.

Strachia ornata, Linn.; *Brachypelta aterrima*, Först.; *Lygæus punctato-guttatus*, Fab.; *Lygæosoma reticulatum*, H.-S., species of Hemiptera not occurring in the British Isles, are recorded by Mr. Luff as occurring in Guernsey (*E.M.M.*, p. 130).

Mr. R. C. L. Perkins (*E.M.M.*, p. 123) describes a monstrosity of the ant *Stenamma westwoodi*, taken last August between Dartmouth and Stoke-Fleming, the right half of the body "exhibiting characters strongly characteristic of the ♂, while the left half resembles the ♀."

SCIENTIFIC NOTES.

Retarded Development of the Wings of Lepidoptera.—I have been forcing my pupæ this spring in a greenhouse, at an average temperature of about 65°, and have noticed that several insects have not expanded their wings for some hours after emergence, and then only by my using the means suggested by Mr. Anderson (vol. i., p. 304). One specimen (*Smerinthus tiliæ*) emerged at 10 a.m. on March 13th, and had not begun to expand at 1 p.m. on the following day. I then put it into a large chip box, and gave it a good shaking, afterwards turning it back into the pupa box. On examining it a few hours afterwards, I found it perfectly expanded. Mr. Fenn's theory (vol. i., p. 327) that this retarded development may occur with deep-burying larvæ, cannot apply here, as I always find the pupæ of *S. tiliæ* just below the surface, often only under the dead leaves, at the roots of lime and elm. I also have a distinct recollection of a female specimen of *Odonestis potatoria* emerging in the early morning, expansion taking place naturally the same evening.—A. U. Battley, 28, Amherst Park, N. *March 20th*, 1891. [This shaking up business is exceedingly strange, but it appears to me that this retarded wing expansion must in some way be connected with suspended active respiration. The wing nervures are extended tracheal passages, and it follows that, as they unroll, air passes through them, or conversely, as air is forced through them, they unroll. If active respiration be suspended, and the shaking up induces an active state, I can understand the subsequent development of the wing. Has any reader another suggestion to offer as to the probable cause?—Ed.]

I have a case to record of the pairing of lepidoptera before the wings were developed, but in this instance the sexes are the reverse of those mentioned by Mr. Mackonochie with regard to *Platypteryx falcula* (*Record*, vol. i., p. 305). In February, 1889, on looking into my pupa-box I saw a pair of *Anisopteryx æscularia*, *in cop.*, but the wings of the male were entirely undeveloped. After a while, however, the wings unfolded themselves, hung down in the usual way, were finally folded round the body in the customary manner adopted by this species, and were in no ways malformed. All this occurred before pairing had ceased.—R. M. Prideaux, 9, Vyvyan Terrace, Clifton.

I have observed a very similar development of the wings of moths to that

described by your correspondents in the February number. On the 10th of March, 1889, I looked at my pupæ at 11 o'clock a.m. and saw a *Tæniocampa stabilis* on the lid, the wings quite undeveloped and very small. I looked at it again in the course of the evening, when the wings had not altered in the least. I concluded it was a cripple, put it in a box and left it till the next morning, when I found the wings were perfectly developed. I noticed the same process of development several times with *T. cruda*, in one instance the under wings never developed at all. — John Williams Vaughan, Jun., The Skreen, Radnorshire, Erwood R.S.O.

Temperature versus Heredity in producing variation.—To show the amount of cold that pupæ can withstand under natural conditions, and what marvellous vitality they possess, the following observations may be interesting. In April, 1890, I took a ♀ *Tæniocampa instabilis* at sallow bloom, and noting her to be a very pale variety I reserved her for oviposition, and she laid the remainder of her eggs. I reared a number of these as far as the pupa stage; and the large garden pot in which the larvæ went down was placed out of doors in a shady spot with a north-east aspect, about the very coldest place I could discover. The pot was exposed to the very severe temperature of the recent long frost, and from its position must have frequently been subjected to 30° of frost. The earth it contained, with the pupæ, was frozen hard for over six weeks. About January 23rd, when the frost had broken up, I removed the pot indoors and sorted out the pupæ, of which there were about five dozen, and I was glad to find that not one of them had succumbed to the cold. Laid in damp sand in a very cold room with eastern aspect, and where no fire is ever lighted, these pupæ soon began to show signs of life. The first moth was bred February 3rd, and to the present date at least forty have emerged. Considering the temperature of the room where they were kept, they are at least six weeks in advance of their usual time. The moths bred follow to a great extent the variation of the parent ♀, and I have many very lovely pale grey, pinkish grey, and other light forms; among them, of course, are a few of the ordinary type, the dark reddish brown, and even these vary in intensity and markings. Not a single black specimen has emerged, although it is a very common form here. The larvæ were fed on sallow. Here, at any rate, is a natural experiment which shows that heredity beats temperature out of all calculation. If Mr. Merrifield's experiments be correct, my *instabilis* should be certainly darker than usual, or at any rate some part of the brood should be darker, but the reverse is the case. This is an extreme case in point of temperature, for none of Mr. Merrifield's pupæ were ever frozen for six weeks, at least as far as I recollect. During the same frost a few larvæ of *Cidaria russata* were frozen stiff and hard, but thawed when the frost broke up, and are now feeding and thriving on strawberry. In two other pots standing beside the one containing the *russata* larvæ are a lot of *C. immanata* ova still unhatched, although laid before the *russata* ova were deposited.—C. Fenn, Lee. *February*, 1891.

Melanism and Temperature (A note on Mr. Fenn's experiment with *Tæniocampa instabilis*).—Mr. Fenn (*Ent. Record*, vol. ii., p. 20) exposed the pupæ of *instabilis* to the great cold of last winter and bred some very pale specimens, and very properly regards the result as

chiefly due to heredity, but falls, I think, into error when he advances the experiment as having any bearing on the conclusions of Mr. Merrifield, to which his experiment has led; the fact being that Mr. Fenn exposed to the great cold of last winter not the pupæ of *instabilis* but the imagines. *Instabilis* hybernates as a moth not as a pupa, although it hybernates within the pupa case, that is, the moth is fully developed within the pupa case in the autumn or early winter, but does not emerge till the spring. I do not know how long I have been aware that this is the rule in *Tæniocampa*, certainly for many years, and always supposed it was one of those things that everybody knew, and that one need not inquire into. It so happens that I have in recent years verified it for myself in the case of *cruda* and *instabilis*, but I have not made so many observations as to be able to assert on my own authority that it is invariable in these species or universal throughout the genus.—T. A. Chapman, Firbank, Hereford. *April*, 1891.

Aneurism.—I have very little idea as to the cause of aneurism, but it is certainly not a rare occurrence, and is not always caused by fluid contained between the wing membranes. In several which I operated on last year, whilst the notes were appearing in the *Record*, it seemed to be caused by an air bubble.—Wm. Reid, Pitcaple, N.B. *February*, 1891.

Representative Species of Noctuæ and the Male Genitalia.—It is probably generally known that in North America there are found certain so-called representative species of moths, which differ only in small details of colour, marking or structure from their European allies, while closely agreeing with these in form, size and habit. There can, I think, be no question that these representative species are related by blood, and that the differences, such as we find them, have resulted from their different environment since their separation. Sometimes these differences appear to be marked in the larval stage, as is the case with *Triæna occidentalis* and the European *Triæna* (*Cuspidia*) *psi*. Sometimes the peculiar larvæ remain very similar and the moths differ in marking, as seems to be the case with *Jocheæra funeralis* and the European *J.* (*C.*) *alni*. The amount of difference is very variable; and the limits of these representative species, as a class, are hardly defined. I have given lists of such instances as have fallen under my observation. The species of the genus *Agrotis* offer a number of such cases, and this genus affords also examples of identical species found in America and Europe. Such, for instance, appear to be *A. chardinyi*, *plecta*, *c-nigrum*, *ypsilon*, and *fennica*. The species which in America represents the European *A. augur*, is *A. haruspica*, and I select this one instance for the purpose of illustrating the question generally. Writers have not been hitherto agreed as to the constancy of the differences noted in marking between the two. In colour, size, and general appearance the two are indeed so similar that they cannot be well separated, yet it has been recently shown that they differ in the structure of the male genitalia. On the supposition that this discovery is real, it would certainly prove that the male genitalia are more readily susceptible of change than is colour, size, or marking, and that they are thus to be used as the basis for specific, not generic, characters. In co-existing forms, very closely otherwise connected, the genitalia have offered strong differences—an additional argument for the view here taken.—Aug. R. Grote, Bremen.

STRUCTURE OF THE COCOON OF ERIOGASTER LANESTRIS.—Has any one studied *Eriogaster lanestris* much? Two of mine spun a common cocoon and pupated therein to the detriment of one another. I sent them to Mr. Tutt. I had two notes from lepidopterists saying that it had happened to them with the same insect. Is it an ancestral custom, nearly lost? Is there any parallel among other insects? How do they make the lid to the top of the cocoon? It is plainly visible long before the pupa emerges, and chips off with quite a clean edge. The cocoon itself is made in two distinct layers; the outer hard one with the air holes in, and an inner and soft one of the texture of very fine brown paper, without any holes at all. The two separate pretty easily if a cocoon is pulled to pieces. I have never had time to watch the process of cocoon making, but I should like to have seen the two working together. The insect itself is a late emerger, generally about 4 o'clock, nine of mine have emerged up to date in each case in batches of three, consisting of one male and two females, I was looking into my pot when the last lot came, and they all emerged as nearly simultaneously as I could see, so that the insect has behaved with strange, if accidental, eccentricity, in my case.—G. M. A. HEWETT, The College, Winchester.

VARIATION.

LARENTIA MULTISTRIGARIA VARS.—I have been capturing *Larentia multistrigaria* for the purpose of getting varieties, and have got some nice banded forms, and last night three very dark, one as black as soot, with a few light dots round the edge.—W. REID, Pitcaple. *March 24th*, 1891.

HOMŒOSOMA SAXICOLA, Vaughan, AS A VAR. OF H. NIMBELLA.—There can be no doubt that Ragonot, in pronouncing *H. saxicola* to be only a variety of *nimbella*, expressed the opinion already formed about it by not a few British entomologists. As Mr. Tutt has quoted (*Record*, vol. i., pp. 325–326) the last half of Mons. Ragonot's note in *Ent. Mo. Mag.*, xxii., p. 26, I should like to complete the quotation by recalling the first half which runs thus:—"This appears to be the most frequent form of *nimbella* in England I have a number of British *nimbella* from Yarmouth, Yorkshire, Cheshire, Pembroke and Dublin, and none are like Continental specimens of that species." At any rate, Mons. Ragonot had plenty of *nimbella* before him, and, though he was incorrect in assigning the name *saxicola* to the great bulk of our British specimens instead of to only a certain proportion of them, there seems to me to be no doubt that in considering *saxicola* to be a var. of *nimbella* he formed a perfectly correct conclusion about the matter. It is almost certain that, among his British specimens, Mons. Ragonot must have had some genuine *saxicola*, and was acquainted with the form, as he would not have treated of it without consulting the original description in *Ent. Mo. Mag.*, vii., p. 132; but it is clear that he regarded all our examples as belonging to one variable species. True though it is, as Mr. Tutt says, that all British *nimbella* are *saxicola*, yet it is apparently equally true that hardly any of them are typical *nimbella!*

Nimbella is a decidedly variable species both in colour, size, and markings,—several different forms being sometimes bred together from the very same batch of larvæ—and the specimens which occur in Britain seem for the most part either to be, or to approach the variety *saxicola*, or else to be intermediate between that and the type. Although I have not seen the original specimens of *nimbella* in the late Professor Zeller's collection, I have been fortunate enough to see those from which Mr. Howard Vaughan described *saxicola*, but failed to find any reliable distinction between them and *nimbella*.

It is very surprising that in the published notices of *saxicola* we find no full and careful comparison between it and *nimbella*, and no attempt to differentiate them satisfactorily. In his original description of *saxicola* in *Ent. Mo. Mag.*, vii., p. 132, Mr. Howard Vaughan merely says: "This species is closely allied to *H. nimbella*," and then proceeds to separate it from *senecionis* (!), whilst in Mr. J. H. Leech's *British Pyralides* we only read "This species differs from *nimbella* in the longer and narrower fore-wings, the costal streak, and the more conspicuous longitudinal white lines,"—all of which characters, it may be observed, differ considerably in individual specimens of *nimbella*. It should be noticed that in Stainton's *Manual*, ii., p. 169, the expanse of *nimbella* is given as 7–8 lines, which is *the exact size* of *saxicola* as given by Mr. H. Vaughan; the insect therefore, as a general rule, runs rather larger in all its varieties in Britain than on the Continent.

The foodplants of *nimbella* and *saxicola* are the same, and to the best of my belief no real differences have ever been shown to exist between the larvæ; in fact, the only description (if it may be so called) of the larva of *saxicola* which I can find, is in *E.M.M.*, vi., p. 132, where Mr. Howard Vaughan says: "The larva, as well as I can remember, was short, obese, and greenish, with darker blotches on the back"; and this would of course apply equally well to the larva of *nimbella*.

I certainly know of no *reliable specific distinctions* between the perfect insects, but if anyone can show any such to exist between *nimbella* and *saxicola* in either or both stages, he will do good service by making them known; till then, however, there seems to be no reason for refusing to accept the conclusion arrived at by Mons. Ragonot that they are merely different forms of the same species.—Eustace R. Bankes, The Rectory, Corfe Castle. *April 4th*, 1891.

Arctia lubricipeda vars.—It is stated that between 1860 and 1870, vars. of *A. lubricipeda* in which the dots tended to form longitudinal lines, only occurred in a timber yard which has since been destroyed. From my own knowledge I cannot prove or refute this statement, it is too far back for me; but my friend, Mr. Jackson, tells me that long before this date he took it in gardens, timber yards, etc., pretty well all round York. The variety is by no means common. At a rough guess I should say that it averages about one var. in every hundred, although in some years it varies much more than others; last year was exceptionally bad. I have never heard of the true var. *radiata* as figured in the *Entomologist* for August, 1874, p. 169, having been taken at York.—G. C. Dennis, Tower Street, York.

Variation of Catoptria ulicetana.—The majority of the specimens of *Catoptria ulicetana* that have come under my notice (and it is an

abundant species in my collecting grounds) have a pale ground colour like the Aberdeen specimens more or less ; but a considerable minority have a greyish, some almost blackish, suffused appearance. I think the southern form is rather of a brownish shade?—T. J. HENDERSON, Glasgow.

SCANDINAVIAN VARIETIES OF BRITISH SPECIES. — The following varieties of British species are described in the *Entomologisk Tidskrift*, 1890, pp. 201, 202, by Enzio Reuter :—"*Zonosoma punctaria*, L. ab. *infuscata*. The wings of a dull colour with a sooty coloured fascia, more densely spotted on each side, the underside of a suffused red, not so fuscous, with the central part of the upper area of the anterior wings deeply suffused with liver-colour. Ab. *arcufera* (with figure). The anterior wings with the almost central fascia strongly arched in its lower fourth, extending from the discoidal cell (♀). *Thyatira batis*, L. ab. *confluens* (with figure). The superior wings with the base and central area of a dull reddish white ; a semi-oval, dull, olive-fuscous spot on the costal margin before the centre ; from this, almost to the hind margin, sparingly sprinkled with fuscous dots, and with a dull obsolete fascia ; the apical (outer) third decidedly olive-fuscous adorned with the typical spots but with the posterior one much more obsolete than in the type ; the cilia unicolorous fuscous. The posterior wings as in the type, but the pale median fascia paler ; abdomen whitish (♀)." —J. W. TUTT, Westcombe Hill, S.E.

ERRATUM.—Page 36, lines 3 and 4 from top of page, for *Dianthœcia capsincola*, read *Fidonia conspicuata*.

NOTES ON COLLECTING, Etc.

PACHETRA LEUCOPHŒA BRED, WITH DESCRIPTION OF LARVA AND PUPA. —As I have recently had the pleasure of rearing this moth—a pleasure emphasised by various unsatisfactory failures with other species—a note thereon may be interesting. I received at the end of June, 1890, ten larvæ which had just passed their first moult. They were the product of Kentish eggs, and I was indebted for them to the kindness of Mr. W. R. Jeffrey. I fed them throughout on *Poa annua ;* they soon fed up and passed their second moult, and on July 18th had all completed the third change. On July 23rd two had already moulted a fourth time, and thereafter they did not keep together. They all progressed very slowly after this date, one larva moulting later than the others, appeared to reach the last skin on fourth moult about August 22nd. The others moulted (fifth moult) into last skin during September. From this date they progressed still more slowly, but seemed full-fed at end of October. They still, however, often ate a little. During this period five of them died (sickening, ceasing to eat, and shrinking till they died). They were kept in a cold room, but did not experience any freezing temperature. On January 25th, on the frost giving, the five that were still alive and eating occasionally were brought into a warm room, when three at once spun up on January 29th, 30th and 31st ; a fourth spun on February 10th, having fed a good deal in the interval ; the fifth continued eating, but did not look robust ; it

finally, however, spun, but died without changing. The first moth emerged March 2nd (♀), the second March 4th (♀), and the others (♂ and ♀) a few days later. The treatment by which this fairly successful result was attained was quite artificial. The larvæ were throughout kept indoors in glass jars and fed on *Poa annua*, which was changed every second day until the larvæ became sluggish in December and January, when it lasted about a week; but throughout, the larvæ were regularly disturbed, and not allowed to rest for hybernation or otherwise. When they reached the fourth skin each larva had a separate glass, small, less than three inches high and two in diameter, covered by a glass plate; this kept the food fresh, whilst undue moisture was prevented by half an inch of clean dry sawdust at the bottom, changed with the food, and a sheet of blotting-paper under the glass cover, this also dried at each change of food. The larvæ usually hid themselves in the sawdust during the day, they often made therein a smooth cocoon-like cavity, but without using any silk. I find that I rarely fail to rear anything to which I pay sufficient attention and individualise each larva in this manner. Dampness, stale food, and crowding are the great enemies of success in rearing larvæ in captivity, and they all result from trying to do more than the time and attention available justify. The full-grown larva has at first blush a very Agrotid appearance. It varies from a nearly uniform nankeen-yellow with markings only indicated, to a handsome larva with distinct black stripes. There is a pale dorsal line, quite narrow; thence to the spiracles (which are black) is divided into three longitudinal stripes, a dark dorsal one, a dark (but less dark) lower one, and a pale intermediate one. In all these the ground colour is the same nankeen-yellow, and the darker areas depend on the greater or less darkness (and abundance?) of fine black mottlings, generally in fine wavy streaks running more or less longitudinally. The dorsal dark band is darker on each of its margins, and each margin is darker towards the incisions; the pale band is somewhat darker centrally, whilst the lower band again is darker marginally and towards the incisions, but only to a degree that requires looking for, instead of being obvious as in the dorsal dark band. The spiracular region is paler, almost amounting to a pale spiracular stripe, and the lower surface is nankeen-yellow, with a slight fuscous tendency. The second segment is of a more uniform tint, and the pale dorsal line extends distinctly through it and on to the head, which is rather brown than yellow, mottled in a honeycombed pattern, there is also some black marking about labrum and jaws. In some lights the whole larva has a pearly lustre, or perhaps a bloom like that on a plum, would best express the effect. Each segment is divided into four (or five) subsegments by transverse incisions. The ordinary tubercles are marked by very fine, nearly transparent, brown bristles, of which there are also some on the head. The segments taper slightly towards the head, more rapidly (in two or three segments) towards the anal extremity. The cocoon (made in sawdust, only just under the surface, so that naturally I imagine it gets under a dead leaf or piece of wood and does not bury itself in the soil) is made with sufficient silk to give it a firm and coherent structure. The chrysalis has much the colour, size, and general outline of that of *Acronycta aceris*, but of course very different except as to broad effect. The smallest pupa was 20 mm. long by 7 mm. wide, in front of 5th

segment rather narrower (6 mm.), tapering from the 8th segment, but only slightly till the 11th, arched dorsally, straighter anteriorly, of a rich red brown colour, very active when disturbed, with a strength and energy suggesting great robustness. The surface is smooth and polished, but over the whole dorsum of the thorax, the wing-cases, etc., very fine impressed furrows divide the surface into parallel convolutions. The fixed abdominal segments (segments 5–8) have similar furrows more transverse in direction, most decided on 5th, least so on 8th; on these and less so on 9, 10 and 11, are dorsal and subdorsal hollows, just as though dented in by violence; these occur in many pupæ and are difficult to understand. The 5th and following abdominal segments have some fine punctures, which are more marked and numerous towards the anterior margin of each segment, especially are they so on the 9th, 10th and 11th segments. On these segments, there is a tendency to an angular prominence along their anterior margins. Spiracles very obvious on 6, 7, 8, 9, 10 and 11. Ventrally the wing-cases meet and cover the 3rd tarsi; the 2nd tarsi, antennæ, and proboscis reaching just short of this. There are the two antennæ-basal hairs on either side, very slender, brown, also one at the angle of 2nd segment against the wing base and antenna. Each abdominal segment also affords a trapezoidal, supra-spiracular and post-spiracular hair: these are very fine and rather difficult to detect. The anal armature is placed quite at the dorsal margin of 14th segment, and consists of a wrinkled black projection 1.4 mm. broad, 0.6 thick, and 1.0 mm. long, rounded at the end, and terminating in two spines, close together and nearly parallel, with a graceful regular curvature, downwards (ventrally) about 0.7 mm. long; half-way between the armature and the anterior margin of the segment, there is on the dorsum a transverse hollow or depression arched backwards and terminating laterally at the base of the armature. I may add that I failed to obtain eggs, the moths refusing to pair, in spite of the several inducements I held out to them.—T. A. Chapman, Firbank, Hereford.

Early Spring Notes.—*Kingstown.*—On the three worst days of storm and stress (by the papers) I was digging for pupæ, and at night, taking larvæ (now full fed) of *Stilbia anomala*, *Epunda lichenea*, a few *Agrotis lucernea* (probably) and any amount of *Noctua xanthographa* together with a few *Triphæna orbona*, *Gnophos obscurata* and *Satyrus semele*. The east wind was very keen at night, and, in the north, we had a slight fall of snow and severe frosts. But though cold, *Larentia multistrigaria* was on flight and has been since February 12th, which seems to me a very early date. *Endromis versicolor* also emerged about February 18th and on for a week, though out in the open, aspect east.—W. F. de V. Kane, Sloperton Lodge, Kingstown, Ireland. *March 14th*, 1891.

Aberdeen.—Mr. Reid and I went out to the moors on Saturday night with the intention of trying the sallows, but we were at least a week too early and found the trees were not in working order; on the way out we picked up a few pupæ of *Viminia* (*Acronycta*) *myricæ*, *Arctia fuliginosa* and *Saturnia carpini*.—A. Horne. *April 13th*, 1891.

Bristol.—In company with my friend, Mr. Prideaux, I have paid two or three visits to the sallows, and though the usual species may not be quite so abundant as in some seasons, we have seen fairly good

numbers. *Brephos parthenias* also has been abundant on sunny days in Leigh Woods, but my opportunities for day collecting being limited, I have only so far secured a very few specimens.—G. C. GRIFFITHS. *April 16th*, 1891.

Weymouth.—Twice this season I have been out "sallowing," I have found insects fairly plentiful, but nothing actually worth taking. *Tæniocampa cruda*, *T. stabilis* and *T. gothica*, the latter in abundance, and a few *T. instabilis*. As we have had a very severe winter, other species may be a few days or weeks later.—A. FORSYTH. *April 6th*, 1891.

Chinnor.—Sallows are very late this year. I beat nine *Tæniocampa populeti* last evening from one sallow bush growing under a row of six aspen poplars.—A. J. SPILLER, Chinnor, Oxon. *April 17th*, 1891.

Clevedon.—Sallows are almost over. Insects have been tolerably abundant at the catkins on the few favourable evenings we have had, but I have taken nothing special.—J. MASON, Clevedon, Court Lodge, Somerset. *April 17th*, 1891.

Carlisle.—On Good Friday, I set out for Carlisle, prospecting new ground for the summer; I went first to Armthwaite on the Eden and into Barrow Wood. Mr. Eales and I searched the mosses on the walls for *Eudorea* larvæ and *Gelechia confinis*, and among the lichens for *Xysmatodoma argentimaculella*. After a walk of four hours and much searching we returned discouraged and thoroughly done up. About the middle of April I started for Kingmoor, and in a sheltered place discovered *Micropteryx* in great numbers; I shook a dozen into my umbrella at once, and, although having a hundred boxes, had to put eight or ten into one large box. They are such a size and in splendid condition. They vary much, many I think are *purpurella*, a species I am little acquainted with. On April 22nd, Mr. Eales, my nephew and I went to Corby to search the *Luzula* for *Elachista* larvæ. In two hours we found about a dozen, which I believe to be *trapeziella*, and were much discouraged, thinking we were too early for *magnificella*, when I noticed a *Luzula* leaf puckered together, and my friends also brought some for investigation. On one small spot about five yards in length we got them in profusion. No blade was without a larva, some contained two and even three. My large canister was soon full and my coat pockets filled with roots and soil. What turns up in breeding will tell what we have. I brought the whole away and they are doing well.—J. B. HODGKINSON, Ashton-on-Ribble. *May 1st*, 1891.

Wicklow and Exmouth.—I had 3 days at sallows in Wicklow 3 weeks since, and one night in Exmouth, Devon. Insects were scarce, especially in Devon. I took a few [*Xylocampa lithoriza*, *Xylina rhizolitha*, *Tæniocampa munda*, one *T. opima*, one *X. petrificata* (Exmouth); and two *Hybernia progemmaria* on the 20th April (rather late for this insect in South Devon I think), as well as common *Tæniocampas*. I also found at rest in the day time two *Cidaria miata*, the ♀ of which laid a batch of ova. These hatched out on April 30th, but the larvæ would not feed on the young birch leaves I supplied and all died! Will some one explain? I think I have taken the larvæ when half-grown on birch. There is no alder here or I should have tried that. I put one larva on lime, but fear it is dead also. My experience was equally unfortunate with *Catocala fraxini* (foreign) ova. The larvæ would not feed on the young balsam-poplar leaves, sallow nor

willow. The Lombardy poplar is only in bud still. I should be glad of any suggestions.—W. F. de V. Kane, Sloperton Lodge, Kingstown, Ireland. *May*, 1891. [See *Ent. Record*, vol. i., pp. 185 and 260.—Ed.]

Ruthin, N. Wales.—Weather very cold here, though I suppose some of the early species must be out. I visited the *Agrotis ashworthii* locality on March 26th, but all appearances point to a much later season than last. Larvæ of *A. ashworthii*, *A. lucernea* and *Gnophos obscurata* ought to have been found, but apparently they have not yet left their winter retreats for I did not see one. Coming home over More Famman, at a height of nearly 1000 feet, I found a *Larentia multistrigaria*, clinging to the stones in the middle of the road, and almost blown away by the gale.—J. E. R. Allen. *March 28th*, 1891.

Darlington.—We are having very stormy weather, in fact there is no staying out of doors at all, I should say some of the hybernating larvæ must have suffered, as they were beginning to show up in February, which was a very fine month here, and I thought I was going to get an early start, but shall now be later than usual.—Wm. Milburn. *April 4th*, 1891.

Elgin.—In the North of Scotland, March and the early part of April have been very stormy with strong east winds and hard frost at night, now we are getting bright sunshine, but the frost continues, and in consequence everything is very late. I have been working the sallows in the neighbourhood of Forres and Elgin; *Tæniocampa gothica*, *stabilis*, *instabilis* and several other species were fairly common, but generally much worn. I expect the sallows in Morayshire will be a total failure this year owing to the frost having spoiled the catkins. *Retinia resinana* is widely distributed in Morayshire, and often abundant. Mr. Abel, of Elgin, kindly pointed out a locality for it within a few miles of that town, where it is distributed over a wide area, and is not rare. I have also found it in nearly every plantation of young Scotch firs which I have visited. The insect is in the pupal stage just now. Micros are not scarce.—Wm. Reid. *April 22nd*, 1891.

Newbury.—The wonderful change in the weather (to sudden and extreme heat) is bringing out numbers of insects in my forcing-house. *Eupithecia pulchellata* comes out every day by threes and fours, and at present only one has been anything but perfect. *Macroglossa fuciformis*, *Scotosia undulata*, *Smerinthus ocellatus* and *Euplexia lucipara* have also emerged this week, and I have taken a few common insects in the moth-trap, and one *Cidaria silaceata* on May 4th, which seems early.—M. Kimber. *May 14th*, 1891.

Cucullia scrophulariæ as a British Insect.—This species is undoubtedly British, although I notice that Mr. Dale doubts its being so. I am afraid that doubt is often thrown on our rare species being indigenous, because the writer has been collecting many years and has not happened to find the species. *C. scrophulariæ* has been erroneously recorded dozens of times, without doubt, by those who have found *C. verbasci* feeding on *Scrophularia*, but the larva of *C. scrophulariæ* is very different. Its usual food appears to be *S. nodosa* and not *S. aquatica*, although *C. verbasci* feeds on both these plants. In 1889, whilst collecting in Kent, I picked up six strange larvæ not at all like *verbasci*, being much stumpier and less strongly marked, near a well eaten plant of *S. nodosa*. These pupated at once and whilst three

emerged last year, one has just appeared. The imagines are not at all like *C. verbasci* but they are very much like *C. lychnitis*, although perhaps rather larger and more coarsely scaled, but still it would be difficult to distinguish them in the imago state. The three species are well distributed and definitely distinguished on the Continent (principally in the larval stage), where *scrophulariæ* appears to be the commonest. Dr. Staudinger gives the following as their distribution :—" *C. verbasci*, Central and Southern Europe, Southern Sweden, Livonia, Asia Minor, and Armenia." " *C. scrophulariæ*, Central Europe, Southern Sweden, Livonia, Piedmont, Corsica, North part of the Balkan District, and Southern Russia." " *C. lychnitis*, Germany, France, South England, Corsica, Southern and Western Russia." By this it will be seen that *verbasci* and *scrophulariæ* each spread equally north, but that *scrophulariæ* has a more southern range, whilst *lychnitis* is far more restricted and more decidedly a southern species. Britain therefore comes well into the area of distribution of both the former species. I find on reference to the *Entomologist*, vol. ix., pp. 259–260, that Mr. Harwood quotes from a letter of the late Mr. H. Doubleday as follows :—" *Cucullia verbasci* and *C. scrophulariæ* are as distinct as any two species of the genus ; but I believe that few English entomologists are acquainted with the latter species, which appears to be very scarce in this country at the present time. The Rev. A. H. Wratislaw, of Bury St. Edmunds, found a brood of larvæ three years since, but he has not met with them again. M. Constant says it is sometimes abundant in autumn and then disappears for several years. I sent three or four larvæ to Mr. Buckler, and bred a few moths myself. The larva is quite different from that of *C. verbasci*, being shorter and with fewer markings. The moths appear the middle or end of May, a month or six weeks later than *C. verbasci*. I send for your acceptance a pair that M. Constant gave me. You will see that this species is more like *C. lychnitis* than *C. verbasci*. The larva of *C. verbasci* often feeds upon *Scrophularia aquatica*, but I believe *scrophulariæ* only feeds upon *S. nodosa* which always grows in dry places." I presume this refererence, by a lepidopterist who undoubtedly knew both species thoroughly, has been overlooked by Mr. Dale, or he would not have suggested that the species was "an entomological myth," although the Rev. O. P. Cambridge is of opinion that " his Bloxworth examples may not be any more than *C. verbasci*," in fact, if they are very like *verbasci* they probably are that species. I suppose there are some true *scrophulariæ* in various collections but all I have ever had sent me have turned out to be *verbasci*. I have never formed an opinion on Haworth's *scrophulariæ*, but it may be *lychnitis*, although that seems in no way to affect the former as a British species. In the Rev. E. N. Bloomfield's *Lepidoptera of Suffolk*, p. 23, we read :— " Larvæ of this rare species were taken by Mr. E. Skepper, and the Rev. A. H. Wratislaw. Some of these were sent to Mr. Doubleday, and were described and figured by Mr. Buckler." It is also recorded on the same page from Lakenheath, Barton Mills and Higham in Suffolk, by Messrs. T. and J. Brown.—J. W. Tutt. *May*, 1891.

Flowers attractive to Moths.—I beg to supplement Mr. Russ' " list of border plants and shrubs which are attractive to moths " (*Record*, vol. i., p. 340) with the following :—Border Flowers. Golden rod (*Solidago canadensis*) ; torch flower (*Tritoma uvaria* and vars.), this

flower is very attractive; bedding geraniums, I find *Sphinx convolvuli* partial to the rose-coloured varieties; *Salvia pratensis*, moths are particularly fond of this plant; the different vars. of garden iris attract *Chærocampa elpenor* occasionally. SHRUBS. *Lauristinus*, the flowers of this attract the sallow moths after that tree is over, so do the flowers of the common laurel, but I do not remember seeing any at the Portugal variety; lavender, this sub-shrub is one of the greatest attractions to moths in this locality, they literally swarm at it (it is a curious fact that whilst the humble bee is continually feasting at its flowers, one never finds the hive bee attracted by it; tastes differ I presume); *Althea frutex* and vars., I have taken *S. convolvuli* at the flowers of this shrub on several occasions, also at flowers of rhododendrons and weigeleas.

Looking over some old memoranda the other day, I came across the following list of insects taken at the flowers of lavender by myself, during the season of 1886; which, I trust, may interest some of the readers of the *Entomologist's Record*, as showing how very attractive this bloom is to insects. *Pieris brassicæ, P. rapæ, P. napi, Gonepteryx rhamni, Vanessa urticæ, V. atalanta, Cynthia cardui, Pararge egeria, Lycæna alexis, Epinephele janira, E. tithonus, Cœnonympha pamphilus, Polyommatus phlœas; Macroglossa stellatarum, Calligenia miniata, Lithosia complanula, L. griseola* and var. *stramineola, Viminia rumicis, Leucania conigera, L. lithargyria, L. impura, L. pallens, L. comma, Xylophasia polyodon, Mamestra brassicæ, Miana strigilis, Apamea oculea, Caradrina alsines, C. cubicularis, Agrotis exclamationis, A. tritici, A. corticea, Triphœna janthina, T. interjecta, T. orbona, T. pronuba, Noctua plecta, Phlogophora meticulosa, Euplexia lucipara, Hadena oleracea, Habrostola urticæ, H. triplasia, Plusia chrysitis, P. iota, P. gamma, P. pulchrina, Uropteryx sambucata, Epione apiciaria, Rumia cratægata, Metrocampa margaritaria, Boarmia repandata, B. rhomboidaria, Gnophos obscurata, Geometra vernaria, Hemithea thymiaria, Ephyra trilinearia, Acidalia scutulata, A. bisetata, A. incanaria, A. aversata, A. imitaria, Timandra amataria, Thera obeliscata, Melanthia ocellata, Melanippe montanata, M. rivata, M. fluctuata, Coremia ferrugata, C. unidentaria, Camptogramma bilineata, Triphosa dubitata, Cidaria russata, C. immanata, Eubolia bipunctaria, Anaitis plagiata, Hypena proboscidalis, Zanclognatha griscalis* and *Rivula sericealis*. The row or hedge of lavender at which all these insects were taken, is about 40 yards long, and is close to the outskirts of a large plantation, which no doubt, to a great extent, accounts for the number of species taken.—J. MASON, Clevedon Court Lodge, Somerset.

HYBERNATING LARVÆ.—The cold season seems to have suited hybernating larvæ. Very nearly all mine have come through, *i.e.*, *Geometra papilionaria, Bombyx quercus* (which I was cherishing with much care, thinking they were *Trichiura cratægi*, they are a very striking larva when small), *Lasiocampa quercifolia, Boarmia repandata*, some very minute clematis feeder and two *Apatura iris*. The two latter are still dormant, but look plump and well. One has spun on the stem of the sallow and the other to the midrib of a dead leaf. I hope they will eventually come to life. At present they are covered, as far as I can see, with a thin film of silk. I suppose sleeving out on fresh sallow, as soon as they rouse themselves, is the best course to pursue.

One spun his silly self to the gauze of the bag in which I had sleeved them for the winter, a course of action which I knew to be dangerous and meant to prevent, but he did it in the night, and an earwig was up earlier than I, and ate him or sucked him through the gauze. I expect one reason why larvæ sleeved out for the winter have done so well is that the frost kept off the earwigs and woodlice, who burrow into anything and have the most marvellous trick of finding out where one's sleeves are. I always inspect mine every morning through the autumn. I expect one ought to doctor the stem of the branch below to keep these visitors off.—G. M. A. Hewett. *March 26th*, 1891.

Noctua sobrina.—I begin to take the larvæ about the end of April, they are very small at that time. I do not know whether the larvæ hybernate or if the ova lie over all the winter. I am inclined to think it is the latter (I may be wrong), because, had they hybernated, the larvæ must, I think, have been much larger. Last year, about the end of April, I began to sweep for them, when I took some that seemed newly hatched, while a few others were in their first moult. I swept once or twice every week from that time until about the first week in June, when they begin to get rather scarce, but the last night I went out, Saturday, June 7th, I took four larvæ full fed. Last season, I took in all about six or seven dozen larvæ, and out of those barely a score of imagines emerged, the rest were stung. The first emerged in the last week of July, the last in the second week of August. The ichneumon did not emerge at the same time but much later. The larvæ feed on bilberry only, at least that is the foodplant here, although heath and various grasses are growing amongst it.—J. Wylie, 12, Union Street Lane, Bridgend, Perth. *February 20th*, 1891.

A good many years ago, when *N. sobrina* was not so common as it is now, I investigated its life-history to a certain extent, and what I know about it is as follows:—The eggs laid in August, hatch the same season, and the larvæ hybernate small, feeding up in the spring. The larva is very similar (speaking from memory) to *N. brunnea*, *N. ditrapezium* and their congeners, but, if I recollect rightly, duller and greyer. Its proper food I believe to be *Vaccinium*, but I daresay it is not very particular. It was common enough in the Black Wood at Rannoch. It feeds at night. —C. Fenn, Lee. *January*, 1891.

Uncertain appearance of certain Lepidoptera.—Mr. Reid (vol. i., p. 341) mentions the disappearance of *Epunda lutulenta* from his neighbourhood about 1875 or 1876. Singularly enough we lost this moth here about the same time. In 1875 it was plentiful here, and for years before —in fact it was a species of which we always depended on getting enough. In 1876 not one was to be found, and, although the place was tried every year, I never saw a specimen there again till 1889, when two appeared at the old spot. In 1890 their numbers had increased, and now I hope we may have them with us again for a time. In 1871, and before that, *Epunda viminalis* was a common thing in a wood near me. In 1872 they were absent, and I never got another at the place till 1888, when they suddenly appeared again in abundance. I used to get plenty of *Agrotis tritici* here till 1877, when they became scarce for a time, but in 1882 and 1883 they turned out again as common as before. Since those two years, however, it is unusual to get one here. Many other species I have seen plentiful for a time, then scarce, and then become

as abundant as ever; so I think Mr. Reid may hope to see *Epunda nigra* and *E. lutulenta* common again at Pitcaple. By the way, whatever may be the reason for the disappearance and reappearance of so many insects—is there any truth in that old story that *Melitæa aurinia* moves its quarters systematically? A colony occurred on a large common here for years, and, when I first saw them, they were at the south-west side of the common, but each year they got further and further across it, till at last they were in the north-east corner only, and now they are gone altogether. Should I find them by looking still further to the north-east? The country does not look likely, as it is under cultivation.—W. Holland, Reading. *April 3rd*, 1891.

Life-History of Gonophora derasa.—After reading the account (*Record*, vol. i., p. 348), about the larva of *Gonophora derasa* from Mr. Geo. Elson, I thought, perhaps, he might be glad to know that for the last three or four years, in the first week in October, I have beaten the larvæ of *derasa* from *Spiræa ulmaria* (meadow-sweet). I have never seen this plant mentioned in any book as its foodplant. The larvæ always hide amongst the leaves in the day time. I have noticed the larvæ of many Noctuæ feed at night and go to the same place day after day to hide.—W. J. Cross, Ely. *April 4th*, 1891.

Killing Lepidoptera.—It has occurred to me that boxes made with perforated cardboard lids and bottoms would be at least as useful as those made with glass tops, and I should think they might be made at even a cheaper rate. I think indeed they would be more useful, because the insects in them could be killed as described by Mr. Turner in your March number (p. 344), without the trouble of tilting the lids. The boxes would of course be better laid on their sides in the tin.—R. D. Postans.

I can quite corroborate Mr. Cutts' remark (vol. i., p. 345) on the use of cyanide for killing lepidoptera. I once tried ammonia myself for a short time, but could not be satisfied with its effects on the wings of some species. I have used cyanide now for some years, and have never experienced any difficulty in setting insects killed by this agency, as I have invariably left them in the bottle for a couple of days before proceeding to pin them. After this interval of time lepidoptera are always to be found beautifully relaxed. If the insects are not kept in the bottle as long as this, they must be set within an hour of death; otherwise, I admit, the use of cyanide is most disappointing.—J. E. Tarbat, Reading. *March 24th*, 1891.

I quite agree with Mr. Turner (*Record*, vol. i., p. 344) that the easiest and best agent for killing is ·880 ammonia, but I think I have a more perfect apparatus for using it than he describes. I have a cylindrical tin made for me with a lid at both ends, and one end—the bottom—has in addition a false bottom of perforated zinc, about three-quarters of an inch up. I put the boxes of moths in first, and, having shut the lid, take off the bottom lid and pour a little ammonia on a piece of sponge and close it again without losing any of the fumes. Mr. Cutts is certainly right; it does take the colour out of some species, especially green and some rich purples and blacks, *e.g.*, *Plusia orichalcea* and *Penthina fuligana* (*carbonana*). Such species I should not think of putting into ammonia—the smaller insects, such as the

above mentioned Tortrix, I kill with tobacco smoke or chloroform and the larger ones with—what no one up to the present seems to have made much mention of, but what I consider invaluable—a solution of oxalic acid. I use it for such things as SPHINGIDÆ, most BOMBYCES, NOTODONTIDÆ, *some* large NOCTUÆ, and all colours which seem to be affected by ammonia. A steel pen with one nib broken off is a good thing to use. Dip it in the acid and introduce it well into the underside of the thorax; a steel pen, however, quickly corrodes if left in the acid, but an entomological friend made me a very good pricker of a mixture of silver and platinum, which does not corrode although constantly in the acid. It is very fine (about one-sixteenth of an inch in diameter), tubular, in order that it may take up a quantity of the acid, and finely pointed, so that a very small moth can be pricked with it. For all small species that I want to kill with oxalic acid, I find it best to put them into a cyanide bottle first, just long enough to quiet them, or chloroform them, which is perhaps just as easy; larger species will generally allow themselves to be picked out of the breeding cages and undergo the operation without an anæsthetic! If not, a drop of chloroform soon quiets them; of course the object is to get the wings back so as to hold them with the thumb and finger. Cyanide I don't like at its best. How is one to leave the moths in cyanide from thirty-six to forty-eight hours? For fifty or sixty macros you would want about twenty bottles to accommodate them, and as these are to remain in the bottles two days you will probably require another twenty bottles for the next day's captures. This seems to be rather an undertaking, especially if you are away from home; and we may put a good deal of bad setting down to the use of the cyanide bottle, particularly among the micros. Compared with the above, how easy is the use of ammonia; you come home after a hard day's collecting, and after taking out the very few specimens you do not care to trust in ammonia, turn out your boxes into the killing tin, perhaps a hundred or more micros among them (which I should hardly care to imagine in cyanide bottles), and the next morning—all beautifully ready to set. I may add that if Mr. Turner made a small hole in the lids of his boxes with a thick needle, red hot, it would save him the trouble of tilting the lids when putting them into the ammonia. This refers to glass bottomed boxes; chip boxes do not need it as the ammonia fumes will penetrate them. The size of my killing tin may be a hint to some, it is about fourteen or fifteen inches high, by about five in diameter.—WM. FARREN, Union Road, Cambridge.

THE FAUNA OF SOUTH LONDON.—Following up the suggestion of Mr. H. J. Turner, in the *Record* for last month, that other entomologists should record their observations as a contribution towards the fauna of our suburban districts, I have looked up the notes of my captures in Forest Hill and Sydenham, the district of which may be taken as a continuation of Brockley, and thus extending the distance from Charing Cross to about $6\frac{1}{2}$ miles. I find I have taken most of the insects noted by Mr. Turner, together with many others not noted by him. My observations extend over a period of six years (1885–1890). I have not, however, worked the district with a view of ascertaining what it will yield, as my time has been too limited for that; my work has been principally at fences, and occasionally at the lamps. I

believe, if well worked, there are many other species beyond those I have met with yet to be taken in the district. From the number of different species I have casually taken, *viz.*, 317, including micros, I have no doubt that Forest Hill must have been at no distant past date a very capital entomological hunting ground; but, unfortunately, like most of our suburban districts, the builders, by their operations, have destroyed many of the foodplants of the larvæ, and so driven the insects further afield. I propose leaving the micros to be dealt with in the next month's *Record*, and to confine my present notes to those species of macros taken by me and not referred to by Mr. Turner in his list, *viz.*, *Sesia myopæformis*, one at rest on a fence, June 29th, 1885; *Cilix glaucata*, two at rest on a hedge; *Lophopteryx camelina*, one at rest, July 19th, 1887; *Cymatophora fluctuosa*, one on a fence, June 3rd, 1886; *Acronycta* (*Cuspidia*) *tridens*,[1] common on fences; *Hydræcia micacea*, one on a gas lamp; *Dipterygia scabriuscula*, several in various parts of the district on fences; *Apamea basilinea*, two at rest on fences; *Miana fasciuncula*, one on a fence on June 24th, 1886; *M. arcuosa*, two in June, 1885; *Grammesia trigrammica*, one specimen flying over a hedge, June 8th, 1886; *Caradrina morpheus*, common; *Triphæna ianthina*, one only, indoors at light; *Tæniocampa incerta*, one at light; *Anchocelis pistacina*, one on a gas lamp; *Hadena pisi*, one at rest indoors! *Cucullia chamomillæ*, one at rest on a railing on May 18th, 1886; *C. umbratica*, one on an oak fence, July 15th, 1885; *Erastria fasciana*, one on July 24th, 1886; *Habrostola triplasia*, one flying in a garden on June 30th, 1886; *Gonoptera libatrix*, two flying over a hedge; *Mania maura*, common; *Zanclognatha grisealis* and *tarsipennalis*, one of each on the wing; *Hypena rostralis*, one indoors and one on a fence; *Selenia bilunaria*, fairly common; *S. lunaria*, one on the wing on June 1st, 1886; *Odontopera bidentata*, one on a fence; *Himera pennaria*, one on a gas lamp on November 20th, 1886; *Amphidasys strataria*, several on fences in April, 1886, but not common; *A. betularia*, one only on June 2nd, 1886; *Tephrosia biundularia*, one specimen only; *Iodis lactearia*, one on the wing on July 1st, 1886; *Phorodesma pustulata*, one beaten from a hedge in June, 1888; *Hemithea strigata*, one on a fence at Honor Oak; *Asthena candidata*, two on the wing close to Dulwich Wood; *Acidalia dimidiata*, *trigeminata* and *dilutaria*, one of each on flight on July 3rd, 1885; *Acidalia aversata*, common on fences; *Timandra amataria*, two on the wing on July 1st, 1886; *Cabera pusaria*, two only at rest on fences; *Lomaspilis marginata*, one at rest on June 22nd, 1889; *Eupithecia isogrammata*, two only at rest on fences; *E. indigata*, one at light on July 3rd, 1885, and one on a fence July 13th, 1888; *E. exiguata*, fairly common; *E. sobrinata*, four specimens at different dates on fences; *E. pumilata*, three on fences in July, 1888; *Thera variata*, two at rest in June, 1886; *Melanthia ocellata*, one specimen on the wing on May 18th, 1886; *Melanippe sociata*, common on fences near Dulwich Wood; *Anticlea badiata*, common on hedges in May; *Coremia unidentaria*, several specimens at different times on fences; *Eucosmia certata*, one at rest on May 8th, 1887; *Cidaria truncata*, one specimen at rest on June 8th, 1886; *C. associata*, common everywhere; *Aglossa pinguinalis*, three specimens indoors; *Scoparia basistrigalis*,[1] one on a fence on June 30th, 1888; *S. zelleri*, one on May 4th, 888;

[1] These are remarkable as London insects.—Ed.

S. mercurella and *cratægella*, common on fences; *Nomophila noctuella* and *Pyrausta purpuralis*, two specimens of each on the railway embankment; *Scopula prunalis*, one; *Paraponyx stratiotata*, one on June 22nd, 1885; *Crambus pascuellus*, *uliginosellus*[1] and *furcatellus*,[1] one of each on fences in 1888; *C. tristellus*, two at rest; *Ephestia elutella*, fairly common on a fence near Dulwich Wood; *Rodophæa marmorea*, one on August 5th, 1887. I hope other entomologists will follow up these notes with their observations, so that we may have ere long a complete record of the fauna of South London.—W. D. Cansdale, London Road, Forest Hill, S.E. *March*, 1891.

Times of Emergence.—I trust Miss Kimber will forgive me if I say that in my experience in breeding lepidoptera, extending over 30 years, I have found, generally speaking, no exact data of the kind she mentions (vol. i.p.342). Species, according to my observation, emerge from the pupa with some connection to the habits of the imago. Day fliers are excluded in the early hours, but the majority of insects which fly at dusk or at night have really no time specially at which they emerge. I am now breeding *Tæniocampa instabilis*. It is a fair type of the genus of which I have bred every one but *leucographa*. They all emerge from 7.30 a.m. to 11 p.m.—a wide range. The same may be said of most Noctuæ. The butterflies emerge in the day-time; so do the day-flying Sphingidæ, and many Tortrices and Bombyces, but I am sure it is the exception and not the rule for a species to have any special time for emergence. Of the insects Miss Kimber mentions, I have bred *Notodonta trimacula* as late as 10 p.m., *Drepana lacertula* from 9 a.m. to 5 p.m., *Arctia mendica* from 8 a.m. to 11 p.m.; *Chesias spartiata* at every time of day, and also *Agriopis aprilina*, *Eupithecia sobrinata*, and *Nola cucullatella*. The position or aspect of the receptacle of the pupæ is the determining influence, as a fall of temperature will stay the emergence of any species. What I have particularly remarked is the effect of the prevailing wind on the emergence of bred insects. Over and over again in breeding insects in large numbers, I have found that the moment the wind went round to the east the emergence stopped, and was only resumed when a change occurred, or the temperature rose on the eve of such an event, which is often the case.—C. Fenn. *March 2nd*, 1891.

With reference to times of emergence, I bred last year several hundreds of butterflies varying in size from *Polyommatus amphidamas* to *Papilio alexanor*, and I noticed that they all emerged before 11 a.m., the greatest bulk of them appeared between 9 and 10 a.m. I also bred a large number of moths of many species, but they emerged at all sorts of times, except the day-fliers which appeared to follow the butterfly rule.—T. Maddison. *March 7th*, 1891.

As Mr. Fenn says, day fliers must generally emerge in the morning, and Mr. Maddison's butterflies amply seem to bear this out. My brother used to take *Sesia bembeciformis* between 7 and 8 a.m., sitting on the poplars just after they had emerged; and I have myself done so, and have taken *S. apiformis* in the same manner. It is, I fancy, the best method of obtaining these insects. They (*S. bembeciformis*) never come out after 8 a.m. My brother took a large series of these, but I have only taken a few *S. apiformis*, and so cannot speak with certainty

[1] These are remarkable as London insects.—Ed.

as to it. *S. sphegiformis* emerges in the early morning in a similar manner, and it depends on whether the morning is bright and sunny or the reverse how early they come out. I have not the exact times, but I know that on sunny mornings I used to be up about 8 o'clock looking after them, as they are fidgety insects after they have dried their wings. They used to prefer the sunny mornings for emergence, and I used to expose them to the morning sun. On dull mornings they came out, if at all, much later, about 8 a.m. or so, and I remember one came out about 10 a.m. It was interesting to watch the whole performance; the beak of the pupa case first breaking the bark over its hole, then the pupa forcing its way out to three parts of its length, after which the pupa case would burst and "*sphegiformis*" would emerge. Sometimes when their wings were dry, and they saw me, they took fright and went from the top of the cage to the bottom like a flash of lightning, so that I could not see where they had gone, and had to look about at the bottom to see where they were.—A. Robinson. *March 11th*, 1891.

I would just remark that in breeding *Epione vespertaria* last year, the time of emergence was about sunrise, but I also found that a small proportion made their appearance about sunset, which led me to believe that light had something to do with it, and further explained why we generally meet a small number after dark when collecting other insects on the same ground, which no doubt are those which emerge at sunset. The principal time of flight is from 6 to 9 a.m. I might further remark that some mornings mostly males emerged, and the following morning nearly all females. Of course in its native habitat we rarely come across the latter, but a goodly number of the former, but in the breeding cage I could find out no reason for this singular phenomenon.—R. Dutton, Castle Mills Bridge, York. *March 19th*, 1891.

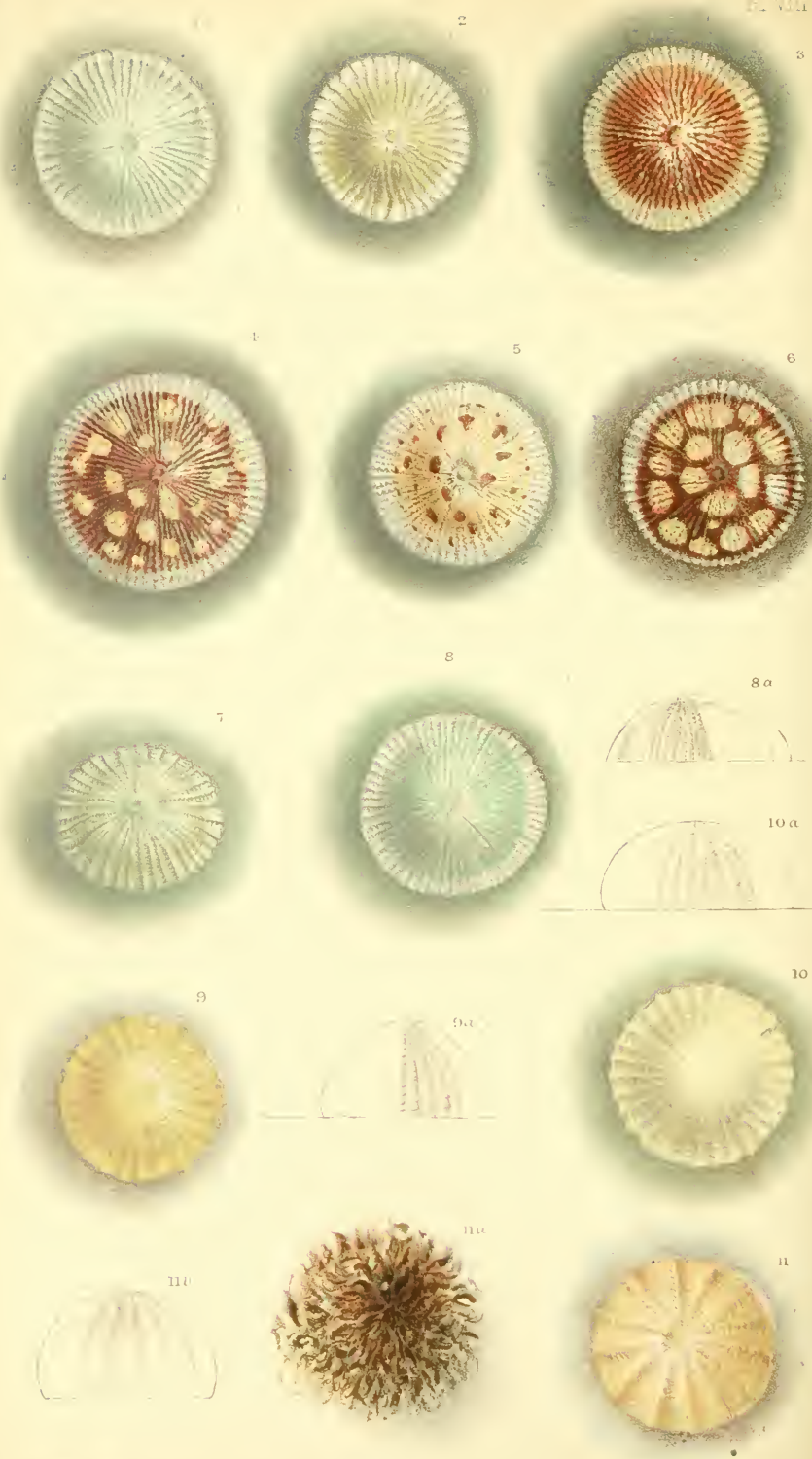
SOCIETIES.

Entomological Society of London.—*May* 6.—Dr. D. Sharp exhibited a number of eggs of *Dytiscus marginalis* laid on the sheath of a species of reed, and commented on the manner of their oviposition, which he said had been fully described by Dr. Régimbart. The Rev. A. E. Eaton exhibited a collection of *Psychodidæ* from Somersetshire, including six species of *Psychoda*, eleven species of *Periconia*, and one species of *Ulomyia*. Mr. M'Lachlan commented on the interesting nature of the exhibition. Mr. P. Cowley exhibited a specimen of *Prothoë caledonia*, a very handsome butterfly from Perak; and a specimen of another equally handsome species of the same genus from Tonghou, Burmah, which was said to be undescribed. The Secretary read a letter from Mr. Merrifield, pointing out that the statement made by Mr. Fenn, at the meeting of the Society on the 1st of April last, of his views on the effects of temperature in causing variation in lepidoptera, was incorrect; he (Mr. Merrifield) had never suggested what might happen to *Tæniocampa instabilis*, and had expressly stated that he had found a reduction of the temperature below 57° to produce no effect, whereas in Mr. Fenn's experiments the temperature must have been below 40°. The Secretary also read a letter which Lord Walsingham had received from Sir Arthur Blackwood, the Secretary of the Post Office, in answer to

the memorial which, on behalf of the Society, had been submitted to the Postmaster-General, asking that small parcels containing scientific specimens might be sent to places abroad at the reduced rate of postage applicable to packets of *bonâ fide* trade patterns and samples. The letter intimated that, so far as the English Post Office was concerned, scientific specimens sent by sample post to places abroad would not be stopped in future.—H. Goss, *Hon. Secretary*.

South London Entomological Society.—*May 14th*, 1891.—Mr. Jäger exhibited living larvæ of *Callimorpha hera* from ova laid by a female captured in Devon. Mr. Frohawk, a variety of *Euchlöe cardamines* ♀. Mr. W. H. Tugwell, a series of bred *Lobophora viretata*, and on behalf of Mr. J. E. Robson, a most interesting box of insects, containing amongst others a suffused variety of *Abraxas ulmata*, a variety of the same species resembling *A. pantaria* in the absence of the spots a hybrid *Smerinthus ocellatus-populi*, a remarkable underside of *Vanessa atalanta*, fine varieties of *Lycæna alexis*, *Vanessa urticæ* and many others; whilst on behalf of Mr. Collins of Warrington, the black var. of *Aplecta nebulosa* (*Ent. Rec.*, i., p. 241), and *Leucania lithargyria* var. *marginata* (*Ent. Rec.*, i., p. 242) were exhibited. Mr. Fenn exhibited a strange moorland form of a *Tortrix* which Mr. C. G. Barrett referred to *T. costana*. Mr. Adkin exhibited a fine series of varieties of *Noctua festiva*, from Forres, N. Wales, Kent, etc., some of the bright red forms being particularly striking. Mr. Carrington considered that certain specimens of the so-called var. *conflua* sat on the sugar differently to typical *festiva*, and that there might be an undetected species among them. Mr. Merrifield's remarks on the effect of temperature on the coloration of *Selenia illustraria* and *Ennomos autumnaria*, as published in the *Trans. Ent. Soc. Lond.*, were read, Mr. C. G. Barrett making some comments thereon. Mr. Tutt then gave a short lecture on "Reproduction and Parthenogenesis." He explained first of all the methods of asexual reproduction by fission, gemmation and encystation in monads, the *Amœba*, and *Vorticella*; showed how both asexual and sexual reproduction occurred in *Hydra*, the former by gemmation and by artificial subdivision, the latter by the development of spermatozoa and ova. The reproduction of the common earthworm was considered, its hermaphroditism and method of copulation explained, showing how by the arrangement of the spermathecæ and male genital pores common fertilisation was effected. The sexual reproduction of the cockroach was then considered, and lastly, that of insects generally.

Referring to the asexual reproduction due to gemmation, the well-known parthenogenetic reproduction in *Aphis* was compared with that in *Hydra*, and the daughter-cells, produced all the summer in the former, were looked upon as a specialised form of gemmation, whilst the normal sexual reproduction appeared similar in both cases, excepting that *Hydra* was hermaphrodite, whilst *Aphis* had distinct sexes. Parthenogenesis and its influence on the sexes of bees was then mentioned, and the probability of parthenogenesis occurring in insects was discussed, with references to cases which seem beyond dispute. A discussion followed in which Messrs. Tugwell, C. G. Barrett and J. T. Carrington took part.—Ed.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The Entomologist's Record AND JOURNAL OF VARIATION.

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THE GENUS ACRONYCTA AND ITS ALLIES.

By Dr. T. A. CHAPMAN, F.E.S.

(*Continued from page* 31.)

ACRONYCTA (*Cuspidia*) *psi.*—*Psi* is in many respects so like *tridens* that having fully described those aspects of that species to which I have paid most attention, *psi* may be most conveniently treated by noting the points of distinction between them, rather than by going into a fully detailed account of each stage. *Psi* is the only *Acronycta* of which it has happened to me to meet with the egg as laid naturally by the moth in the wild state. This egg was found on July 4th, 1888, laid on the upper surface of an oak leaf, the diameter was .97 mm., and the height about .33 mm.; it had 51 ribs, of a pale straw tint or almost colourless. An egg laid in captivity on a glass slide measured 1.03 mm. in diameter and had 50 ribs, other specimens had 54 ribs. It is thus seen that the egg is distinctly larger than that of *tridens*, and has a larger number of ribs; in colour (or want of colour) and other characters they are very much the same; in the figures (Pl. VIII., fig. 1, *psi*; 2, *tridens*) the difference in colouring represents the different method taken by the artist, at different times, to show the glassy transparency of the eggs, and does not correspond to any actual difference of tint in the eggs themselves. These two eggs exhibit perhaps more distinctly than any others, what is very obvious in all *Acronycta* eggs, and is common to all eggs of Lepidoptera so far as I have observed them, *viz.*, that the egg contents shrink away from the shell in a very early stage of development, leaving a space containing only a clear fluid between, and the flatness of these eggs leaves this space very evident as a margin round the contents, and in the species with

coloured egg contents, this has the form of a colourless ring round the coloured internal egg proper. In most species the young larva is very plainly visible through the shell before hatching. In *psi* and *tridens* it is perhaps most evident, owing to the transparency and thinness of the egg shell, and the transparency of the larva itself. It lies coiled round the egg, making one complete circle with the head in the centre, and the arrangement of dark and pale segments in *psi* and *tridens* is such that the black head in the centre is surrounded by a margin divided into six nearly equal parts which are alternately dark and light tinted.

The hatching may occur in from five to twelve days after laying, according to the temperature prevailing. It is perhaps repeating unnecessarily, as the sculpturing is almost identical in all the species, to point out that the transverse ribs are only represented by a waved outline of the summits of the primary ribs and hollows on their sides, the hollows and projections of the sides of the ribs corresponding to each other on opposite sides of each furrow, and therefore alternating in adjacent furrows, and that the micropylar area is marked by a small circle of slightly raised radiating lines, surrounded by a hardly raised irregular margin in which the ribs terminate; the ribs arise from this to the number of about twenty, and increase in number towards the margin by dividing dichotomously in some instances, in others by arising *de novo*, in the hollow between two other ribs.

The newly hatched larva (Pl. VI., fig. 1) is 2 mm. in length, very distinctly larger than that of *tridens*, this is unmistakably seen by drawing them under the camera when the head of the larva of *psi* is decidedly larger than that of *tridens*, in the proportion of 8 to 7 in diameter. The only other point of difference that I can be sure of is that the 13th segment in *psi* belongs rather to the dark series, in *tridens* certainly to the pale. I think I may also say that the tubercles of *psi* are rather larger and more markedly angulated than those of *tridens*, and the lateral plates of the pro-legs are nearly colourless in *tridens*, distinctly dark in *psi*.

When fully grown in this skin, it has a trace of a broad yellow dorsal line on the pale segments, *viz.*, 3.4, 6.7, 10.11, the 12th segment is already large and dark, with its four tubercles set four-square; the 13th segment seems intermediate in tint between the dark and light series. The hairs (this applies also to *tridens*) are one to each tubercle, those of the anterior

trapezoidals being very long, those on 11 very short, on 5–10 nearly twice the diameter of the larva in length, the others longer; the posterior trapezoidal hairs on 12 have the appearance of belonging to the anterior trapezoidal set, being equally long and merging with them.

In the 2nd skin the larva is blacker, hairs longer, tubercles so large on 2nd, 5th, and especially on 12th, as to look like humps, the dorsal hairs are black, the lateral white; the dorsal band is pale lemon yellow (almost white) visible only on the pale segments, till the larva is well grown, when this area on the dark segments is paler than the rest of the segment, and there is then on 6 and 7 a trace of a vertical white mark in front and behind the spiracular tubercles. The post-spiracular tubercle is still of good size, the area below it is paler, and the effect of the longitudinal form of the sub-spiracular tubercle is to show a paler line above the darker tubercles, the tubercles (anterior trapezoidal) of 5 already approach one another. Those of 12 are large, but the area between them is but slightly paler than the rest of the larva, 13 is pale rufous, slightly paler than 12, but there is no white cross on 12, no white diamonds between trapezoidals, no rich colour of 13, and the hump on 5 is not so distinct as in *tridens*.

In the 3rd skin it has the *psi* appearance of the full-grown larva, the yellow dorsal band is continuous on 3–4,6–11, and on 13, but the yellow is of a brownish tint on 8 and 9; the anterior trapezoidals on these segments are now very small. There is now a distinct hump on 5th segment, but still recognisable as consisting of anterior trapezoidals; most of the tubercles carry 5–8 hairs, those of dark segments rather the longest and generally black. The sides are rufo-fuscous, marbled with yellowish fuscous, with black tubercles and two pale vertical lines in front and behind the spiracular tubercles. The sub-spiracular tubercles of 11 and 12 are yellow, others black.

In the 4th and following skins it gradually assumes the well-known appearance of the full-grown larva.

Its habits of pupating seem to be identical with those of *tridens* already noticed. The pupa (Pl. III., figs. 1, 1*a*, 1*b*) is not to be distinguished with certainty from that of *tridens*. *Psi* usually has four spines on each side forming the ventral portion of the anal armature, whilst *tridens* usually has but three, but just as *tridens* has not unfrequently four, so *psi* has at times only three. *Tridens* is also usually smaller and more delicate and transparent in appearance, and I cannot with cer-

tainty say of any individual pupa which it is, but of a score of pupæ said to be all one species, I should take a census of the numbers having 3 and 4 spines to the lateral anal armature, and if 3 predominated, I should say they were *tridens*, if 4, then they were *psi*.

On one or two occasions I have fancied this larva missed the 5th moult, but being on occasions when the moults were not being carefully recorded, am in doubt, nor have I reared an autumnal specimen.

The young larvæ of *Cuspidia* have each their own method of eating and resting. *Psi* and *tridens* affect somewhat impartially either side of the leaf, leaving the small ribs and the cuticle of the opposite surface, and when at rest are curled round in a circle.

Notes on Plate VIII.—The ova here delineated are those of the sections *Cuspidia* and *Bisulcia*, together with those of *Moma orion*, *Demas coryli*, and *Diloba cæruleocephala*, three species associated by many systematists with the *Acronyctas;* in my opinion correctly so in the case of *M. orion*, doubtfully in that of *D. cæruleocephala*, and erroneously in that of *D. coryli*. I am very well satisfied with the success of the artist in these delineations. As pictures of the eggs they are everything that can be desired, and convey to the mind a most correct idea of the actual objects. As a matter of scientific accuracy they may be criticised on two points:—1st. The glassy transparency of *psi*, *tridens* and *strigosa* is of precisely the same character, and that of *ligustri* is nearly the same, and it is therefore unfortunate that, the drawings being made at different times, the method of representing this has involved different, instead of identical tints, in each instance. 2nd. In several cases the ribs are represented as all proceeding to the summit of the egg, instead of diminishing largely in number either by coalescing or by certain ribs stopping short as shown in the lateral view of *M. orion* (fig. 10 *a*).

Fig. 3.—*Leporina* is most accurate in this respect, and is indeed a wonderfully successful representation of one of the most beautiful of these beautiful objects. The marginal clear zone is shown in all the *Cuspidia* eggs, and is widest of all, as shown in *megacephala*, the largest but also the flattest of the group. The eggs of *aceris* and *alni* most resemble those of the *Viminia* group, *auricoma* being, at its best colouring, not unlike them; *psi* and *tridens* which in the larva state most approach *Viminia*, both in the arrangement of dark and light segments

in the young larva and in the *rumicis* attitude of the older larva, and in these respects are to some extent intermediate between *Viminia* and *Cuspidia*, depart from the types of both groups in being colourless. It may be that they are the more ancient forms and that the colouring of the others has been acquired later.

It may be useful to append a note of the sizes of these eggs and the number of their ribs, both items being subject to variation within small limits.

	Number of ribs.	Diameter, mm.	Height, mm.
tridens	38	0·80	
strigosa	41	0·74	
leporina	41	1·10	
alni	53	1·00	
psi	54	0·97	
megacephala	66	1·23	
aceris	75	1·10	
ligustri	60	0·90	
orion	30	0·70	0·40
cæruleocephala	13	0·93	0·61
coryli	25	0·76	0·47

The *Acronyctas* are so flat that the measurement of their height is difficult. In most it is about half the diameter, less than this in *megacephala* and perhaps in *leporina*.

DESCRIPTION OF PLATE VIII.

Fig. 1.—Egg of *Acronycta* (*Cuspidia*) *psi*, vertical view of upper surface × 25 diam.
Fig. 2.— ,, ,, ,, *tridens* × 26 diam.
Fig. 3.— ,, ,, ,, *leporina* × 22 diam.
Fig. 4.— ,, ,, ,, *aceris* × 27 diam.
Fig. 5.— ,, ,, ,, *megacephala* × 19 diam.
Fig. 6.— ,, ,, ,, *alni* × 25 diam.
Fig. 7.— ,, ,, ,, *strigosa* × 29 diam.
Fig. 8.— ,, ,, (*Bisulcia*) *ligustri* × 27 diam.
Fig. 8a.— ,, ,, ,, ,, side view.
Fig. 9.— ,, *Demas coryli* upper surface × 29 diam.
Fig. 9a.— ,, ,, ,, side view.
Fig. 10.— ,, *Moma orion* upper surface × 34 diam.
Fig. 10a.— ,, ,, ,, side view.
Fig. 11.— ,, *D. cæruleocephala* upper surface × 26 diam.
Fig. 11a.— ,, ,, ,, ,, as naturally covered by maternal scales.
Fig. 11b.— ,, ,, side view.

(*To be continued.*)

MELANISM AND MELANOCHROISM IN BRITISH LEPIDOPTERA.

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

(*Continued from page* 53.)

I HAVE previously noted that other views, based indirectly on physiological causes, have been brought forward to account for melanism. With regard to these, Mr. Nicholas Cooke (*Entomologist*, vol. x., p. 94) writes, concerning the

large quantity of smoke, fumes, etc. which of late years have been developed in Southern Lancashire:—"This may have effected a change in the climate, as well as deposited on the leaves of trees and foodplants of *Lepidoptera*, matter which may possibly cause some white insects to become gradually black, through being swallowed by the larvæ with their food." This, I believe, would have no effect on the larvæ themselves, as far as colour is concerned. Phytophagic varieties are, as I have before repeated, mainly[1] those of size, and I fail to see, on ordinary physiological grounds, how the colour could be affected in this way. Dr. White also writes in a very interesting paragraph on this subject (*Entomologist*, x., p. 128):—"In the same way, the foodplants may, on certain soils, affect the colours of the insects; but if it is so at all, it is probable only in a few cases; the influence of the foodplant upon the colours of insects seems not to be very great." Mr. Prest, dealing with the same subject (*Entomologist*, x., p. 130) writes:—"I do not think that either chemical fumes, or coal-smoke can have any influence in our district of Yorkshire." He then runs through a list of species which are melanic in Yorkshire, and writes:—"From these facts I form my opinion that soil in its action upon the foodplant has more to do with variation—heredity or otherwise—and melanism, than either chemical fumes or coal-smoke." At p. 131, Mr. E. K. Robinson looks upon the foodplant as being the main agent, and instances the *Leucaniidæ* in marshes, entirely overlooking the protective resemblance these species bear to the nodes on the reeds, etc., on which they rest head downwards. He also states as a fact that "food in a semi-withered or dry condition produces moths of small size; for *Amphidasys betularia* thus fed becomes in a few generations completely black; and by the same means the proportion of black to white in *Abraxas grossulariata* and of brown and black to white and red in *Chelonia caia*, is largely increased." I do not know that there is the slightest foundation in fact for supposing that any of the three species mentioned are influenced directly in the way suggested by Mr. Robinson, nor does he offer any further proof of his statements, other than thus giving most positively his own opinion on the point. He sums up his arguments as follows:—"(1). A large percentage of water in the tissues of the foodplant

[1] Unless the species feeds on different foodplants which have a very different chemical composition.—J. W. T.

tends to produce a large, pale variety; while small, dark specimens result from dry and stunted food. (2). Resinous, and other strong vegetable properties, produce distinct brown markings. (3). Chalk soils produce a chalky white or bright colour in insects: conversely we should expect rich loamy soils to be haunted by deeply-coloured moths. (4). A cold climate, or the gloom of damp dark woods, causes a bleached appearance and general absence of distinct markings."

These conclusions are all more or less open to very serious objection. In No. 1, it has never been proven in the slightest degree that succulent food produces pale, and dry and stunted food produces dark varieties, other than in the direction I have previously pointed out with regard to the relation that colour bears to comparative size. This is assumed practically by Mr. Robinson who associates "large" with "pale" and "small" with "dark." Nos. 2 and 3, I consider a simple outcome of the most elementary law of "natural selection," for the dark brown colour of fir-feeding species is of the utmost necessity for protection, when such species are resting on the dark fir-trunk, *e.g.*, *Boarmia abietaria*, *Retinia resinana*, *Thera variata*, and many others; and the cause of the occurrence of pallid species and varieties on chalk needs no further discussion. That part of No. 4 referring to cold has already been dealt with, and "bleaching and general absence of distinct markings" has been proven to accompany a cold climate, but the part referring to "the gloom of damp dark woods" is purely theoretical and unsupported by fact, *vide* what has been previously written concerning the Huddersfield and Derby melanic varieties.

Still continuing the discussion relative to food as a cause, Mr. Cooke (*Entom.* x., p. 152) writes:—"The extraordinary dark varieties in Scotland cannot have been caused by smoke or chemicals, but they are, as far as my experience goes, produced in black bog or peat soil, which, I suppose, contains a large amount of carbon; and this may have the same effect on the caterpillars, through the tissues of the foodplants containing more carbon than in other situations, as when the caterpillars eat the carbon in the form of soot along with their food; and again, although the country immediately around York is purely agricultural, yet I am satisfied there is a sufficient amount of soot deposited on the plants to affect the colours of the Lepidoptera." Here again the actual fact of the dark varieties being produced "in black bog or peat soil"

points overwhelmingly to the influence of "natural selection" rather than that an excess of carbon in the soil, after assimilation, first, by the plant to form its tissues, and then by the larva when it eats it as food, should act in some unknown way on the larva and thus affect the colour of the moth, in the final stage of its existence.

I have gone thus fully into what has been written concerning "this physiological aspect of melanism," but I think there has been very little written which will strike practical lepidopterists as having any value in causing us to look on melanism generally, as a result of phytophagic variation.

(*To be continued.*)

BIBLIOGRAPHY.

Additions to the British List and Changes in Nomenclature.

Diptera.

Macquartia spinicincta, n. sp. Previously confounded with *M. cœlebs* (R. H. Meade, *E.M.M.*, pp. 156-157).

Polidea crassitarsis replaces *P. simplicitarsis* (R. H. Meade, *E.M.M.*, p. 157).

Hemiptera.

Dactylopius walkeri, n. sp. from specimens taken at Manley, Cheshire, Sept., 1890, on *Agrostis vulgaris* (R. Newstead, *E.M.M.*, 164, with plates).

Eriococcus insignis, n. sp. from specimens taken at Ince and Manley (Cheshire), August and Sept., 1890, on *Agrostis vulgaris*, *Rumex*, *Pteris* and *Ulex* (Id., *E.M.M.*, 164-165, with plates).

Eriococcus fraxini, n. sp. at Ince, August, 1890, on bark of *Fraxinus excelsior* (Id., *E.M.M.*, pp. 165-166, with plates).

Lepidoptera.

Plusia bimaculata, St. = *P. verticillata*, Guen. (*acuta*, Walk.) (P. B. Mason, *E.M.M.*, p. 163).

Viminia, *Cuspidia* and *Bisulcia*, Chapman. Incorrectly referred by Mr. A. G. Butler to *Pharetra*, *Triæna* and *Arctomyscis* of Hübner respectively (see "Scientific Notes" in this number).

Erastria venustula, Hb. Referred by Mr. A. G. Butler to the genus *Hapalotis*, Hb. with much doubt as to this genus being sufficiently characterised.

Hydræcia lucens, Frr. (with vars. nov. *pallida*, *grisea* and *rufa*); *Caradrina superstes*, Tr., H.-S. (with var. nov. *suffusa*) are treated as distinct sub-species (J. W. Tutt, *The British Noctuæ and their Varieties*).

Helotropha leucostigma var. *lunina*, Haw. = var. *intermedia*, Tutt; *Gortyna ochracea* var. *flavago*, Esp. = var. *flavo-auratum*, Tutt (J. W. Tutt, *The British Noctuæ and their Varieties*).

Viminia menyanthidis var. *salicis*, Curt. is referred to *V. rumicis* var. *salicis*, Curt. (J. W. Tutt, *The British Noctuæ and their Varieties*).

Thyatyra batis var. *juncta*, v. nov.; *Cymatophora ocularis* vars. *octogesima*, Hb., and *rosea*, v. nov.; *Asphalia flavicornis* vars. *galbanus* and *rosea*, vars. nov.; *A. ridens* vars. *xanthoceros*, Hb. and *erythrocephala*, Esp.; *Moma orion* var. *rosea*, v. nov.; *Cuspidia aceris* vars. *infuscata*, Haw, and *intermedia*, v. nov.; *C. megacephala* var. *ochrea*, v. nov.; *C. alni* vars. *suffusa* and *obsoleta*, vars. nov.; *C. tridens* vars. *rosea*, *bidens*, *quinquedentata* and *juncta*, vars. nov.; *C. psi* vars. *virga*, *juncta*, *bidens*, Chpm., and *rosea*, vars. nov.; *Leucania conigera* vars. *intermedia* and *flavipunctum*, vars. nov.; *L. albipuncta* vars. *rufa*, *suffusa* and *grisea*, vars. nov.; *L. lithargyria* vars. *pallida*, *fulvescens* and *marginata*, vars. nov.; *L. turca* var. *lividus*, v. nov.; *L. comma* vars. *ochracea* and *nigropuncta*, vars. nov.; *L. obsoleta* vars. *nigrostriata* and *grisea*, vars. nov.; *Tapinostola fulva* vars. *ochracea*, *punicea* (and sub-vars. *ochracea-suffusa* and *punicea-suffusa*) vars. nov.; *Nonagria geminipuncta* vars. *pallida*, *rufa*, *fusca* (and sub-vars. *unipuncta*, *pallida-unipuncta*, *pallida-obsoleta*, *rufa-unipuncta*, *rufa-obsoleta*, *fusca-unipuncta*) vars. nov.; *Calamia lutosa* var. *rufescens* (and sub-var. *rufescens-suffusa*) v. nov.; *Hydræcia nictitans* var. *albicosta*, v. nov.; *H. paludis* var. *brunnea*, v. nov.; *Xylomiges conspicillaris* vars. *melaleuca*, View., *intermedia* and *medio-linea*, vars. nov.; *Xylophasia rurea* var. *combusta*, Hb.; *Apamea didyma* vars. *grisea*, *reticulata*, *virgata*, *rufa*, *nigra*, *albistigma*, vars. nov.; *Miana strigilis* vars. *virgata*, *nigro-rufa*, *rufa*, *unicolor*, *fasciata*, vars. nov.; *M. fasciuncula* vars. *pallida* and *suffusa*, vars. nov., *rubencula*, Frr.; *M. bicoloria* vars. *pallida*, *albicans*, *reticulata*, *brunnea-reticulata*, *rufa-reticulata*, vars. nov., and *insulicola*, Stdgr., *pulmonariæ*, Dup.; *Crymodes exulis* vars. *gelata*, Lef., *grœnlandica*, Dup., *marmorata*, H.-S., *gelida*, Gn., *poli*, Gn., *borea*, H.-S.; *Luperina testacea* var. *incerta*, v. nov.; *Grammesia trigrammica* vars. *obscura*, *pallida-linea*, vars. nov., *evidens*, Borg.; *Acosmetia caliginosa* var. *aquatilis*, Bdv.; *Caradrina morpheus* vars. *obscura*, *minor*, vars. nov.; *C. alsines* var. *suffusa*, v. nov.; *C. ambigua* var. *plantaginis*, Dup. These varieties are all newly described British forms, or are Continental vars. found to occur in Britain (J. W. Tutt, *The British Noctuæ and their Varieties*).—J. W. Tutt.

CURRENT NOTES.

Will our subscribers kindly inform their friends as to the best way to obtain *The Entomologist's Record*, etc., as under our present conditions of publication booksellers may be unwilling to procure copies?

Mr. Dobrée suggests the possibility of *Cucullia scrophulariæ* being specifically identical with *C. lychnitis*.

Dr. Mason records (*E.M.M.*, 163) as existing in the collection of the late Mr. Edwin Brown, received from Carter, of Manchester, a specimen of *Plusia bimaculata* of Stephens; this has proved identical with *P. verticillata*, Guen. The only other record of the capture in England besides this specimen and the Stephensian type (the whereabouts of which appears to be unknown) is by Mr. H. P. Robinson of Tunbridge Wells, in May, 1870 (*E.M.M.*, vii., p. 138).

Mr. Bird records cases of *Coleophora vibicigerella* from the Essex saltmarshes, and I understand that Mr. Elisha has discovered cases of the rare *C. chalcogrammella* from Scarborough.

Dr. Wood contributes a most interesting article on "Oviposition and the ovipositor in certain lepidoptera" (*E.M.M.*).

The Guernsey Natural History Society held a very successful meeting at Guille-Allès Library in April. The subjects discussed were "The Clays and other superficial deposits in Guernsey," and "The Flora of Guernsey, compared with that of West Cornwall."

Our readers will hear with regret that our correspondent, Mr. R. Gillo of Bath, died on April 9th.

SCIENTIFIC NOTES.

THE SUB-GENERA VIMINIA, CUSPIDIA, AND BISULCIA, Chapman.—Mr. A. G. Butler proposes sinking these names respectively for *Pharetra*, *Tricena* and *Arctomyscis* of Hübner. I would ask whether Dr. Chapman's criticism (*Record* i., pp. 269–270) of Mr. Butler's superficial paper (*Trans. Ent. Soc. Lond.*, 1879) on this genus had anything to do with this result. As Dr. Chapman has not finished his paper, Mr. Butler cannot know the whole of Dr. Chapman's arguments. Mr. Butler can only arrive at the substitution of Hübner's names by making the science subservient to names and not the names to science. *Pharetra*, Hb. Butler by replacing *Viminia*, Chpm. with this name would make Hübner's *Pharetra* include a part of that author's *Arctomyscis* and at least three outside genera, which could never possibly have been that author's intention. Again he would include Hübner's *Hyboma*, *Jochœra*, *Acronicta* and part of *Arctomyscis* in the same author's *Tricena*, which appears ridiculous, and if this be allowed, Hübner's diagnosis cannot be worthy of Dr. Chapman's notice. Hübner's *Arctomyscis* does not even contain Dr. Chapman's type of *Bisulcia*, but contains on Mr. Butler's own showing (*Entom.*, pp. 111–112), a mixture of *Cuspidia* (*aceris* and *megacephala*) and *Viminia* (*euphorbiæ* var. *myricæ*), but no trace of Chapman's type — *ligustri*. How in the name of common sense, can Hübner's names replace Chapman's, worked out on the minute structure of ova and larvæ of which no previous author seems to have had the slightest knowledge? Of course, I am probably one of those "unacquainted with the laws of zoological nomenclature" as understood by Mr. Butler, but common sense appears against his application of them. Whatever does he mean, too, when he suggests that "Butler should be quoted as the author of the genera that Hübner indicated?" By all means, let him be quoted if he is so enraptured with "Hübner's indications," but I fail to see how these hazy indications interfere with Dr. Chapman's exact science.—J. W. TUTT.

THE VALUE OF THE GENITALIA IN DETERMINING SPECIES.—In the *Record*, vol. ii., p. 13, the editor expresses his doubt (? Ed.) as to the value of the specific characters afforded by the structure of the genital armature of the male lepidoptera, and cites the opinion of a recent writer in the *Canadian Entomologist* in support of his views. As, if I mistake not, I was amongst the first—in this country at least—to study the genital armature in the order lepidoptera, the result of my experience may be of some little interest. In the course of my studies I have had occasion to examine the structure in a considerable number of species and in many individuals, and have never found it to be

otherwise than not only distinct in every species but unvarying in its form. At the same time I am not prepared to deny that there may be exceptions to this difference and its constancy, although I do not think that it is probable. A more extended and exhaustive study of this subject than has yet been made will alone demonstrate this. That *post mortem* alterations of form take place in the armature is a supposition that may be dismissed as impossible. The armature consists of hard chitinous plates which do not change their shape in drying any more than do the elytra of an ordinary beetle.—F. Buchanan White.

On Hybridising Amphidasys prodromaria and A. betularia.—In this matter I can record from one point of view a great success, from another a disastrous failure. The experiment is so interesting that it will doubtless be followed up by others with more leisure and capacity to bring it to a successful issue than I unfortunately have, and it may be of assistance if I record my own experiments. I have bred *prodromaria* for several years, and it occurred to me to ascertain whether it would cross with *betularia*; so in the spring of 1890 I obtained some pupæ of that species and forced them in order to bring about their emergence along with *prodromaria*. In this I was successful, and a ♂ *prodromaria* paired with a large black ♀ *betularia*, which laid a large number of eggs which proved to be fertile. These hatched and fed up well at first on sallow, afterwards on oak, and were as healthy and thriving a brood of larvæ as one would wish to see. Some half dozen of them did what I have not met with in *prodromaria* (I have reared few *betularia*), *viz.*, omitted a moult, and assumed the last skin one moult earlier, and not feeding up to full size, pupated rather earlier than the others. On looking at these in early spring, I found the moths had emerged during the winter, and somewhat damaged, had died. The mass of the brood from want of attention became unhealthy, as did also *prodromaria* and some other larvæ I had, and in the result only a dozen produced healthy pupæ. And here again I made a mistake, I endeavoured to force these in March to bring them out with *prodromaria*, but instead of taking to this treatment kindly as *betularia* does, they refused to be forced. One or two are still alive showing no signs of emergence; the rest appear to be dead. In forcing pupæ, it happens not unfrequently, more with some species than with others, instead of yielding, they appear to conclude that they have missed their proper season, that full summer is upon them, and that they must tide over till the following season. Probably this could be avoided by a proper graduation of temperature suitable to each species. This, however, was the result of the experiment with the hybrids. This spring I repeated the attempt to get hybrid eggs and had several hybrid pairings; these all proved to be infertile, but as all my *prodromaria* proved also to be infertile except one batch, I attribute this result not to any infertility due to hybridisation, but to the fact that my *prodromaria* were in the fourth year of their domestication, and were also as already noted, not a healthy brood. The larvæ of the hybrids were not exactly intermediate between those of the two parents but consisted of a majority much more like *betularia* and a minority that closely resembled *prodromaria*. The pupæ on the other hand, so far as concerns the anal armature are much more exactly intermediate.—T. A. Chapman, Firbank, Hereford.

Aneurism.—My only experience of saccular distention of wings was in the case of *Nonagria typhæ*. Nearly all of a series bred in 1889 were thus affected; but, as I found that by pricking the distention they soon became all right, I took no further notice of it.—E. W. Brown, Shorncliffe Camp. *May*, 1891.

Variation.

Polia chi and its Varieties.—You ask me for information concerning the var. *olivacea* in the Castle Eden district. I regret I am unable to say anything about it as I never took anything but the type there, and very few of that. Thirty years ago I took v. *olivacea* here in some numbers, along with the type, but it seems to have disappeared for I have seen neither for quite twenty years. *Olivacea* is comparatively common about Newcastle-on-Tyne, whence I obtained all the specimens I have had of recent years. It passes the winter in the egg state, which are of the usual Noctua form, like a tiny limpet shell, and deposited so that one overlaps the other. It is an easy species to rear, and a bred *olivacea* is something very different to the faded specimens captured, being much darker and not so green. The first I ever bred appeared to be something I did not know, and thoughts of a new species came into my head, but quickly proved vain thoughts. In the west of the county of Durham—perhaps I should say the south-west—the type occurs commonly but I have no knowledge of *olivacea* occurring there. If the species occurs in the north-west, I should expect it to be *olivacea* rather than the type. In the Cleveland district of Yorkshire the type form is also very common, and may be taken in any number at rest on the stone walls that form boundaries on the moors. In West Yorkshire another form occurs, distinct enough to have a varietal name. Instead of the pure white of the type, it has the ground much suffused with grey. It is scarcely so dark as captured *olivacea*, and is entirely without the greenish hue of that variety. *Suffusa* would be an appropriate name for it. I know little of the species from other places. The few Scotch specimens I have seen, all have the pure white ground of the type. I have no acquaintance with it from the south of England, nor from Ireland.—John E. Robson, Hartlepool.

Variety of Argynnis paphia.—The form of *A. paphia* with pale spots on the wings is, I believe, a well-recognised variety of the male in the New Forest, several were taken there the same year as mine. The spots vary very much; sometimes the white spots are present on all the wings as in my specimen, sometimes on only two of them; in some specimens, also, the spots are much more distinct than in others. I believe mine to be a fair type of the variety with regard to the distinctness of the white markings. It would be interesting to have the opinion of several entomologists, as to the cause of these markings.—E. C. Dobrée Fox. *April*, 1891.

Varieties of Apamea basilinea and Noctua rubi.—On May 28th, I took a very nice var. of *Apamea basilinea*, either *unicolor* or *nebulosa*, but whichever it may be, it is quite distinct from any that I have ever taken before. At the same time I got some good variations of *Noctua rubi*, varying from quite a light reddish colour to dark brown

approaching unicolorous.—A. FORSYTH, 4, Ranelagh Terrace, Weymouth. *June 4th*, 1891.

ERRATUM.—Page 57, last sentence, for "True though it is, as Mr. Tutt says, that all British *nimbella* are *saxicola*" read " . . . that all British *nimbella* are *not saxicola*."

NOTES ON COLLECTING, Etc.

NOTES OF THE SEASON (LEPIDOPTERA).—*Castle Moreton.*—The season here is very backward, and very little is to be obtained from the sallows. I have been up to the woods four times, and the only insects I have taken worth mentioning are two *Tæniocampa munda*, three or four *T. rubricosa*, and four *Larentia multistrigaria*. Last night I worked a quantity of sallow bushes through the woods, and, except on one bush in a sheltered corner (having any number of the commonest things on it), not an insect was to be found. It was a warm night and no wind, but there was a bright moon, and this, I believe, is often fatal to a good bag from sallow.—E. C. DOBRÉE FOX, Castle Moreton Vicarage, Tewkesbury. *May*, 1891.

Gloucester.—I have been for a week in Gloucestershire, where I have had the opportunity of working sallow several nights. Insects seemed plentiful as to numbers, but the species were but few. *Tæniocampa gothica* and *T. stabilis* swarmed, and *Cerastis vaccinii* and *Scopelosoma satellitia* were fairly numerous, but the better species of sallow-frequenters were conspicuous by their absence. The effect of moonlight on the flight of insects was curious to note. The evening of Thursday, April 16th, was cloudy, showery, and mild—the sallow bushes were crowded with moths, every blow from the beating stick brought down scores of *T. gothica* and *T. stabilis*, but the following evening, when the moon was shining very clearly and the air was cold, the total number of insects taken did not reach a dozen.—M. KIMBER. *April 25th*, 1891.

Newbury.—Before I left home *Notodonta trepida*, *Arctia mendica*, and *Tephrosia biundularia* were coming out in my forcing-house, and I am glad to say that from half a dozen pupæ of *Notodonta carmelita* bred last year, I have four most perfect imagines.—ID. *April*, 1891.

Highbury.—Biston hirtaria is again very plentiful on tree trunks, occurring most frequently on lime, often on acacia, occasionally on other trees. I did not see any until April 10th; last year my first record is March 17th.—FRANCIS JOHN BUCKELL. *April 29th.* 1891.

Crosby and Wallasey.—We are having real fine weather now, and what insects are appearing seem fairly plentiful. *Nyssia zonaria* has occurred in hundreds at Crosby, more, I think, than I have ever seen before, and at Wallasey, *Larentia multistrigaria* has been equally abundant. The sallows are very backward and have very few buds, but where the *Tæniocampas* are to be found, I believe they are plentiful, except *T. opima*, of which I have been unable to take a single specimen. We were at Crosby yesterday looking for *Arctia fuliginosa* larvæ. So scarce were they that in two hours we only found about twenty each, while in the autumn it would have been easy to get two hundred in the same time. We picked up two or three *Tæniocampa gracilis* and

one *T. rubricosa*. The larvæ of *Leucania litoralis* are plentiful, but as yet only half grown. *Nyssia zonaria* seems to have almost totally abandoned Wallasey. I have seen none at all there this year, and have only heard of a solitary ♀ having been taken.—Geo. A. Harker. *April*, 1891.

Tilgate.—Mr. Harker is indeed fortunate in his "weather and crops" (of insects). Here it is a delusion and a snare to attempt collecting in any form. Incessant hard frosts, easterly winds and bitter nights seem invariable. The sallows were all spoiled by the Easter snowstorms, and I have never come across any fortunate collector in this district who has taken anything worth mentioning. I believe *Brephos parthenias* was not scarce at Tilgate on the 18th inst., but sugar and sallows combined, at Christchurch on the same evening only produced about four specimens of the commonest *Tæniocampas*, one *Scopelosoma satellitia* and a *Cerastis vaccinii*.—C. Fenn, Lee. *April*, 1891.

Warrington.—About a fortnight ago I was at Delamere Forest with my friend, Mr. Acton, and spent a couple of nights larvæ-hunting. We found Noctua larvæ plentifully along the lanes and wood edgings and inside the woods. The larvæ of species obtained were *Triphæna fimbria*, commonly; *Noctua brunnea* and *N. triangulum*, abundantly; *Leucania lithargyria* and *Aplecta nebulosa*, a fair number. We also got a few *Ellopia fasciaria* and quantities of *Thera variata* by beating pines; a few *Trachea piniperda* imagines tumbling into the umbrella at long intervals. Altogether, we were much pleased with our success, bringing home over three hundred larvæ. I am indebted to sallow for half a dozen *Tæniocampa gracilis* and two *T. rubricosa* this season, and for these I repeatedly visited the sallows of this neighbourhood. The common *Tæniocampas* were numerous, and I sorted out a few light, mottled, and banded forms of *T. instabilis*. Of black vars. I saw several, but some years they are very common. Hybernating *Calocampa exoleta* and *Scotosia dubitata* females appeared also. I kept several for ova, but could not induce them to deposit, even though I put them out of doors in a wire-guaze cage over growing plants.—J. Collins. *May 23rd*, 1891.

Pitcaple.—During the last week of April and first week of May, insects, on favourable evenings, literally swarmed at sallows. *Tæniocampa gothica* and *T. stabilis* were, as usual, most abundant. *T. instabilis* and *T. rubricosa* were not uncommon, var. *gothicina* a few. *T. gothica*, *T. stabilis* and *T. instabilis* varied to an extraordinary degree, but the latter, unfortunately, were mostly all showing signs of wear. Hybernated species, such as *Cerastis vaccinii*, *Calocampa vetusta* and *C. exoleta*, though not uncommon, were of course left to enjoy themselves. General collecting has been fairly good lately, and, among others, I have taken or seen the following:—*Pieris rapæ* and *P. napi*, a few; *Melitæa artemis*, larvæ abundant in one locality; *Polyommatus phlæas*, one at Muchalls; *Sesia philanthiformis* larvæ on coast; *Nudaria mundana* larvæ excessively abundant at Muchalls; *Chelonia plantaginis* larvæ not rare; *Arctia fuliginosa* pupæ common; *Bombyx callunæ* larvæ a few; *Selenia illunaria* only coming out; *Dasydia obfuscata* larvæ at Muchalls; *Melanippe fluctuata*, a few; *Lobophora lobulata*, a few; *Anticlea badiata*, just appearing; *Cidaria suffumata*, common, var. *piceata*, not rare, about 15 per cent.; *Chesias obliquaria*, a few; *Dasy-*

polia templi, several females; *Amphisa walkerana*, rare; *Peronea caledoniana*, common, also several other species of hybernating *Peroneas*, but generally worn; *Phoxopteryx myrtillana*, just coming out; *Retinia duplana*, only a few at Forres, it seems to be excessively local and rare (this insect, I consider, is the true *R. duplana*); *R. turionana*, a few larvæ; *R. resinana*, pupæ fairly common (I don't think it is generally known that this insect only appears in the perfect state once every two years, this year the imagines will appear in May and June, next year, at the same time, it will only be possible to find larvæ of the first year); *Stigmonota perlepidana* is out in great numbers, also quite a number of other Tortrices and Tineæ; at night larvæ are abundant, and I should think the outlook for the coming season is remarkably good. Almost everything is very late though.—W. Reid. *May*, 1891.

Guernsey.—The last few sunny days have brought things on well. Friday afternoon (June 5th), in the course of a couple of hours or so with the help of a friend, I had no difficulty in taking about fifty *Melitæa cinxia*, one of which is a good var. under-side. Flying with them was a profusion of *Lycæna icarus* worn, also an abundance of *Satyrus megæra* amongst which there is occasionally to be taken here, a variety with a twin or double eye-spot. *Aspilates citraria* were plentiful but worn, but *Euthemonia russula* was in fine condition, amongst which I secured a fine female. *Emmelesia decolorata* also was just out, and in splendid condition.—Albert J. Hodges. *June 6th*, 1891.

Armagh.—The spring here has been very backward and unproductive. Sallows produced nothing but *Tæniocampa stabilis*. Last month I took a few *Anticlea derivata*, and this month a few *A. badiata*, *Eupithecia castigata*, *E. absinthiata* and a *Depressaria* which is, I think, *assimilella*, *Melanippe montonata* and *M. sociata* are also in evidence. *Phigalia pilosaria* ♀ emerged in my breeding cage on Feb. 8th., *Saturnia pavonia* on April 1st, *Fidonia atomaria* on May 7th, *Hadena pisi* on May 7th, and *Spilosoma lubricepeda* on May 12th, these are all much later than usual.

The first butterflies I met with were *Pieris napi* and *P. rapæ*, which I took on April 18th. Up to the present I have not seen a single specimen of *Vanessa urticæ*. It is usually the first to appear, and last year I took it on April 5th.—W. F. Johnson, Winder Terrace, Armagh. *May 30th*, 1891.

Wansford.—Up to the present insects seem to be very late in appearing, and also scarce; I have only seen a few *Hesperia paniscus*, and by this time they are generally worn.—J. A. M. Vipan. *June 2nd*, 1891.

Wickham Wood.—With the exception of a few days I have visited Wickham Wood throughout the month of April, usually accompanied by my brother. Off the "Bishop's palings" I have taken *Phigalia pilosaria* (1), *Anisopteryx æscularia* and *Hybernia progemmaria* (plentiful), *Hybernia rupicapraria*, 1 on April 14th—surely a very late date for this insect; *Tephrosia biundularia* and *Lobophora lobulata* (common), *Tæniocampa cruda*, *Anticlea badiata* (numerous), *Xylocampa lithoriza* (a few), and *Selenia illunaria*.

By beating the pines we obtained 7 *Trachea piniperda*, 2 *Cymatophora flavicornis*, 2 *Brephos parthenias*, and numerous larvæ of *Thera obeliscata*.

We captured as many *Brephos parthenias* as we wanted, flying by day among the birches, and at dusk *Selenia illunaria* and *Anticlea badiata* were very common, besides a few worn *Scotosia dubitata*.

Although we did not begin to search the sallows till April 20th, we met with very fair success, and I append a tabular list of our captures :—

	T. stabilis.	*T. instabilis.*	*T. gracilis.*	*T. rubricosa.*	*T. cruda.*	*T. gothica.*	*T. munda.*	*C. vaccinii*	*T. populeti*
Apl. 20th	innum'ble	1	...	...	a few	a few	...	...	...
,, 21st	do.	...	...	5	plenty	abund.	2	plenty	1
,, 22nd	do.	3	...	3	do.	do.	4	do.	...
,, 23rd	a few	...	...	2	a few	do.	...	a few	1
,, 24th	very few	1	...	...	...	a few	...	do.	...
,, 25th	abundant	...	...	4	abund.	abund.	5	abund.	...
,, 27th	a few	2	2	2	1	abund.	1	...	...
,, 28th	a few	1	...	...	1	a few	...	a few	...

Also 1 *Trachea piniperda*, 1 *Gonoptera libatrix*, and a number of battered specimens of *Scopelosoma satellitia*; about 1 dozen full-grown larvæ of *Xanthiæ*.

By sugaring we obtained numbers of *Cerastis vaccinii* and *Scopelosoma satellitia*, about half a dozen *T. munda*, and a few *T. stabilis* and *T. cruda*.—C. Wells, Hurstfield, The Avenue, Gipsy Hill, S.E. *May 15th*, 1891.

Cannock Chase.—I paid a visit to Cannock Chase at Easter, and found *Cymatophora flavicornis* abundant; I could have taken many hundreds had I been so minded, but contented myself with looking for varieties and succeeded in getting a very variable series. *Brephos parthenias* did not put in an appearance until the 31st March, somewhat later than usual.

At the beginning of May, I was again in the vicinity of the Chase; one *Tephrosia punctulata* was my only take, but I didn't do much work being invalided at the time.

On the 20th May, when I paid another hurried visit, I took *Hadena glauca*, sundry *Tephrosia punctulata*, one *T. crepuscularia* (surely very late), *Thecla rubi*, and *Ematurga atomaria* were abundant; the former feeds on bilberry (*Vaccinium myrtillus*) here. The blackthorn was in full bloom, and the bilberry had not yet burst into flower. It is the latest year I can recollect.—Richard Freer, St. Mary's Hospital, Paddington, W. *June 1st.*

Meteorological Influences and Sugaring.—Several collectors grumble at the moon as a cause of failure. My own experience has led me to think the moon is a great deal too much abused. Some time ago, I went for a week's collecting, there was a bright moon, cold clear nights, and very little flying. "Oh! it's the moon," I said, "I'll always avoid the moon for the future." The next time I planned my work on nights when there should be no moon. Cold, clear, dark nights, very little flying. I began to doubt about the moon, and set it down to the cold clear atmosphere. Since then I have not changed my opinion. Cold, clear nights, with or without moon, bad; warm nights, with or without moon, good. Some of the best nights I have had, have been warm and cloudy, but the moon for long

intervals shining brightly on the sugared trees, and the insects apparently enjoying it. I think, however, the moon affects light collecting, as it diminishes the power of the lamp so much. The reason the moon gets so much abuse is simply this. When it is a cold, clear night and there is a moon, you always see it; in fact, you don't see much else except the moon and its shadows. When it is a warm night you don't very often see the moon if there is one, as it is usually cloudy. I daresay few collectors will agree with me, but this is at present my theory, and it will be interesting to hear what more experienced collectors have to say.—A. Robinson, 1, Mitre Court Buildings, Temple, E.C. *May*, 1891.

Uncertain appearance of certain Lepidoptera.—With regard to Mr. Holland's remarks on *Melitæa aurinia* (vol. ii., p. 67), it is a most variable insect in its appearance here. There is one particular field, where it sometimes swarms; this was the case in 1888, in 1889 only a few were to be found, and last year not one. But I believe it will turn up again, as the same thing has happened before.—E. C. Dobrée Fox. *April*, 1891.

I could write pages on the disappearance of insects which were common in my early collecting days in localities from which they have long departed, but it is a wide subject and will bear no hasty generalisation. The vagaries of species like *Aporia crataegi*, *Lycæna acis*, *Endromis versicolor*, *Aleucis pictaria*, *Moma orion*, *Cuspidia alni*, *Ennomos autumnaria*, *Eupithecia dodoneata*, *Argyrolepia schreibersiana*, *Papilio machaon*, *Epunda nigra*, *E. lutulenta*, *Dicycla oo*, etc., would fill a good sized volume. Near all large towns the ever increasing smoke must have a great effect, and this is remarkable in the London district, but there are other causes, of which we have at present but a faint idea.—C. Fenn, Lee. *April*, 1891.

As to the disappearance of species from a locality, I can give but one instance. In the summer of 1888, *Procris statices* was extremely abundant in a meadow at Enborne (Newbury). For two or three days the place seemed alive with them, and it was curious to remark that all the moths seemed flying in one direction, although there was no wind whatever. In 1889, I visited the same locality constantly, hoping to get more *P. statices*, but I only saw one specimen, and last year I saw none at all. I have worked for the species in the fields lying to the S.W. of their former habitat, as the general flight of the insects was in that direction in 1888, but have failed hitherto to discover them in any fresh spot. It will be interesting to find if, in the coming season, they reappear in their former locality, or in another in the same district.—M. Kimber, Cope Hall, Newbury. *April*, 1891.

Twenty years ago *Plusia festucæ* was to be had in almost unlimited numbers in the larval and pupal stages in the Warrington district. I have heard my father speak of breeding hundreds in a season from pupæ obtained here. I have myself seen evidence of their former abundance, a deplorable ring of closely packed *P. festucæ* in a wall-case, bodiless, and wholly given up to mites. Now we seldom take more than half-a-dozen imagines a year; the only pupæ got of late were five in 1889. Formerly their particular locality was a tortuous, winding, slow-flowing brook or rivulet, with *Carex* growing in luxuriant masses from its sides. Such, I am told, was the paradise where *P. festucæ* revelled in numbers,

until some agriculturist with an eye to improving the drainage of his land, straightened the bends, which, awakening the stream from its lethargy, sent it hurrying along carrying the sedges with it, and alas! *P. festucæ* too.—J. Collins. *April 6th*, 1891.

Time of Appearance of Acontia luctuosa.—In reply to the Rev. E. C. Dobrée Fox, *Acontia luctuosa* is very uncertain in the date of its appearance at Reading. Sometimes it is out at the end of June; in another season the middle of July is the time for it, and occasionally it is the beginning of August before I get any. It is very tormenting in this way.—W. Holland. *April 3rd*, 1891.

Referring to Mr. Holland's account of the uncertain appearance of *Acontia luctuosa*, I may mention that two years ago I took a lovely example at light in my house, at about 1 a.m. I have never seen the insect here before or since. C. Fenn, Lee. *April*, 1891.

Retarded Emergences.—I took a large number of larvæ of *Cymatophora ridens* in the New Forest during July, 1888, the greater part of which emerged in the spring of 1889, but not all. I have kept some half-dozen pupæ ever since, with the result that one emerged yesterday, and I hope that the remainder will do the same. Is not this a most unusual length of time for pupæ to lie over? at least for this species.—Joseph H. Carpenter, Johnson Villa, Gleneagle Road, Streatham. *April 28th*, 1891.

In 1884 I fed up larvæ from 25 ova of *Endromis versicolor*, from which I reared in 1885 (April 19th) 1 ♂ and (April 20th to 25th) 8 ♀; and in 1886 (April 3rd to 20th) 12 ♂ only, giving a total of 21 specimens. From another lot that I fed up in 1888, I reared in 1889 (March 30th to April 4th) 2 ♂ only; and in 1890 (March 22nd to April 4th) 5 ♀ and (April 16th) 1 ♂, giving a total of 8. In both cases, the larger number of moths emerged in the second year after the larvæ had fed up, but whereas, in the first case, those that lay over until the second year were all males, and those that came out in the first year were nearly all (all but one) females, in the second case it was just the other way about, males the first and females the second year.—R. Adkin, Lewisham. *June*, 1891.

Respecting Miss Kimber's note (*ante* p. 39) on *Endromis versicolor* lying over in the pupa state, I recollect, about fifteen years ago, in course of conversation with the late Mr. Tester of Balcombe in Sussex, who was well known at that time as an intelligent collector, that he told me he was then breeding *E. versicolor*, which had been in the pupa state for five years. He also told me that *Notodonta carmelita* frequently lie over, and I believe it is an acknowledged habit among the *Notodontidæ*.—C. Fenn, Lee. *April*, 1891.

Mr. Carpenter of the observatory here kept a note of *Sesia bembeciformis* in 1889, and he found they emerged (and were taken drying their wings) on the poplars in the observatory garden between 5 and 8 a.m., none appeared after the latter hour. Last year he did not see a single specimen, although from the dust, etc., at the bottom of some of the trees, it would appear that larvæ were in the wood. Does this insect remain two years in the larval and pupal stages?—T. Maddison, South Bailey, Durham. *March*, 1891.

With regard to Mr. Maddison's query; the analogy of other internal feeders such as *Cossus ligniperda* and *Zeuzera æsculi* suggest that

probably *Sesia bembeciformis* may sometimes remain two years in either the larval or pupal condition.—F. J. Buckell, Canonbury Square, N. *March*, 1891.

Referring to Dr. Buckell's statement as to the duration of the larval state of *Cossus ligniperda*, etc., I think there can be but little doubt that woodboring larvæ live two, if nor three, years in that state. I believe there is little question that this is the case with *C. ligniperda* and *Sesia sphegiformis* and possibly also with *Zeuzera æsculi*, *S. cynipiformis*, *S. apiformis*, etc., although I am rather inclined to the idea that the three last mentioned pass two years as larvæ. I never heard of any one breeding any of these species from the egg, so one can only argue from finding larvæ of two or three very distinct sizes in the burrows at the same time of year.—C. Fenn, Lee. *April*, 1891.

Cossus ligniperda.—In August, 1890, I found, crawling on a road, a nearly full-fed larva of this moth, which I captured and fed on elm wood. On the 10th of May last, I was pleased to see it had gone into pupa. It could only just have turned, as it was quite soft and of a light brown colour. It soon got harder and darker, and to-day, to my surprise, I found a lovely male specimen emerged. Is not this an exceptionally short time for it to remain in the pupa state? I thought it always remained for a year or two. I might mention that I kept the larva in an ordinary wooden breeding cage, with glass front, and gauze at the top and sides, and it never attempted to gnaw its way out. Is not this also exceptional?—W. P. Blackburne-Maze, Boundes Park, near Tunbridge Wells. *May 25th*, 1891. [When the larva of *C. ligniperda* is full-fed it makes an autumn cocoon to hybernate in. In the spring it generally leaves this cocoon, and without feeding, spins another in which it pupates, the moth emerging the following June or July. I have known a larva to pupate in the cocoon it hybernated in, but I do not think that it often does so. I have never before heard of the species not remaining in the pupal stage at least five or six weeks, nor have I heard of the pupal stage extending to more than eight or ten weeks, although the larva is two or three years coming to maturity.—Ed.]

Times of Emergence.—I can only speak from memory on this point. I have found *Nyssia zonaria* drying their wings at 10 a.m. and at 4 p.m., and more than one at each time. They may possibly emerge at all times between, but I have not noticed. *Zygæna filipendulæ* seems to emerge from 10.30 to 12 a.m. *Sesia bembeciformis* emerges here from 7 to 8 a.m., *Smerinthus populi*, 6 p.m. I bred a lot of *Vanessa cardui* some years ago, in a room facing the west, and hot in the afternoon; these emerged from 2 to 4 p.m. The effect of an east wind is very noticeable, even on pupæ forcing on my kitchen chimney-piece. As soon as the wind changes to the east they stop, and wait till it goes round again.—Geo. A. Harker. *April*, 1891.

On the broad lines I have stated (vol. ii., p. 70) insects emerge from the pupa with a certain regard to their times of flight,—a provision of nature, and one that will account for the fact that so very few captured females are infertile. By this explanation the emergence of butterflies, day-flying *Sphinges* like the *Sesiidæ*, etc., would naturally take place in the morning; and the rest some time either in the

morning, afternoon, or evening, to enable them to use their wings when their period of flight arrived.—C. FENN, Lee. *April*, 1891.

It seems to me that the result of the discussion on this subject has been to show a very general agreement with the broad proposition I laid down in my last note. Even Mr. Fenn, who is the most doughty opponent, practically yields the point when he admits that time of emergence has some relation to time of flight. If this be so, however, why should the dusk-flying Sphinges follow the example of their day-flying congeners and emerge in the early morning as I have found to be the case with the hawk moths? I do not think breeding cage observations are so reliable as field observations, inasmuch as our pupæ can hardly be considered *in statu naturâ*. Of course, field observations are less frequently possible, but a careful record of the times of finding insects either unexpanded or drying their wings, might in time be worth generalising.—FRANCIS JOHN BUCKELL. *April 29th*, 1891.

NORTHERN RANGE OF HEMEROPHILA ABRUPTARIA. — I should like to mention that this insect has been discovered as far north as Stonehaven in Kincardine, but I never heard of its being taken in Aberdeen.—WM. REID. *March 23rd*, 1891.

FOODPLANT OF H. SENECIONIS (CRETACELLA).—By the notes on the life habits of *H. senecionis* in the *Record* (vol. i., p. 326), some of your readers might think an error of observation has been made, but this is in seeming only, for like many other species of lepidoptera the larva is an internal feeder only when small. Thus both statements are correct for it mines the tops of the stems whilst young, afterwards living within a compact web which envelops the whole of *small* flower shoots. I have seen the central blossom thus surrounded but only in small plants, when vigorous the side flowering stems will alone be attacked. It used to be common at Chattenden, and the perfect insects were larger from there than anywhere else I know of.—SYDNEY WEBB, Dover. *March 22nd*, 1891.

FOODPLANTS OF HOMÆOSOMA NEBULELLA AND H. SENECIONIS.—I bred a number of *H. nebulella* from the dwarf thistle *Cnicis acaulis* from the dry pastures in Norfolk. Of *senecionis*, some years ago, I bred large quantities from larvæ feeding in the top of ragwort under a web. The fat brown larva was at home among its frass. There is always plenty of breeze on the coast where I got them. I have two specimens without any markings whatever, the ground colour being as in the typical form.—J. B. HODGKINSON. *March*, 1891.

SUGGESTIONS FOR A NEW WORK ON BRITISH TORTRICES.—It may be treading on old ground to suggest the great want of a thoroughly practical work, with accurately coloured plates, on the British TORTRICES, but I am induced to re-open the subject by personal need of it. Stainton's standard book of reference exists, but it is not by any means up to date; and there are other works, obsolete, untrustworthy, inaccurate, which I can only describe as "brain-twisters" to young or any aged students of this most interesting group. Doubtless the number of micro-lepidopterists in Great Britain is comparatively small, and only the valiant attack the TINEINA, but would it not be a step in the right direction to contemplate—contemplation often precedes action—the advisability of a modern work on TORTRICES. There must be a round

dozen of earnest students of this group who would not deny—in book form—the results of long and careful research to their less experienced brethren, and there must be as many, or more, gentlemen willing—I believe anxious—to support the publication of such a work by qualified hands. Why should it not be a standard work? Through the careful co-operation of micro-lepidopterists much might be achieved; unity is strength, and accurate notes of individual species from past, present, and future working might be sent in monthly to a committee competent to arrange and select everything that would be permanently useful. This might be carried on for a couple of years without unduly rushing into print, or incurring any expense, meanwhile it could be ascertained, by means of the entomological journals, if a satisfactory number of subscribers could be obtained. It is within the power of the beginner to supply facts which the collector of half a century may have overlooked. In this way, a vast mass of information might be collected and sifted, and a book given to entomologists of the utmost value. General co-operation, guided and kept in hand by a committee, would obviate friction, and everyone might hope to contribute data for the good of all, and perhaps obliterate to a certain extent that tendency to secrecy, which may be regarded as the typical failing of the British entomologist.

These crude remarks merely skim over an important subject, but they may serve to bring it to the front, and I shall be glad if they elicit the opinions of experienced collectors. Such a book as I advocate, compiled and published by the activity of many, would surely be of more value, and more easily carried into effect than any individual effort, however praiseworthy.—R. E. Salwey, Folkestone. *May*, 1891.

[I should be pleased to have practical suggestions from those, and only those, willing to help. Something definite might then be arranged. I think I could devise a satisfactory method of collecting, collating and arranging the information obtained.—Ed.]

Societies.

Entomological Society of London.—*June 3rd*, 1891.—Mr. E. B. Poulton exhibited living larvæ of *Endromis versicolor*, and commented on their habits. Mr. W. F. H. Blandford called attention to the fact that the larvæ of *Liparis monacha* remained in small groups on the bark of the tree for about a week after emerging from the eggs, and that this fact was taken advantage of by the German foresters to destroy them. Also that he had himself verified the statement that uric acid can be detected in the malpighian tubes of insects. Mr. M'Lachlan agreed that the demonstration that the malpighian tubes were of the nature of renal organs was now satisfactory. Mr. C. J. Gahan exhibited two species of Coleoptera that he considered to possess a mimetic resemblance. Mr. Tutt exhibited a hybrid between *Amphidasys prodromaria* and *A. betularia*, obtained by Dr. Chapman. Mr. Stainton commented on the fact that the two insects appeared at different times; and Mr. Tutt stated that the *A. betularia* had been subjected to forcing, so as to cause it to emerge at the same time as *A. prodromaria*. Mr. Tutt also exhibited forms of *Caradrina*,

some of which he said were considered distinct on the Continent, though they were not recognised as such in this country, *viz. Caradrina taraxaci* (*blanda*), *C. superstes*, Tr., from Sligo, and *C. superstes*, H.-S., considered as synonymous with *superstes*, Tr., but apparently more closely allied to *C. ambigua*. Mr. Bristowe exhibited varieties of *Arctia menthastri*, some of which had been fed on mulberry and others on walnut; no difference was observed in the variation. Mr. G. Elisha exhibited larvæ in their cases of *Coleophora vibicigerella* and *C. maritimella*. Mr. A. G. Butler communicated a paper entitled "Additional notes on the synonymy of the genera of Noctuid Moths." —David Sharp, V.P., *Acting Secretary*.

South London Entomological Society.—*Thursday, May 28th*, 1891.—Mr. Fenn exhibited a long and varied series of *Biston hirtaria*. Mr. Adkin, specimens of *Endromis versicolor* which had been three years in pupæ. In 1889, two ♂'s were bred, in 1890 five ♀'s and one ♂. Another brood fed up in 1884 emerged as follows:—1885, one ♂ and eight ♀'s, in 1886, twelve males, giving a result of twenty-one moths from twenty-five ova. Mr. Fenn stated that the late Mr. Tester had given him facts relative to the same species lying over five years. Mr. Tutt gave some results *re Eriogaster lanestris*, whilst Mr. H. T. Dobson gave some particulars *re* a brood of *Cuspidia leporina*, the period of emergence going over three years, sixty per cent. of the emergences occurring in the second year; whilst in *Notodonta chaonia* similar facts were observed. Mr. Hall referred to *Emmelesia unifasciata*, Mr. Adkin to *Petasia nubeculosa* and Mr. Tutt to the Shetland *Emmelesia albulata* and *Eupithecia venosata*. Mr. C. G. Barrett referred to the *Cucullias*, and Mr. Tutt mentioned that *Cucullia scrophulariæ* had lain over with him, and that this species, so distinct as it was from *C. verbasci*, was liable to be confounded with *C. lychnitis*, and that although there was no doubt of the distinctness of both these species and *C. verbasci* on the Continent, *C. scrophulariæ* was rare and but little known in England. Mr. C. G. Barrett concurred in these remarks. Mr. South exhibited *Vanessa antiopa* from Japan, China, India, France and Germany, and two fine vars. *hygiæa*, with the pale costal blotches extended. Mr. Cockerell exhibited an American specimen. A discussion ensued on the abundance of this species in 1872, Messrs. C. G. Barrett, Fenn and Tutt making some remarks on the occurrence of the species in that year. The character of the green on the underside of *Thecla rubi* was discussed, and Mr. C. G. Barrett stated that in specimens recently emerged and not fully developed, the underside was brown and not green. Mr. H. Moore exhibited an orthopteron—*Meroncidii ochraceus*, from Trinidad. Mr. South, parallel series of *Cidaria suffumata*, exhibiting the typical form and a var. with distinct band and pale ground colour from Dover. Mr. Adye, a large specimen of *Notodonta chaonia* and a dark specimen of *Cucullia chamomillæ*. Mr. Tutt exhibited a hybrid between *Amphidasys prodromaria* and *A. betularia* belonging to Dr. Chapman together with typical forms of the latter species, also various *Caradrinidæ* including *Caradrina blanda* (type), *C. superstes*, Tr., and *C. superstes*, H.-S., recently added to the British fauna in *The British Noctuæ*, etc., pp. 148–151, and *C. ambigua*. He made some remarks on the differential characters of the speci-

mens; Mr. C. G. Barrett made some observations on this exhibit.—Ed.

City of London Entomological and Natural History Society. —*Thursday, May 21st*, 1891.—Exhibits:—Mr. Smith, *Saturnia carpini* from Wicken and Lyndhurst. He pointed out that the specimen bred from the light (Wicken) cocoon was darker and browner than that bred from the dark (Lyndhurst) cocoon. Mr. Prout, a fine yellow-suffused specimen of *Abraxas grossulariata*, a dark var. of *Amphidasys prodromaria*, *Nyssia hispidaria*, *Selenia illustraria*, and other Geometræ. Mr. Clark, series of *Tephrosia crepuscularia*, bred from an Epping Forest female. Mr. Bellamy, series of *Anticlea badiata*, taken on lamps at Winchmore Hill, one of the specimens being dark, and having a very distinct white band on the front wings. Mr. Bayne, *Tæniocampa stabilis* and *T. gothica*, some of the former being asymmetrically marked. Mr. Milton, *Selenia illustraria*, *Iodis lactearia*, *Ennychia octomaculalis*, *Halias prasinana* and *Myelophila cribrella*. He also exhibited Coleoptera—*Agabus didymus*, *Liopterus agilis*, *Bolitobius atricapillus*, *Cteniopus sulphureus*, *Tenebrio mollitor* and *T. obscurus*; Hymenoptera—*Cimbex lutea*, *Abia nigricornis*, and *A. sericea*; Plectoptera—*Ephemera danica*. With reference to the last order of insects, he said that it was often stated that they only lived a few hours, but he had kept several of them alive for more than a day. Mr. Simes exhibited *Eulophus damicornis*. Mr. Kirby, a hymenopterous parasite bred from *Demas coryli*. Mr. Smith, having spent Whitsuntide in the New Forest, stated that, owing to the backward season, and the bad weather, he had found insects scarce, the chief captures being *Cucullia chamomillæ* and *Lobophora hexapterata*. Messrs. Prout and Bayne had worked Epping Forest, and found Lepidoptera very scarce. Mr. Milton had taken several larvæ of *Halias quercana*, in the same locality. Mr. Battley stated that *Lycæna argiolus* had been fully out at Southend for the last fortnight.

Thursday, June 4th, 1891.—Exhibits:—Mr. Tutt, two specimens of *Vanessa atalanta* bred from larvæ taken at Deal, both of them having the right fore-wing very small, but perfectly expanded; two pupa cases of *Retinia resinana*, showing the way in which the larvæ feed on the pine twigs; and a series of *Halias chlorana*. With reference to the last species Mr. Tutt stated that the larvæ were to be found spun up in the top shoots of willows and osiers in the autumn. He pointed out the affinity of the larva to those of the genus *Nola*, and remarked that the imago has a light band across the front wings which is difficult to see when the insect is set, but is very conspicuous when it is at rest. Mr. Battley exhibited various lepidoptera from Southend (Essex), including *Lycæna argiolus*, *Biston hirtaria*, *Aleucis pictaria*, *Cilix spinula*, several Tæniocampidæ, and *Psyche pullella*. Mr. Smith, *Pachycnemia hippocastanaria*, *Ephyra punctaria*, *Anarta myrtilli*, etc., from the New Forest; also on behalf of Mr. Tremayne, *Lobophora hexapterata*, *Eupithecia nanata*, vars. of *Fidonia atomaria*, *Phytometra ænea*, etc. from the same locality.

Dr. Buckell exhibited a series of *Biston hirtaria*, on which he made some remarks. He stated that the bright green ova of this species were deposited in large clusters. He had never found them in a state of nature, but judging from those deposited in captivity, one would expect to find them in crannies of the bark, although the

lime, its favourite food in London, was not a tree that had a rough surface. He suggested that the female might ascend to the boughs for ovipositing. The larvæ are very general feeders, almost every tree and shrub being attacked by them. The imago is interesting as having a tendency, especially in the females, towards a diaphanous condition. The colour of the blood differs in the two sexes, that of the males being yellow, and the females green. The type form in London may be said to be yellowish brown, with transverse black bands, the band near the hind margin being especially prominent, but in some specimens the yellowish brown ground colour is replaced by grey, while in others (especially females) the darker colour extends entirely over the wing, which thus becomes almost melanic. In another variety the transverse bands become reduced to lines, and occasionally the area between the outermost band and the hind margin, which is normally pale, becomes black. The insect emerges from the pupa usually between 11 a.m. and 1 p.m., pairing takes place the same night, the pairs remaining together until late on the following day, the ova being deposited during the next night. He remarked on the abundance of this species in London, where he had taken it usually on lime and acacia trees and occasionally at light, but judging from the readiness with which it exchanged, it would appear that it was not generally common in the country. Mr. Tutt stated that he had seen male specimens of this species from Germany which were quite black, and that a local race occurred at Rannoch, but that although he had reports of the insect from many localities in England, it did not seem to be so exceedingly common elsewhere as in London. Mr. Prout had bred it from the ova, and had found that it would eat hawthorn freely. He had also taken the larvæ on pear in his garden. He noticed that they were more brightly marked when young than when more advanced in age. They pupated in or on the earth, without forming any cocoon. Several of the females had failed to develop their wings, and he suggested that this was owing to the sluggish habits of the insect, and that, as their wings were used so seldom, they were gradually becoming apterous, like the allied species, *Phigalia pilosaria* and *Nyssia hispidaria*. Mr. Battley remarked that he had a specimen in his box, taken at Southend, but it was the only one he saw there. He had found the larvæ common in his garden on the side-shoots of elm and poplar, which seemed to point to the ova being deposited in the cracks of the bark. Mr. Simes had also noticed that the larvæ were most common on the lower boughs of trees.

Mr. Heasler exhibited a series of *Hallomenus humeralis*, taken in fungi at Mitcham. Mr. Smith stated that he had found *Ephyra trilinearia* and *Platypteryx unguicula* common at Epping Forest. Mr. Battley had taken twenty-five larvæ which he believed were *Apamea ophiogramma*, feeding in the interior of the stems of riband-grass in his garden. Mr. Jackson had worked in the New Forest and Isle of Wight, and had taken *Tæniocampa rubricosa*, *T. stabilis*, *Agrotis puta*, *Phibalapteryx vitalbata*, *Boarmia cinctaria*, *Tephrosia consonaria*, *Ligdia adustata*, and larvæ of *Cleora glabraria*, *Boarmia abietaria* and *Geometra papilionaria*.—G. A. Lewcock and A. U. Battley, *Hon. Secs.*

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MELANISM AND MELANOCHROISM IN BRITISH LEPIDOPTERA.

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

(*Continued from page* 80.)

Having now considered this subject from many points, I think we may safely assume that the general cause of melanism is to be sought for in meteorological influences, and that this cause must act in some way on the larva. It is during the larval existence that the insect is constitutionally strengthened or weakened, and that it is during this period that some active exciting cause acts, is evident, otherwise we should not get a sudden development of dark forms in certain seasons. Mr. J. Jenner Weir writes:—"You are quite correct about the colour of the wings being determined by the condition under which the larva feeds. This is quite true of the horeomorphic species of Rhopalocera in India, Java and other Eastern districts" (*in litt.*), *vide* also *Entom. Record*, etc., vol. i., pp. 30 and 31. Mr. Merrifield—as I have pointed out before—also found the larval, the stage most affected by external conditions. I think we may safely assume that the larval, is the stage in which the melanism-producing factor exerts the greatest influence.

To account for this, no theories have as yet been advanced worthy of the name. I have two, however, one written by Mr. T. D. A. Cockerell, the other by Dr. Chapman, two of our most original and thoughtful lepidopterists. Mr. Cockerell assumes what I have proven, that the change is accompanied by a change in humidity. He then supposes that moist air may absorb some melanism-producing product of decomposition, and then he adds:—"A moderately moist air in a town might produce the same effect as very moist air—say, in

Scotland or elsewhere: thus if m = moisture and p = the melanism-producing product, then :—

2m + 1p might have the same effect as 1m + 2p.

That is supposing there to be an excess of moisture (2m) which held a certain amount of melanism-producing product (p), as might be the case in the very moist humid districts, then it might have the same effect as twice the melanism-producing product (2p) in half the quantity of moisture (1m). If this were so, we should in effect get the same results in the wet districts of Britain as in those less humid districts containing more of the melanism-producing product." Mr. Cockerell then goes on :—"If we assume that 1m absorbs 2p, the products being thus—

$$2\,m + 1\,p = m_2\,p$$
$$1\,m + 2\,p = m\,p_2$$

$m\,p_2$ (the town effluvium) is here stronger in p than is the $m_2\,p$, but it is more diluted with air (on the supposition that the air has less moisture, and therefore can carry less p); so that if 2 ($m_2\,p$) is diluted in 1 cubic foot of air, then there is $m_4\,p_2$ to 1 foot of air; and also if 2 ($m\,p_2$) is diluted in 2 cubic feet of air, then there is $m\,p_2$ to 1 foot of air. That is, each foot of air contains the same quantity of p.

This is perhaps badly put, but you will (I think) see what I mean." I think the idea is very well put, and anyone who understands the simplest forms of chemical equations, will see what Mr. Cockerell means. It must be remembered, however, that this is purely theoretical, although it is quite warranted by the facts at our disposal.

(*To be continued.*)

SCIENTIFIC NOTES.

THE FUNGUS TORRUBIA ROBERTSII ON THE LARVA OF HEPIALUS VIRESCENS.—At the beginning of the year 1890, a friend who had just returned from New Zealand shewed me two of these larvæ which he had bought from the natives. At that time I knew little more of their life-history than is contained in the *Entomologist* (see below) and all the information my friend could obtain from the natives did not add much to it. According to their version, the peculiar appendage is not fungoid, but the result of the larva having eaten a seed of the "Rata" vine (on the leaves of which they said it fed), which, having germinated, kills the larva, and, continuing to grow absorbs its tissues and produces the extraordinary appendage. Such, though very erroneous, is their version. Among scientific works, I have only been able to discover in one single instance anything of a satisfactory description, sufficient to satisfy the

desire for detail which an entomologist must have. *Entom.*, vol. xi. (1878), No. 181, p. 121, Dr. F. Buchanan White says:—"The order Lepidoptera is not the only one attacked by species of this genus (*Torrubia*), for there are records of at least four other orders, *viz.*: Coleoptera, Orthoptera, Hemiptera and Hymenoptera, having been attacked. One of the earliest accounts of such an occurrence appears in the *Philosophical Trans.* (for 1763) *of the Royal Society*. . . . "The vegetable fly," etc. To the above orders named may be added Heteroptera, Homoptera, and the allied order Arachnida. Probably the earliest reference to insects forming the bases of fungi is to be found in the writings of Christian Franc Paulinus, in the ninth century, who states that "certain trees in the Island Sombrero in the East Indies have large worms attached to them underground in the place of roots," etc. Here reference is also made to *T. robertsii*. *Entom.*, xxii. (1889), No. 318, p. 284, Mr. Geo. J. Grapes writes:—"My son writes from Paraparaum, New Zealand: 'I have obtained a veritable entomological curiosity for you . . . . . a dark olive green caterpillar about three inches long, which, when full fed, drops or descends from the tree, ostensibly to enter the ground for the purpose of pupation, but which process seem to be arrested by some mysterious cause, and instead of becoming a pupa, a twig-like plant, sometimes forked, about four or five inches in length, grows apparently indifferently either from its head or tail, etc.'" A footnote by the editor says:—"They prove to be the well known fungus *Torrubia robertsii*, which attacks certain larvæ in New Zealand. We have some of the allied fungi in this country."

Wood's *Illustrated Natural History*, Vol. 1, p. 530:—"*Hepialus virescens* is a truly curious insect, not so much from its form and colour, but from the strange mischance which befalls the larvæ; the vegetable taking the place of the ichneumon fly, and nourishing itself on the substance which gives it support. A kind of fungus affixes itself to the larva and becomes developed in the strange bed taking up gradually the fatty parts and tissues of the caterpillar until at last the creature dies under the parasitic growth, and is converted almost wholly into vegetable matter."

Buckland's *Curiosities of Natural History*. . . . "A living creature becoming converted into a vegetable. . . . . occurs in a caterpillar that lives in New Zealand. There are several specimens at the College of Surgeons. We see a caterpillar as hard as if it were carved out of wood, and from it growing a long stem. The history is as follows. The caterpillar eats a fungus, or the sporules of a fungus, and these immediately begin to grow in its inside. The beast feels uncomfortable, and possibly thinking it is going to turn into a chrysalis buries itself in the ground and there dies. The fungus goes on growing and absorbs the entire contents of the skin, taking the exact form of the creature. Having done this, it throws out a shoot, and this always at a certain fixed spot, *viz.*, at the joint at the back of the head. . . . . This caterpillar is found also in China, where it is used for food."

There are also very many other notes distributed through a large number of works on fungi, etc., giving nothing in the way of particulars beyond the mere mention of their existence. The following more special information is derived from a very valuable and rare paper printed privately in 1858, by "G. R. G.," a copy of which is in my

brother's possession. "Fungoid parasites of some form or other are now known to attack almost every order of insects, and, with this in mind, it would seem a strange and unaccountable fact that, as far as is known, diurnal lepidoptera have hitherto been unrecorded, as being the basis of fungoid parasites of any sort. There appears to be no doubt that the specimen in question is anything other than the fungus *Torrubia robertsii*, grown out of the larva of *Hepialus virescens*. The perfect insect, which, I believe is indigenous to New Zealand, is of a satiny buff colour with green irregular lines distributed over the surface of the upper wings. There is another species, *H. rubroviridans*, of a larger size and with the underwings of a pale rusty colour, the larvæ of which may become the bases of this parasite. These larvæ are usually found in certain districts during the spring, beneath the "Rata" (in reality a species of myrtle, but commonly called a vine) and tree ferns growing in a light, porous and peaty soil, under which the caterpillar burrows perpendicularly in search of its food (which consists of the young fibrous roots), and afterwards forms horizontal chambers in passing from one root to the other. It does not pass any portion of its life on trees, as is supposed by some writers, but the insect remains in the earth during the larval and pupal stages. Probably the parasite becomes connected with the caterpillar by means of the seed being taken with the food and thus passing into the interior of the insect, which had previously become sickly and weakened by the rains which fall in great quantities, saturating the ground around it. It is only after such atmospheric influences that the germination of the plant predominates over the growth of the insect, which is found of various ages in various stages of growth. Its interior becomes completely filled by the inner plant or thallus, after which, the outer plant or fungus, passing to maturity, forces a way out through the tissue of the joint between the head and the first segment of the thorax. The fungus grows to various lengths, in some examples to ten or more inches. This depends on the depth to which the caterpillar may be buried at the commencement of the outer growth of the fungus. It is stated that it "settles itself head upwards to undergo its change when the vegetable develops itself," but the caterpillars are subject to the full development of the parasite at various periods of their growth, certainly some, from their size, are attacked long before they are sufficiently matured to place themselves in that position. The base of the plant invariably rises perpendicularly from its origin, before it is bent, as if the larva had become stationary in a horizontal position (or nearly so) in consequence of its being affected by the internal thallus, and the plant had then naturally made its way directly upwards to the surface of the soil, which it would eventually surmount by two or three inches, which portion becomes granulated when matured. It has been affirmed that the fungus, after appearing above the earth, has been gradually drawn through the loose soil with the caterpillar attached, when the latter has been found in a living state. The stem is not strong, but if broken a new stem arises from or near the same place, a fact which the *Medical Times*, forty-six years ago, said "is not known to occur in any other plant with which we are as yet acquainted in the vegetable kingdom." In the same year the same paper says:—"The parasite is never known to germinate except in connection with the body of one of these caterpillars" (*H. virescens?*). If such be

the case it is in contradiction to what both of two authorities say, when, on p. 7, it is said that "*H. virescens* and *H. rubroviridans* may readily become so."

The natives are said to eat the plants, which when fresh, have the flavour of a nut, and also use them when burnt, as colouring matter for their tatooing, rubbing the powder into the wounds, in which state it has a strong animal smell.

The New Zealand name for this plant caterpillar is "*Hotete*" "*aweto.*" "*Weri*" "*anuhe.*"—J. Herbert Stott, 63, Manchester Road, Bolton. [The parasitic fungus, mentioned by Mr. Stott as *Torrubia*, is now generally known as *Cordyceps*, and belongs to the Ascomycetes. Several species of *Isaria*, formerly placed in a quite distinct genus, have been found to be simply a phase in the "alternation of generations" which ends in the ultimate production of *Cordyceps*. In the *Journal of Microscopy*, 1890, pp. 73–82, is a most interesting paper on "The parasitic fungi of insects," by G. Norman, M.R.C.S., with plates, in which the writer refers to a *Cordyceps* which has a New Zealand larva for a host, but this species is called *C. taylori*. I would also direct attention to the *Entomologist's Record*, vol. i., p. 267, where similar larvæ are mentioned.—Ed.]

Wing Expansion.—Has it ever been noticed how much more rapidly the wings of most diurnal lepidoptera expand than those of truly nocturnal-flying species? It is true that the former frequently place themselves in such a situation that the rays of the sun fall directly upon them while expanding their wings, which is rarely the case with the others, but this cannot be the only solution. The idea of investigating the cause of expansion of the wings of lepidoptera is a good one, and might easily be settled, as far as evaporation or coagulation is concerned, by any competent microscopist. Coagulation, I should say, can hardly be the cause, as the result would not be uniform, and I doubt much if evaporation either has anything to do with it. My reason for this is as follows: The wing of any lepidopterous insect is composed of two membranes, supported on a framework of nervures. That this is the case has been proved conclusively; for I recollect, a few months ago, Mr. Waterhouse exhibited, at the Entomological Society of London, a wing of one of the large American *Saturnidæ* (I am writing from memory), which he had successfully split into two, or divided the upper from the lower surface. Had the space between these two surfaces been expanded by a liquid, which coagulated or dried on the completion of the expansion of the wings, I should think that such an operation would have been absolutely impossible. But there is no objection to the theory that the expansion may be caused by an injection of liquid into the hollow nervures, causing them to stretch to their full extent and carrying the membranes with them. The excess of the liquid is probably the opaque drop which is after expansion, never before, exuded by the insect. I merely suggest this as my own idea, but as I am not a practical physiologist, I daresay Dr. Buckell can tell us if this be possible.—C. Fenn, Lee. *April*, 1891.

Physiology of Expansion.—No one but Mr. Fenn seems to have tackled this question:—(1) As to expansion. The unexpanded wing is a miniature of the expanded. Newman, at p. 14 of *British Butterflies*, quotes from Kirby and Spence to the effect that the two membranes of

which the wing is composed are, in the unexpanded state, corrugated into a vast number of folds, transverse as well as longitudinal, and that the nervures are folded. Are any of our readers microscopists? If so, will they try and verify this statement. Nicholson, in his *Manual of Zoology*, p. 318, states that "each nervure consists of a central trachea or air-tube running in the centre of a larger blood-tube." It seems probable, however, there is no minute series of blood vessels in the wings, but that the blood which passes into these peri-tracheal vessels. simply finds its way anywhere between the two membranes. Curiously enough, when I specially wanted this year to get specimens of *Biston hirtaria* with saccular dilatation, I have only met with one. Examining that with an indifferent microscope, it was evident that the fluid was lying free in the general cavity between the two membranes. I tried to see whether it was possible to press the fluid into other parts of the wing; there was great resistance to any such proceeding, and it seemed as if the two membranes had become joined together, as is affirmed to be the case by Kirby and Spence in the extract quoted by Newman, I thought, however, that I did see some slight tendency for the fluid to make its way; but, on this point I am in doubt, as the sac burst just as I observed this. Mr. Fenn's report of Mr. Waterhouse's demonstration seems opposed to the theory that the two membranes become united, but how did Mr. Waterhouse conduct his experiment? The specimen used was one in which the membranes would certainly be thicker than in the smaller moths, and it may be that some soaking process was used in order to get the membranes apart. Expansion must be the result of some *vis a tergo*, *i.e.*, the insect must unroll the corrugations by forcing between them either blood or air. I incline to the belief that the former is the agent. 1. The wing, when expanded, is for a time limp. This would easily be accounted for if the expanding agent were fluid, it would be difficult to understand if it were air. 2. The attitude taken up by the insect is such that aid is given by gravitation, especially when it is remembered that the blood leaves the heart at its end nearest the head. Many insects bred in our cages go up to the roof of the cage to expand. I do not know whether in nature any take up a corresponding position on the underside of a branch. 3. I do not find any evidence that the tracheæ forming the central tubes of the nervures discharge at their distal end into the general inter-membranous cavity, but the blood vessels surrounding them undoubtedly do. Mr. Fenn seems to suggest that the blood is only forced into the blood vessels in the nervures. At present I incline to the idea that the phenomenon of saccular dilatation points to a more general presence of the blood, but on this, observations are too few to dogmatise. (2) Stiffening. After a certain time the limp expanded wing becomes firm and stiff. How is this brought about? I am not sure that I quite understand Mr. Fenn's suggestion. What I suppose him to mean is that the fluid which has been forced into the blood vessels, causing them to unroll and so expand the membranes, is again withdrawn into the body of the insect and exuded. My difficulty with regard to this is that I know of no organ which could thus suck the blood up from the wings. There must, of course, be muscular structure connected with the wings, but I should expect the muscles to be short and attached to the wing near its base, and therefore not in a position to

press the blood in the wing vessels back towards the heart. Moreover, there is no evidence of muscular action in the wing during stiffening. I am disposed to think the process is probably one of coagulation and evaporation. I hope some other entomologists will make such observations as may be possible towards the elucidation of the problem.—Francis J. Buckell. *April*, 1891.

By pricking the wings of insects, when they are expanding, with a needle, I find that they always exude a greenish liquid, which soon hardens into a solid mass; and I have always looked upon this liquid as the medium by which the wings were expanded, evaporation and coagulation completing the work. The "opaque drop" exuded by the insect after expansion, and noticed by Mr. Fenn, I look upon as the natural exudation of the insect, the difference in colour between the expanding liquid and the exudation is due to the fact that the insect, as often as not, exudes in the pupa case before leaving it, and the difficulty which I find in understanding how the liquid could find its way from the wings, change colour and be exuded by the insect, makes me hesitate in connecting the two phenomena. Is it not more natural to think that the "opaque drop" is only an excess of the insect's excrement? *Re* the theory whether the blood only passes through the large nervures or is more diffused, I leave the settlement of this to others more experienced and observant than myself; simply stating here that I am inclined to think the blood is diffused over all the wing, that it flows from the body through the vessels around the large nervures, and from thence is discharged into every part of the wing. Did Mr. Waterhouse operate upon a newly-expanded wing, or upon one which had had time to stiffen? Saccular dilatation I can only explain by the supposition of air sometimes being forced between the wing membranes and sometimes by an excess of blood.—W. Reid, Pitcaple. *May*, 1891.

I have been interested in the microscopic anatomy of insects, and the question of the "how" of the expansion of the wings after the emerging of the imago, has never seemed clear to me. From the microscopic observations I have made, I make out that the spiral appearance of the air tubes in the wings is not visible in the unexpanded wing, it is not easy to see at times, even in the fully expanded tissue, but the expansion, as it takes place, is all in the direction of length, the breadth of the wing being built up, of course, of laterally expanded nervures. It has seemed to me that the penetration of the fluid blood of the insect into the tubes surrounding the air vessels has a great part to play in this springing open of the spiral air tubes. In the complete air tube there is a spiral space between each coil of the tube, the tube is elastic, and may be compressed under the microscope, it springs out again on being released; may not the mere penetration of moisture be sufficient to determine the partial uncoiling of the air tubes, which are compressed in the unexpanded stage?—Gerard Smith, Upper Clapton, N.E.

With regard to wing expansion, there appears to be no reason for supposing that the blood passes along the nervures, other than in the capillary vessels surrounding the central tracheal passage. That the wing consists essentially of two layers, and that a fluid passes evenly between them is beyond question. I have repeatedly noted that this is so, and have carefully observed and separated the membranes, during

the last few weeks, in newly emerged specimens of *Arctia lubricipeda*, *A. menthastri*, *Smerinthus ocellatus*, *Limacodes testudo*, etc. During expansion, pricking the membrane at any portion of the wing results in the exudation of a drop of fluid. This fluid disappears rapidly when expansion is completed, and dries from the base. When saccular distension takes place, the mere fact of killing the insect and leaving it to dry does away with the distension, the fluid evaporating, but in this case the membranes, previously stretched by the excess fluid, contract and dry irregularly. If the exudation of the insect had any connection with the fluid by which expansion is brought about, it would be difficult to explain why newly emerged insects, if touched or pressed will exude first, and the wings afterwards expand quite normally.—J. W. Tutt. *July*, 1891.

Generic Nomenclature and the Acronyctidæ.—With reference to Mr. Tutt's remarks in the June part of the *Entomologist's Record*, I may say that the whole question of entomological nomenclature is extremely difficult and complicated, and cases continually arise which can hardly be decided by any existing rules. Some of these, but by no means all, are considered in the preface to my *Catalogue of Neuroptera Odonata*. The number of generic names of insects (some in current use, others ignored, some characterised more or less completely, and others not at all) is so vast that I think it most desirable to avoid adding to the mass unnecessarily. Hence I would never rename a genus for which any existing name, characterised or otherwise, is available. To quote from my preface (p. v.):—"The limits of a genus are always variable, and its characters subject to modification, both according to the increase of our knowledge, and to the divergent views of different entomologists; hence, although no generic name ought to be issued without a description, yet the fixing of a type, which must always be an identifiable species placed in it when the generic name is used for the first time [and one which does not contradict the characters of the genus, if any are given, or the meaning of the generic name, if it has any] appears to be even more important, for no real certainty can be obtained without. In fact the fixing of the type of a genus is to the description what the figure of an insect is to the description of a species." Hübner was far in advance of his age, and perceived that a much more minute subdivision of species was necessary than other entomologists were willing to admit for fifty years afterwards, and he tried various experiments in nomenclature with more or less success. It was natural enough for Boisduval, in whose time 20 or 30 of Hübner's "Coitus" (as the latter called subdivisions corresponding to our modern genera) were regarded as one homogeneous genus, to reject Hübner's work on principle; but we cannot do so now, when we subdivide genera to the same extent as Hübner, only that we subdivide them differently, according to what we consider, with our present increased knowledge, to be more important characters. If every author who alters or improves the characters of a genus considers himself at liberty to rename it, or to impose a new name on any subdivision of a genus, without inquiring whether any name exists which can lawfully be applied to it, we may as well abandon the study of entomology as foredoomed to hopeless and irretrievable confusion.

I have not yet sifted the nomenclature of the *Acronyctidæ*; but I

may say that Pastor Wallengren so far agrees with Mr. Butler as to include the whole of the *Noctuæ Trifidæ* among the Bombyces. With respect to Hübner's genus *Triæna*, it is used first[1] in the *Zuträge*, i., p. 21, for *T. psi*, L., and *T. tritova*, Hüb.; and therefore one or other of these two species is indubitably the type, if the name is not preoccupied or otherwise forestalled. At first sight it would seem easy enough to apply the rule of taking the species first mentioned under any new generic name as the type; but even this is not without occasional difficulties. Thus, some years ago, Snellen Van Vollenhoven figured a moth as *doubtfully* belonging to Felder's genus *Crambomorpha*, which was not published by Felder till a year or two later. Thus, as the species referred to *Crambomorpha* by Vollenhoven and Felder are not now considered congeneric (no characters were given by either author), Vollenhoven's species would actually be obliged to be accepted as the type of a previously unpublished genus to which he referred it with doubt, but that fortunately *Crambomorphus* had already been used as a generic name in Neuroptera, which enables us to escape from the dilemma by rejecting *Crambomorpha* in Lepidoptera, as being a generic name practically preoccupied in Zoology.—W. F. Kirby, British Museum, Natural History, South Kensington. *June 17th*, 1891. [By the above I understand that Mr. Kirby supports Mr. Butler's would-be alteration of Dr. Chapman's sub-generic names. Since *Arctomyscis*, Hb. does not contain the type of Dr. Chapman's *Bisulcia*, even by Mr. Kirby's own showing, this is a good sub-generic name. Now, on Mr. Kirby's reasoning above, *psi* is the type of *Triæna*, on the same lines we may look on *strigosa* as the type of *Hyboma*, *alni* as the type of *Jocheæra*, *leporina* as the type of *Acronicta*, and *aceris* as the type of *Arctomyscis*. But Dr. Chapman has shown that these are all, in their larval characters, etc., so closely allied that they may be grouped under his *Cuspidia*, but Messrs. Butler and Kirby argue :—This is a new name, therefore it is inadmissible, you can choose which you like of the above generic names, and give that to your genus. Mr. Butler settles that *Triæna* is the best, but why *Triæna* more than any of the other four, and why either, since neither of them answers to Dr. Chapman's diagnosis of the sub-genus? Why is it such a gross mistake to sink all five names (as all are equally inapplicable), and not a mistake to sink any four of them so long as you keep one? Why is one of these ill-characterised and (as Dr. Chapman has proven) useless genera to be retained, whilst the others are to be suppressed? Wherefore is it unconstitutional to sink one name given in ignorance, but not wrong to sink the other four? Or, putting it into another form, *auricoma* may be looked upon as the type of *Pharetra*, *euphorbiæ* (*myricæ*), as the type of *Arctomyscis*, but both these belong to *Viminia*, therefore I presume *Arctomyscis* = *Pharetra*, since either might replace *Viminia*, which must now be considered proven to every one's satisfaction. I must add that I think that the sooner the number "of generic names (some ignored, some characterised more or less completely, and others not characterised at all)" are relegated to oblivion, the better for the science, and why it is necessary

[1] Dr. S. H. Scudder has shown in his work on the *Generic Names of Butterflies* that the greater part of Hübner's *Verzeichniss* was not published till long after the ostensible date (1816).

to have to tack these ill-characterised names to our latter-day knowledge, I must own I cannot understand. It may be an interesting study to Bibliographists, but practical students want something better than these mere hazy indications, and the sooner the whole lot of Hübner's (and others') badly characterised names are thrown away, the better for the science. *Re* Pastor Wallengren's agreement with Mr. Butler to include the whole of the *Noctuæ Trifidæ* in the Bombyces, it is well to bear in mind that Pastor Wallengren, like Mr. Butler, knew nothing of Dr. Chapman's recent researches into the structure of *Acronycta*, and each had only the most superficial characters (which Dr. Chapman has since shown to be unreliable) to go on. I agree with Mr. Kirby that there is a tendency to suppose that "the study of entomology is foredoomed to hopeless and irretrievable confusion," but I do not think it is in the direction Mr. Kirby fears. As each genus is thoroughly worked out and its limits defined, the exclusion of all existent misleading names had better be swept away (rather than patched up to make them fit) and new ones substituted. Of course it may be hard on those who have created endless genera that their names should not go down to posterity in the way they anticipated, but I do not see why a feeling for Hübner's names should prevent Dr. Chapman from subdividing the genus in the way he finds it necessary to do.—Ed.]

After Mr. Cockerell's admission in the current number of the *British Naturalist*, it appears to be a great pity that he did not himself question the propriety of Dr. Chapman's sub-generic names. At any rate it would have relieved Mr. Butler of any suspicion of *animus*. His assumptions as to the action of the editor of the *Record* are possibly (and probably) altogether unwarrantable, and Mr. Lewcock seems to have measured his arguments at their proper value, although I must own my ignorance of an "Entomological Cocker." At any rate Mr. Cockerell might have learned exactly from the editor of the *Record*, how far his assumptions were correct or incorrect, and thus have had facts for publication. The editor of the *British Naturalist*, himself suggests that his assistant editor's ideas would make it "dreadfully embarrassing" for an editor, though the embarrassment is not clear in the matter of the *Record* and the *Ent. Mo. Mag.*, where every contributor uses his own nomenclature, the editors only adding, in brackets, sufficient to make such clear to their ordinary readers. In the *Entomologist*, where an objectionable list is insisted on, and in the *British Naturalist*, where an attempt is made to keep up the out-of-date *Doubleday List*, trouble may occur, but it is in each case of the editor's own seeking. The editor of the *British Naturalist* deplores the "constant and purposeless alterations in nomenclature," but apparently fails to see that, whilst every country on the Continents of Europe and America uses Dr. Staudinger and Wocke's *Catalog* as a standard of nomenclature, we still try to drag on with the old, obsolete *Doubleday List* as a basis for multitudinous dealers' lists, which appear to be the only guide that an average British collector possesses; and that, as a more or less intelligent collector gets beyond the contents of his out-of-date Stainton's *Manual* and Newman's *British Moths*, and tries to come up level with Continental thought, he has to break himself free from the trammels that his isolation has begotten, and re-learn some of the names that have long ago been proved erroneous, and about which

there is nothing in English literature to guide him. To stay our best entomologists advancing because beginners find it hard to learn the names of insects, or because collectors cannot remember a necessary change of name is absurd. It suggests to one's mind that Edison must wait because schoolboys have a difficulty with Ohms, Volts and Ampères. Perhaps Mr. Tutt's book, *The British Noctuæ and their Varieties*, will put us on a better footing, at any rate in one group, and we may hope in time to obtain a nomenclature somewhat uniform with that in use in every other part of the world, but not by sticking to a list as obsolete as our text-books.—C. Cammerer. *July*, 1891.

Larvæ in a common cocoon.—Last June I found a large brood of larvæ of *Eriogaster lanestris*, which I fed on plum in my garden. I had three cocoons with two larvæ in each. Two I broke, and found the larvæ had died without pupating, the other is still in my breeding-cage. Up to the present not a single specimen has come out, all appear to be lying over.—W. Foddy, Wolverton Road, Stony Stratford.

CURRENT NOTES.

According to the daily papers, parts of the New Forest are advertised to be sold for building purposes. Mr. C. A. Briggs makes an appeal in the *E.M.M.*, to the Entomological Society of London and others to take the matter up.

The *Daily Telegraph* also publishes several letters relative to attempts being made to close the Norfolk Broads.

It is assumed that all subscribers to the *British Noctuæ and their Varieties* have now had their copies of Vol. I. The copies in future will be 7s., the price at which the volume is published to non-subscribers.

Part III. of the *British Pterophorina* will be ready next month, and can then be obtained from Mr. Robson, Hartlepool (Price 6d.).

As will be seen from the report of the meeting of the Ent. Soc. of London for July 1st, Dr. Chapman has at last succeeded in obtaining larvæ of the common *Micropteryx calthella*. This is interesting, after the many years it has succeeded in frustrating all attempts to find or obtain the larva.

Mr. W. H. B. Fletcher has been successful in rearing hybrids between *Zygæna loniceræ* and *Z. trifolii*. Mr. Fletcher last year successfully crossed *Z. loniceræ* and *Z. filipendulæ*.

VARIATION.

Polia chi var. olivacea.—Referring to Mr. J. E. Robson's note (*Record*, vol. ii., p. 84), the type and the var. both occur here. I take them at rest on grey stone walls, tree trunks, and palings, the var. forming about 25 per cent. of the specimens taken. I have also one or two intermediate forms.—T. Maddison, South Bailey, Durham. *June 30th*, 1891.

Arctia lubricipeda var.—I have bred an *A. lubricipeda* with the posterior wings slightly flushed with pink instead of yellow; nothing

very striking, but peculiar.—William Farren, 9, Union Road, Cambridge. *June 6th*, 1891.

Thyatira batis (type).—Last summer I took a nice var. of *T. batis*, which I greatly prize as *T. batis* is so little given to variation. As far as I can judge, it seems quite perfect, evidently fresh from pupa, but instead of possessing the usual pink-tinted blotches, they are all of delicate brown, without (or to speak more correctly, having the faintest tinge of) pink. I look upon it as a genuine var. and not a fraud.—Hope Alderson, Hilda Vale, Farnborough. *May*, 1891. [Mr. Alderson has since sent me a perfectly fresh specimen, which also is without the normal pink colour. In *The British Noctuæ and their Varieties*, p. 2, I write:—"It seems very strange that the Linnæan description makes no note of the rosy colour of the spots which are so characteristic of this species, but I have an Irish specimen without a trace of this colour."—Ed.]

Dark var. of Strenia clathrata.—I took one dark var. of *Strenia clathrata*. Does anyone else take it? I cannot get more than one a year.—G. M. A. Hewett, The College, Winchester.

Pale Variety of Hepialus lupulinus.—I took a very light specimen of *Hepialus lupulinus* at rest on an oak fence in Putney Park Lane on June 14th. All four wings are of a dirty white with no markings whatever.—Charles Maxted, 7, Church Terrace, Castelnau, Barnes. *July 5th*, 1891.

Cænonympha davus vars.—One remarkable feature regarding *Cænonympha davus* is that it gets lighter in colour the further north one goes, until it is sometimes found almost white in Sutherland. In Aberdeenshire, *C. davus* is abundant on all moors, frequenting both the low swampy ground and the bare, rough, and breezy hill-sides, where their capture is a matter of some difficulty. In habits they closely resemble *C. pamphilus*, and from the nature of the ground they frequent, are difficult to get in good condition.—W. Reid, Pitcaple. *March*, 1891.

The *Cænonympha davus* (*typhon*) of Ireland is an intermediate form with fairly strongly marked ocelli, usually rather dark brown in colour, but occasionally approaching the paler Scotch form. I have never taken a typical *davus*, Hb., in Ireland. In Norway, the pale form is taken with obsolete markings, and also a small form with decidedly dark margins, rather dark ground colour and with markings not very distinct.—W. F. de V. Kane, Sloperton Lodge, Kingstown.

NOTES ON COLLECTING, Etc.

The genus Zygæna.—Do all the "Burnets" spin up on grasses, etc.? I believe there are two or more species found in Kent under the name of *Z. trifolii*. I was in the habit of taking a very large species at Sandwich, upwards of 30 years ago, in the old locality for *Melitæa artemis* which was always called *Z. trifolii*. They were excessively abundant in the small marsh just below the mill, and I frequently gathered a large number of cocoons when searching for *M. artemis* the first week in June, the moth generally commencing to appear at the end of that month. The cocoons were always spun

about 12 to 18 inches from the ground. Now comes the difficulty! I have worked a certain hill on the chalk over 20 years for *Scoria dealbata* and *Pachetra leucophæa*, and there I take another five-spotted *Zygæna* commonly, but not so common as the Sandwich insect, which also has gone by the name of *trifolii*. There are, I believe, two species under one name. The Sandwich insect is much larger and brighter than the chalk hill species, the spots deeper in colour, but the chief point is that the former insect always spins its cocoon high up on the grasses or rushes like *Z. filipendulæ*, the latter does not. I have for many years searched for the cocoon but never found it. They must either spin up close to or amongst the roots themselves. Perhaps, by pulling up the grass, they might be found occasionally, but I have never found a single one; I have seen cocoons, which I have thought might be the "Burnet," but they have always turned out *S. dealbata*. The late Mr. Sydney Smith of Walmer, and other collectors from Deal used to take the Sandwich insect and always called it *Z. trifolii*. About one specimen in ten would have the spots all joined together forming a large blotch. It would be interesting to know who really takes *trifolii*, and whether they spin up on grasses, or is the Sandwich insect *loniceræ*? I have, this year, taken some very curious varieties of the chalk hill form, some no larger than *meliloti*, others with the spots forming one blotch, their colour sometimes pinkish-yellow. I may add that the Sandwich insect does not appear so soon by a fortnight as the chalk hill one.—J. PARRY, St. Paul's, Canterbury. *July*, 1891.

As we understand species, the different forms known collectively as *Zygæna trifolii* are very puzzling. The largest and most typical specimens of *Z. trifolii* I have ever received came from Mr. Boult, and were taken at Spurn. The only blotching that I have in these specimens is the union of the central pair of spots. These are very large, much larger than from any other locality. The smallest specimens I have ever taken were found in a marshy field in North Kent. In this field I never saw a pupa, never could find a pupa, and I am satisfied that the cocoon is not spun on the grass stems in that locality. These are nearly all blotched, sometimes two, sometimes three, and occasionally all five spots being joined. From the New Forest I have a long series of *Z. trifolii* almost as small as the North Kent specimens. I did not take these myself, so I dare say they were picked over, but none of these are blotched except the central pair of spots. These, however, are undoubtedly the same as the North Kent form. I have a long series of the Sandwich form from the same locality mentioned by Mr. Parry, and these vary exceedingly. Some are almost as large as the Spurn specimens some as small as those from North Kent. Many are blotched. This, however, forms quite a distinct race from either of those before-mentioned. An exactly similar lot came to me from Capt. Robertson, caught in South Wales, and his description of the latter locality corresponded almost exactly with that at Sandwich. I was on the latter ground last night and picked off some two or three dozen cocoons spun up on the sedges as mentioned by Mr. Parry. With regard, however, to the query as to these specimens being *loniceræ*, they decidedly are not.

As to the different forms of *Z. trifolii*, there appears to be no doubt that the different local races are largely due to environment, and the

character of the foodplant. Whether these have so far developed two or even more distinct forms, differing essentially in habit I am not prepared to say, although I have noticed and been struck by the very same peculiarities noticed. Many hold that *meliloti* is not really distinct from *trifolii* but only differs in scaling, etc., such differences having been brought about by environment. Of this, as much can be written for as against, although at present I am inclined to consider it quite distinct as we understand species. On the same principle, I am inclined to think that we really have two distinct local races known as *trifolii*, but proof is undoubtedly less available than in the case of *meliloti*. That we have a distinct race of *Z. filipendulæ* I have long been convinced. This spins its cocoon on grass culms, is smaller than typical *filipendulæ*, occurs quite at the beginning of June, almost always shows traces of the suppression of the lower of the two outside spots and inhabits marshy fields. I have often supposed that this race has been brought about by the crossing of *Z. filipendulæ* and *Z. loniceræ* as both species occur commonly in the same locality some four weeks later than the others have made their appearance, and this idea has received a certain amount of probable confirmation since Mr. Fletcher has crossed *Z. loniceræ* and *Z. filipendulæ* (*Ent. Record*, i., p. 352 and ii., p. 11). As will be seen from our "Current Notes," Mr. W. H. B. Fletcher has this year succeeded in rearing hybrids between *Z. loniceræ* and *Z. trifolii*. This makes the matter still more complicated, but there is no doubt that experiments like Mr. Fletcher's and that of Dr. Chapman (*ante*, p. 83) will soon widen out our present ideas of "What is a species?" At the same time it opens out a wide range of speculation as to the development of peculiar local races, in genera similar to *Zygæna*, where the superficial characters of larvæ and imagines are so close as to render certain separation a matter of the utmost difficulty.—J. W. Tutt. *July*, 1891.

Notes of the Season (Lepidoptera).—*Reading*.—On May 10th was my first evening out, and I got a female *Dasycampa rubiginea* which gave me a nice batch of eggs. Mr. Holland and I shared them and the larvæ are getting on well. Then on the 19th, I found a female *Stauropus fagi*, with which Mr. Holland tried assembling, but it was no good; he has, however, kept the imago and she is now laying eggs. Yesterday I found a male *S. fagi*; so, though the quantity I have got this year has not been great, the quality has not been bad. I also found a *Lobophora viretata*, and afterwards Mr. Holland took three more; it has, I believe, been taken in the neighbourhood before, but never by Mr. Holland, who is quite the oldest and most experienced entomologist in Reading.—E. C. Bazett, Springfield, Reading. *June*, 1891

Above thirty specimens of *Stauropus fagi* have been taken here this year, and I have had a fine specimen sent me from Somersetshire.—Id. *July*, 1891.

Winchester.—During May I took *Nola cristulalis* freely both here and at Lyndhurst, *Boarmia consonaria* fairly freely at Lyndhurst, and larvæ are now feeding up on beech, *Epione advenaria* near here, a fair number. I have sent away the ova. Larvæ of *Geometra papilionaria* at Lyndhurst and a nice lot of *Cleora glabraria* larvæ. They have to be found with the eye on the long tails of fine lichen dangling from the oaks and beeches, and feed up very slowly. There

are a few *Lasiocampa quercifolia* larvæ about, full fed. I have taken three, and various boys have taken eight among them. Altogether the season seems a good one. I have taken a fair lot of *Orthosia upsilon* under the willow bark, they squeeze under uncommonly close pieces—and yet the ichneumons get at them a great deal. *Drepana hamula* have been very plentiful this year, but they are cruelly wild.—G. M. A. Hewett, The College, Winchester.

Ashton-on-Ribble.—About a month ago I captured a very dark grey specimen of *Tephrosia crepuscularia* (*biundularia* (?) Ed.). I have never found one before in this district, but used to take plenty of the creamy white ones in the same wood about 50 years ago. At Grange-over-Sands, a week later, *C. vacciniana* and *Nepticula woolhopiella* were very plentiful, and also *N. argentipedella*. My breeding has been indifferent. Mainly a few *N. desperatella, N. rubivora, N. serella, N. luteella* and *N. weaverella*. A nice series of *Gracilaria ononiella* has also come out, one *Elachista trapeziella* and one *Cidaria reticulata*, but it is early yet for this species.—J. B. Hodgkinson, Ashton-on-Ribble. *July 2nd*, 1891.

Chatham District.—On June 1st, with Mr. Shelton, in the neighbourhood of Chatham, we captured *Anthocaris cardamines*, *Pieris napi*, *P. rapæ* and *Lomaspilis marginata* (two), and a few days later, by beating, *Ligdia adustata* (above a dozen). At Wigmore on the 8th, I found *Argynnis euphrosyne* and other common species. Two days later at Queensdown Warren, the locality where Mr. Sabine and myself used to take so many vars. of *Lycæna adonis*, I got next to nothing, and at present I have got only one *Abraxas ulmata*. The place is all cut and spoiled, scarcely a hedge or bush left. At another locality, however, the first brood of *Lycæna adonis* swarmed, and several others of this genus. I captured in half an hour above two dozen fine specimens, similar to those which Mr. Sabine captured, and of which so much was written in the *Entomologist* about three or four years since under the name of *bellargus*. I found also a beautiful var. of *Lycæna adonis*, ♀. Upper side bright blue in the centre, shading off to a deep chocolate border and a similarly marked one of *Lycæna alexis*. On the 12th at Chattenden, I got one *Chelonia plantaginis*, two *Scoria dealbata*, three *Procris statices*, one *A. cardamines* (the smallest I have ever seen), and other common species, also *Acidalia remutata*, *Asthena candidata* and *Halias prasinana*.—J. Tyrer, Chatham. *July*, 1891.

Pitcaple, N.B.—There has been too much cold weather this spring to have been a good season as yet, but insects are now appearing in greater numbers. Up to the present I have seen *Vanessa urticæ*, *Pieris brassicæ*, *P. rapæ*, *P. napi*, *Polyommatus phlœas*, *Tæniocampa stabilis*, *T. instabilis*, *T. gothica* and var. *gothacina*, *Calocampa exoleta*, *C. vetusta*, *Dasypolia templi*, *Pachnobia rubricosa*, *Trachea piniperda*, *Larentia multistrigaria*, *Cidaria suffumata* and var. *piceata*, *Anticlea badiata*, *Chesias obliquaria*, *Selenia illunaria*, *Crocallis bidentata* and *Fidonia atomaria*.—A. D. Connon, Woodend Brace. *June 5th*, 1891.

I have been having good sport among the hills, the severe frosts have prevented night work but the sun has shone out brightly during the day, and in consequence many species have been abundant. In one locality, *Argyrolepia baumanniana* fairly swarmed; and among others I have taken the following:—*Penthina ochroleucana*, *P. dimidiana*, *Euchromia purpurana* (2), *E. arbutana*, in fair numbers, *Orthotænia ericetana*,

Cnephasia politana abundant, *C. musculana*, *Phoxopteryx unguicella*, *P. myrtillana*, *P. lundana*, *Coccyx cosmophorana*, *C. vacciniana*, *Retinia resinana*, also some of the rarer Tortrices and other things.—W. Reid, Perthshire.

Tullamore.—I have been across the bog near Tullamore to-day but saw no *Cœnonympha davus* or *Macroglossa bombyliformis*. One or two *Anarta myrtilli*, one *Eupithecia satyrata*, some *Thecla rubi*, some *Saturnia carpini*, and various common insects. *Melitæa aurinia* is not out yet.—W. F. de V. Kane, Sloperton Lodge, Kingstown.

Drymonia chaonia and Cucullia chamomillæ at Christchurch. —It may be of interest to note that I captured on May 9th a large specimen of *Drymonia chaonia* flying at dusk in my garden from which I obtained some ova; also *Cucullia chamomillæ* on the evening of the 11th at laurel blossom close to the same spot. Both are in very fine condition, and I believe have never been taken in this neighbourhood before.—J. M. Adye, Somerford Grange, Christchurch. *June 19th*, 1891.

Agrilus sinuatus in the New Forest.—Last autumn I took several specimens of *Agrilus sinuatus* (*chryseis*, Curt.) in the New Forest. Two of them I have presented to the Hope Collection at the University Museum.—E. W. Bowell, Wadham College, Oxford.

Bombyx rubi.—On the evening of June 10th, I found the males of this insect flying in numbers on a moor in Inverness. By watching their flight I discovered a female in the heather already *in cop.*, and by taking my station close to her I netted nine males in a few minutes, and could doubtless have captured more had I had time to stay longer. Her attractive power was evidently not lost with her virginity.—John E. Eastwood, Enton Lodge, Witley.

Notes on Biston hirtaria.—Ova deposited latter part of April, hatch in about three weeks (middle of May). The species lays very freely in confinement always in cracks, crevices, etc., if available. The larva in this neighbourhood feeds normally on lime, but in my garden occurs on pear, and in captivity will eat almost anything, *e.g.*, hawthorn, birch, etc. I have never noticed the imago on anything but lime, pear, poplar (once) and hawthorn (a ♂ worn, so that this would afford no clue to its food). The larva does not seem to undergo any important changes of coloration, though when young the tints are decidedly brighter than afterwards—purplish, ringed (at the segmental divisions (?)—I have made no proper description of this larva, and write from memory) with bright yellow. Moults five times—approximately when ten, nineteen, twenty-eight, thirty-nine and forty-eight days old, but some of the same batch grow much more slowly than others. They begin going to earth about middle of July, a fortnight after last moult, and make no cocoon, not even (at least in captivity) a very fragile one, as Dr. Buckell suggested, might possibly in the case. Some go down nearly two inches, others turn on the surface of the earth. The imago seems to emerge most freely about the middle of April; I find them most abundant from April 15th to 25th, but no doubt weather influences them greatly. Of my batch this spring three emerged on March 25th, brought about by a S.W. wind. The bulk (except some I forced at a moderate temperature in January and February, which mostly produced cripples) from April 14 to 28, and one tardy one on May 7. It copu-

lates freely in confinement. Normally, this takes place, as Dr. Buckell records (*ante* p. 96), the night following emergence, on the first flight of the ♂, but I believe that if both sexes emerge simultaneously on the same tree, they pair as soon as the wings are dry; this is almost certainly the case in captivity, and I have taken very fresh specimens *in cop.* about 4 or 5 p.m. on trees where I had not noticed them on the morning of the same day. The variation is very great. I notice in my series two ♂'s having the ochreous ground colour most mixed with white scales. One has the additional peculiarity of a large elongate black spot (often present, but generally inconspicuous because placed on or adjoining the black costal line) midway between central line and outer dark band. The ♀'s are generally thinly scaled, so that even bred specimens look worn; but occasionally one meets with a specimen nearly as thickly clothed as the ♂, and of similar ochreous colouring. The ♀ is very sluggish, seldom if ever using her wings. I noticed two on one tree trunk almost in the same spot for a fortnight and at last killed and set them, and they are in perfect cabinet condition.[1] With regard to geographical range I can say nothing, never having seen it out of London. I have been told that it is taken at Shanklin, but on the authority of an informant not well up in Geometræ. — Louis B. Prout, 12, Greenwood Road, Dalston, N.E. *June 5th*, 1891.

From the *Record*, p. 96, it appears that this insect is somewhat common, if not indigenous, to London. I have ever found it plentiful in my suburban garden. After a heavy shower, the larvæ congregate upon the trunks, under the projecting branches, upon which they subsequently distribute during the night to feed. I shall be happy to send living larvæ, if this summer it is as plentiful as of yore with me, to any entomologist who may send their boxes.—H. E. Barren, 23, Bouverie Street, E.C.

Cannibalism of Cosmia affinis Larvæ.—On June 12th, I beat some forty larvæ of *C. affinis*, and about ten *C. diffinis* from elm trees some three miles from here, and although they all travelled home together, I detected no signs of cannibalism. To-day I visited the same locality and beat thirty-two *C. affinis*, one *C. diffinis*, and one very large full-fed *Himera pennaria*. On reaching home I found the latter half-devoured by a *C. affinis* larva, which was very loth to leave its wretched victim. I also noticed an *affinis* feeding (in my umbrella) on a larva of *Anisopteryx æscularia*. Therefore, it seems probable that *C. affinis* is only a cannibal with regard to larvæ of species other than its own.—G. H. Raynor, Victoria House, Brentwood. *June 20th*, 1891.

Meteorological Influences and Sugaring.—I think my experience is almost identical with that of Mr. Robinson (*ante* p. 88). In the north, we do not dread the moon so much as frost and mist. Mist sometimes is not so bad when collecting Noctuæ, but with the little things one can do nothing.—W. Reid, Pitcaple. *May*, 1891.

My experience of moonshine also agrees with Mr. Robinson's. At Portland there are no trees, and thistle-heads, bramble twigs, and

[1] As the ♀ often fails to develop its wings, and makes so little use of them when developed, may it not be that in course of time it will become apterous as in so many early spring Geometers, including the allied *Nyssia hispidaria* and *Phigalia pilosaria*. I believe nature refuses to develop organs for which there is no use.

other low plants have to be utilized for sugaring, but notwithstanding the absence of shade, a calm, warm night was generally successful even with a bright moon.—E. W. Brown, Shorncliffe Camp. *May*, 1891.

Effect of Moonlight.—Messrs. Robinson, Reid and Brown have pretty well settled this. The moon is not much of a drawback if unaccompanied by frost, but it very often happens to be frosty when the moon is bright and atmosphere clear. I never have much hope on misty or dewy evenings, and am very seldom disappointed at getting but little, after going round the sugar.—J. Collins, Warrington. *May 23rd*, 1891.

Killing Lepidoptera.—I was interested in the notes (*Record*, vol. ii., pp. 67, 68) on killing lepidoptera (I would never think of leaving specimens in the cyanide jar longer than is necessary to kill them). I think potassium cyanide answers every purpose if properly used. I make my cyanide bottle in the following way:—I put in the bottom of the bottle about an ounce of cyanide in pieces about the size of a small chestnut, and cover these with dry plaster of paris; then I pour in plaster of the consistency of molasses, sufficient to make a top over all of $\frac{1}{4}$ inch in thickness. In killing large moths I use a saturated solution of cyanide and introduce it with a toothpick or splinter of wood. This is all introductory to a little point I wish to make in regard to a plan that I know of no one else having adopted. Coming home tired, I have been obliged to spread (set) my treasures to keep them from stiffening. This spreading has to be done when one is tired and would prefer to rest. My plan now is to put all my specimens in the relaxing jar after returning home, and I then spread them at my leisure, and I find them perfectly relaxed. I can thus leave them for forty-eight hours, if necessary. In this way I avoid any stiffening that may be produced by the cyanide, and spread them the next day, or the third day after capture. Chloroform, I find, stiffens the thoracic muscles to such an extent that I never use it. Ammonia I do not like, having tried it and given it up. I believe that giving the sand in the relaxing jar a good stirring round before putting in specimens helps to prevent mould, as does also putting in a fresh piece of paper to put the specimens on, if left over twenty-four or forty-eight hours. I think the plan of not spreading the insects when tired and played out, and putting them in the relaxing jar until you are ready for them, may be new to many of your readers.—Henry Skinner, American Entomological Society, Logan Square, Philadelphia. *June 17th*, 1891.

Times of Emergence.—I quite agree with Dr. Buckell as to the superior value of field observations in this matter, and hope to see records with regard to many species. On June 16th I happened to be hunting oak trunks near here, and found a ♀ *Amphidasys betularia* just out of the pupa, running very fast up a tree trunk at 6 p.m. The wings were duly expanded about an hour after. Next day at 5 p.m. I found a freshly-emerged *Smerinthus tiliæ*, on an elm trunk, with wings folded over its back and still limp.—G. H. Raynor, Victoria House, Brentwood. *June 20th*, 1891.

Lepidoptera of Sidmouth, Devon.—An account of the Lepidoptera of Sidmouth may prove of some interest to the readers of the *Record*. I have been collecting here for three years, with the exception of seven or eight weeks during the earlier part of each season, from

about the middle of April to the middle of June, and have worked within a radius of five miles of the town. The following is a list of my captures, or of insects which I know to have been taken here. *Pieris brassicæ*, *P. rapæ*, *P. napi*, *Euchlöe cardamines*, all very common. *Leucophasia sinapis*, fairly common, though I have not taken it myself, not having been here for the first brood, when they are more plentiful. *Colias edusa* was abundant along the coast in 1888 and 1889—I saw none last year. In 1889 I saw one specimen of *C. hyale*, caught by a boy in the same locality. This is the only specimen taken here I have seen, though I believe it is plentiful at times. *Gonopteryx rhamni*, very common, especially hybernated ones. *Argynnis paphia* and *A. aglaia* both extremely common, the former in Harpford Wood, the latter, the ♀'s of which are very dark, on the moors. *A. adippe* is not so common, but may generally be met with in Harpford Wood. Of *Melitæa artemis*, my father took a specimen last year, and I hope to obtain more this season. *Vanessa polychloros*, I have generally found one or two specimens, but it is by no means common. *V. urticæ*, *V. io*, *V. atalanta*, *V. cardui*, all abundant. On August 17th, 1889, my father saw one specimen of *V. antiopa*, but not knowing its rarity did not capture it. I have also heard of others being seen in the neighbourhood. *Melanargia galatea* abundant, but local. *Pararge egeria*, *P. megæra*, *Satyrus semele*, *Epinephele janira*, *E. tithonus*, *E hyperanthus*, *Cœnonympha pamphilus*, all extremely plentiful. *Thecla betulæ*, scarce, I have only taken one, but I have seen others taken close by. *Thecla quercus*, and *T. rubi*, very common, especially the latter, of which there were any number last year. *Polyommatus phlœas* abundant. *Lycæna ægon*, *L. astrarche*, *L. icarus*, *L. bellargus*, *L. argiolus* fairly plentiful, though the last is very uncertain in appearance. *Syrichthus malvæ*, *Nisionades tages*, *Hesperia thaumas*, very common. *H. actæon*, very abundant, but excessively local, I know of only one spot it frequents. *H. comma*, I took two examples of this insect in 1889. *H. sylvanus*, abundant. I forgot to mention that *Argynnis selene* and *A. euphrosyne* were both common. The above list, it will be seen, comprises 43 species, which is a good proportion of British Rhopalocera. Among the Heterocera, the following are my chief captures :—*Acherontia atropos*, *Sphinx convolvuli*, *S. ligustri*, *Chœrocampa elpenor*, *Smerinthus ocellatus*, *S. populi*, *S. tiliæ*, *Macroglossa stellatarum*, *Sesia bembeciformis*, *Cossus ligniperda*, *Callimorpha dominula*, *Euthemonia russula*, *Arctia villica*, *Orgyia pudibunda*, *Bombyx rubi*, *B. quercus* (both very abundant), *Lasiocampa quercifolia*, *Saturnia carpini* (very common), *Cilix spinula*, *Dicranura vinula*, *Stauropus fagi* and *Notodonta dromedarius*. NOCTUÆ.—*Gonophora derasa*, *Cuspidia aceris*, *Viminia rumicis*, *Leucania conigera*, *L. impudens*, *L. putrescens*, *Chortodes arcuosa*, *Xylophasia sublustris*, *Cidaria reticulata*, *Neuronia popularis*, *Agrotis puta*, *A. corticea*, *Triphæna janthina*, *Tæniocampa rubricosa*, *T. gracilis*, *T. munda*, *Cosmia pyralina*, *C. diffinis*, *C. affinis*, *Aplecta nebulosa*, *Xylina socia*, *Habrostola tripartita*, *H. triplasia*, *Plusia chrysitis*, *P. iota*, *P. pulchrina*, *Mania typica*, *Catocala nupta*, *Euclidia mi* and *Phytometra ænea*. GEOMETRÆ.—*Uropteryx sambucaria*, *Pericallia syringaria*, *Odontopera bidentata*, *Amphidasys strataria*, *Hemerophila abruptaria*, *Cleora lichenaria*, *Pseudoterpna cytisaria*, *Geometra papilionaria*, *Fidonia piniaria*, *Lobophora polycommata*, *Melanthia bicolorata*, *Anticlea rubidata*, *A. badiata*, *A. nigrofasciaria*,

Coremia ferrugata, *C. unidentata*, *Scotosia certata*, *Cidaria siderata*, *C. silaceata*, *C. prunata*, *C. dotata*, *Eubolia bipunctaria* and *Anaitis plagiata*. This list omits the very common insects, and gives a very fair idea of the Macro-lepidoptera to be found here. Though these are no great rarities, yet several of them are good insects. Sidmouth is, I think, a good centre for entomology, and all the woods being open to the public, and there being much moorland, render it a pleasant place for entomologists. In conclusion, I should be very glad to give any help in my power to any one on a visit to the neighbourhood.—W. R. S. Majendie, Hill's Cottage, Sidmouth.

Newspaper Entomology.—"A terrible story comes from South Algeria. M. Kunckel d'Herculais, an ardent votary of natural history, some time since went to that country to experiment on the phenomena of the breeding of locusts and their periodical and disastrous flights over the fertile regions of North Africa. Yesterday he had been engaged from an early hour in the morning exploring a region where millions of locusts' eggs were reported to have been laid. Towards eleven a.m., overpowered by the suffocating heat, he lay down in the shade of a few shrubs. He fell asleep, and a few hours later his corpse was found under a heap of these loathsome insects. From the examination of the body it is inferred that myriads of locusts had settled on him as he endeavoured to obtain his midday siesta, that he crushed many thousands of them, and attempted to scare them away by firing the bushes in the shadow of which he had taken rest, but that the swarms of locusts gradually suffocated him. This is the first authenticated case of such a death, and it has caused a thrill of horror in Paris, where this martyr to Science was well known."—*Standard*, May 19*th*, 1891.

Another item is as follows:—"A young man camping in the Sierras discovered and captured a butterfly of an unknown species. He sent it to the Smithsonian Institution at Washington, and received for it a cheque for three hundred and eight pounds, with the request to make careful search for other moths of the same kind. It was an individual of a fossil species supposed to be extinct, and great was the excitement among the scientists at the discovery that one of the race had been recently alive. Although diligent search has been made by men paid for the service, no other specimen has been found."—J. W. Tutt.

Stauropus fagi.—I took one specimen of *S. fagi* while collecting at West Wickham on June 13th, but unfortunately the left upper wing was not properly developed.—W. Bloomfield, 14, Canterbury Road.—*July 6th*, 1891.

Societies.

Entomological Society of London.—*July 1st*, 1891.—Mr. Jacoby exhibited a specimen of a species of Coleoptera belonging to the family *Galerucidæ*, with the maxillary palpi extraordinarily developed. Canon Fowler, on behalf of Mr. Wroughton, Conservator of Forests, Poona, exhibited specimens of a bug imitating an ant, *Polyrachis spiniger*, and of a spider imitating a species of *Mutilla*, and read the following notes:—"I have taken a good many specimens of a bug which has achieved a

very fair imitation of *Polyrachis spiniger* (under the same stone with which it may be found), even to the extent of evolving a pedicel and spines in what, were it an ant, would be its metanotum. Curiously enough, however, these spines are apparently not alike in any two specimens. Is it that this bug is still waiting for one of its race to accidentally sport spines more like those of *P. spiniger*, and thus to set the ball of evolution rolling afresh? or is it that the present rough copy of *spiniger's* spines is found sufficient to deceive? The bug has also been found in the Neilgherries. Mr. Rothney remarks on the above species :—'I have not found the species mimicking *Mutilla*; but in Calcutta and Barrackpore, where *P. spiniger* is a tree ant, forming its net by spinning together the twigs of a shrub, the mimicking bug also assumes arboreal habits, and may be found on the trunks of trees with the ants.'" Mr. Porritt exhibited living specimens of *Eupithecia extensaria* and *Geometra smaragdaria*: the position assumed by the former proved conclusively that it had rightly been placed in the genus *Eupithecia*. Mr. Crowley exhibited two specimens of a *Papilio* from the Khasia Hills, belonging to an undescribed species allied to *P. papone*, sub-generic section *Chilades*. Col. Swinhoe remarked that he possessed a specimen from Northern Burmah. Mr. Moore and others took part in the discussion which followed. Mr. Dallas Beeching exhibited a specimen of *Plusia moneta*, recently taken by himself at High Woods, Tonbridge, and specimens of *Gonepteryx cleopatra*, lent him for exhibition, which were alleged to have come from the same locality. Dr. T. A. Chapman exhibited the larva of *Micropteryx calthella*, and read the following notes :—"The larvæ were obtained by placing moths in a cage with damp moss, dead leaves, and other *débris* off the surface of the ground. Into this the moths crept to the depth of half-an-inch, forcing their way into narrow cavities, and laid their eggs in groups of six or twelve. The eggs are clothed with fine hairs, tipped with refractive particles. The larva, about a millimetre in length, possesses on each segment eight processes of a globular form raised on a very slight pedicel. Besides the thoracic legs, each of the abdominal segments (eight) possesses a pair of minute jointed legs of the same type as the thoracic. There are also a pair of long jointed antennæ." Col. Swinhoe read a paper "On new species of Heterocera from the Khasia Hills." Mr. Crowley read a paper "On a new species of *Prothoe*." Mr. C. J. Gahan read a paper "On the South American species of *Diabrotica*," Part II., being a continuation of Dr. Baly's paper on the same genus published in the Society's *Transactions* for 1890, Part I. Mr. W. F. Kirby communicated a paper entitled "Notes on the Orthopterous family *Mecopodidæ*." Prof. Westwood communicated "Notes on *Siphonophora artocarpi*," referring to an appendage of the eyes which had been overlooked in his previous description.—H. Goss and W. W. Fowler, *Hon. Secretaries*.

City of London Entomological and Natural History Society.—*Thursday, June 18th*, 1891.—Mr. Huckett exhibited a box of insects from Epping, the most noticeable being *Platypteryx hamula*, *P. lacertula*, *Nola cristulalis*, *Corycia temerata*, *Tephrosia consonaria*, a dark variety of *Cidaria russata*, and *Hypena rostralis*. All these insects were taken on May 23rd and June 6th. Mr. Mead, an interesting exhibit of numerous insects, including Noctuæ bred this year. Mr. Simes, living larvæ of *Saturnia carpini* and *Catocala nupta*. Mr. Quail,

series of *Emmelesia albulata*, *Eupithecia lariciata* and *Heliodes arbuti*. Mr. Milton, 27 species of lepidoptera bred this year, among which might be mentioned *Papilio machaon*, *Saturnia carpini*, *Smerinthus tiliæ*, *Deilephila euphorbiæ* (foreign), *Habrostola triplasia*, *Cucullia verbasci*, *Amphidasys betularia*, *Eurymene dolobraria*, *Iodis lactearia*, etc. Mr. Smith exhibited *Smerinthus tiliæ* bred this year; also *Platypteryx hamula*, *P. falcula*, *P. lacertula* and *Anaitis plagiata* from Wickham, and *Platypteryx unguicula*, *Cilix spinula* and *Ephyra trilinearia* from Chingford.

In Coleoptera, Mr. Burrows exhibited a nice specimen of *Thalycra sericea*, one of the rare club-horn beetles.

Mr. Tutt remarked on the abundance of lepidoptera at Chattenden, he having taken as many as 180 insects there in a few hours. Mr. Simes remarked, in connection with his exhibit, that many of the Noctuæ larvæ when first hatched somewhat resemble Geometers, on account of their not having the full number of legs until after the first or second skin was shed. Mr. Tutt and others corroborated this statement. Dr. Buckell, who exhibited the genus *Lobophora*, gave an interesting account of the specimens exhibited. He said that all the species of the genus were characterised by the development of a lobe at the base of each hind wing. In *sexalisata* and *halterata* this presents the appearance of an additional wing. *Halterata* (*hexapterata*) occurs in two forms, one with transverse lines more or less over the whole disc of the wing, the other with a pale zone occupying the whole of the centre of the wing. Mr. Tutt, in speaking of the last mentioned variety, remarked that the British specimens came almost exclusively from South Yorkshire. Messrs. Milton and Quail gave an account of rearing *Chelonia caja* larvæ, many of which had died of some disease. From the remarks that followed, it seemed to be a question of bad food or overcrowding. Mr. Smith mentioned having taken *Platypteryx lacertula* at High Beech, and several other members stated that they had taken the insect in Epping Forest.

Thursday, July 2nd, 1891.—Exhibits:—Mr. Tutt, a very dark, almost black specimen of *Boarmia roboraria*. Mr. Battley, living larvæ of *Scotosia certata*. He remarked that he had taken this species in several localities in North London, and had also found the larvæ. The latter are usually spun up between two leaves in the top shoots of the holly-leaved barberry (*Mahonia aquifolia*) which grows freely in the London parks and gardens. Dr. Buckell exhibited the ova of *Acronycta rumicis* under the microscope. They were deposited only two or three days before, and consequently had not yet developed the colour and markings shown in the plate (*Ent. Rec.*, vol. ii., No. 1), but in other respects testified to the fidelity of the plate to nature and the skill of the draughtsman. He also exhibited ova of *Amphidasys betularia*. These were very small, in that respect resembling *A. prodromaria*; they are ovoid in shape, one end smaller than the other, ribbed longitudinally, and of a greenish-grey colour. Like the ova of *Biston hirtaria*, they are deposited in crevices, but have not much cohesion. Mr. Quail exhibited bred specimens of *Callimorpha dominula* and *Chelonia villica*. Mr. Smith, *Platypteryx lacertula*, *Ephyra punctulata*, *Cidaria corylata* and a fine variety of *Rumia cratægata*, taken at light at Rectory Road, the outer half of the left fore-wing being suffused with reddish

brown, and the wing rays yellow. Mr. Hill, a very fine variety of *Argynnis euphrosyne*, taken by a lad in Epping Forest some years ago. The upper surface was much suffused with black, while the silver spots on the underside were changed into streaks. He also exhibited a dark specimen of *Dicranura vinula*, and a bred specimen of *Cabera pusaria* with the lines on the left fore-wing coalescing. Mr. Bayne exhibited *Platypteryx hamula* and *P. unguicula* from Epping Forest, a specimen of *Notodonta dodonæa* and some vars. of *Lycæna alexis* (*icarus*) from Aylesbury, also some asymmetrical varieties of *Tæniocampa stabilis*.

Coleoptera.—Mr. Heasler exhibited a series of the "Death-watch beetle" *Xestobum tessellatum*. He stated that although this species was fairly common in the bark of oak trees, specimens were difficult to obtain, owing to the hardness of the wood, but at a certain time of the year, they were to be found crawling on the outside of the bark, probably for the purpose of oviposition. He had endeavoured to induce them to make the well-known "ticking" noise, but they only produced a faint sound, and he suggested that the louder noise was caused by the acoustic property of their burrow. He also exhibited a series of *Telephorus translucidus*, which he remarked was formerly thought a rare species, but it had been taken a few years ago at Epping, then at Highgate, and now he had found it at Peckham.

Mr. Quail read a portion of a letter that he had received from Mr. Culpin, who had gone out to Brisbane. The subject brought forward was the position of *Lycæna bætica*. He stated that three species occurred in his neighbourhood, *viz. bætica*, and two closely allied species, and expressed his opinion that they should not be included in the genus *Lycæna*, but form a separate genus, between *Lycæna* and *Thecla*. Mr. Tutt, in remarking on this letter, said that some of the continental forms of the *Lycænidæ* had the two sexes resembling respectively the genera *Polyommatus* (*Chrysophanus*) and *Lycæna*, thus proving the close connection existing between them.—A. U. Battley and G. A. Lewcock, *Hon. Secs.*

South London Entomological Society.—*Thursday, June 11th*, 1891.—Mr. Adkin exhibited a series of *Larentia didymata*; Mr. Tugwell, specimens of *Spilosoma mendica* bred from Huddersfield eggs, with Irish specimens for comparison, also *Notodonta carmelita*. Mr. Tutt, specimens of *Vanessa atalanta* bred from Deal larvæ, the right hind wing in each, although fully developed, being exceedingly small compared with the others. Messrs. Weir and C. G. Barrett made some remarks. Mr. Bouttell exhibited bred *Coremia unidentaria*, including the red form. Mr. Dennis, living larvæ of *Thecla betulæ* from Epping; Mr. Adye, *Eurymene dolobraria* from New Forest larvæ. Several members remarked on the abundance of species up to the present this year.

Thursday, June 25th.—Mr. W. West exhibited a series of bred *Sesia formicæformis* and remarked that he had larvæ still feeding. Mr. Tugwell remarked that he had bred what appeared to be *Phycis abietella* from shoots of Scotch fir, which had been sent to him containing the resinous cones of *Retinia resinana*; Mr. Barker, *Macroglossa fuciformis* and a specimen of *Epinephele hyperanthus* with the left underwing very small, although perfectly formed, and the other three wings normal; Mr. Briggs, a specimen of *Pieris brassicæ* with the left antenna less than half

the size of the right, also a fine dark var. of *Papilio machaon* and one paler than usual; Mr. Croker, a specimen of *Coremia ferrugata* with one antenna, ♂, the other, ♀, the specimen also exhibited some variation in the wing markings on opposite sides, also a dark *Spilosoma lubricipeda*; Mr. Turner, a killing tin made on the plan suggested by Mr. Farren (*Ent. Rec.*, vol. ii., p. 67). This attracted some attention. Mr. H. Moore, the Orthopteron, *Acrydium peregrinum*, which has caused so much devastation in Algeria this year, and *Acrydium tartaricum*, which did great damage in Cyprus, some 8 years ago. An account of the excursion to Eynesford was then given by Messrs. Carrington and Lewcock, from which it would appear that 17 species of DIURNI, 8 BOMBYCES, 3 NOCTUÆ, 22 GEOMETRÆ, 3 CRAMBIDÆ, besides other Lepidoptera were captured; also many good species of Coleoptera.—ED.

NOTICES, REVIEWS, Etc.

A LIST OF THE MACRO-LEPIDOPTERA OF LEICESTERSHIRE WITH DATES AND LOCALITIES. By F. Bouskell and C. B. Headley. Published by Geo. Gibbons and Co., 49, King Street, Leicester. Price 6d. Another county list to hand. This time that of the Macro-lepidoptera of Leicestershire compiled by Messrs. F. Bouskell and C. B. Headley. Of these local lists there is generally nothing but praise to bestow, and this is no exception to the rule. Done from pure love of the subject those responsible have executed their work well, and there is only one regret, that they have not added notes to the most interesting species. These local lists always call to mind the great show that the South London Entomological Society made four years ago for producing a fauna list of Kent and the adjacent counties. With every opportunity of obtaining the fullest and most complete information, and after spending as much money in preliminaries as many a local list has cost to produce, there has been absolutely nothing done, the committee seem to have died from sheer inanition, and, unless the members strongly take the matter up, it would appear that the council will let the idea collapse completely. One would think that with such a comparatively large income, the general body of members would insist on the production of some scientific work instead of allowing the money to be frittered away on an Annual Report, which, good enough in its way, if brought out to date, is highly ridiculous when two to three years behind time.

THE DOVER PICTORIAL just issued by Messrs. Goulden for the small sum of sixpence contains no less than thirty photo-print views, with information upon a variety of topics. Amongst others there is an article on Entomology, with a list of lepidoptera. This, we notice, has been revised by members of the Dover Field Club, and is something more than a mere catalogue of names, as the latest dates of capture, the localities, and distances from the Dover centre are given in all the principal instances. Some of these comprise specimens unrecorded in the entomological literature of the day, such as *Sesia andreniformis* in 1889, 1890; *Clostera anachoreta*, 1888; and *Phycis obductella* in 1889. The list will, we think, be very useful to those visiting the town.—ED.

The Entomologist's Record AND JOURNAL OF VARIATION.

No. 6. Vol. II. August 15th, 1891.

THE GENUS ACRONYCTA AND ITS ALLIES.

By Dr. T. A. CHAPMAN.

(*Continued from page* 77.)

ACRONYCTA (*Cuspidia*) *alni.*—*Alni* seems to come nearer to *psi*, *tridens*, and *strigosa* than the remaining species we have still to examine, though it is distinguished from all the rest of the genus by the curious neck which marks off the anal armature of the pupa; this seems correlated with its manner of pupating, which is very like that of *leporina*. In *alni* the elaboration for providing abundant entanglement in the silk, of the end of the cocoon, is found in this curious groove, the spines remaining of the same simple type as in *tridens;* whilst in *leporina* it is achieved by an abundant multiplication of the spines and their curving into very efficient hooks.

The egg is laid at the end of June or beginning of July, always solitarily, I conjecture on the upper side of the leaf, though in captivity it lays them on either side. I recently had an opportunity of observing *psi* deposit her eggs when in freedom. The moth came from some little distance, laid two eggs a quarter of an inch apart on the under side of a hawthorn leaf, and then flew off out of sight. I have already recorded finding an egg of *psi* on the *upper* side of an oak leaf. *Psi* as a young larva affects either side of the leaf, but as *alni* lives on the *upper* side, the eggs are probably laid there.

When first laid the egg (Pl. VIII., fig. 6) is nearly as colourless as that of *psi*, but soon assumes some coloration, and in about three days, reaches its proper tint. For twenty-four hours before hatching it becomes much darker, with the black head of the larva occupying the summit.

In form the egg is of typical *Acronycta* shape; the diameter

is just over one millimetre, and the height is about 2-5 the diameter. The ribs are about 53 in number. They increase in number from the apex by division, and intercalation takes place at all distances from the top, but rarely further than half-way down, the ribs are distinctly waved, with corresponding shallow foveolæ in the furrows. The micropylar area has a very regular rosette of fine willow-leaf-shaped cells, in the centre of a small area not encroached on by the ribs. The inner egg leaves a distinct colourless margin round the limit of the outer shell, but this is less obvious at first glance than in some other species. The inner egg is of a rich chocolate brown, marked with creamy white, nearly circular, patches, somewhat irregular in size and disposition, but tending to be arranged in two circles round a central one, making the egg a very beautiful and striking object.

My earliest experience of *alni* was to have five eggs which produced five moths, but, dealing with larger numbers, I find the larvæ, when first hatched, are so far restless that a certain number perish from leaving their food and not finding it again.

The newly-hatched larva (Pl. VI., fig. 3, 3*a*, fed about two days) has a large black head, the 3rd, 4th, 11th, and 13th segments pale, the others dark. Its length is 2 mm. The incisions of the segments are very marked owing to the large size and projection of the tubercles, the tubercles of 5, 6, 7, 8, 9, and of 12 and 13 are especially large, appearing almost as if fused together, the plates being fuscous in colour and the lines between them rufous; on the 10th segment the tubercles are not quite so large and the spaces between them towards the posterior margin are white, showing a tendency of this segment to belong to the pale series. The 11th segment has the characteristic *Acronycta* form, projecting slightly laterally, depressed dorsally, and with the tubercles and hairs much smaller than on any other segments. Each tubercle carries one hair, of rather greater length than the diameter of the larva (when newly hatched). The second segment has a black dorsal plate—Head, when viewed from the front, markedly heart-shaped. *Alni* presents, perhaps more than any other species, the large development of the tubercles and their angulated margins, as if their forms resulted from their being closely packed together. They are really large flat plates with a central hair. So large are the plates that a suspicion arises as to whether they are not really areas surrounding the tubercles proper, represented by the bases of hairs, but

reasons in favour of such a supposition seem otherwise wanting. The disposition of the tubercles is that normal in the other species.

After the first moult (2nd skin), the general impression is of a black larva, but really it is rufo-fuscous, with a white dorsal and sub-dorsal line, but the tubercles are very large and black, their bases being nearly continuous. On the second segment the tubercles are separably distinguishable, although apparently fused together. On 3 and 4 the tubercles are smaller, and these segments look pale and brindled; on 5, 6, 7, 8, 9 and 12, the tubercles are so large as to make these segments look black, they stand up very pointedly, terminating in a stiff bristle, and there is a transverse ridge connecting the anterior trapezoidals and another, still more pronounced, connecting the posterior; on the 10th segment, the tubercles are smaller and like large black islets on a white area. On the 11th, they are quite small and the segment looks nearly white. The 12th segment is decidedly humped with pronounced tubercles. The 13th and 14th look white. There are pale dorsal, sub-dorsal and lateral lines, and the 12th segment is white beneath. The pointedness of the tubercles gives an angularity to each segment taken individually, essentially of the same character as that which I have called echinate, where the tubercles have several hairs, here they have only one.

In the 3rd skin (after 2nd moult), it has assumed the bird dirt plumage, which is so well known as characteristic of the immature larva, and which is as much or more pronounced in the next (4th) skin. It is to be remarked that the whiteness of the 11th segment (pale colour being one of the characteristics of this segment as "weak" in the *Acronyctas*) of the newly hatched larva, is the basis from which the white area of the terminal segment has been gradually developed, making this larva of all the others, the one that carries this feature to a marked degree to so late a stage as the 4th skin.

The head and following segments to the 10th are black dorsally, with indications of a white dorsal, and a pale sub-dorsal line, chiefly as yellowish marks at the incisions of the segments. The 4th, and to some extent the 3rd, have this most pronounced. On the 4th segment, the anterior aspect of the hump which the trapezoidals make on each segment is orange yellow. The white lateral line is here also most obvious, giving altogether a paler mottled tone to the 3rd and 4th segments. The 10th segment, described as black, has

dorsally a large creamy wedge-shaped area, stretching forwards from the 11th segment so as to enclose the posterior trapezoidals which form a black patch. The 11th segment is creamy, with a dark marbling on the same area that is white on the 10th segment, and a faint dark marbled streak below. The 12th segment is marbled in this way throughout, except a creamy dorsal line and the two great black double humps formed by the trapezoidals and the smaller points of the supra-spiracular. Segments 13 and 14 are white with a trace of black marbling. Anal prolegs blackish; the under surface is creamy white on 11, 12, 13 and 14, fuscous elsewhere.

The 2nd segment has a plate carrying, or corresponding to, (apparently) 6 trapezoidal tubercles, of which 2 pairs carry spatula-ended bristles, and are apparently anterior trapezoidals, though on the other segments it is the posterior trapezoidals that carry the longest bristles representing the grand ones of the last skin. The trapezoidals mark out an elevated angular dorsal area, almost to be called a hump, and most marked in 5th, 6th, 7th, 8th and 9th segments. In the 4th skin, the length, when extended, is 16–17 mm., but it usually sits in the form of a note of interrogation with the head curved round against the 9th segment, the bending taking place in the 5th and 6th and 9th and 10th segments. It eats the leaf irregularly in small rounded patches, giving a jagged outline and a ragged appearance to the leaf.

The head is sometimes entirely black, but usually has the upper portion buff with darker tesselations. The segments, from the 2nd to the 9th, are black with a white porcellanous lateral line fading upwards, a trace of white dorsal line, best marked in 2, 3 and 4. Segments 3 and 4 are rather paler, with a sub-trapezoidal whitish line, and other portions buff-coloured. Traces of a sub-trapezoidal line may elsewhere be observed in incisions; 11 is creamy porcellanous, invaded laterally and behind from 12 with fuscous, this segment is flatter and broader than the others; 12 is large and humped, with a creamy white dorsal line and other markings, but the tubercles are large, dark rufo-fuscous, and have fuscous clouds about them, the anterior trapezoidal with short hairs, the posterior with larger faintly clavate; 13 and 14 are creamy, 13 with two clavate hairs on posterior trapezoidals, 10 is dark fuscous, invaded behind by creamy, up to trapezoidals, and below them just to front of segment, joined by a white line between the trapezoidals: there is also a white dot at the base of the hair

on the posterior trapezoidal. The tubercles on this segment and forward are black, and carry single hairs, with a rufous point at the base, those on posterior trapezoidals about the diameter of the larva in length and faintly clavate; on 11 the tubercles are almost evanescent and the hairs small and fine. The second segment has on each side two long distinctly clavate hairs and two simple ones. On 5, 6, 7, 8, 9, 10 and 12 the trapezoidal tubercles are very large and packed closely and angulated, much as in the newly-hatched larva, being pyramidal to the base of the hair, they form an irregular flat surface on the dorsum bounded by the hair points, on segments 3 and 4 the fused trapezoidals have each two short hairs.

The spiracles are black, surrounded by a white line, the supra-spiracular tubercle is a black plate with very short hair, the sub-spiracular is in the porcellanous white lateral line and is of same colour, except in 8, 9 and 10, where it is black, and where the line is interrupted to the posterior margin of segment; the legs, prolegs and ventral tubercles are black, the ventral surface rufous, except 11, 12 and 13, which are white. The post-spiracular tubercles are very small black plates with very minute hairs. The form of the head is distinctive but difficult to describe without a figure, except as bifid above.

When the last moult (4th) takes place, the larva in its last skin has at first much of the coloration of the 4th skin, which gradually but rapidly fades, or rather intensifies into the well-known golden and black of the adult larva. Thus the head is brown, the general tint fuscous with broad, white lateral line extending irregularly upwards, and shading off without definite boundary, and involving a great part of 10th, 11th, 13th and 14th segments.

The yellow plates of 2–9 are brownish, 10–14 pale yellowish-white, and a deep groove separates the anterior from the posterior trapezoidals. The spiracular tubercles are white, prolegs yellowish, and legs yellowish with a black line.

It is perhaps superfluous to say anything about the adult larva, well-known as it is, owing to its remarkable hairs and striking colour leading to its being observed with care whenever met with; but a few notes may be useful. In length the full-grown larva is 33 or even 35 mm. Its colours are now changed in a wonderful manner, but it has also lost all those features, which it retained up to the 4th skin, of a young *Acronycta* larva, *viz.*, its angularity, the whiteness and weakness of the 11th

segment and the tendency to a hump of the 12th. It no longer sits in ? shape except occasionally when alarmed, it is wonderfully uniform in width and bulk from end to end, the front few segments being only a little smaller, and behind, it tapers only at the 13th segment. Each segment is full and cushiony, and (except the head) each has the yellow lozenge on back, so as clearly to demonstrate not only the 13th but a 14th segment.

The yellow plates include both trapezoidals, of which the anterior has a small black bristle, the posterior the clavate hairs; on each segment the yellow lozenge has a special outline, those of 5th to 10th have rounded ends and front and back edge parallel. On the 11th it is square with a minute notch at the side, on the 12th nearly square, on the 13th curved, with the concavity forwards, and ends square, the 14th lunated with only two short hairs; on the second, it is broader but of similar shape, on the third, the front edge is produced to a blunt angle in the dorsal line, and, on the 4th, the same, but with the addition of a corresponding notch behind.

The yellow lozenges rise a little above the surface as if laid on, on the 3rd and 4th they include the supra-spiracular tubercle; the anterior and posterior edges of each lozenge paler, in a few specimens nearly white. Each lozenge has sundry wrinkles disposed in relation to a deep groove that crosses it transversely about the middle, and has several dark spots or lines in its course.

This groove, with its ends curving forwards and a shallow depression in the dorsal line, mark the divisions between the tubercles On the 3rd and 4th segments there are no transverse grooves, the original disposition of the tubercles being different, on each of them the six hairs of the original tubercles exist but are very short, none being clavate, a survival of the circumstance of these being originally pale segments. Similarly, 11 has no clavate hair, is lower dorsally than the other segments, the anterior trapezoidal has a very minute hair, and that of the posterior trapezoidal is only as large as that of the anterior trapezoidals of the other segments. Segment 2 has two clavate hairs, which always lie closely together at their ends, this segment still has a double row of tubercular hairs, and illustrates that this segment is, dorsally, an equivalent for two segments, what the second equivalent is ventrally is not so plain; it appears to have a pair of prolegs like 3 or 4, whether the appendages of the other half of this

double segment are represented by the *mentum* or by the "chin-gland," I do not know.

The rest of the larva is black, dorsally with a greenish-blue, almost metallic tint, laterally and beneath with a brownish, bronzed tone, it is elaborately wrinkled, the grooves having a bluish bloom. The wrinkling is pronounced about the spiracles and the spiracular tubercles, forming a lateral raised ridge, until the larva is quite full-fed, when this is filled out and tolerably level, and the finer wrinkles only are to be discovered. The spathulate hairs are on either side, two and a short one on 2nd segment, and one each on 5 to 10, 12 and 13. They are spathulate, not clavate, that is, the enlarged end is flattened, the flat sides being dorsal and ventral. The circum-spiracular and marginal tubercles are also present, each with a minute blackish-brown hair.

All the other British *Acronyctas* have normally 5 moults, unless, perchance, *strigosa* is to be regarded as an exception, *alni* has only 4. But, whilst several of them, probably all, do upon occasion have only 4 moults, so *alni* does sometimes have 5; and, when it does so, the larva in the extra, penultimate skin, differs from any of those already described, and shows a transition between the juvenile and adult plumage, showing that formerly the adult plumage was attained by a gradual development, and that the abrupt transition occurs by the suppression of the now lost intermediate stages. One form of extra skin is like the present 4th, with certain adult characters superadded, of this form I have seen a good many. Another form has only been observed in one specimen, and is more like the adult than the juvenile form, but with some juvenile characteristics.

Of the former of these two forms, I have noted that out of about 250 larvæ, half had spun up and only some 15 were not in last skin; of these 15, 4 were extra moulters, and of the remaining 11, three were certainly not extra moulters, and several were likely to die of atrophy, how many of the others became extra moulters I have not recorded. It would thus appear, and I have observed a similar circumstance in other species, that a larva, belated by want of food or other circumstances, may die of atrophy, or may display extra vigour, have an extra moult, and finally be a larger specimen than if the usual normal course had been pursued.

Roughly, the larva in extra 5th skin resembles that in 4th skin, but is larger, and differs in colouring. It has a dark

shade across between segments 13 and 14, and this, with other dark tinting laterally, gives an appearance of 10, 11, 12, and especially 13 and 14, having the yellow lozenges of the adult or a strong indication of them, the colour being yellower than the creamy white of 4th skin. The 10th and 12th are sometimes very dark in this connection, and the front margin of the 2nd segment is yellow. The spathulate hairs are spread laterally instead of being erect as in the previous skins; these hairs are really spathulate as in the other skin, though smaller, much more so than is occasionally to be seen in an unusually fine larva in 4th skin.

The length of these hairs will give some idea of the relative development in this respect, and will also show that the extra-moulter produces a larger adult larva than normal.

Lengths of spathulate hairs:—

A large fine 4th skin.	Extra fine 4th.	Extra moult 5th.	Adult (5th).	Adult (6th), extra moulter.
On 2nd segment .. 3¼ mm.	3¼ mm.	3½ mm.	6 mm.	7 mm.
On 8th ,, 1½ ,,	2 ,,	3 ,,	3½ ,,	4 ,,
On 12th ,, 2½ ,,	2½ ,,	3 ,,	4 ,,	4¼ ,,

It is to be noted that these larvæ produced moths of both sexes, and further, that the variation is not hereditary. The memorandum, as to the ratio they presented to the normal form given above, was for 1888. Ova were obtained in 1889 from these, but in 1889 not one example of this variation in moulting presented itself, either from the ova laid by the five-moulters or from the ordinary types. A note on this form will be found in the *Ent. Mo. Mag.*, vol. xxiii., p. 226, and on the result of the broods of 1889, in the *Entomologist's Record*, vol. i., p. 271.

The other var. of larva, of which only one specimen occurred, appeared in 1889, and presented in its extra (5th) skin a form much more nearly resembling the usual adult form, at least in so far that it was on the whole dark, and had the 13 dorsal yellow marks. The head, instead of being black, had the dorsal half brown, as is usual in the 4th skin. The yellow patches are very pale as to their ground colour, but look dark, owing to the plates of the tubercles being a pale greenish or olive-brown. Thus that of the 2nd segment is brown, almost like the head; segments 3 and 4 have each a double tubercle on either side (as in the other skins, but noticeable here owing to the colour differences); 5, 6, 7, 8, and 9 are very much alike,

in addition to the olive tubercles they have a dark central line (transverse) or shade, on the 10th the anterior tubercles are dark, but the posterior nearly of the yellow of the ground colour; the 11th, 13th and 14th are uniformly pale (these pale portions are on the pale area of 4th skin), the 12th has the tubercles very dark, thus resembling the 2nd.

The paleness of the pale segments is increased by the space on the 10th and 11th, between the lozenges, being nearly as pale as the lozenges themselves, and by an isthmus passing from the 11th to the 12th. There are also, on the forward segments, traces of a yellowish dorsal line, and also of a sub-dorsal line at the margin of the lozenges. The dark portion of the larva has not the velvety metallic sheen of the ordinary full-grown larva, and it is broadly marked by the pale lateral band (on level of sub-spiracular tubercles) that the larva has temporarily just after moulting into the last skin. This line fades slowly upwards, it tends to invade 3 and 4 in the incisions of those segments, narrows rather on 8, 9 and 10; on 11 it throws a curious branch upwards and forwards, and is continuous with the lozenge on 13 (suggestive of juvenile *tridens*). The circum-spiracular tubercles are black (with short hairs), and surrounded with narrow pale rings (like various other species) on 7, 8, 9 and 10. The marginal tubercle has two hairs. The sub-spiracular tends to be olive coloured, as do the others on the pale segments. There is a faint pre-spiracular tubercle. The 11th segment is markedly lower than the others, whilst the 12th is distinctly humped. The hairs are rather more clubbed than is usual in 4th skin, less than in the last; length of clubbed hairs on 8th segment $2\frac{3}{4}$ mm. This larva died when in its last skin, owing to ill-usage.

The only variation noted in larvæ in their last skin was a band connecting the lozenges of 12 and 13, making one dumb-bell-shaped mark. There is, however, considerable difference in the intensity of the yellow, from pale lemon to orange.

No detailed remarks I could make would add to the evidence these two vars. of larva in extra (5th) skin afford, that *alni* was once a 5-moulter, like the other species of the genus, and that intermediate forms between the present 4th and 5th skin plumages at one time existed, some features of which are preserved for us by these atavistic variations, and it is also interesting that, in the latter form, at any rate, some features of other species of the genus are presented, which are quite absent in normal *alni*.

For pupation, the larva seeks a piece of rotten wood or soft spongy bark; it will readily accept a piece of elder pith, or probably anything in which it can easily make a burrow, and it will adopt a hole already partially made. It is not particular as to the direction in which it burrows, but seems to prefer to enter horizontally and then turn upwards, resulting in the pupa resting head downwards. The depth of the burrow varies from $1\frac{1}{2}$ to $2\frac{1}{2}$ inches, generally about $1\frac{3}{4}$ inches (45 mm.). This is made very rapidly, often in three or four hours, usually eight to ten, no doubt varying with the nature of the material; the width is 7 to 8 mm. The larva throws out all the excavated material, then when the tube is completed, he stretches out his head and picks up some of the chips or any other material within reach, and, with this and some silk, makes a tolerably firm diaphragm across the opening. Then, retiring to the bottom of the excavation, he there makes the cocoon proper. In shaping this out, some further chips are sometimes placed loosely in the space between the outer diaphragm and the top of the cocoon proper. The top of the cocoon is made firmly of silk and chips, and lined closely and smoothly with silk, the walls have but little silk, but, at the base, some strong silk is loosely disposed round the sides, and it is in this that the pupa takes such a firm and abundant entanglement with the anal spines and groove. The space between the outer defence and the cocoon proper varies from half an inch to an inch, according to the depth of the burrow.

The pupa (Pl. III., figs. 4, 4*a*, 4*b*, 4*c*), in texture, form, and general outline, is of the *psi* type, and indeed very like *psi*, a little darker in colour, and the free segments tapering rather more regularly. The length is 17 to 22 mm., divided between wings portion 10 mm., free segments 8 mm.; width 5 mm; colour rich deep brown with indications of a black dorsal line, and the incisions (dorsally of course) of segments 4, 5, 6 and 7 a little raised into a sharp line of nearly black colour. The back covered by well separated minute pits. Wing cases faintly corrugated and showing veins. Two hairs at the bases of the antennæ, very small but distinct. Also two fine brown bristles between the eyes, difficult to find, but quite obvious when found. Claws of 3rd pair of feet just visible. The spiracles present a fine raised border, but are not decidedly prominent as in *psi*, *leporina*, etc. The anal armature is more elaborate and specialised than in any other species. There is this difficulty in observing it properly, that it is constructed for

seizing strongly the loose silk of the bottom of the cocoon, and this is always done so effectually, that it is only with great care and pains that the silk can be unravelled, without damage to the pupal spines. The spines are arranged on the *tridens* formula, *i.e.*, with 2 dorsal and 6 (3 on each side) ventral spines. They are curved so as to be hooks rather than spines, the dorsal curved downwards and the ventral upwards. The latter are, however, not so terminal as in *tridens*, but are spread round a semicircle, so that the outer ones are lateral rather than terminal. The, roughly speaking, round boss, on which the spines are situated, is separated at its base from the rest of the pupa by a shallow groove ventrally, but dorsally by a deep channel or incision, so cut into it that the basal portion of the boss has a thin round margin over it, with a smooth surface, passing down to the dorsal spines, which is somewhat shield-shaped. The pupal margin of the incision presents a series of longitudinal ribs or buttresses, four on either side, with indication of a minute one in the intervals between them.

When the moth emerges, it leaves very little trace of an opening in the outer diaphragm, but there is always a little wool rubbed off the moth to be observed in the opening. If the pupæ are kept too dry, the moth is unable to force the outer diaphragm, either because this becomes too hard and dry, or because the moth has no spare fluid to soften it, the moth then perishes in the outer chamber.

The larva appears to eat almost anything arboreal, is perhaps even more omnivorous than *psi*; but I have little doubt it is correctly named, in so far that in the wild state it is fonder of alder than anything. It is very widely distributed and supposed to have its headquarters in the New Forest; I fancy it is as abundant here as anywhere. My friend, Dr. Wood, finds a larva or two most years, and I have twice taken it here on birch. On only one occasion have I searched for it, and then Dr. Wood and myself (really looking ostensibly for *Cerura bicuspis*, which we did *not* get) each took two larvæ off alder.

Alni feeds up the most rapidly of any species I have bred. In each skin it occupies four days in feeding, one or two days in moulting, with a few extra days in the last skin. One month is all the time spent as a larva when the season is reasonably warm.

(*To be continued.*)

VARIATION.

CAPTURE OF AGROTIS OBSCURA AND ITS VARS. IN CAMBRIDGESHIRE.—Some years ago this species was not uncommon in one or two restricted localities in England. Of late years, however, it has become exceedingly rare and is now probably the rarest British member of the genus *Agrotis*. It was therefore with great pleasure that I noticed on the night of August 1st, a specimen on the sugar in Wicken Fen. Since then Mr. A. Houghton and myself have worked most assiduously for the species and have during the last night or two been reinforced by Mr. G. T. Porritt, but our combined efforts up to date are not altogether satisfactory from a numerical point of view, most evenings producing but three or four specimens between us. However, the specimens are still in fine condition and I have no doubt Mr. Houghton will render a good account of the species before it disappears for the season. At any rate it is certainly interesting to know that the species is still among us, and likely to find its way into our cabinets more frequently than it has of late.

The forms of *obscura* which we have taken are as follows:—(1). Costa red, inner margin grey-brown = *obscura*, Bork. (2). Costa red, inner margin grey-brown, space between reniform and orbicular, dark = var. *ravida*, Hb. (3). Grey-brown = var. *obducta*, Esp. (4). Grey-brown, space between reniform and orbicular, dark = var. *bigramma*, Esp. We have also an odd specimen or so each of the following vars.:—(5). Reddish-brown = var. *rufa*. (6). Reddish, space between reniform and orbicular, dark = var. *austera*, Esp. (7). Greyish-black, unicolorous = var. *suffusa*.

It is worthy of remark that those specimens of this species which were captured some years ago in East Yorkshire appear to show a more general tendency to a red coloration, whilst those which were taken in the well-known locality in North Kent were more variable in colour, like the specimens now being taken in this neighbourhood.—J. W. TUTT, Wicken. *August*, 1891.

NOTES ON COLLECTING, Etc.

NOTES OF THE SEASON (LEPIDOPTERA).—*Tewkesbury*.—The season is a fairly good one. With regard to sugar, trees that have been done night after night have produced for the last three weeks common things in abundance, but our better things have been scarce. Sugaring just for one night in distant localities has produced but little. Flowers have attracted nothing this season, it was just the same last year. *Grammesia trilinea* and *Agrotis exclamationis* have been unusually abundant; it is interesting to note how insects seem to have their special season. *Miana furuncula* has been plentiful, also *M. strigilis*; I do not remember ever having noticed the former insect here before.—E. C. DOBRÉE FOX.

Somerset.—The season has been much against entomological work, and cold east and north-east winds still prevail, with hail, snow and sleet. Such fine days as we have had seem to show that the severe winter will not make lepidoptera scarce. Whites have been very abundant, and *Anthocaris cardamines* was frequent on May 12th. *Cidaria suffumata* has been out in its usual abundance. On such nights

as I was able to get at sallows they were unproductive of anything but *Tæniocampa gothica*, *T. stabilis* and *T. cruda*.—W. MACMILLAN, Castle Cary. *July*, 1891.

Lincoln.—I have not had time to do more than a few hours' collecting on two or three days; but have found most insects on the whole plentiful, I think this promises to be a good season. During a short expedition on June 1st, I saw or took the following:—*Pieris napi*, *P. brassicæ*, *Macroglossa fuciformis*, *Cabera pusaria*, *Lomaspilis marginata*, *Coremia unidentata*, *Argynnis euphrosyne*, *Hesperia paniscus*, *Thanaos tages*, *Nola cristulalis*, *Euclidia mi* and *Tephrosia biundularia*. Most of these seemed recently emerged and were not at all plentiful. I only saw two *M. fuciformis*. *A. euphrosyne* seems exceptionally scarce this year, as does *N. cristulalis*; *E. mi*, later on, was fairly common. On June 11th, besides the foregoing, mostly in increased numbers, I took *Eupithecia lariciata*, *Heliodes arbuti*, *Ephyra pendularia*, and one *Numeria pulveraria*. The next day I took *T. biundularia*, one, where last year I had taken some nice dark varieties. *Anarta myrtilli* were too nimble for me to catch. *Fidonia atomaria* swarmed; the females were numerous, last year I could hardly obtain any although the males were common. Of *Tephrosia punctulata* and *M. fuciformis* I saw none, although I made the expedition for them especially. The former, I think, could not have been out, as it is usually common here. I have seen nothing of it earlier this year. On June 20th, I found *H. paniscus* almost over, it has been more plentiful this season than for the last few years (which does not say much), but I did not find it common. I also took several *E. mi*, *H. arbuti*, *E. lariciata*, a few *Cidaria corylata*, two *N pulveraria*, one *Plusia pulchrina*, one *Melanippe hastata*, one *Melanthia albicillata*, a few *N. cristulalis*; *Iodis lactearia* was beginning to come out. I took two or three *Emmelesia albulata*, and one *Asthena luteata*. On June 19th, I found *Fidonia piniaria* and *Chelonia plantaginis* pretty common at another wood, besides *E. lariciata*, a few *F. atomaria* and one *Anaitis plagiata*. I also got a beautiful *Chærocampa porcellus*, one *Amphidasys betularia*, and one *Smerinthus ocellatus*, all freshly emerged. There were several *A. myrtilli*, but I only succeeded in capturing one.—A. MACKONOCHIE, Lincoln. *June 26th*, 1891.

Winchester.—Common insects have been plentiful, *Nola cristulalis* on the tree trunks, always head downwards—conspicuous—like a little white triangle. *Cuspidia psi* in immense numbers everywhere. A fair lot of *Xylophasia hepatica* at sugar. In a little lane in the suburbs I have sugared every evening since the middle of June and taken *Hadena dentina*, *C. psi*, *X. hepatica*, *Noctua augur*, *X. polyodon*, *X. sublustris*, *X. lithoxylea*, *Gonoptera libatrix* (hybernated), *C. megacephala*, *C. aceris*, *Miana strigilis*, *M. fasciuncula*, *M. literosa*, *Rusina tenebrosa*, *Triphœna pronuba*, 2 *Gonophora derasa*, *Leucania pallens*, *L. impura*, *Nœnia typica*, *Caradrina blanda*, 1 *Heliothis marginatus*, 1 *Smerinthus tiliæ!* and 1 *Chærocampa porcellus!* The latter rushed like a hawk at my brush, as I took it out of the pot to sugar a tree, and began feeding. I managed to change hands and slowly put the brush against the tree, and I luckily bottled him as he continued to hover. I had no net. Is it not very unusual to see this class of moths at sugar? *S. tiliæ* was sitting on a tree. Is it any good trying assembling with a female *Lasiocampa quercifolia?* I am inclined to.—G. M. A. HEWETT, Winchester College.

[I remember occasional instances of *C. porcellus* at sugar. One almost identical with that mentioned above happened to Mr. Ovenden many years ago when I was with him.—Ed.]

St. Anne's-on-Sea.—We have done pretty well this season on the sallows, *Tæniocampa gracilis*, *T. opima* and *T. gothica* with *T. rubricosa* putting in an appearance, *T. gracilis* being by far the commonest. *Orgyia fascelina* are not nearly so abundant this year as last, but still we have managed to secure a few larvæ. We have also got a fairish amount of *Leucania littoralis* larvæ off the sandhills and they are just beginning to turn.—H. Baxter, St. Anne's-on-Sea.

York.—Sallows yielded plenty of specimens, mostly of the common tribe, when nights were favourable; but I was prevented owing to the wet and cold windy nights which prevailed during the blooming season, trying them sufficiently often to take *Tæniocampa leucographa*. This species was however taken at Bishop's Wood, near Selby, and, judging by my previous experience when I took a large number one season, the species is not uncommon there. *Anticlea badiata* I found, on one of the sallowing nights, flying round the rose bushes in the greatest profusion.—S. Walker, 75, Union Terrace, York.

Cambridge, etc.—I found the early part of this season decidedly bad, and things very late, they are coming out much better now, and seem tolerably plentiful. A day at Tuddenham ("The Breck Sands") in April produced larvæ of a *Gelechia* in *Cerastium arvense*, probably *G. fraternella*, and other larvæ in flowers of broom, from which I have to-day bred one *Tortrix xylosteana* (I expected *G. mulinella*), cases of *Coleophora lixella* and *C. onosmella* (the latter of which have been coming out the last week), and one imago, *Gelechia velocella*. *C. alcyonipenella* is now coming out from cases occurring plentifully near the town, and *C. troglodytella* from the Fens. I was at Wicken one day in the middle of June and collected some larvæ of *Gelechia morosa* from yellow "loose-strife," and *Peronea shepherdana* in "meadow sweet," and took a series of *Eupœcilia vectisana* (? Ed.) and odd specimens of *Phoxopteryx paludana*, *Chauliodus illigerella*, *Stigmonota orobana*, etc. I saw Mr. Houghton (the local collector) who told me *Meliana flammea* had been pretty plentiful, *Nascia cilialis* and *Viminia venosa* just coming out. The larvæ of *Plusia orichalcea* were very late, I took a few and the last one spun up July 1st, a full fortnight later than in other years, and three weeks later than last year, which, by the way, was the earliest year I have known them. Two nights in the Fens, July 4th and 5th, proved good for "light" and produced *Macrogaster castaneæ (arundinis)* slightly worn, but more plentiful than I have ever seen them, about fifty or sixty in the two nights. *Leucania pudorina* came freely to "sugar," three *L. straminea* at honeydew on alder leaves, *Xylophasia rurea* and var. *alopecurus* at "sugar," one *Triphœna subsequa* in a heap of rubbish, and other odd things such as *Hepialus hectus*, *Coremia quadrifasciaria*, *Herminia cribralis*, *Rivula sericealis*, etc. One thing I have found in the Fen fresh this year which has pleased me much, *viz*:—*Strathmopoda pedella* which occurs plentifully on three alder trees only, although I tried all over the Fen where alder grows.—W. Farren, Cambridge.

Swansea.—So far as this season goes, insects seem to be scarce, I have taken some *Boarmia consonaria*, but mostly ♂ ♂, the ♀ ♀ being about one in ten. Oddly enough, the majority of these were taken on birch

trunks, some hundreds of yards away from a beech wood. Do the larvæ feed on birch also? Insects seem much later this year than last. *Mamestra albicolon* is not yet out on the sandhills, and sugar, on June 4th, only produced one *Agrotis ripæ*. I have taken a good many *Melitæa artemis* in a field where they certainly did not occur last year, the question is, where did they spring from? *Leucania turca* also occasionally turns up, but it seems hard to get in good condition. Mr. Holland, who has been staying with me, has taken *Argyrolepia baumanniana*, but unfortunately his first day's catch was all spoilt through carelessness.—R. B. Robertson, Skelty Park, Swansea.

Sligo.—The season here promises to beat the record. All insects are exceedingly abundant, and "sugar" seems to have quite regained its old attractiveness, absolutely swarming with the commoner Noctuæ. The time of appearance also is earlier than usual, for instance *Plusia v. aureum* appeared on June 19th, *Apamea oculea* and *Noctua xanthographa* on June 29th, all these being fully three weeks earlier than usual. *Chærocampa porcellus* is again abundant, and I am endeavouring to procure eggs.—P. H. Russ, Sligo.

Brockenhurst.—Having just had a week's collecting at Brockenhurst with my cousin, Mr. William Ogden, I thought a few notes might be of interest to some of the readers of the *Record*. Arriving on May 30th we were fortunate enough to have fine weather the whole time, until the last day, June 6th, which was dull and rainy. *Argynnis euphrosyne* was one of the commonest butterflies and was in fine condition. *Gonepteryx rhamni* was also abundant and occasionally, *Euchloë cardamines* and *Thecla rubi* were taken. *Hesperia tages* and *H. malvæ* were common everywhere, and at Stubby Copse *Nemeobius lucina* was by no means scarce, as we managed to take some twenty specimens between us. Beating resulted in *Ephyra punctaria*, *E. trilinearia*, *E. pendularia*, *Corycia taminata*, *Eupisteria heparata*, *Cidaria silaceata*, *Halias prasinana*, *Lithosia aureola*, *Arctia mendica* (four females only), *Platypteryx falcula*, *P. lacertula*, *P. hamula* and *P. unguicula*. On the heath, *Bombyx rubi* (males) and *Phytometra ænea* were plentiful, and an occasional *Anarta myrtilli*, 2 *Boarmia cinctaria*, and a single *Nemoria viridata*. *Fidonia piniaria*, *Thera obeliscata* and *Macaria liturata* were taken among the pines, but only one specimen of the latter. On June 5th we visited Rhinefield, hoping to take *Macroglossa fuciformis* at the rhododendrons, but found they were not in blossom. However, we succeeded in taking seven specimens at the flowers of the American honeysuckle, all in fine condition. Other captures during the visit were *Numeria pulveraria*, *Ypsipetes ruberata*, *Euchelia jacobææ*, *Epione advenaria* and *Lobophora hexapterata*, and among larvæ might be mentioned *Triphæna fimbria*, *Catocala promissa*, *Liparis monacha*, and *Argynnis paphia*.—Russell E. James, Chesterville, Hornsey Lane, Highgate, N.

Hepialus velleda in Bucks.—Whilst mothing at dusk, on June 18th last, round the outskirts of a fir plantation, near Tring, but just beyond the boundary of the two counties (Herts and Bucks), I found a large number of the common *Hepialus lupulinus*, hovering over one particular spot in the thick herbage, as though in quest of a female, and among them I could just distinguish in the dusk a moth somewhat larger than the rest! on making a sweep with the net, among the

herbage, I found I had secured a fine ♂ and ♀ *H. velleda*, among a lot of the commoner species. I should be interested to know how far the range of this species has been found to extend in the south of late years. If I remember rightly it has been taken in Kent.—E. Geo. Elliman, Westcroft, Tring, Herts. *July 10th*, 1891. [*H. velleda* is, I believe, found in almost every county in Britain. It is a popular but erroneous idea that it is a northern species. I used to take it in abundance near Strood (Kent) some sixteen years ago.—Ed.]

The Rhopalocera of Herefordshire.—The following list contains most of the species that occur here, and the chief alterations which have had to be made in an older list simply refer to the relative abundance of the different species. Pieridæ. *Aporia crataegi*. No specimens recorded since 1872, when Miss Hutchinson took two at Kimbolton. Formerly in abundance at Ross (*teste* Mr. H. Southall). *Pieris brassicæ*. Common. Scarce in 1882, about two thirds of the larvæ infested with *Microgaster*. *P. rapæ*. Very common. Those larvæ fed on red pickling cabbage seem invariably to produce dark ochreous imagines, as did some I fed on *Sinapis arvensis* though in a less degree. *P. napi*. Common in woods and fields. Some of the summer brood in 1888 were especially dark. I am not sure that those fed on *Nasturtium officinale* do always produce the var. mentioned by Newman. That var. does occur here not unfrequently, however. *Euchloë cardamines*. Common, especially in fields and lanes, the larvæ on *Sisymbrium alliaria* in July. The ova are bright orange colour. *Leucophasia sinapis*. Abundant, but only in a few localities, though these are extensive. I have one ♀ with markings almost like the ♂. The var. *erysimi* has occurred. The æstival brood is not plentiful. *Colias hyale*. None recorded since the one mentioned by Newman. One is reported to have been captured in the south of the county in 1889 (it subsequently escaped). *C. edusa*. Plentiful in 1877; two in 1882 at Dinedor: one at the Great Doward, August 1889, one at Bridge Sollers, and several in the Golden Valley in September. Mrs. Hutchinson has obtained the var. (♀) *helice*. *Gonepteryx rhamni*. Locally not uncommon in woods in the south, sparingly elsewhere. It occurs here most years, although there is no *Rhamnus* within convenient distance. It must feed on something else also, but on what?

Nymphalidæ. *Argynnis selene*. Not uncommon in woods. Very plentiful in 1890. *A. euphrosyne*. Very common in woods not close to the town. I have a series of u.s.; in some the hind wings are very brightly marked, quite purplish, in others chiefly yellow. *A. aglaia*. Occasionally in woods in the south. *A. adippe*. In woods and fields, especially on hillsides, found with *A. aglaia*, but much commoner. *A. paphia*. Dr. Chapman has taken the var. *valesina* just on the border of the county (south), so we are anxious to claim that as a Herefordian also. The type common in woods, the ♀ being very variable. *Melitæa aurinia*. Locally plentiful some years ago, since sparingly; I have not seen it alive since 1888. *Vanessa c-album*. Common, some years especially so, *e.g.* 1887. The var. *hutchinsoni* (spring brood) may be obtained. *V. polychloros*. Usually scarce. The larvæ were in great profusion a few years ago. *V. urticæ*. Very common and very variable. Mr. A. C. Edwards bred the extreme variety figured in Newman's *British Butterflies*, in August, 1887 (it might appropriately be named

var. *mista*). *V. io.* Also common, varies little except in size. *V. antiopa.* One from near Ross (1882) in my collection; another in the Golden Valley, 1889. *V. atalanta.* Fairly common, locally abundant. *V. cardui.* Some years plentiful (*e.g.* 1885). A larvæ fed on *Urtica dioica* produced an imago with the ground colour pink instead of pinkish-brown. Is this usually the case? Apaturidæ. *Apatura iris.* Not very rare on the whole. Specimens have been captured in several localities, seen in others. Satyridæ. *Melanargia galatea.* Scarce and seldom. One at Dinedor many years ago. Dr. Wood says it occurred rather plentifully at Eastnor some time ago. *Pararge egeria* (v. *egerides*). Common in woods and lanes near (how many broods are there?), but less so than formerly. I once took the type at Dinedor Camp, but fear this specimen is lost and have not yet taken a second. *P. megæra.* Common. Vernal brood, contrary to usual rule, scarcer than later one; much duller and smaller and less difference between the markings of ♂ and ♀. *Satyrus semele.* Formerly close to Hereford, now extinct there; still common in places, but very local and restricted in its range. *Epinephele ianira.* Very common and variable. The ♀ more abundant than the ♂ in this genus. I have taken ♀ *ianira* with fore wings very much resembling a very large ♀ *tithonus.* *E. tithonus.* Common on bushes. Vars. with extra (small) ocelli, not uncommon. *E. hyperanthus.* Common, especially so in 1890, in woods and lanes. I have not yet obtained the var. *arete*, but it would be an easy task to make out a long list of varieties using the numerical method as in demonstrating vars. of *Helix hortensis* and *nemoralis.* *Cœnonympha pamphilus.* Common nearly all the summer. Mountain specimens much more reddish than those from lower situations. A form, having the ocelli only just visible, is common on the Great Doward in August. It also varies much in size. Lycænidæ. *Thecla w-album.* Occurs in most woods, sometimes common, but is difficult to obtain in good condition. Larvæ not uncommon. *T. quercus.* Common in oak woods about the middle and end of July. Larvæ often abundant in June. *T. rubi.* In fair numbers in most of our woods. *Polyommatus phlæas.* Common. I have not seen the var. *schmidtii* from this county. *Lycæna ægon.* None recorded since Newman's in the *British Butterflies.* *L. astrarche* (*agestis*). Rare and very local. Most of the specimens from Backbury, where I once saw it plentiful. *L. icarus.* Common everywhere. Var. *icarinus* not uncommon, early brood larger and brighter than others. *L. corydon.* See *Entom.* xx., p. 265. The only instance I know of its having been taken in this county. *L. argiolus.* Fairly common in spring, summer brood not so plentiful. Unusually abundant in 1890. *L. semiargus* (*acis*). I know of no record since Newman's (*British Butterflies*). His locality has been searched for many years in vain, but in the early part of the century it was not uncommon here. *L. alsus.* Sparingly in one locality only where it was discovered by Dr. Chapman in 1889. It used to occur not far from Malvern, but was extirpated by young "entomologists," more ardent than scientific. *L. arion.* Apparently no record except the one in Newman. Erycinidæ. *Nemeobius lucina.* Very common in Haugh Wood, but does not remain out long. Hesperidæ. *Syrichthus malvæ.* Generally common on railway banks and cuttings, on hillsides and in woods. *Nisionades tages.* More common than the last in similar localities. Larger than some Scotch specimens I have seen. *Hesperia*

thaumus (*linea*). Fairly common. *H. sylvanus*. Locally common in woods and on bushy hillsides. It seems much to be desired, that someone would undertake to collate the various forms and varieties from various parts of the kingdom. A cabinet intended to contain British insects has been placed in the Museum here. Only the Rhopalocera have yet been arranged, but I should be very glad to show these to any entomologist who will let me know beforehand by letter.—E. W. Bowell, Hereford.

Hybernation of the larvæ of Noctua sobrina.—With regard to the question as to whether *N. sobrina* passes the winter in the egg or the larval state, the following entry in my 1874 note book may be of interest, *viz*:—Ova laid August 13th and 14th, hatched September 1st, and the larvæ from these hybernated very small, although I failed to rear them, probably because I could not obtain their proper food. In the following year (1875) I had full fed larvæ sent me from Scotland, June 8th, from these the moths were bred, July 14th, and subsequently. On August 30th I had a batch of ova hatch, and the larvæ again hybernated as before. These two notes, I think, conclusively show that the larvæ of *N. sobrina* like so many other species of that genus hatch in the autumn and feed up in the spring. It is a nocturnal feeder.—C. Fenn, Eversden House, Burnt Ash Hill, Lee, Kent.

The Foodplant of Catoptria citrana.—I believe the larvæ of *Catoptria citrana* feeds on the flower heads of *Achillea millefolium* (yarrow) in June. It is double brooded, the imago appearing the last week in May, and again in August at Deal, and the moth occurs among the same plant in July and August. These, also, are the Folkestone dates which would probably be a little modified by the difference of locality although it is a well-known fact that many species appear earlier in the north than in the south.—C. Fenn, Lee, Kent.

I have always taken *Catoptria citrana* among "yarrow" and "rest-harrow" (*Ononis*) and was always under the impression that the latter was its foodplant, but, as I have never bred it, I cannot say for certain. I take them flying in June and beginning of July, at Tuddenham, which appears to be a month earlier than the Folkestone date.—W. Farren, Cambridge. [The species occurs at Deal at the end of May and beginning of August, but it was most abundant at Tuddenham on July 18th this year. Mr. Austin of Folkestone, has bred the species from yarrow.—Ed.]

Hybernating Iodis vernaria.—I have bred *Iodis vernaria* right through the winter. They seem easy. I forgot I had them until the clematis had been well out for a fortnight when I found them sitting quite peacefully on the dead stems in the pot. They are exactly like the dead stems and drop at a touch—quite rigid. In the spring they change from brown to green, and still drop rigid—beautifully protective. Mr. Owen Wilson's picture is a good one of the full grown larvæ, though he failed to get his through the winter.—G. M. A. Hewett, Winchester College.

Hadena rectilinea.—Owing to the late spring I have done very little in collecting this season yet, although I have bred a good many species. I took a female *Hadena rectilinea* last July on a tree trunk, she was nearly laid out; however, I got over a score of ova which duly hatched and fed up to the end of October, they then went down,

hybernated during the winter, then entered the pupa in the early spring without coming up to feed again. Now all the entomological books I have read say this species feeds from autumn to May or April. Will any reader tell me if they have a similar experience?—J. Wylie, 6, Union St. Lane, Perth, N.B.

Times of Emergence.—My breeding pots have brought forth a good many things this year, some species later, some earlier than other years. Below is a list of species bred, and the time of day each species emerges. I think it would be interesting if some other entomologists notified the time. I think Mr. Fenn's assertion in the *Record*, vol. ii., p. 70, that species have no special time of day at which they emerge is a bit too sweeping. I believe the discussion was first started by Miss Kimber (*Record*, vol. i., p. 342), and I think the question a very interesting one; for my part, I believe, at any rate, most species have their own time of day to emerge.

SPECIES BRED.	LOCALITY OR WHERE RECEIVED	EMERGING TIME OF DAY.
Notodonta carmelita .	A series of pupæ from Rev. B. Smith.	Between 8 and 9 a.m.
Hadena genistæ ...	Young larvæ from Dr. Crallan.	„ 8 and 9.30 a.m.
Arsilonche albovenosa = *Viminia venosa.*	Larvæ from the Fens.	„ 9.30 and noon.
Anticlea rubidata ...	Long series from eggs, Tuddenham.	„ 8 and 10 p.m.
A. sinuata	Larvæ near Cambridge.	„ 7 and 9 a.m.
Collix sparsata ...	Larvæ from Fens.	„ 8 and 10 p.m.
Selene lunaria ...	Four from larvæ, Mr. Bower, Lee.	„ 7 and 8 a.m.

—W. Farren, Cambridge.

Bryophila perla appears to emerge from 6 to 8 p.m. One has just emerged at the latter hour, July 22nd, 1891.—Victor Gerrard, 47, Foulden Road, Stoke Newington.

Hybernating Apatura iris.—My specimens of *A. iris* emerged last week—both females. The larvæ fed up quickly. They fed at night, and rested in the daytime on the mid-rib of the upper side of the leaf, the head towards the base of the leaf. One ought to be able to find them by the leaf hanging down with the weight of the larva, otherwise they are almost invisible. When about to pupate, they reversed their position and attached themselves to the upper side of the leaf, head towards the point of the leaf. The back of the pupa is very narrow and indented in exact imitation of the slightly indented sallow leaf. The pupa again was almost invisible. I am glad to have bred them right through the winter.—G. M. A. Hewett, Winchester College.

Zygæna trifolii.—The *Z. trifolii* mentioned last month (*Record*, p. 109) as sent me by Mr. Boult, were taken on the coast between Bridlington and Flamborough, and not at Spurn, as there (by error) stated.—J. W. Tutt.

The genus Zygæna.—I have been much interested with the notes under this head, and especially with Mr. J. Parry's query "Do all the

Burnets spin up on grasses?" In the December number of *The Entomologist* for 1889, page 297, I have a note on finding empty cocoons of a gregarious member of the *Zygænidæ*, as well as solitary but empty cocoons of *Bombyx quercus* on rocks at Tan-y-Bwlch, North Wales. I had every reason, from their appearance, colour, etc., to suppose that the former were cocoons of *Z. filipendulæ*, but my surprise was considerable at finding them fixed to the perpendicular rock surfaces about a foot or so from the ground, when plenty of rushes and grass stems were close at hand. It was a common occurrence to come across about a dozen close together—in some cases touching each other—but not a single cocoon could I find anywhere else. I have never taken anything in North Wales belonging to the genus except *Z. filipendulæ*, which is there an abundant, but local insect. As a rule—I cannot remember an exception to it—the larva spins up on a stone, a wall, or a rock, but I have never met with collections of cocoons except at Tan-y-Bwlch. In Newman, page 23, the cocoon of *Z. minos* is said to be spun upon stones; and I hear this is the habit of the insect at Abersoch.—J. Arkle, Chester. *July 22nd*, 1891.

Lepidoptera of Dulwich.—After reading Mr. H. J. Turner's note in the *Record*, vol. i., p. 349, on the "Lepidoptera of Brockley," I think your readers would be interested in the following list of species taken by myself in Dulwich during the last few years. Rhopalocera.—*Pieris brassicæ*, *P. rapæ*, *Vanessa polychloros*, *V. urticæ*, *V. atalanta*, *V. cardui*, *Epinephele janira*, *Polyommatus phlœas*, *Lycæna icarus*, and *Hesperia sylvanus*. Sphinges.—*Sphinx ligustri*, *Smerinthus ocellatus*, *S. populi*, *S. tiliæ* and *Sesia tipuliformis*. Bombyces.—*Hylophila prasinana*, *Nola cucullatella*, *Arctia caja* (larva), *Spilosoma lubricipeda*, *S. menthastri*, *Hepialus humuli*, *H. lupulinus*, *Cossus ligniperda* (larva), *Zeuzera pyrina*, *Porthesia chrysorrhœa*, *Dasychira pudibunda*, *Orgyia antiqua*, *Cilix glaucata*, *Dicranura vinula*, *Lophopteryx camelina* and *Phœlera bucephala*. Noctuæ.—*Bryophila perla*, *Acronycta* (*Cuspidia*) *psi*, *A. megacephala*, *Leucania conigera*, *L. impura*, *Gortyna ochracea*, *Axylia putris*. *Xylophasia rurea*, *X. lithoxylea*, *X. monoglypha*, *Dipterygia scabriuscula*, *Cerigo matura*, *Luperina testacea*, *Mamestra brassicæ*, *M. persicariæ*, *Apamea basilinea*, *A. gemina*, *A. ophiogramma*, *A. didyma*, *Miana strigilis* (mostly var. *æthiops*), *M. bicoloria*, *Caradrina morpheus*, *C. quadripunctata*, *Agrotis segetum*, *A. exclamationis*, *Noctua c-nigrum*, *N. xanthographa*, *Typhæna janthina*, *T. pronuba*, *T. comes*, *Nœnia typica*, *Mania maura*, *Tæniocampa gothica*, *T. incerta*, *T. stabilis*, *T. pulverulenta*, *Orthosia lota*, *Anchocelis pistacina*, *Cerastis vaccinii*, *C. spadicea*, *Xanthia citrago*, *Calymnia trapezina*, *C. diffinis*, *C. affinis*, *Dianthœcia capsincola*, *Hecatera serena*, *Miselia oxyacanthæ*, *Euplexia lucipara*, *Phlogophora meticulosa*, *Hadena trifolii*, *H. oleracea*, *Cucullia umbratica*, *Plusia gamma*, *Catocala nupta*, *Hypena rostralis* and *H. proboscidalis*. Geometræ.—*Uropteryx sambucaria*, *Rumia luteolata*, *Crocallis elinguaria*, *Eugonia alniaria*, *E. fuscantaria*, *Phigalia pedaria*, *Biston hirtaria*, *Amphidasys betularia*, *Hemerophila abruptaria*, *Boarmia gemmaria* and var. *perfumaria*, *Tephrosia crepuscularia*, *Hemithea strigata*, *Acidalia bisetata*, *A. trigeminata*, *A. virgularia*, *A. remutaria*, *A. aversata* and *var.*, *Cabera pusaria*, *Halia vauaria*, *Abraxas grossulariata*, *Hybernia leucophœaria*, *H. marginaria*, *H. defoliaria*, *Anisopteryx æscularia*, *Cheimatobia brumata*, *Oporabia dilutata*,

Larentia viridaria, *Eupithecia oblongata*, *E. castigata*, *E. vulgata*, *E. sobrinata*, *E. rectangulata* and var. *nigrosericiata*, *Melanippe fluctuata*, *Camptogramma bilineata*, *Triphosa dubitata*, *T. certata*, *Cidaria russata* var. *centum-notata*, *C. associata*, *Eubolia cervinata*, *E. limitata* and *Chesias spartiata*. Pyralides.—*Pyralis farinalis*, *Eurrhypara urticata*, *Scopula olivalis*, *S. prunalis*, *Botys ruralis*, and *Pionea forficalis*. Pterophori.—*Mimæscoptilus pteroductylus*, *Leioptilus pentadactyla* and *Alucita hexadactyla*. Crambi.—*Crambus prætellus*, *C. hortuellus*. Tortrices.—*Tortrix podana*, *T. xylosteana*, *T. rosana*, *T. heparana*, *T. ribeana*, *T. corylana*, *T. unifasciana*, *T. viridana*, *T. fosterana*, *Teras contaminana*, *Dictyopteryx læflingiana*, *D. forskaleana*, *Penthina corticana*, *Hedya ocellana*, *Spilonota trimaculana*, *Asvis udmanniana*, *Sericoris urticana*, *S. lacunana*, *Cnephasia musculana*, *Grapholitha nævana*, *Pædisca corticana*, *P. solandriana*, *Ephippiphora cirsiana*, *Carpocapsa splendidana*, *C. pomonella*. Tineina.—*Diurnea fagella*, *Scardia cloacella*, *Hyponomeuta padellus*. *Harpipteryx xylostella*, *Phibalocera quercana*, *Gelechia mulinella*, *Teleia luculella*, *Æcophora pseudospretella*, *Endrosis fenestrella*, *Argyresthia nitidella*, *A. pygmæella*, *A. gædartella* and *Laverna atra*. I have not worked any of the species as systematically as I could wish, but have no doubt many more might be added to this list.—Jno. A. Helps, Wood Vale, Forest Hill, S.E. *April 30th*, 1891. [In future communications on "The fauna of the London (South-east) District," it would be an advantage to give only additions to those lists already mentioned.—Ed.]

SOCIETIES.

South London Entomological Society.—*Thursday*, *July 9th*, 1891.—A series of *Lycæna icarus* from Snodland containing several varieties, also living larvæ of *Euclidia glyphica* were exhibited by Mr. R. Adkin. Mr. Oldham exhibited a pallid form of *Argynnis euphrosyne*, a yellow var. of *Pieris rapæ* and dark *P. napi* from Cambs. Mr. C. A. Briggs an extreme melanic form of *Sphinx ligustri* (the fore wings with the inner margin black, the black coloration passing upwards from the anal angle to the costa just outside the subterminal line, the hind wings with three black bands). Mr. Tugwell stated that he had taken *Sesia sphegiformis* for 15 years at Tilgate Forest. In 1883, 19 were bred and 21 taken. This year Mr. L. Gibb and himself had taken 30 larvæ in an hour or two, from these 2 ♀'s were bred and taken to Tilgate, 26 ♂'s being captured during one morning by "assembling." He exhibited alder sticks with the pupa case *in situ* and also imagines. —Ed.

Thursday, *July 23rd*, 1891.—Mr. Barker exhibited a very varied series of *Triphæna fimbria*. Mr. Turner, *Bupalus piniaria*, bred from larvæ taken at Westerham, showing pale and dark forms of the female. Mr. Barrett remarked that the white northern form of this species should be considered the type as it occurred over a much larger area than the darker southern form. Mr. Turner also exhibited a varied series of *Hybernia leucophæaria*, with females of *H. marginaria* and *Anisopteryx æscularia*. Mr. Hawes, living pupæ of *Pararge megæra*, *in situ*; light green, pice green, and the hitherto unnoted black forms all

being seen; and remarked that, so far as he had observed, the varied coloration had nothing to do with sex. Mr. Dennis dark var. of *Spilosoma lubricipeda*. Mr. Tugwell, a long series of *Zygæna exulans* from Braemar, with specimens from Switzerland for comparison, and remarked that all the British examples he had had were of the var. *subochracea*. Mr. Barrett said that this fact seemed good evidence that the species was not introduced but native. Mr. Nussey, *Cucullia absynthii* bred, and remarks were made as to the remarkable protective coloration of the larvæ. Mr. Billups, some half a dozen species of Diptera new or previously reputed as British. Mr. Waller, bred series of *Aplecta tincta*, one specimen being very pale and hardly recognisable, *Triphæna fimbria*, *Eupithecia venosata* and a very long and varied series of *Dianthæcia carpophaga* from one locality. Mr. Barrett noted, that as one goes further north the proportion of dark specimens increases. One specimen of the latter was noticed as having five wings. It was announced that the proposed new Bye Laws prepared by a portion of the Council would lie upon the Library table until September 10th, and that all amendments were to be sent to the Secretary on or before September 17th. Members would do well to carefully peruse these Rules as some are remarkable for "the exuberance of their verbosity," as well as for their interesting nature.—H. J. Turner.

City of London Entomological and Natural History Society.—*Thursday, July 16th*, 1891.—Exhibits—Mr. Clark, a series of *Heliodes arbuti* from Epping Forest, varieties of *Arctia lubricipeda* (bred) and *A. menthastri* (from Hackney) both showing a large development of the black markings; also a larva of *Hepialis virescens* (from New Zealand) with a fungoid growth of *Torrubia robertsii* protruding from the back of its head. He remarked that there was a description of this in the July number of the *Entomologist's Record* (p. 98). Mr. Battley exhibited a bred series of *Arctia villica*, he pointed out that the pale specimens had the markings on the fore wings approaching those of *A. caja*, the four cream coloured spots nearest the tip of the wing coalescing to form the X like mark much resembling that species. He also exhibited light and dark forms of *Callimorpha dominula*, from Deal. Mr. Gates, *Procris statices*, *Sciaphila sinuana*, *Psyche reticella* (from Southend), *Dasycera sulphurella*, *Endrosis fenestrella*, etc., also living larvæ of *Dicranura vinula*. Dr. Buckell exhibited the ova of *Acronycta megacephala*, under the microscope. These were deposited singly, and not in groups as with *A. rumicis*. They showed the usual shape and contour of the genus, and were pale green, with dark red spots. He also exhibited a specimen of *Melanippe fluctuata* from Highgate, with a pale space in the centre of the dark costal blotch, thereby revealing the discoidal spot: and a series of *Ephyra trilinearia* from Epping Forest. These latter varied considerably in (1) the basal line, which was well marked in some, but scarcely to be traced in others; (2) central line, usually narrower in the females, but in one specimen (female) it was exaggerated into a band; (3) discoidal spot, on (*a*) upper wings, not to be traced in one specimen, well marked in others, and outlined with black in one; (*b*) hind wings to be traced in all, and often well marked. The position of this spot varied from being imbedded in the median line, to half-way between median and basal lines. Mr. Bayne exhibited *Sesia tipuliformis* and *Scotosia certata*

from Tottingham; *Demas coryli*, *Tephrosia consonaria*, *Emmelesia affinitata* and *Ephyra porata* from Epping; and *Procris geryon* from Aylesbury. Dr. Buckell remarked that many species, notably *Platypteryx falcula* and *P. lacertula*, were still on the wing in good condition. From notes given him by Mr. Bayne, he found that they had first been taken at Epping on 31st May, and had continued without any intermission up to 12th July. He suggested that the cold spring had caused these insects to come out for a few at a time, instead of all appearing towards the end of May as usual. Mr. Battley reported that he found *Hesperia lineola* common on July 14th, between Benfleet and Leigh. He thought that it was somewhat more sluggish than *H. linea*, and it was very easy to detect the difference of these two species when at rest. He also stated that *Apamea ophiogramma* were now on the wing, he having taken or bred several during the last week.

Coleoptera.—Mr. Heasler, various species from Eltham and Bexley, including *Notiophilus 4-pustulatus*, *Mordellistena abdominalis*, *M. pumila*, *Corymbites bipustulatus*, and *Hedobia imperialis*. Mr. Clark, series of *Carabus nitens*. Mr. Pearson, *Blaps similis*.—G. A. Lewcock and A. U. Battley, *Hon. Secs.*

Guernsey Society of Natural History.—The usual monthly meeting was held in the Society's room at the Guille-Allès Library. Mr. John Whitehead presided and there was a good attendance of members. Mr. E. D. Marquand read a paper on the "Wings of Insects," illustrating his subject by numerous drawings on the blackboard. Mr. A. Collinette followed with another on "The Evolution of Insects' Wings," which he illustrated by several specially prepared diagrams, and a genealogical tree showing the relation and interconnection of the various orders. An interesting discussion followed. Mr. W. A. Luff exhibited specimens of *Sesia philanthiformis*, taken on midsummer day, also a fine variety of *S. janira* with the hind wing of a beautiful pearly grey colour. The Secretary read a note from the Rev. J. Lowe, announcing the capture of a specimen of *Ellopia fasciaria*, this being the first record of its occurrence in this island.—W. A. L.

OBITUARY.

Henry Edwards.—This well known and highly esteemed entomologist died at his home in New York City, at 1.30 a.m. on the ninth day of June, 1891. His death was caused by dropsy and other complicated troubles which affected the heart.

In him the world has lost an earnest devotee to science and art, and those who knew him, a kind-hearted, generous, true, and sympathizing friend. In his death entomological science has lost one of its most active and energetic workers, and his loss is deeply felt and deplored by all who knew him, and he has passed out of this earthly domain with the affectionate regret of many grateful and loving friends.

Mr. Edwards was born in Ross, Herefordshire, England, on August 27th, 1830, and was destined by his father to become a lawyer. After studying for some time without evincing any particular aptitude for the profession, he entered a London counting house, and frequently appeared in amateur theatricals, for which he had much talent. He

finally decided, much against the wishes of his parents, to adopt the professional stage. In 1853 he embarked for Australia, where he made his first appearance as an actor, and where he passed many prosperous years. From Australia he drifted to Peru and Panama, and in 1867 he reached San Francisco, California. In about 1877 he made his first appearance in the east, at Boston, and finally in 1879 he came to New York In 1889–1890 he again visited his old home in Australia, from where he returned last year. During all these years he was constantly connected with the stage, until only a short time previous to his decease, when he was compelled to retire on account of his illness. At the time of his death he had just returned from a trip to the Catskill Mountains, where he was staying for his health, and three and a half hours later he entered into rest and the everlasting silence.

As an entomologist Mr. Edwards was world-known, and was considered one of the greatest authorities of the science, to which he was attached ever since his boyhood days. He was chiefly known by his excellent papers on the Pacific Coast Lepidoptera, which contain the descriptions of many new and interesting species from that region. He was also known by his articles on North American Ægeriadæ, of which family he described nearly all our American species. Besides these papers he has also written many other articles on descriptions of new species and transformation of Lepidoptera. He also edited three volumes of the journal *Papilio* The last large work he published was his *Bibliographical Catalogue of the Described Transformations of North American Lepidoptera*, which is now in the hands of all our working entomologists.

Mr. Edwards spent much money for the increase of his collection of insects, and devoted all his leisure time to his favourite study. His travels afforded him many rare opportunities for collecting material for his collection and writings. The collection consists of about 300,000 specimens of insects of all the orders from all parts of the globe. It contains the types of all the species he described, about four hundred and fifty, except a few which are in other collections. It also contains a number of Grote's types of Noctuidæ and Pyralidæ, and many of Fish's types of Pterophoridæ, and types of other writers. It contains the unique pair of *Oniticellus californicus*, and also many other uniques, oddities, and rarities of considerable value. The collection is one of the largest private collections in the world His library consists of about five hundred volumes of entomological works, and about double the number of pamphlets, and about two thousand volumes on travels and other topics (I am not sure about these figures).

Mr. Edwards belonged to many scientific and other societies. He was for some time vice-president of the California Academy of Sciences, life-member Brooklyn Entomological Society, member of the Torrey Botanical Club, Players' Club (New York), Bohemian Club (San Francisco), San Francisco Microscopical Society, corresponding member Boston Society (Natural History), San Diego Natural History Society, Belgium Natural History Society, etc.

He leaves a widow who deeply mourns his loss, and we would here add our condolence, sympathy, and heartfelt regret for her irreparable bereavement.—Wm. Beutenmuller, New York. *June 15th*, 1891. (From the *Canadian Entomologist*. July, 1891.)

The Entomologist's Record,
AND
JOURNAL OF VARIATION.

No. 7. Vol. II. September 1st, 1891.

MELANISM AND MELANOCHROISM IN BRITISH LEPIDOPTERA.

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

(*Concluded from page* 98.)

I must say that, ingenious as this theory is, the following explanation by Dr. Chapman appeals much more strongly to me. It shows how completely Dr. Chapman has grasped the subject. As is usual with his writing, it is so clear that any addition to or subtraction from the original would do harm instead of good. He writes:—"I have no doubt my theory (*Ent. Mo. Mag.*, vol. xxv., p. 40) is correct in a large number of cases, but as to the ground which it actually covers, I have not made observations enough to make even a guess. Mr. Merrifield finds that delay in the larval (or pupal?) stage produces darker specimens[1]—cold and wet produce such delay. It occurs to me to inquire whether there is any correlation between these facts. That is, dark coloration is advantageous to a species when living in a damp and cold climate, and will therefore no doubt prevail by 'natural selection.' Will the individuals of a species, that is, or has been so circumstanced, acquire a habit of responding immediately in coloration to any change in the special climatic circumstances in which it is placed? A species varies, say, in colour. Let us arrange it in diagrammatic form accordingly:—

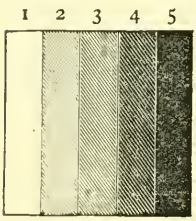
Diag. 1.

"Then in a wet season batch No. 5 (owing to its darker

[1] To wit, the early broods of *Tephrosia crepuscularia*, *Selenia illustraria*, *S. illunaria* and *Pieris napi*.—J.W.T.

colour) will have an advantage if the species rests on trees, rocks, etc., No. 4 a greater advantage than No. 3, and so on; and *vice versa* in a dry season (*vide* Diag. 1).

"Now let us suppose the same species to vary, independently in its relation to dryness and damp, constitutionally. Let us arrange it again diagrammatically (*vide* Diag. 2), in order thus:—



Diag. 2.

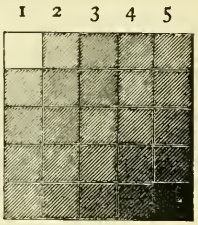
"Then the individuals of No. 1 thrive best when dry weather pushes them on rapidly, but die in wet. No. 5 gets on well and strongly in damp weather, but dies in dry. (These I mean as tendencies, of course). Now if we superpose these diagrams (*vide* Diag. 3), we have a set 1–1, that is doubly favoured by hot weather, *viz.*, is *pale* in colour and suits the weather constitutionally; another set, 5–5, is doubly suitable to damp weather, *viz.*, is *dark* in colour and suits the weather constitutionally; the occupants of the other squares are in intermediate positions. In a variable climate, like that of the British Isles, it is obvious that, in some seasons, 1–1 would be highly favoured, in others, 5–5; whilst the others, 1–5, 2–3, 3–2, 5–1, etc., would always be at a relative disadvantage, and we should in course of time have a race consisting of 1–1 and 5–5, freely crossed together. In a series of dry seasons, 1–1 would predominate, after a series of wet seasons, 5–5.[1] Now what would the effect of 1–1 and 5–5 crossing together be? Chiefly, probably, they would result in a race indistinguishable from 3–3, but they would possess the potentiality of readily, under suitable conditions, evolving 1–1 or 5–5, which 3–3, if bred true in an uniform climate would not possess. Each individual is, though to appearance 3–3, really nothing of the sort, but a combination of 1–1 and 5–5, capable by selection of being easily sifted apart, and the pure race of, say, 1–1, evolved in a few generations, whereas it would require a long period to do so from a pure race of 3–3. Now the question I ask is this:—Will it result also that the 1–1 element and the 5–5 element in each individual exist in a so far independent state that if placed in circumstances favourable to 1–1, it will predominate in that individual, or, if in circumstances favourable to 5–5, the 5–5 element will assert itself during the life of that indi-

[1] I leave out of view, for the sake of simplicity, the fact that 2–2, 3–3 and 4–4 would also largely survive; 1–5, 5–1, and, to a large extent, 4–1, 1–4, 2–5 and 5–2 would disappear.—T.A.C.

vidual? Experiment shows that, as a matter of fact, some such reaction does occur in certain species, the point is, has the possibility of such a reaction arisen in the manner indicated?

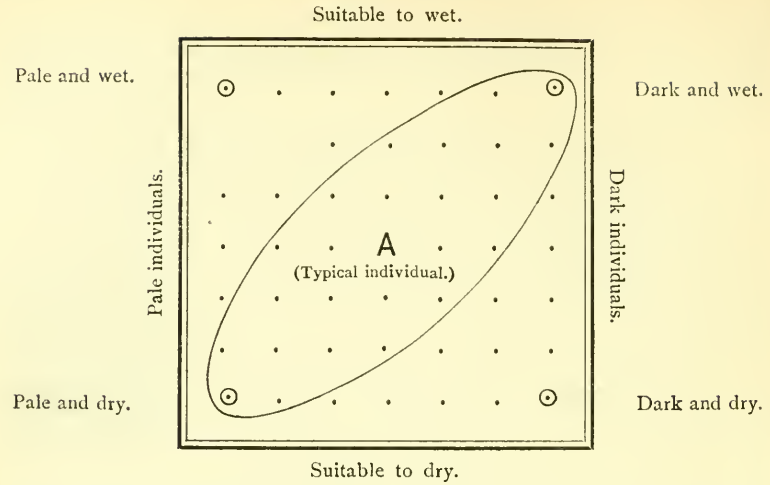
"Now, would the action of these two tendencies developed under corresponding variations of weather, tend to produce a physiological correlation between them in course of time?

"Diagram 3 illustrates hypothetical race varying independently in colour, and constitutionally with regard to climate as suggested above.



DIAG. 3.

"Or let us go over the origin of damp producing varieties in this way:—Suppose we have a race of Lepidoptera that has not yet been influenced in this way (as a matter of fact, there is probably none that has not been so influenced over and over again), and assume, as is no doubt true more or less of all races of Lepidoptera, that it possesses (1) a tendency to vary to lighter or darker, and also (2) a totally independent tendency to vary in the way of adaptability to a drier or moister climate;—then a dry climate or season will preserve pale vars. and those suited to dry conditions, and a wet season or climate the dark vars. and those suited to wet conditions; and *à fortiori* those individuals will have the best chance that combine suitability to climate in constitution and colour, and these will appear more numerously in the progeny by the crossing of those suited by constitution and those suited by colour, till at length these two variabilities will become correlated; the further step that the wet (or dry) season (or climate) shall elicit the latent adaptability to it, and with it the corresponding colouring, is not quite so logically evident, but I think it follows. We want really to know whether exposure to wet (or cold) *makes* dark vars. or only selects them. I do not know that the evidence of its *making* them is yet very cogent; but I think, if two kinds or sorts of variability are thus made to occur together for countless generations, such an effect might result. But it may be merely that in a wet season dark specimens survive and are found—in a dry season pale ones do so. I think my black *Diurnæa fagella* resulted from a succession of seasons, not from one season. The following diagram may make my idea more intelligible:—



"Diagram[1] illustrating hypothetical race varying independently in colour and adaptability to climate. Individuals may be arranged in a square as above. When subjected to variations of climate, the race will take the form (compared with the original hypothetical race) shown by the curved line."

Nothing, I think, can be clearer than these ideas of Dr. Chapman, and there is no doubt they will direct attention to the subject in a different way to which it has ever been directed before. We all know of the existence of melanism; we have all seen that it is intimately connected with humid areas, and that similar conditions produce almost identical results in our own country, on the Continent, and in New Zealand. But no attempt has, I think, before been made to point out the exact way in which the active factors producing melanism, work. For myself, as may be gathered from what I have before written, I have no faith in the results of the so-called temperature experiments of Mr. Merrifield, nor do I yet accept the suggestion that cold produces melanism, but the slightest modification of Dr. Chapman's theory to exclude cold and substitute moisture as the active agent in the production of melanism would satisfy my ideas exactly. It must be owned that we are simply on the threshold of this all-absorbing and interesting subject, and in a very short time new

[1] In this diagram 7 dots are used each way. Had 5 been used each way, the numbers in the previous paragraphs could have been applied direct to this diagram. As it is, the same method of reasoning is applied, but A (the typical individual) becomes here 4–4 and not 3–3 as in the previous diagrams, and so on with the other numbers.—J.W.T.

experiments may be carried out and new facts come to hand which will entirely revolutionise our present ideas. So much the better. Science is so rapidly advancing that specialists in any branch have all their work cut out to keep pace with the times, and I look forward with confidence to the advance this phase of our study is sure to make in a short time.

One thing appears, however, quite certain. Whatever suggestions and theories may be developed, the process of 'natural selection' will always have to be taken into account in the perfection of varieties and local races, whatever may finally be proven relative to the actual agents in the first production of such forms.

In conclusion, I can only say to my readers, that what I have written on this subject has grown from a comparatively short paper prepared a considerable time ago. The study of variation is increasing at such a rate, and there are so many good workers in the field that it would have been no trouble to have extended the present paper on the subject much beyond its present limits. However, there is enough written, and sufficient facts collected, I trust, for other workers to use, and it is to be hoped that the careful study of the subject may lead others into the field, to add to our store of knowledge. There are so many probable causes to be worked out in a subject of this kind that one is apt to emphasise some one special condition to the exclusion of all others. Perhaps I have erred in this, but I am in most hearty sympathy with Lord Walsingham's statement to the Fellows of the Entomological Society (*Trans. Ent. Soc. of London*, 1890, p. lv.), where he says :—" It cannot be too freely admitted that in all cases of supposed 'natural selection,' accompanied by advantage to the species, such advantage is probably by no means the sole and exclusive cause of, or inducement to selection—all the special conditions under which the species exists must be taken into consideration, and any inclination to overrate the active value of one special condition should be carefully discounted. The study of such supposed causes and effects is yet in its infancy, and although the promising child has 'grown apace' under the loving care of its numerous admirers, it has by no means arrived at maturity; on the other hand, no jealous or disparaging critic can at present be justified in putting it down as an 'ill weed.' "

SCIENTIFIC NOTES.

GENERIC NOMENCLATURE AND THE ACRONYCTIDÆ.—I had not intended to return to this subject until I had finished the histories of the individual species, but as it has got under full discussion, it appears necessary that I should make some remarks. In the first place, it is hinted that I have annoyed Mr. Butler. I hope this is not so, and write to make every apology if such is the case, as nothing was further from my intention than to say anything that could be personally offensive or annoying to Mr. Butler. My only object was to point out that the conclusions he had formulated as to *Acronycta* were erroneous, being founded on superficial characters of one state only of the insects, and that, the one in which they are most variable and therefore the one least useful for furnishing generic characters, still less characters for division into families; but if I have failed to do this without offending the author, I owe him an apology, even if tenderness on his side is as much to blame as roughness on mine.

As to the names, my difficulty was that none of the many names that have been heaped up as subgenera in this genus admitted of the meanings I wanted. I have pointed out in the case of *Cuspidia* that it may be desirable to subdivide this section further, in which case *Tricena*, say, would be available for *psi* and *tridens*, *Hyboma* for *strigosa*, *Jochæara* for *alni*, and so on. Whereas, to adopt any of these names for *Cuspidia* would altogether obscure the main fact I wish to bring out, that all these belong to a division of the genus, all closely allied when compared with *Viminia* or *Bisulcia*. Similarly, with regard to *Viminia*, I have placed *Arsilonche venosa* in this section, it is indeed a twin with *rumicis* much as *psi* is with *tridens*, in spite of the very different facies of the perfect insect. But also, though I have had no opportunity of fully studying them, I have little doubt that *Simyra nervosa* and *Clidia geographica* belong to *Viminia*; that is, they are more closely allied to *auricoma*, etc., than any of these *Viminia* are to *Cuspidia*. Still, they differ so far from our British *Viminia* that their present generic names must be retained as subgenera of *Viminia*. I want names to have these values, and if anyone will show that any pre-existing names are available to do so, without confusion or violence to their present meanings, I will gladly agree to them. I am concerned that these relationships between the species should, in some way, be indicated, that they should be indicated by *my* names is a matter of indifference. —T. A. CHAPMAN, Firbank, Hereford.

THE MALE GENITALIA.—Under the title of "The male Genitalia and the subdivisions of *Agrotis*," Mr. A. R. Grote, A.M., Bremen, Germany, writes:—"It is forty years ago since Lederer used the male genitalia to group the European species of *Agrotis*. According to the latest general work on the subject, the 127 European species of *Agrotis* fall into nine groups, characterised chiefly by changes in the form of the male genitalic appendages. The failure to correlate these European groups with the American subdivisions of *Agrotis*, prevents me from considering Professor Smith's recent revision as complete,

since I have demonstrated the near relation between the two faunæ exhibited by NOCTUIDÆ of the old and new world. The characters drawn from the male genitalia must be ranked with those from the antennæ. They are sexual or secondary characters. On this account to use them as the sole basis for generic separation is hardly necessary. The genitalia in the NOCTUIDÆ are found to differ markedly in otherwise very closely related species. In other species, easily distinguishable, they are practically of the same pattern. Undoubtedly we must know and study all the parts of an insect, but no single character will enable us to classify an order. It will be found impracticable to classify the moths by their tails, as by their wings alone or chiefly, as attempted by Herrich-Schäffer. Among the representative species this change in the structure of the genitalic appendages is instructive and indicative of their morphological value. The European *Agrotis augur* is a well-marked and tolerably isolated species, presenting peculiarities in shape, size, colour and pattern. In all these respects the American *Agrotis haruspica* is nearly its exact counterpart. As the basis of separation of the two, the immature stages not having been used, we have a tendency to obsolescence of certain markings and perhaps a hardly perceptible change in the exact shade and average size in *haruspica*. Now the genitalia are shown to differ in pattern as well. From this fact we must logically conclude that the genitalia are more easily impressed and changed by environment than colour, size, pattern or other structure. Consequently the genitalia are subject to variation, and the question rather comes up, are the characters drawn from the male genitalia of specific value? The true ground for considering the two species distinct is that they do not interbreed and produce each other, and that so far the American examples may be picked out by experts. When these conditions can no longer be fulfilled there would be no ground for retaining a different name. The mere fact of their inhabiting differing continents is not sufficient, they must breed true to type and not produce each other. Then we can be sure we have to do with separate cycles of existence, and we can catalogue the fact. As the genitalia are concealed, their structure is not so apparent, and it is clear that repeated observations are necessary to verify the statements drawn from solitary dissections. But, granting what has been published as substantially reliable, there yet remains the test of breeding to be applied to the genitalic species. We have an instance in the genitalic species of *Nisionades*. These butterflies have not been bred to ascertain if they remain true in their genitalic peculiarities, if one genitalic type does not produce the other, if the caterpillars show no differences. Until all the matters are cleared up we can arrive at no final conclusion as to the value of genitalic characters, as to which single observations must be checked by repeated experiments. Writers on the subject have apparently proceeded on the basis that the male genitalia are formed, not by deposits of chitine but of cast iron, moulded so as to fit and give at last a stable and firm reality to our artificial system of classification. Vain expectations. The characters on which we are obliged to found all our categories, are one in quality and only differ in quantity; what is generic is specific also, and what is specific is varietal."—*Canadian Entomologist. July*, 1891.

Under the heading of "Thoughts on Species," Mr. Moffatt writes:—"In considering the value of the structure of genitalia in determining species, we come in direct collision with the old unsettled question, 'What constitutes a species?' I believe it to be a simple one, when we remember that there are two ways of using the term, the natural and the artificial. All are agreed that there is no such thing as genera in nature, and I am fully convinced that there is such a thing as species in nature, which is satisfactorily demonstrated by cross-breeding; and that the artificial method of defining species is merely a matter of individual opinion, as to how much difference should be considered enough to make a species. Does the fact stated by Prof. Smith, that 'in an entire genus all the species will be practically alike,' prove that the character has failed? May it not rather go to show that genus to be composed of just so many artificial species of one natural species, which, I am quite satisfied, may often be the case, and, therefore, be a valuable proof of its success?

"There are no two opinions of the advantage to be obtained from a reliable test of species. Prof. Smith expresses confidence in the genitalia up to a certain point; given his experience, we might have the same. One of his published investigations convinced me that there must be a great deal in it.

"In *Entomologica Americana* for August, 1890, dealing with the *Scopelosomas*, he says:—'*Moffatiana* is closely allied in colour and maculation to *grœfiana*, so closely, indeed, that for a long time they were considered identical.' 'The genitalia of *moffatiana* are of an entirely different type from the other species of the group. This strong difference in species otherwise so nearly allied is remarkable.' As I know the history of how they came to be separated, I will give it as confirmatory evidence to the value of that method.

"In that famous entomological year, 1877, I took *Scopelosomas* for the first time; they were in great abundance. From the latter part of September to the first day of December, I took about 800 moths, mostly *Scopelosoma* and *Lithophane*, the bulk of the *Scops.* being of that form now known as *moffatiana*. I had noticed a difference in the depth of shading in the yellow ones, but thought it the result of age and exposure.

"In November, I visited Mr. Grote in Buffalo, taking with me representatives of my recent captures, and received from him over a dozen names of *Scops.* and *Liths.*, and amongst them *S. grœfiana*. In following years, I observed that the yellowish form was just as fresh as the reddish one, and that in some localities one would greatly outnumber the other, and I began to suspect that we might have in these forms different moths. About this time, Roland Thaxter, who is now, I understand, entitled to the prefix of Dr., opened communication with me, with a view to exchange; to him I expressed my suspicion, and sent to him an example of the light form as being least abundant with me, and received the reply, that he saw no difference in it from those he took. I then sent him the reddish form; he expressed delight, never having seen the same before, and inquired if Mr. Grote had seen it. I told him that I had got the name from just such specimens.

"I supplied him with a good series, and he went into communication with Mr. Grote about it, and, it seems, with some difficulty, succeeded in persuading Mr. Grote that it was deserving of a separate name. And now Prof. Smith, by the examination of the genitalia, finds them widely apart. I, by observing their habits, had suspected this might be the case, but could not prove it, whilst, from appearance alone, Mr. Grote had failed even to suspect it.

"As resemblance is not always proof that they are one, so the lack of it is not a demonstration that they are separate. In the early part of 1890, I had an opportunity of examining an extensive series of *Lithophanes* in the collection of Capt. Geddes, Toronto. I could arrange in line thirty or forty *disposita*, *petulca*, *ferrealis*, *signosa*, *bethunei*, in such a way as to make it appear impossible to tell where the separation should be made. What verdict would the genitalia give in this case? I would expect it to be in favour of their being artificial species of one natural species; yet it may not, but suppose it did? Let no one think that I would favour the obliterating of a single name."—*Canadian Entomologist*, Aug., 1891, pp. 178–179.

Wing Expansion.—As the question of wing expansion is under consideration in the *Entomologist's Record*, I enclose an observed instance of it, taken from the *Canadian Entomologist* of May, 1882, which may be of interest to you. What impressed me most forcibly in connection with it, was the contrast in its condition while expanding, to what I had observed in *Actias polyphemus* and *A. cecropia*, they appearing quite wet, whilst it seemed to be perfectly dry, and as it remained quiet for a length of time before there was any perceptible change, I came to the conclusion that it had dried, and therefore would not expand.

Now as this shows that there are at least two modes of expansion, it leads to the suspicion that there may be more; and what is true of one, may not be applicable to another. The extract is as follows:—

"*The Development of Actias luna.*—On the evening of the 12th of April, being at the residence of Mr. J. Johnston, a noise proceeding from his hatching box attracted his attention. Upon looking for the cause, he found a *luna* just emerged, the fifth from a batch of nine cocoons which he had raised from the egg. Its body and wings seemed to be quite dry, and were a pure downy white, with the exception of the costal band, which appeared disproportionately large, and a minute dark speck for the eye spot. It was remarkably active and did a great deal of rapid travelling before it came to rest, which it did at last quite suddenly on the end of a twig, and then never moved except to better secure its foothold. Mr. Johnston placed it in a suitable position under the full light of the lamp, that we might watch its progress to maturity. The first change noticed was the appearance of a bright green spot near the base of the front wing, and as that enlarged the wing expanded, very slowly at first, but more rapidly as it increased in size, the green colouring matter flowing along between the upper and under membrane of the wing, becoming more delicate in its shade as it spread first along the front of the wing, and had reached the apex before it extended through the inner half; but by the time it had touched the extremity of the whole outer angle the size, form and colour of the wing were complete.

"In the meantime the hind wing had not yet doubled its original size, with the part from which the tail was to come showing as a slight break on an otherwise even edge; the same routine was followed in the development of the hind wing as in that of the front, and by the time the broad part of the wing had attained its full size, the tail was a little more than half an inch long and very much crumpled. This was the last part to expand, but as the fluid passed into it, it also took size and form. The whole time occupied in the operation, from first seeing it until it was completed, was about one hour and three-quarters."—J. Alston Moffat, Victoria Hall, London. Ont. *July 30th*, 1891.

Towards the end of June I had a number of *Arctia villica* pupæ emerging, and what struck me as being rather peculiar was the difference in time which the wings took to attain their maximum expansion. I will quote two instances. A female which emerged while I was looking at it, and which I helped out of the cocoon, had its wings fully expanded in a minute or two from the time it left the cocoon, an unusually quick operation I should think! Another specimen, this time a male, took at least twenty minutes to develop. This species, as far as I know, never "flutters" while the wings are developing, the only movement perceptible being a slight raising and lowering of the wings.

I am inclined to agree with Dr. Buckell's idea that the process is one of coagulation and evaporation, and I think the reason why the insect climbs to the top of the cage is to prevent the wings from adhering to the body during the process.

I have frequently found bred specimens with the two main joints of the fore legs adhering together almost in a straight line and rendered quite incapable of grasping anything, their incessant and vain efforts to do so making the movements of the insect appear pitifully ridiculous. —D. H.S. Steuart, Royal School of Science, Kensington, W.

Disuse of Wings = Apterous Females (?)—Mr. Prout's footnote (*Record*, vol. ii., p. 113) is very interesting. But, can the suggestion it contains be supported by such examples as *Endromis versicolor*, *Saturnia carpini*, *Bombyx neustria*, *B. quercus*, etc.? I believe, amongst lepidoptera, males use their wings more than females. Why should not the converse to the suggestion be true, *viz.*, that the greater use of wings should produce greater wing development? But this is not so. As a rule the females have the larger wings.—J. Arkle, Chester. *July 22nd*, 1891. [The species mentioned here by Mr. Arkle are not at all parallel cases with that of *Biston hirtaria* mentioned by Mr. Prout. The latter is a remarkably well-known instance of a female with a considerable wing area, but weak, given to malformation and ill-development of the scales. The species Mr. Arkle mentions, have also a larger wing area, but here the resemblance ends. The wings of the females of these species are as thickly scaled and strong, muscularly, as those of the males. The dimorphic condition, which in these species happens to be correlated with a pale coloration, is not necessarily a sign of weakness or strength, and the wings are equally well-developed, though not of the same area in either sex. The assumption that "amongst lepidoptera, males use their wings more than females" may have an apparent tinge of truth in it, from the fact, that, when they are in search of the females either during the day or at dusk we see more of them, but long after the flight of the males is over the

females are on the wing ovipositing, etc., and we get no real idea of how much their wings are used. Whoever captured a ♂ *Bombyx quercus* on the wing late at night? I have taken dozens of females in this way. But Mr. Arkle leaves out of sight the probable reason of the larger wing area generally found in female moths where both sexes are active. I refer to the extra weight of the body when distended with ova which the females have to carry. The examples quoted by Mr. Arkle might be increased tenfold, and as a rule the greater the difference in the weight of the body in the sexes, the greater the difference in the wing area. *Lasiocampa quercifolia* is a case in point. Where the bodies of males and females are almost of equal weight, the wing area is much the same. This would more than counteract "the greater use in the males" if there be such greater use, which I much doubt.—Ed.]

VARIATION.

Varieties of Zygæna filipendulæ and Z. trifolii.—Whilst collecting in the Isle of Wight, this year, my wife found on some undercliff a colony of *Z. filipendulæ*, and amongst them the yellow variety. We visited the spot on several occasions after this and were fortunate enough to find two more specimens of this variety, all of them without the faintest tinge of red in the yellow; although we examined hundreds of this species we failed to find any other variation. I also found in a damp meadow *Z. trifolii* abundantly, the type of which was scarce; the majority had the two spots in the centre of the wing coalesced, and in many, the five spots were joined and formed a brilliant splash. In both species I noticed that the larvæ had spun up in an apparently haphazard way, choosing whatever object came first, such as stems of various plants and thistle leaves, and many on an adjacent boathouse.—P. W. Abbott, Birmingham. *August*, 1891.

With further reference to the occasional occurrence of the yellow form of *Z. filipendulæ*, I was fortunate enough to find one myself on July 20th in the same locality referred to by Mr. Abbott in the preceding note, *viz.*, a rough grassy undercliff, near Brook, in the Isle of Wight. The species was excessively abundant, and the few thistles scattered throughout the undercliff were simply a mass of "Burnets," and whilst in some spots it was difficult to find a suitable grass stem without a cocoon attached, yet these were not confined to the grass stems, as many dozens were spun up on the boathouse Mr. Abbott mentions, and others on a small windlass close by. In one case a second cocoon was made almost over the first on a grass stem, but not enough so to interfere with the proper emergence of the imago; whilst in the case of *Z. trifolii*, in another locality, the cocoons were distributed in quite as erratic a manner. I found several on large rush stems, and one on the under side of a broad leaf of *Iris*. With reference to *Z. filipendulæ*, I may say that, although I have worked the same spot for several seasons, I have never seen the species in anything approaching similar abundance, nor have I met with the yellow variety before, of which, unless my memory deceives me, Mr. and Mrs. Abbott secured four specimens, one of which they very generously added to my collection. They also succeeded in

obtaining ova from one yellow ♀ taken *in cop.* with a typical ♂.—Albert J. Hodges, Isle of Wight. *August*, 1891.

Variety of the larva of Biston hirtaria.—With regard to *Biston hirtaria*, I have not seen any mention made of a light variety of the larva. This year there was a brood in my garden on an apple tree. Out of about 200 or so, all were of the dark umber-brown form, except some half-dozen, which were a pale yellowish-grey. These have now pupated. Next season I hope to find out whether the imago is different to that from the common type of larva.—George Hollis, Dartmouth House, 47, Dartmouth Park Hill, N.W. *July*, 1891.

Hermaphrodite specimen of Coremia ferrugata.—I have had under examination a specimen of *C. ferrugata* in which both sexes are plainly visible. The band of the left wing is rather broader than that of the right, on which side is the female antenna, the other being male. I took the insect at rest, at Norwood, and did not observe this peculiarity until I was setting it.—A. J. Croker, 156, Tennison Road, South Norwood.

Varieties of Anticlea sinuata.—I have this year bred a nice variety of *A. sinuata*—generally a constant species. The method of variation appears to be generally peculiar to the genus *Anticlea*, *A. rubidata*, *A. badiata*,[1] and *A. berberata* constantly showing it. The method referred to seems to be a tendency to form an 8-like mark in the centre of the wing, the upper part enclosing the discoidal spot if one be developed. In this var. of *A. sinuata* it seems to be an extra line which is developed on the inside of the costal blotch (which itself varies very much ordinarily in width and intensity) situate towards the apical part of the wing, between it (the blotch) and the discoidal dot. The lower internal edge of this line (which extends to the median nervure) is then joined by a transverse line passing along the median nervure to the angulated point of the basal patch, thus making a somewhat circular outline containing the discoidal spot. From the centre of this transverse line, which joins the two blotches, an extra wavy line runs to and joins the lower external part of the basal patch on the inner margin, making with the circular character mentioned above a somewhat 8-shaped mark which appears to be characteristic of a certain form of variation in this genus. I had thought that it was a misplacement of the line, but Dr. Chapman pointed out to me that there appears to be an extra line; the central spot is very large, much more so than usual, and the dark greyish-blue blotch on the costa is paler than the type. Besides the variation in the width and intensity of the costal spot as before noticed, and the consequent variation in the width of the central pale area, there is a tendency to variation in ground colour. One specimen I have is entirely diffused with blackish, making the ground colour dark bluish-grey instead of the usual pure white. Others show a tendency in the same direction.—W. Farren, Cambridge.

Variety of Larentia pectinitaria.—I have also captured a variety of *L. pectinitaria*, in which the basal patch is more than usually developed, but the central band is entirely absent, except for the slight development of the inner costal blotch of the two forming the upper part of the band. No other part of the band is developed, although

[1] It is certainly most rare in *badiata*, and commonest in *berberata*.—W. F.

represented by a pale shade. In addition, however, there is an ⊢-like mark in the centre of the wing under the discoidal area, reminding one of the similar mark in the species of the Noctuid genera *Apamea* and *Miana*. This seems to be an extra development of the dot found on the inner margin of the banded area on the central nervure.—ID.

VARIETY OF MELANIPPE SUBTRISTATA.—I have also captured a specimen of the above, in which the outer half of the central band is undeveloped, the inner half only being developed up to and including the discoidal spot. The outer dark fascia directly beyond the basal patch is altogether undeveloped. The two suppressions make the variety look very pale.—ID.

BLACK VARIETY OF TEPHROSIA BIUNDULARIA.—I do not know whether black *T. biundularia* occurs only in Wales, it certainly is rather common here. On June 10th I took a fine black ♀, apparently only just emerged, and Sir John Llewellyn and his gardener, who have taken hundreds during the last thirty years, say it is the blackest they have ever seen.—R. B. ROBERTSON, Swansea. *August*, 1891. [Very dark *biundularia* are taken near Barnsley, Birmingham, Derby, Mansfield (Notts.), etc.—ED.]

CURRENT NOTES.

IT is with the greatest regret that our readers will hear of the death of Mr. Ferdinand Grut, F.L.S., for so many years honorary librarian to the Ent. Soc. of London. He was 71 years of age, and died on July 19th.

If any of our readers have not yet read Drs. Wood and Chapman's articles "On Oviposition and the Ovipositor in certain Lepidoptera," "Note on the Life-history of *Adela rufimitrella*," and "The Oviposition of *Lampronia rubiella*," published in the June, July and August numbers of the *Ent. Mo. Mag.*, we would advise them to do so. No scientific lepidopterist can afford to miss them.

One has no idea of the strength of the Yorkshire Naturalists' Union, until one reads their annual report in *The Naturalist* (their own organ). The Annual Presidential Address of the Right Rev. W. W. How, D.D., Lord Bishop of Wakefield, entitled "The Study of Natural Science" (published in the August number), is well worth reading, and illustrates the great advance made by the leaders of the Church towards the acceptance of the great fundamental scientific truths.

We are continually making extracts from *The Canadian Entomologist*. Some of the articles are of the greatest value and interest to British lepidopterists, and those who can should support it. It is the same price as our own Magazine, and can be obtained from Mr. W. E. Saunders, 188, Dundas Street, London, Ontario.

Cleora viduaria is recorded in the *Brit. Nat.*, from Lyndhurst, by Mr. Brady. How many times has this species been recorded in error of late years?

Microdon mutabilis, L., in Mr. Verrall's list of Diptera as doubtfully British, was captured by Messrs. Bignell and Lemann, at Ivybridge, during June (*E.M.M.*, pp. 224-225).

Mr. C. G. Barrett records (*E.M.M.*, p. 221) *Dioryctria splendidella*

(one of the species into which *abietella* was split up) and *Eupithecia togata* from Southwold, far from fir and pine trees. I have a specimen of the former captured by Mr. Coverdale some years ago under similar conditions at Shoeburyness. I have often mentioned it at the South London Society. Where do these specimens feed up and pupate?

Dr. Lang captured at light, near Guildford, on July 11th, a specimen of *Plusia moneta*.

Plutella cruciferarum (*xylostella*) is in abundance this year. The Agricultural Society is, we believe, employed in working out the life-history (which has been known for years) of this destructive species.

BIBLIOGRAPHY.

ADDITIONS TO THE BRITISH LIST AND CHANGES IN NOMENCLATURE.

COLEOPTERA.

Heterocerus flexuosus, Steph., is to be separated specifically from *H. femoralis*, Kies. *H. arenarius*, Kies., probably not British, or only a synonym of *H. femoralis*, Kies. *H.* (*Tœnheterocerus*, Kuw.) *intermedius*, Kuwert, n. sp. = *H. rectus*, Wat., which becomes a var. of *H. salinus*, Kies. (W. W. Fowler, *Ent. Mo. Mag.*, pp. 204–207).

HEMIPTERA.

Aleurodes rubicola, n. sp., allied to *A. carpini*, Koch. (J. W. Douglas, *E.M.M.*, p. 200).

LEPIDOPTERA.

Polia chi var. nov. *suffusa* (J. E. Robson, *Ent. Record*, etc., p. 84). *Agrotis obscura* vars. nov. *rufa*, Tutt, and *suffusa*, Tutt; vars. *ravida*, Hb., *obducta*, Esp., *bigramma*, Esp. and *austera*, Esp., differentiated, and added to the British list (J. W. Tutt, *Ent. Record*, etc., p. 132).

Homœsoma saxicola, Vaughan, referred to *H. nimbella* as a variety (E. R. Bankes, *Ent. Record*, etc., pp. 57-58).

Nepticula tormentillella, H.-S., introduced as British, *Ent. Mo. Mag.*, xxiv., p. 160 in error. The article refers entirely to *N. serella*, described *E.M.M.*, xxiv., p. 260 (E. R. Bankes, *Ent. Mo. Mag.*, pp. 196-197).

NOTES ON COLLECTING, Etc.

NOTES OF THE SEASON (LEPIDOPTERA).—*Liss, Hampshire.*—Collecting here has been rather more lively work during the last two months, though sugar has been almost an utter failure. The list of my captures for June and July besides many other species includes the following—(in chronological order)—*Bombyx rubi*, *Thyatira batis*, at sugar, *Tephrosia crepuscularia*, *Odontopera bidentata*, both at light, *Hylophila prasinana*, *Tanagra atrata* (*chœrophyllata*), *Ellopia fasciaria*, *Cuspidia leporina*, at sugar, *Metrocampa margaritaria*, *Phibalapteryx tersata*, *Pseudoterpna cytisaria*, *Spilosoma mendica*, *Dipterygia pinastri*, at sugar, *Xylophasia sublustris*, at light, *Phorodesma pustulata* (*bajularia*) (from ova obtained from one of these I am rearing a few larvæ), *Ptilodontis palpina*, at light, *Agrotis porphyrea*, *Apleeta nebulosa*, *Fidonia piniaria*, *Hepialus hectus*, *Euthemonia russula*, *Lithosia mesomella*, *Macaria liturata*.

Epione advenaria is common in a certain wood near here, but I have not taken it this year.—(Miss) A. J. MARINDIN.

St. Anne's-on-Sea.—We are having a rattling season here both with macros and micros. The larvæ of *Orgyia fascelina* and *Leucania littoralis* have turned out better this year than before; sugar has also succeeded much better this season. *Acronycta* (*Viminia*) *rumicis*, *Miana fasciuncula*, *M. strigilis* var. *æthiops*, *Mamestra albicolon*, *Agrotis corticea*, *Leucania comma*, *Hadena adusta*, etc., turning up with hosts of other commoner insects. The micros that have turned up and still are coming, are *Gelechia temerella*, *G. sororculella*, *G. artemisiella*, *G. marmorea*, *G. umbrosella*, *G. mundella*, *Tinea imella*, *Depressaria contaminella*, *D. assimilella*, *G. desertella*, etc., together with a lot of common ones. The *T. imella* we get in one little spot only a few feet square, evidently been an ash heap once, now covered over with grass, and in this spot they fairly swarm. We got a very red *Triphœna orbona* the other night, about the reddest I have ever seen, also one or two funnily marked *T. pronuba*. *Depressaria liturella* is just coming out and we have got a few already. *G. temerella* up to now seems to be very abundant, having only appeared a day or two ago.—H. BAXTER, St. Anne's-on-Sea. *July* 15*th*, 1891.

The South Coast.—Although, in common with the majority of our collectors this season, short records of my doings have appeared in these columns, the following notes may be read with interest, especially by those who have been able during the same period to collect in the same district; and I trust, also, by many further away, to whom any information even as to our commoner species, is interesting reading, and to whom we southerners are indebted for so many good things. In the first place although it is by most agreed, that, to "prophesy unless you know," is risky, yet I must congratulate myself that my prognostications of a good season, have in my own experience been quite justified by the result, and I trust all my entomological friends have been equally successful, in which case I think the Postmaster-General may look forward with confidence to a "boom" in the returns of the Parcels Post Department, and the exchange columns of the next few numbers of the *Record* will be found useful during the busy time of re-arranging and enlarging series to which we all look forward as such a pleasant finish to a good season's work. The general opinion seems to be, from our experience of this season after the phenomenally severe winter, that such old-fashioned and seasonable winters are favourable to the prospects of the lepidopterist, and I trust we may, next year, have the opportunity of further confirming this opinion.

Owing to other engagements I was unable to do much collecting during the early part of the year, and in fact did not leave home till the beginning of June. I had the opportunity, however, towards the end of May, through the kindness of friends, of getting news from what, in former seasons, I have found to be a stronghold of a favourite little butterfly with me, *Nemeobius lucina*, *viz.*, Wychwood Forest in Oxfordshire, to which, through the courtesy of Mr. Wynne, I have free access. In former seasons in some of the flowery glades, I have been able to take as many as six in my net at a time, flying freely over the primroses although settling rarely on anything except the bracken ferns, with which the glades are bordered. My friends were rather early, and,

being unable to revisit the spot, I had to be content with a very short series, but in fine condition. I may here add that it is a real pleasure to me, in these days of alterations in so many old "happy hunting grounds" beloved by the old collectors, to be able to confirm one of the old localities given in our useful and standard work Newman's *British Butterflies*, which, if re-edited and altered to suit the extinction of many old localities, and, what is more pleasant to record, the discovery of many new ones, would be of much greater interest at the present day. I lived in hopes of seeing a stray *Hesperia paniscus* in the miscellaneous series sent me from Wychwood, on the faith of Newman's localities, but my own experience is to the effect that it does not now exist there. My own first visit was to Guernsey (June 1st), where, however, owing to business, I was unable to do any collecting for a few days. I soon, however, discovered my previous locality for *Melitœa cinxia*, and in several visits secured a fine series, including a good var., as noted in the *Record*, vol. ii., p. 87. I was told later on that this species was rather more plentiful than usual this season in the Isle of Wight, in a very restricted locality on the coast near St. Catherine's Point. I did not go across although in the island at the time, as I trust the temporary cessation of the too close attention of the collector, may result in its establishing a more firm footing again on this side. Sugar was very attractive during June in Guernsey, we always worked flower-heads, which, in my own experience, especially near the sea, prove more attractive than the old tree trunks, and to me, very naturally so. The only rarities, however, were five specimens of a *Caradrina*, similar to those already recorded by me as *C. ambigua* from Guernsey and the Isle of Wight (*Record*, vol. i., p. 249). These I have not yet had the opportunity of submitting to Mr. Tutt. Two were taken 16th June, two 18th June, and the last a day or so later, when accompanied by Mr. W. A. Luff. The other species were *Noctua plecta*, *N. rubi*, *Agrotis puta*, *Miana strigilis*, and many commoner species. During this visit I also found a new locality for *Procris statices*, which, in Mr. Luff's experience, shifts its quarters by short distances every season, as noted by Miss Kimber in our June No. (p. 89). It had a most strange liking for the steeper parts of the cliffs, here covered by a mass of blossom principally large dog-daisies, and is, in its habits of flight, very similar to the "Burnets." Although not very bright weather, the species was not so sluggish as they, and was not altogether easy to capture, owing to the face of the cliffs being so very steep. I was disappointed in not taking a series of *Nola confusalis*, which I met with the previous season in Sark, and although unable to visit that island, I had hoped to find it in Guernsey; my take was, however, confined to a single specimen.

We arrived in the Isle of Wight, June 20th, and during the ensuing week I think I got more thorough wettings than ever before, in fact, I got to regard a heavy storm as the usual adjunct to an evening in the woods. These proved fatal to the condition of the very delicate little *Acidalia emutaria*, which, in the best of weather, is apt to get worn almost the first evening. They were plentiful, however, on the marsh with the usual embarrassing numbers of the commoner Geometers, such as *Iodis lactearia*, etc. During that week I also netted a pair of *Phibalapteryx lignata*. Sugar now began to fail, although for the first few nights *Xylophasia hepatica* appeared in plenty, with *Aplecta nebulosa*, of

which I secured a very pale var., and *X. rurea* (two dark vars. *combusta*, which I had never taken previously in that locality), *Miana fasciuncula*, *Apamea gemina*, *Hadena thalassina*, etc. The fact that certain species of NOCTUÆ that will in some seasons come freely to sugar are in others absent from it, whilst occurring freely on the wing and being netted freely, and whilst the same sugar is attracting other species in the same woods in numbers, seems to me to point to the fact either that meteorological influences affect different species in a different manner, which seems improbable, or that the natural attraction for one particular species may fail in occasional seasons, thus impelling the insect to seek other and normally less attractive "sweets." The idea also occurs whether the tendency to be attracted to the artificial and exhilarating "sugar" may be the result of any deficiency of feeding or want of moisture in the earlier stages of development, thus having the "drink tendency" developed in what might be called a hereditary form. This view I throw out for the attention of those who devote their attention to the great "Temperance" question. Amongst the more occasional visitors, during this wet week, to the sugar were *Apecta herbida*, *Noctua brunnea*, *Euplexia lucipara*, *Thyatira batis*, etc. The most notable absentees of what I have in former years taken in the same wood were *Cymatophora duplaris* and *Diphthera orion*, although I netted a very fine specimen of the former.

About the end of June I always commence work on the Downs, where sugaring is more certain work than in woods, and where my own experience is, that a whole season's work is either a thorough failure or a complete success, and does not vary from night to night in the erratic way so often reported in the woods; this may be due to the comparative absence of honey-dew, as noted by several writers in the *Record* last season. I sugared almost regularly on the Downs through July, and never had a really bad night's work, the greatest drawback being the very high winds, almost gales, from the S.W. during the first week in July. *Agrotis corticea* was in unusual numbers, and some very fine dark and banded, and some pale forms were to be selected; this species was in scores on some of the smallest blossoms, and it was difficult to box any single insect without getting one or more companions with it in the box. *A. lunigera* beat the record for this locality as regards early emergence, my first being taken June 30th, one day earlier than the previous season's earliest. Owing to the gales, for the next few days nothing could hold its own, a few being, however, circumvented by bunches of cut wild blooms, fixed in sheltered crannies. As soon as the weather improved they were taken fairly freely in company with *A. lucernea*, of which I must note again that not 1 per cent. show any marks of being worn in the slightest, even during rough weather in a most exposed locality. This latter species was also early, and both were fully out about the 13th July, but required plenty of cliff work to secure them in any numbers. My best spot was some 30 feet down the face of the cliffs, upon a little patch of spikes of the "wild beet" growing out from some rabbit holes, and off which, on two or three evenings together, I nearly filled my boxes. During part of July, I had the pleasure of the company of Mr. and Mrs. Abbott, of Birmingham, who were also successful in taking good series of both of these Agrotidæ. I was unable to meet with *A. cinerea* here, but picked up

one ♂ on June 30th during a gale, blown almost inside out and very worn. On the same date I also found *Aciptilia spilodactyla*, the pupæ numerous with a few imagines. This is very early for the species, and I took pupæ in a more exposed locality on Monday, August 10th. The horehound was exceptionally plentiful and early this year. It is a blossom well worth working, either with or without sugar. In the former case the sheep seem to display the same natural liking for sugar as the moths, and, to my great disgust, I found one of my most prolific grounds spoiled, all the horehound being cropped off close; my cut blooms seldom survived for the second evening, but in this case I think the rabbits were the guilty parties. Larvæ of *Cucullia verbasci* were fairly plentiful on the Mulleins, but, owing to the time taken in "setting," I had not the opportunity of searching on the bed-straw for those of *Chærocampa porcellus*, which occurs freely in one or two spots round.

Setina irrorella occurred in its usual plenty on the rocky slope referred to in the *Record*, vol. i., p. 334. In company with my friend Mr. G. F. Peek, of Guernsey, an early morning visit by boat produced some ninety, amongst which was one with the IVI mark on the right wing only; surely an aberration or var. *semi-signata*. This species also came specially freely to light on July 13th, which was an exceptionally still evening; we boxed them without nets as fast as possible about 2 a.m. That evening NOCTUÆ came on as freely at that time as early, but as five hours' work had filled all my reserve stock of boxes which I carry in bags almost as large as pillow-cases, we had reluctantly to return.

Day-work was almost neglected during this time. Geometers were, however, very plentiful, especially the common *Melanippe rivata*. *Anticlea rubidata* was scarce and worn, I think we were late for it. *Lycæna alsus* at Totland was spoilt by the rough weather and was a failure; as also we found, and partly from the same cause, *Limenitis sibylla*, when we visited the New Forest, about July 20th. We were of course late for it, but it was in nothing like its usual plenty. *Argynnis paphia* was in profusion; we secured 6 or 7 of the var. *valesina*, and I took a good var. of the ♂ with the black rays very much suffused on each upper wing making almost a black patch—unfortunately it was like many *paphia*, chipped. During the preceding week we had been successful in netting a good long series of *Toxocampa pastinum*, of which I beat out the first four, July 13th, from a low yellow vetch growing in an open rough field; they were then fresh, but, during the week, those netted at dusk were mostly more or less chipped. During the several years I have worked that neighbourhood (near Yarmouth, Isle of Wight) I have found it scarce, one or two occasionally being netted at dusk. Another species which has been commoner than usual this season with me is *Nudaria mundana* which could be netted freely several evenings along the hedgerows about 11 p.m. *Leucania conigera* also visited sugar freely several evenings, but *Gonophora derasa*, *Xylophasia sublustris* and some others occurred only sparingly.

The *Zygænidæ* were also in profusion, which is of course only remarkable for the fact, that, during several recent seasons they have occurred very sparingly—but amongst the *Z. filipendulæ*, as will be seen from a note under the heading "Variation," no less than five pure yellow varieties were obtained in the same locality during about a week; and

of *Z. trifolii*, in a small marshy field of very rank growth (for information concerning which I am indebted to Mr. Tugwell), Mr. Abbott and myself secured some of the most remarkable blotched varieties I have ever seen, and some remarkable for their large size. Of micros I can say but little, not having worked the same up, but took a few *Stenia punctalis* on the sugar on the Downs (last year on one evening this species swarmed). *Botys flavalis* occurred in its usual plenty, and during August (working only very occasionally) a few *B. asinalis* were netted or boxed off the sugared *Eupatorium* heads, the foodplant, madder, occurring in some plenty on some banks bordering the marsh. *Agdistis bennetii* were also freely flying on the marsh, over the sea-lavender, a very unpleasantly damp locality to work—which, however, has to be done for *Nonagria geminipuncta* which has occurred again freely, but is more restricted in its habitat even than last year—Mr. Abbott and I had one good morning's work, cutting the reeds, which I find this year backward and very small, thus compelling the larva in almost every instance to leave the reed in which it has fed, even in the last stage, and pupate in quite fresh stems; and, as well-grown reeds were scarce, this caused rather a run upon pupating-accommodation, accounting for my finding as many as four pupæ and one larva in an apparently healthy reed. This adds much to the difficulty of finding the insect.

Should the autumn prove equal to the summer and be a little more favourable to outdoor work, I think the season will prove to have been a not unfavourable one.

Of captures of rarities I hope to be able to record more as the season progresses, so far my only good species is *Triphæna subsequa*, one at sugared thistles on the Downs, July 9th, and this owing to the growth of our knowledge of the species can, I am afraid, no longer be regarded a rarity.—Albert J. Hodges. *August 15th*, 1891.

Hepialus velleda in Cambs.—Whilst at Wicken, Mr. McLachlan, F.R.S., sent me a wing of *H. velleda* found in an outhouse in the village. —J. W. Tutt, Westcombe Hill, S.E.

Mortality among larvæ of Chelonia caja.—I, too, have been rearing *caja* larvæ—in fact, I do so every year in the hope of obtaining varieties. My experience this year is identically that of Messrs. Milton and Quail, see *Ent. Record*, vol. ii., p. 118. Half of my larvæ died —certainly not through either unhealthy food or overcrowding. This is remarkable, as the number of imagines should correspond to the number of caterpillars—they are so easy to rear.—J. Arkle, Chester.

Capture of Hesperia lineola in Cambridgeshire.—Whilst collecting on the edge of Burwell Sedge Fen on August 2nd, a skipper flew across my path, which, on being netted, proved to be *Hesperia lineola*. There is no doubt that this species is widely distributed in England, and will probably prove as common as its congener, *H. linea*. —J. W. Tutt. *August*, 1891.

The Fauna of South London.—I have read with much interest the notes (vol. i., p. 349, and ii., p. 68) by Messrs. Turner and Cansdale. Having collected here since 1874, I may make a few additions to the list. The following I have taken myself in Sydenham (several seem to have disappeared within the last few years):—*Argynnis euphrosyne*, *Vanessa polychloros*, *Pararge megæra*, *Epinephele janira*, *Haliasprasi-*

nana, *Lithosia complana*, *Odonestis potatoria*, *Ptilodontis palpina*, *Diloba cæruleocephala*, *Xylophasia hepatica*, *Orthosia upsilon*, *Hecatera serena*, Since 1886 I have taken *Vanessa io* (not uncommon), *Lycæna argiolus* (scarce), *Sphinx convolvuli* (2), *S. ligustri* (not uncommon), *Porthesia similis*, *Notodonta dictæa* (2), *Thyatira batis* (1), *Asphalia diluta*, *Leucania comma* (3), *L. impura* (2), *Noctua festiva* (1), *N. baia*, *Pachnobia rubricosa* (1), *Tæniocampa gothica* (common), *T. stabilis*, *Orthosia lota* (several, 1889), *Anchocelis lunosa* (5), *A. litura*, *Cerastis vaccinii*, *C. spadicea*, *Scopelosoma satellitia* (common), *Xanthia citrago* (2), *X. silago* (*flavago*), *X. circellaris* (2), *Cosmia diffinis* (3), *C. affinis* (4), *Miselia oxyacanthæ* and *Hadena dentina* (common), *Xylina areola* (1), *Calocampa vetusta*, *C. exoleta*, *Plusia chrysitis* (3), *P. gamma* (common), *Heliothis peltiger* (1, 1888), *Herminia barbalis* (2), *Hypena proboscidalis*, *Eupithecia assimilata* (common), *Melanippe montanata*, *Coremia ferrugata*, *Phibalapteryx tersata* (1), *P. vitalbata* (1), *Scotosia dubitata*, *Cidaria testata*, *Eubolia bipunctaria* and *Anaitis plagiata*. Of the insects mentioned by Mr. Cansdale, I have taken several each of *Sesia myopæformis*, *Lophopteryx camelina*, *Cilix glaucata*, *Apamea basilinea*, *Triphæna janthina*, *Anchocelis pistacina*, *Habrostola triplasia*, *Gonoptera libatrix*, *Herminia tarsipennalis*, *Hypena rostralis*, *Odontopera bidentata*, *Amphidasys betularia*, *Thera variata*, *Cidaria truncata* and *Eucosmia certata*.—Reginald S. Sellon, The Hall, Sydenham. *June*, 1891.

Agrotis cinerea.—I took three specimens of this insect at light on Chinnor Hill (Oxon) on the 23rd instant, all three were males. Mr. Spiller, of Chinnor, and I tried both light and sugar on the two following nights, but did not take any more *cinerea*.—T. Maddison. South Bailey, Durham. *June 30th*, 1891.

Erratum.—On page 135, line 6, for "*Leucania turca*" read "*Hydrelia unca*."

Societies.

Entomological Society of London.—*August 5th*, 1891.—The President announced the death of Mr. Ferdinand Grut, the Hon. Librarian of the Society, and commented on the valuable services which the deceased gentleman had rendered the Society for many years past. Dr. D. Sharp exhibited *Japyx solifugus*, from the Eastern Pyrenees, and stated that in his opinion it was a connecting link between the *Thysanura* and *Dermaptera*. He also exhibited pupæ of *Dytiscus marginalis*; one of these was perfectly developed, with the exception that it retained the larval head: this was owing to the larva having received a slight injury to the head. Dr. Sharp also exhibited specimens of *Ophonus puncticollis* and allied species, and said that Thomson's characters of the three Swedish species, *O. puncticollis*, *O. brevicollis*, and *O. rectangulus*, applied well to our British examples, and separated them in a satisfactory manner. Thomson's nomenclature, however, would, he thought, prove untenable, as the distinguished Swede described our common *puncticollis* as a new species under the name of *rectangulus*. Mr. F. W. Frohawk exhibited a bleached specimen of *Epinephele janira*, having the right fore wing of a creamy white,

blending into pale smoky brown at the base; also a long and varied series of *E. hyperanthus*, from the New Forest and Dorking. The specimens from the former locality were considerably darker and more strongly marked than those from the chalk. Amongst the specimens was a variety of the female with large lanceolate markings on the under side, taken in the New Forest in July, 1890, and a female from Dorking with large, clearly defined white-pupilled spots on the upper side. Mr. Frohawk further exhibited drawings of varieties of the pupæ of *E. hyperanthus*, and also a large specimen of a variety of the female of *Euchloë cardamines*, bred from ova obtained in South Cork, with the hind wings of an ochreous-yellow colour. Coloured drawings illustrating the life-history of the specimen in all its stages were also exhibited. Mons. Sergé Alpheraky communicated a paper entitled "On some cases of Dimorphism and Polymorphism among Palæarctic Lepidoptera."—H. Goss, *Hon. Sec.*

South London Entomological Society.—*Thursday, August 13th*, 1891.—Mr. Jenner Weir exhibited the different stages of *Psyche villosella*, illustrating the life history, with notes. He stated that the male only, left the pupa skin projecting from the case from which it emerged in June and July. The female was never observed to leave the case, but was fertilised by the exceedingly extensile abdomen of the male, and deposited its eggs also within the case. These eggs, he observed, hatched in 10 or 12 days, and, most probably the first meal of the young larvæ consisted of the remains of their parent. These larvæ were very active, and at once commenced to cover themselves with a case. They preferred strawberry, sloe, whitethorn, bramble, etc., for food, rather than the less succulent heath. The females were absolutely without eyes or appendages of any kind, and their only movement seemed to be a feeble annular constriction. The inside of the cases were made of fine silk, the pieces of *débris* being placed on as the cases were made, but the young larvæ seemed to leave the central portions of their cases free from pieces. He suggested that the larvæ reversed themselves before changing to pupæ, and stated that the legs on the anal segment were the most developed, no doubt for holding on to the case, from which the young larvæ protrude themselves very considerably when feeding. He had failed to obtain specimens by assembling. The larvæ fed always in the very hottest sunshine. Mr. Fenn exhibited an exceedingly dark *Odonestis potatoria* from Deal. Mr. Carpenter, *Epinephele hyperanthus* from Horsley, with the large wings characteristic of the New Forest specimens; also *Melitæa athalia* bred from Essex, in which the contrast between the dark and light markings was very noticeable. Mr. West, of Streatham, a series of *Apamea ophiogramma* taken in his own garden, and also a bred series of *Cucullia asteris*. It was the general experience of the members that the latter species was not usually captured at flowers. Mr. C. H. Watson bred *Ocneria aispar*, and stated that he had frequently endeavoured to naturalize this species, but had always failed. None of the members present were aware of any recent captures. He also exhibited *A. ophiogramma* from Streatham. Mr. C. A. Briggs, *Heliothis peltigera*, several of which were notably a very pale variety. Mr. H. Williams, hermaphrodite *Pieris rapæ* from Box Hill. Mr. Frohawk, bleached *Epinephele janira*, in fine condition; Mr. Carrington remarked that he had taken

some half a dozen examples in one Essex locality, and suggested heredity as a cause of the variation instead of action on the pupa; this was supported by several members present stating that they had either captured or seen examples at the same locality. Mr. Tugwell, a short series of *Dioryctria abietella* bred from fir cones, *Eurrhypara urticata* var. with markings coalesced, and *Pyralis farinalis*, and also for distribution a number of *Hesperia lineola*. Mr. Hawes, living larvæ of *Syrichthus malvæ* (*alveolus*), and *Nisioniades tages*. Mr. Carrington reported that he was quite satisfied the white spot in the red band of *Vanessa atalanta* was present independently of sex, but Mr. Weir's remarks were diametrically opposed to this statement. Mr. Fenn, who had been to Deal for some time, noted that insects were very plentiful, among others captured being *Agrotis ripæ*, *A. corticea*, *Callimorpha dominula*, *Lithosia pygmeola*, *Crambus contaminellus*, etc., but he had heard of no *Nola centonalis* being taken.—H. J. Turner.

Proposed Bye-laws of the South London Entomological Society.—I should like to draw the attention of the members of the South London Entomological Society to the various sections of the proposed new Bye-law 19. If these be passed in their present form, the Council of the Society will become a close body, among whom it will be quite impossible for an independent representative to gain admittance. Thus, instead of having an Executive to carry out the wishes of the Society, we shall have an irresponsible body ruling at their own sweet will.—H. J. Turner.

Mr. Turner points out an inevitable result that must follow from the adoption of the proposed new Bye-laws of the South London Society. The Council is, and always has been, a comparatively close one, and the Society is practically governed by a very few members. Contrary to the general opinion of the outside members, the Council last year refused at the starting of the *Entomologist's Record* to send official reports, except when sent to the other magazines, which, as matters stand, would throw our reports about six weeks behind the actual meeting. To show their want of sympathy with this proceeding, the general body of the members elected Mr. Fenn and myself on the Council, throwing out two of that body's nominees. However, matters are much as they were, and but little improvement is yet to be looked for inside the Council. At present, the 1890 Report appears to be not even in the hands of the sub-committee, the time and money that should have been spent in the production of a Fauna List will be partly frittered away on the proposed new Bye-laws by which the officers and members of the Council may become a self-elected body, the outside members having nothing to do with the actual working of the Society, except that of paying their annual subscriptions. To prevent any repetition of the election of a member not in sympathy with the one-sided views of the Council, it is suggested in one of the proposed Bye-laws that no member may vote for a greater *or less* number of candidates than have to be elected. In a small body of voters, numbering about 40, it becomes evident that if the 15 members of the Council agree to vote for their nominees the members have no chance of introducing an outsider.

It will be objected that, being a member of the Council, I am partly responsible for the production of these proposed Bye-laws. This is hardly so. The minority had to accept them as they found them, and, up to

Bye-law 14, proposed and carried amendments to the more objectionable suggestions. After that, the opposing members were unable from sundry causes (chiefly holidays and illness) to be present. The last part of the Bye-laws were therefore carried practically without dissent, and should be opposed most strenuously by those members who wish to see the Society carried on in an open manner, and who wish to get something in the shape of a Report up to date for their money. At any rate that part of the Bye-law which proposes that no member may vote for a "*less* number of candidates than has to be elected," and all those sections of the Bye-law which leaves the election of itself in the hands of the Council should be opposed. Amendments to these must be sent before September 17th in writing to the Secretary. All members of the Society should have received during the last few weeks the following resolution :—

> "That a copy of the proposed Bye-laws be deposited in the Library at once, and remain there until September 10th next. That any member wishing to propose any amendment shall give notice in writing to the Secretary before September 17th such notice to embody the terms of the proposed amendment, and be signed by at least two members. That a Special General Meeting be called for October 22nd next, for the purpose of moving the proposed Bye-laws. No amendments other than those of which notice has been given in accordance with the above shall be moved. An announcement shall be made from the chair to-night, and a circular shall be sent to each member embodying the foregoing, and giving notice of the Special General Meeting."—J. W. Tutt.

City of London Entomological and Natural History Society. —*Thursday, August 6th*, 1891.—Exhibits—Lepidoptera—Mr. Huckett, a series of *Geometra smaragdaria;* also some varieties of *Abraxas grossulariata*. Mr. Boden, a specimen of a Noctua bred from a larva found feeding in a tomato. He stated that this larva was brown, and had a curious pig-like head. The insect was unknown to the members present, the general opinion being that it had been imported with the fruit. Dr. Sequeira, a large number of Lepidoptera from the Folkestone district, including *Sesia chrysidiformis*, *Lithosia pygmæola*, *Callimorpha dominula*, *Tapinostola bondii*, *Xylophasia sublustris* and *Ennychia octomaculalis*. Mr. Clark, a series of *Aplecta advena* from Raindean Wood. Mr. Battley, series of *Hesperia lineola* ; also young larvæ of *Acronycta psi*, *A. aceris* and *A. megacephala*. Mr. Gates, *Hecatera serena*, dark vars. of *Abraxas grossulariata*, *Coleophora lineolella* and cases of same, *Batrachedra præangusta*, etc., all from Shepherd's Bush.

Dr. Buckell, a series of *Hadena pisi* from Hampstead and Aberdeen ; also living larvæ of *Amphidasys betularia*. He remarked that the majority of these were of the brown form, some being green or stone coloured, and a few intermediate in colour. He had noticed that some of the green larvæ became brown as they advanced in age, but he had not observed the reverse change to occur Mr. Simes, *Lycæna ægon*, *Zygæna trifolii*, *Lithosia complana*, and *Hyria auroraria*, all from the New Forest. He mentioned that he had also taken two females of *Apatura iris* in the same locality, one of which had deposited eggs. Mr. Quail, *Euthemonia russula*, *Angerona prunaria*, *Eurymene dolo-*

braria, *Numeria pulveraria*, and a banded specimen of *Camptogramma bilineata*, all from Epping Forest. Mr. Smith, *Nemeobius lucina*, *Lycæna adonis*, a very light, confluent specimen of *Syrichthus malvæ*, *Tethea subtusa*, *Angerona prunaria*, and *Pericallia syringaria*. Mr. Bayne, *Geometra papilionaria*, *Phorodesma bajularia*, a banded form of *Ephyra trilinearia*, *Mamestra anceps*, a dark specimen of *Rusina tenebrosa*, *Bombyx rubi*, etc., all from Epping Forest; also *Apamea ophiogramma* from Tottenham. Mr. Fox, *Thyatira derasa*, *Plusia iota*, *Xylophasia hepatica*, and *Cosmia trapezina*, from Highgate. Mr. Milton, a large number of Lepidoptera from Somerset and Devon, including *Argynnis aglaia*, *Anthocaris cardamines* (a female, taken in the middle of July), *Chærocampa elpenor*, *Zygæna trifolii*, *Euthemonia russula*, *Geometra papilionaria*, *Boarmia repandata* and var. *conversaria*, *Cidaria picata*, *Melanippe unangulata*, etc.; also a collection of ferns from the same locality.

Coleoptera.—Mr. Heasler, *Heleodonia agaricola* and *Conipora orbiculata*. Rev. J. Isabell, a number of Coleoptera from Oberammergau.

Dr. Buckell stated that he had just bred a specimen of *Demas coryli* from a larva found this season feeding on hawthorn. This was remarkable, as hawthorn was not the usual food of this species, and as the emergence took place the same year it showed a tendency to a double brood.

Thursday, *August 20th*, 1891.—Exhibits.—Mr. Bayne, *Dianthœcia conspersa*, and an asymmetrical specimen of *Satyrus hyperanthus*, from Box Hill; *Lithosia quadra* from Brighton; a bleached specimen of *Satyrus janira*, *Lithosia mesomella*, *Calligenia miniata*, *Scotosia undulata*, *Halias quercana* and *H. prasinana*, from Epping Forest. He stated that these specimens of *H. prasinana* had been killed with cyanide, which had changed them to yellow, but the green colour had afterwards returned. Mr. Quail, two fine vars. of *Agrotis exclamationis* from Cambridge, one being melanic and the other curiously streaked with black; *Leucania conigera*, *Miana furuncula*, and a yellow specimen of *Bryophila perla*, from Margate. Mr. Bellamy, long and variable series of *Apamea didyma*, *Miana strigilis* and *M. fasciuncula*. Mr. Battley, a black variety of *Amphidasys betularia* from Epping Forest, *Liparis monacha* from Enfield, and *Plusia iota*, *Thyatira derasa*, *Tethea subtusa* and *Dianthœcia capsincola*, from Stamford Hill; also larvæ of the latter feeding on the seeds of "sweet william." Mr. Milton, a series of *Hesperia lineola* taken on a sea-wall near Gravesend: also in Coleoptera, *Cicindela campestris*, *Carabus arvensis*, *Toxotus meridianus*, *Pachita octomaculata*, *Philonthus splendens*, and a series of *Hypera rumicis* bred from larvæ found on dock. Mr. Heasler exhibited a series of *Anthonomus pomorum*, taken at Epping Forest by beating apple trees. Mr. Quail stated that a specimen of *Liparis monacha* had been taken by Mr. Smith in Epping Forest, and that he had chased another insect which he believed was this species.—A. U. Battley and G. A. Lewcock, *Hon. Secs.*

Erratum.—In the Report, p. 95, line 22, for: "Mr. Simes exhibited *Eulophus damicornis*. Mr. Kirby, a hymenopterous parasite bred from *Demas coryli*," read "Mr. Simes exhibited *Eulophus damicornis*, Kirby, a hymenopterous parasite bred from *Demas coryli*."—A. U. Battley.

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THE GENUS ACRONYCTA AND ITS ALLIES.

By Dr. T. A. CHAPMAN.

(*Continued from page* 131.)

ACRONYCTA (*Cuspidia*) *megacephala*.—This species is most nearly allied to *alni* in one very important respect, viz., the distribution of the dark and pale segments of the newly-hatched larva. It also resembles it in the less important matter of living as a larva on the middle of the upper surface of a leaf. It presents an approach to *leporina* and *aceris* in the tubercles and their hairs becoming less marked as the larva gets older, in the surface hairs being very obvious, though very minute, and in the increased number of spines carried by the pupa. The resemblance of the perfect insect to *rumicis* or *auricoma*, has, I think, been attained independently, as an instance, of allied species finding it possible and profitable to assume a similar facies; or to express it differently, in tracing both back to a common ancestor, we should somewhere come across a form unlike the existing one, and more like, perhaps, *tridens*.

The egg is the largest of any, being 1·23 mm. in diameter; it is also a good deal flatter than any others. It is laid solitarily, but as the moth, when laying, is rather inclined to buzz about than to fly far, eggs are probably laid on neighbouring leaves (on the upper surface ?) more often than with other species; when first laid it is of a pale greenish colour, uniform throughout, and when the dark dots first appear, the inner egg has not begun to shrink from the margin. When fully matured in colour, the colourless margin, due to the shrinking of the inner egg, is wider than in any other species and has the appearance of a frill round the egg proper, this great width is

due to the flatness of the egg—it is nearly an eighth of the diameter of the egg in width, or, the inner egg is only three-quarters of the diameter of the shell. I have observed more distinctly in this species, that the moth in laying smears a cement on the surface on which she lays the egg, often extending the width of the egg itself beyond the surface that the egg covers. The inner egg presents a series of brown spots (Pl. VIII., fig. 5), a series of very narrow marginal ones and two inner rows, the spots are not round, but angular, usually pentagonal, clearly indicating that if only a little more developed they would coalesce and reduce the pale area to rounded spots as in *alni* or *accris*. The brown spots differ in different specimens, the extremes being merely indicated dots that might easily escape detection, and on the other hand they are so large as to occupy nearly as large an area as do the pale spots in *accris* or *alni*. The specimen figured is about an average, but those with nearly evanescent spots are the least frequent. The ribs are 66 in number, and do not differ in structure or arrangement from the other species.

The newly-hatched larva presents the same pale segments as *alni*, *e.g.*, 3.4 and 11; but the tendency of 10 to be pale in *alni* is not observed in *megacephala*.

The head is black, the general colour rufous, except 3.4 and 11, which are very pale, 3 and 4 are also very small and narrow in the newly-hatched larva, 11 is low and flat, but projects laterally. The tubercles are large raised bosses, paler than the rest of the segment, but without very defined margins. Each tubercle with one hair, dark basally and paler towards the tip, 1 mm. in length, the larva itself being 2 mm. The blackness of the hairs is very conspicuous on the pale 3rd and 4th segments, on the 11th they are shorter and paler than elsewhere, the size of the sub-spiracular tubercles is what gives this segment the appearance of width, or at least the width of the segment forms a boss on which the sub-spiracular hair (and tubercle ?) stands. The 2nd segment has a central flat hairless scutellum with three tubercles on either side, two in front and one behind. Seen laterally the larva is pale whitish or fuscous with a brown back from 5–10 and on 12 and 13, the dorsal tubercles showing as paler bosses out of the brown area; on 12 and 2 the hairs exceed 1 mm. in length. When full-fed in this (1st) skin (Pl. VI., figs. 5, 5*a*), the tubercles are distinctly separate and but little angled, on 12 they have the usual cruciform arrangement, but are small, circular and wide

apart. The white on 3 and 4 has dwindled to a dorsal lozenge just including the inner tubercles, there is an indication of a similar pale patch, towards the anterior margins of 6, 7, 8, 9, and 10. 11 has the white porcellanous look of the hinder segments of young *alni*, and the posterior trapezoidals are rather on a sub-segment, with marked lateral bosses.

In the 2nd skin the markings and colouring remain the same, 11 being still conspicuous as colourless, wide laterally, and flat dorsally, with minute tubercles. As it grows it presents a great resemblance to *alni* at the same age, it sits curled round with the head against the side in the same way. The dorsal tubercles are prominent, so as to give the same angularity and squareness to the dorsal outline. There are two white patches between the tubercles on the centre of 3 and 4. 12 and 13 form a decidedly larger mass than two ordinary segments. On the 11th segment, the anterior trapezoidals are conjoined into a plate or cushion and the posterior on another, which stretches across the segment, and two similar plates on each side represent the supra- and sub-spiracular tubercles, or at least carry their bristles. There is a hair to each tubercle as in the previous skin, and no secondary hairs. Some specimens carry a yellow patch on the centre of the dorsum of 5–10; the sub-spiracular tubercles of 3 and 4 are yellow. The post-spiracular is large and pale on most segments and carries three hairs. The lateral boss of 11 deserves closer notice; it consists of the two plates already mentioned and a third beneath them, arranged so as to form a trefoil protuberance, the leaflets joining together anteriorily, the upper one carrying the spiracle and the supra-spiracular tubercle, the 2nd the post-spiracular and sub-spiracular tubercles, and the 3rd the marginal one. This is a more puzzling and elaborate arrangement than exists in any other species, and continues in some degree through the next two or three moults. The lateral tubercle of 13 seems to be a sub- and post-spiracular fused.

In the 3rd skin, 6–10 mm. in length, the favourite attitude is that of a pot-hook with head against 9th segment, like *strigosa*, without the extra bend of *alni*. Unlike *strigosa* and *psi*, etc., it broadens out and flattens from 10 to 13, but from 5 to 10 the tubercles still give an angularity to the outline viewed laterally. The trapezoidals and supra-spiracular tubercles are black, each with one black hair. The sub-spiracular is pale as also the post-spiracular, which is very large, both of these carry several long white hairs. The large

post-spiracular contrasts with the manner in which this tubercle dwindles in some species. They are especially large on 2.3 and 4, that on 2 almost suggesting a forward tuft as in *Orgyia*. On 3 and 4 is a dorsal lozenge of bright yellow, as also on 11 (the three pale segments), on the former it includes half the trapezoidal tubercles, on the latter it is a large escutcheon and includes both trapezoidals. The whitish lateral marblings are so much more pronounced on 11 as to make that segment still very pale.

In the 4th skin, the larva presents some resemblance to the full-grown larva, and in the 5th, there is little difference from the 6th skin, except that the colours are rather brighter. The difference in colouring is, in 4th and 5th skin, much greater between individuals than between the skins. One, even in 3rd skin, has a yellow escutcheon on 3, 4, 6, 7, 8, 9 and 10, including the anterior trapezoidals, with a small patch in front of it and nearly all the tubercles yellow, but the majority have them black.

In the 4th skin, 10–15 mm. in length, some have the trapezoidals yellow, some brown, very few black. The finest coloured have the trapezoidals yellow, with a little yellow patch in front, except 5, which is dark, larger on 3 and 4, and on 11 forming the characteristic large escutcheon. The sides and dorsum black, covered with minute black hairs, the base of each surrounded by a greenish yellow ring (much modifying the general effect of the black ground colour), this coloration tends to run laterally into lines, with the post-spiracular and sub-spiracular tubercles, and, being more abundant and pronounced, make the sides paler than the back. The escutcheon is free from these. The post-spiracular carry many long hairs, some larger than diameter of larva, nearly white and forming a deep fringe on each side. The sub-spiracular and marginal tubercles also contribute to this fringe. The head is black, but usually with white line and patches similar to adult larva.

In the 5th skin, this is about the same as in adult. The trapezoidals are yellow, each with one erect black hair, about as long as thickness of larva, the supra-spiracular very small, yellow, with one hair, the post-spiracular large, orange above, greenish-yellow below, with 10 to 20 long whitish hairs forming a lateral fringe, sub-spiracular and marginal smaller, pale-greenish and with numerous pale hairs, dorsal tubercles of 13 and 14 pale yellowish, of 11 yellow, like escutcheon. The back is nearly black, changing on the sides to very light

fuscous and dotted closely with extremely small yellowish or greenish-white points, each carrying a minute hair; these dots are aggregated into rows, where they partially coalesce and form paler longitudinal lines, viz., in line with anterior trapezoidals, below the posterior trapezoidals, in line with supra-spiracular and sub-spiracular tubercles; the post-spiracular rises a little above level of spiracle. The larva is thus covered with an extremely fine pubescence—length 15–19 mm.

In the last (6th) skin the length is 20–35 mm. The larva differs from the previous skin chiefly in a duller and more uniform coloration giving a generally hoary appearance. Before it is full grown the great size of the head is remarkable, and remains so to some extent when it is full grown. The escutcheon on 11th segment preserves to some extent the pale character of this segment in the young larva. The head is black, with two lavender stripes placed vertically on either side, the centre ones joining above the clypeus, which is also lavender, with the labrum, the palpi, and a patch below the ocelli. I have a long description of the larva, but with what I have said under skin 5 and its being really well known, this may be properly omitted.

In the matter of spinning, *megacephala* closely resembles *psi* and *tridens*. Its proper procedure is probably to get behind a piece of rotten wood or bark, but it will excavate a hole into rotten wood or pith of elder, etc., as well as *tridens* or *alni*, and is more loth than either of them to go into earth, rubbish, or sawdust, and will wander about disconsolately for days before submitting to do so. The cocoon it makes is much like that of *tridens*, but with rather more silk and of a more robust character; but it makes only the cocoon, no outer defence, like *alni* or *leporina*.

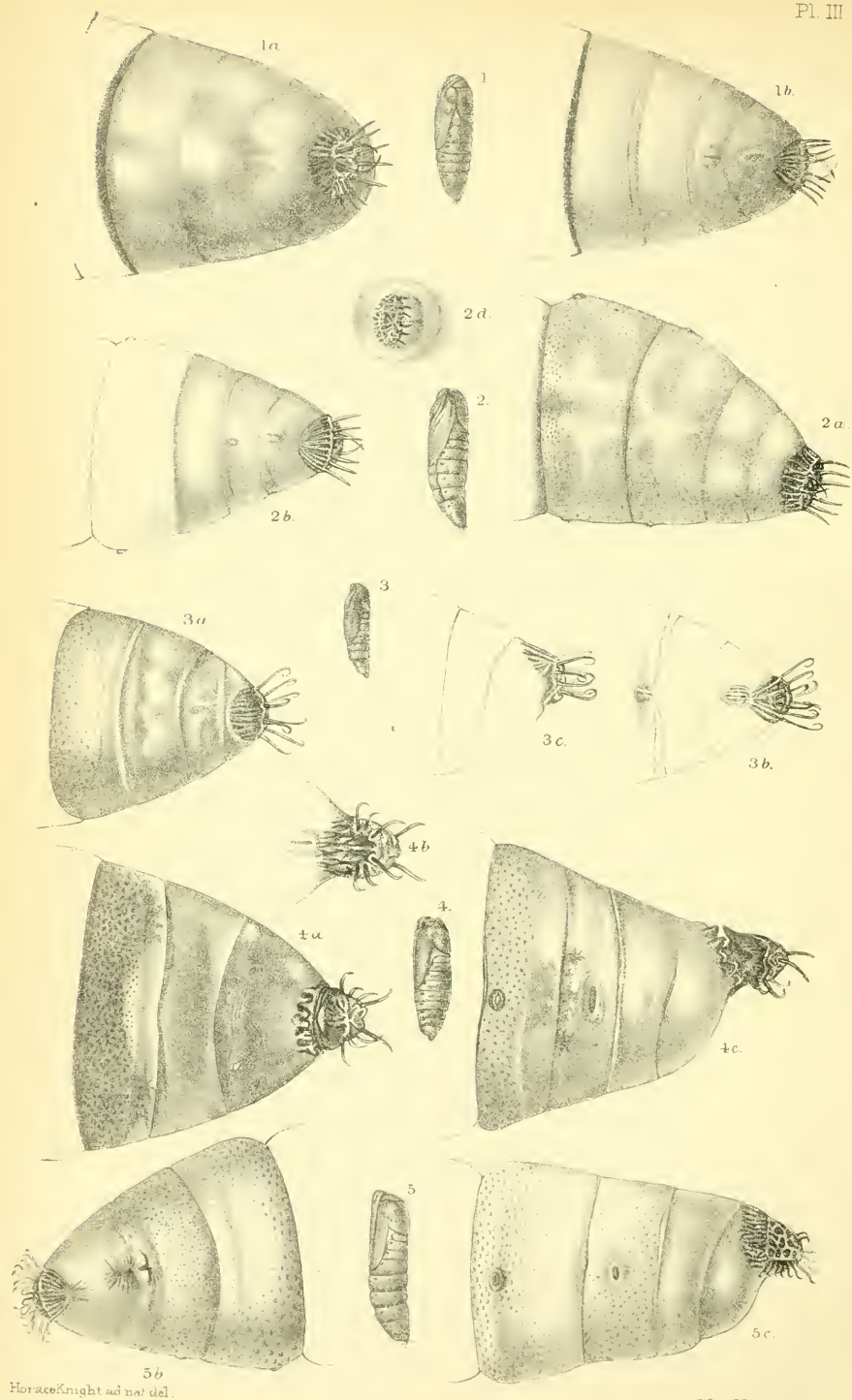
The pupa (Pl. III., fig. 5, 5*b*, 5*c*) in colour, texture, general aspect and outline closely resembles *psi* and *tridens*, length 20–22 mm., width 5½–6 mm., therefore larger and more robust than they. The wing portion is cylindrical, the free abdominal tapering. Down the back is a rather darker shade. Two fine brown hairs exist at the base of each antennæ, but though larger than in *tridens*, would certainly not be seen unless specially looked for. The angularity of the free segments at the incisions is more decided than in *tridens*.

The fixed abdominal segments 5, 6, 7 and 8 besides being pitted minutely have more markedly in some specimens than others, certain depressions, that look at first as though the

pupa, when newly moulted, had been marked by lying against something. There are, however, when fully developed, two of these on each side of each segment, the 4 filling up the space from side to side between the wing covers. The pitting and these depressions are most marked on 5, and tend to be disposed in two transverse series on each segment, the whole arrangement bearing some resemblance to the special sculpturing on the pupa of *ligustri*. In *megacephala*, however, it is never very marked, and in many specimens only to be traced in comparison with a more decided instance. In the last larval skin I noted a very curious depression immediately behind the supra-spiracular tubercle; this is even more marked in the pupa, especially in 7, 8, 9 and 10. At least there is a deep pit on these segments at a situation that very closely, if not absolutely, corresponds with that in the larva, it is evident enough in 11 and 12, and in 6 and 7 is a deeper portion of the hollows referred to above.

The anal armature consists of a boss on the dorsal half of the otherwise rounded end of the pupa; this boss is black, closely wrinkled longitudinally and armed with about 18 spines or hooks. Of these two are dorsal, the remainder are disposed as a fan or fringe round the vertical margin, four along the extreme end and six or seven on either side, closely bunched together. These spines have an elegant curvature and terminate in a hook forming nearly three-fourths of a circle. the dorsal ones curl downwards, the terminal ones upwards, and the lateral ones in several directions. It is impossible to resist believing that the dorsal spines correspond with the dorsal ones of *tridens*, the four central with the four central of that species, and the lateral take the position of the lateral spine, the only difference from *tridens* being this multiplication of the outer vertical spine. As in *alni*, these spines secure a very firm hold of the silk of the cocoon, which is wound round and amongst them most firmly.

I have no record showing that *megacephala* misses a moult, but I did get into a confusion the first year I bred the species, as to the number of moults; which probably arose from some four moulters occurring, those which I specially observed the second year all moulted five times. *Megacephala* is the most accomplished of all the species in passing more than one winter as a pupa, though it is run rather closely by *leporina*. More than half a brood usually goes over to the second year, and this year (1891) I had three pupæ left of larvæ of 1887, of



Horace Knight ad nat del.

West, Newman, lith

Pupæ of Genus Acronycta.

which two emerged quite satisfactorily, ordinary full-sized specimens, and the third is alive and well, and proposes to face a fifth winter as a pupa.

In this district it affects aspen as its proper food, but occurs on other species of poplar. I have seen it, but very rarely on sallow; it does not range far north, at least on the west coast, but I do not know its exact limits.

NOTES ON PLATE III.—The pupæ here illustrated are the most typical *Cuspidiæ*. They all have the two dorsal hooks, and of the three ventral hooks on either side, all have the two inner; *alni*, *strigosa* and *tridens* have also the outer in typical form; *psi* has this outer one simply, or more usually duplicated into two on either side. In *megacephala* it is represented by a lateral group or 6 or 7 hooks. Taking *tridens* for comparison, then *psi* is extremely similar, *strigosa*, though of the same pattern, has the hooks very long and delicate, proportionally (to the smaller pupa) about twice as long. *Alni* has the hooks much the same, but more spread and more hooked, and has in addition the remarkable special groove, with its fluted margin and remarkable smooth escutcheon on the boss below. In *Glea* there is a suggestion that such a structure might arise, but I am not acquainted with any other pupa with this groove fully developed. The drawings, which are well reproduced in the plate, convey a very accurate impression of these structures, and are indeed most excellent and successful. Only in *megacephala* is the success at all modified.

EXPLANATION OF PLATE III.

	Fig.					
Natural Size.—	1.—	Pupa of *Acronycta* (*Cuspidia*) *psi*.				
Enlarged 8 diameters.	1a.	,,	,,	,,	,,	dorsal view of anal armature.
	1b.	,,	,,	,,	,,	ventral ,, ,,
Natural Size.—	2.	,,	,,	,,	*tridens*.	
Enlarged 8 diameters.	2a.	,,	,,	,,	,,	dorsal ,, ,,
	2b.	,,	,,	,,	,,	ventral ,, ,,
	2d.	,,	,,	,,	,,	terminal ,, ,,
Natural Size.—	3.	,,	,,	,,	*strigosa*.	
Enlarged 9 diameters.	3a.	,,	,,	,,	,,	dorsal ,, ,,
	3b.	,,	,,	,,	,,	ventral ,, ,,
	3c.	,,	,,	,,	,,	lateral ,, ,,
Natural Size.—	4.	,,	,,	,,	*alni*.	
Enlarged 9 diameters.	4a.	,,	,,	,,	,,	dorsal ,, ,,
	4b.	,,	,,	,,	,,	ventral ,, ,,
	4c.	,,	,,	,,	,,	lateral ,, ,,
Natural Size.—	5.	,,	,,	,,	*megacephala*.	
Enlarged 6 diameters.	5b.	,,	,,	,,	,,	ventral ,, ,,
	5c.	,,	,,	,,	,,	lateral ,, ,,

(*To be continued.*)

NOTES ON COLLECTING, Etc.

NOTES OF THE SEASON.—*Wicken Fen.*—Probably, next to Darenth Wood, Wicken is one of the oldest of the historical entomological localities of the country still left to us. The mention of the name suggests at once to the entomologist thoughts of the lovely green and black ringed larva of *Papilio machaon*, and its beautiful imago flying rapidly from place to place over the level country; or an abundance of yellow-haired larvæ covering the endless beds of reeds, and occurring in such profusion that the local collectors considered themselves well paid by receiving 1s. 6d. per gross from those who retailed them to amateurs at a slightly greater cost, and of the resulting imago dashing wildly at the light, to be captured as the species which occurred nowhere else in the country, and which, even here, probably occurs now no more. *Lælia cænosa* has not been seen for many years, the last specimens having been captured by Messrs. G. T. Porritt and A. Houghton. Wicken also suggests swarms of the beautiful larvæ of *Viminia venosa*, twin brother to the plebeian and common *V. rumicis*; crowds of the beautiful *Nascia cilialis* hurrying up to the light and sitting contentedly until transferred to the pill-box of the collector; hurrying crowds of the peeping rough-headed *Nonagria hellmanni*, who, in a wondering way come to look at the light, but are quickly off again; reed-boring *Macrogaster arundinis*; root-feeding *Calamia lutosa*: numbers of *Crambus*-like *Meliana flammea* coming up to light in almost as ghost-like a fashion as the common *Chilo phragmitellus*, to which it bears no small superficial resemblance. Rare TORTRICES and still rarer TINEINA attract the collector, and many a one has found his way to Wicken with the hope of capturing some of the rarer "Fen" species. It was with some such hope that I paid my first visit to Wicken on July 18th and 19th, and under the able guidance of Mr. Farren I cannot say that I was altogether disappointed. Taking Tuddenham on the way from Cambridge, a series each of *Catoptria citrana*, *Dicrorampha politana*, *Argyrolepia subbaumanniana*, a single specimen of *Anticlea sinuata*, some worn *Acidalia rubricata*, together with a fine lot of larvæ of *Lithostege griseata* were the principal results of the few hours' work, although sweeping the roadside for a minute or two showed that *Dianthœcia irregularis* larvæ were as abundant as ever. Going on to Wicken, a few specimens of *Catoptria expallidana*, *Elachista crepusculella*, *Phoxopteryx paludana*, *Stigmonota orobana*, *Eupœcilia notulana*, and, quite at dusk, plenty of *Collix sparsata*, with smaller numbers of *Lobophora sexalata*, *Scotosia rhamnata* and *Scoparia pallida* were captured. But we had made up our minds to have a turn at sugar and light, so, whilst I took charge of the former, Mr. Farren attended to the latter, and we had scarcely commenced operations before we knew we were going to have one of those nights in which entomologists and moths alike revel—drizzle and warm. The sugar revealed a mass of *Leucania pudorina* with a good sprinkling of *Apamea gemina*, *Hadena pisi*, *Aplecta advena*, *Noctua rubi*, and hosts of the common "fen" species, but nothing special. After an hour's back-breaking work, at what the natives call "knots," I got back to the light, and found Mr. Farren hard at it. *Acidalia immutata*, *Nudaria senex*, *Lithosia griseola*,

Miana arcuosa, *Viminia albovenosa* (2nd brood), *Lasiocampa quercifolia* and *Odonestis potatoria* were coming up strongly, and above all *Nascia cilialis*. I heard of other species, such as *Arctia fuliginosa* (2nd brood), *Chilo phragmitellus* and *Herminia cribralis*, some of which the regular "fen" workers appear to consider too common for notice. However, when midnight arrived we were getting fixed up for boxes, and visions of colossal labour in the form of "setting" appeared, so, when we had used up all the pins in our zinc box, mutually agreed to box nothing further except *cilialis*. Another hour having passed and the fun getting a little slower, we closed for the night. The next evening was nothing like so satisfactory as the first. Sugar was as productive up to about 10.30 p.m., and light for the first hour. Things then got very slow, and midnight saw us on the road home. Altogether a very large number of specimens rewarded our efforts. Monday found me *en route* to London, but on Saturday I was at Wicken again for a three weeks' stay. During the whole of the three weeks the weather was bad —wet continuously, and sometimes cold, and this led to the almost utter failure of light. But there were one or two evenings on which light did pay, and on Saturday, August 1st, *Macrogaster arundinis*, *Meliana flammea*, *Nascia cilialis* and the second brood of *Viminia albovenosa* all occurred, rather a mixture for such a date. On another night above a score of specimens of *Sericoris fuligana* were captured and on other nights by spending the early hours of the morning at the lamp a few *Nonagria hellmanni* were taken. But the weather was dead against me in this way of collecting, and only a night now and then showed what the resources of the Fen really were in this direction. Night after night, however, I went home with above a gross of good NOCTUÆ off the sugar, including such as *Agrotis obscura* (*ravida*) and its vars., *Nonagria hellmanni*, type and var. *saturata*, *Helotropha leucostigma*, and its vars. *albistigma* and *lunina*, *Noctua umbrosa*, *Caradrina* (all the British species except *ambigua*), *Triphæna interjecta*, *T. janthina*, *Cosmia affinis*, with a good specimen or two of *C. pyralina*, and *Calamia phragmitidis* mostly in considerable numbers. *Lithosia griseola* and its var. *stramincola* came to sugar and light freely, *L. lurideola* only to sugar, whilst odd specimens of *Hypenodes costæstrigalis*, *Mamestra abjecta* and *Triphæna fimbria* were not unwelcome visitors. The second brood of *Noctua rubi* appeared about August 14th, and a few days before *N. baia* was still in good condition. *Agrotis tritici* var. *aquilina* occurred, but was not common like its congener *A. nigricans*, of which I got some good forms. I was surprised at the few specimens of *Orthosia upsilon* considering the vast quantity of poplar and willow in the neighbourhood, and was also much astonished at the late appearance of *Calamia phragmitidis* at Wicken, its first appearance being quite a month later than at Greenwich, and, although I did not want the species, was rather pleased to pick out a few beautiful var. *rufescens* from the paler var. and typical form. *Tortrix dumetana* was late, only a few specimens occurring until quite the last few days of my stay. Fine *Hyria auroraria* were picked up until August 15th. On the same date *Hydrelia unca* occurred, and Mr. Porritt saw a specimen of the second brood of *Papilio machaon* on the wing. Since then I have bred others. With regard to the double-broodedness of this species it occurs to me that the individual members of a family are double-brooded in alternate

years. The early May specimens of one year lay ova which hatch very quickly, and the larvæ being full-fed in July emerge in August. These lay eggs, the larvæ from which do not spin up until October, and do not emerge until June or July the next year, when their progeny go over the winter without a second brood and form the early moths the next year —thus we get:—First year, early and double-brooded; second year, late and single-brooded; third year, early and double-brooded, and so on. In this way one easily explains how it is that from the commencement of July until the end of October, larvæ of every gradation of size may be found everywhere on the Fen. *Acidalia immutata* and *Epione apiciaria* were in fine condition up to the end of my stay. A fairly long series of *Crambus selasellus* was taken, and I was unfortunate in having to leave *Phoxopteryx siculana*, which was just coming out as I left. *Catoptria expallidana* and *Phoxopteryx paludana* were found but rarely, and this was general with all the best things. *Peronea hastiana*, by-the-by, occurred in all stages during the whole time I was present—imagines, pupæ, large and small larvæ. A fine *Chilo mucronellus* occurred on Mr. Houghton's sheet on the night of August 1st, and I saw a few specimens in the professional collector's boxes, but the species appears to be rare at Wicken. My most disappointing results were, however, among the TINEINA, not that there was not an abundance of them on the Fen; a good night now and then showed this, and there were very few of the rare and generally obtained species that I did not capture. Given good weather I do not know what numbers of these I might have taken; as it was the setting got clean beyond me when we did have a good evening with the little things, because of the number of things at sugar. *Anesychia funerella*, *Gelechia divisella*, *G. oblitella*, *G. morosa*, *G. quæstionella*, *G. lathyrella*, *G. muscosella* and many others were taken, several *Depressariæ*, only one specimen of which has proved a puzzle. But the greatest puzzle is a "plume," which Messrs. Porritt, Thurnall and myself are unable to refer to any of our known species. It has a strong superficial resemblance in some specimens to *monodactyla* in colour and markings, but is more nearly allied structurally, so far as I can make out, to *lienigianus*. *Leioptilus microdactyla* turned up, but "plumes" as a rule were conspicuous by their absence. Larvæ of *Halias chlorana*, small and full-fed, were abundant in osiers. At the same time imagines were coming to light.

I thought at first I would head this note "The Home of Ease for Entomologists," and really a lazy entomologist will find this an enjoyable place. I have always had to rough it, and it was quite a new experience to find old and experienced collectors ready to wait on you, to sugar, find lanterns and attracting lamps and all other necessaries; in fact, to wait on you hand and foot for a small consideration. A note to Mr. Albert Houghton or Mr. Tom Rowlison at Wicken is all that is necessary, and a lepidopterist will find himself fixed up with almost everything, and really when one comes to consider that these men take us into their best localities, and fix us up as if they had known us a lifetime, we have certainly much to be thankful for. Mr. Solomon Bailey is another good local collector, and both he and Mr. Houghton have been especially successful this year with *Aplecta advena*, *Cuspidia strigosa*, *Cymatophora ocularis* and other good species. My own special henchman was Mr. John Clark, of the Black Horse, Wicken, and I

can only reiterate my special thanks to him and Mr. Houghton for their kindness and help. There is an amusing side to the entry to Wicken. The best collecting grounds (because the most open) are the public rights-of-way. One or two men, however, patrol these to turn an honest (?) penny by suggesting that it is customary to give a trifle, and if this fails they are ready with the fact that you are trespassing on "their" ground. The fact of "owners" becoming a species of "cadger" is very obvious. Another line is to sell tickets at so much per head per day or week. One would think that actual owners would be above this; most are, and are very courteous to entomologists into the bargain. There is good accommodation to be obtained in Wicken, at the Red Lion, Maid's Head, or if any one prefers it, at Mrs. Phillips' house (The Sycamores). But the lodgings at the pubs. are really private, and although I stayed at the Red Lion I never knew but that I was in a private house, having a private door, key, etc., to myself.

When I left Wicken with a number of insects on my setting boards and in my store boxes, averaging about 150 per day for the twenty days I felt sorry that I could not stay longer to help the native collectors to continue the work of depopulation. However, I hope to go again, and given good weather, the moths will have a bad time of it.—J. W. Tutt, Westcombe Hill, S.E. [Mr. G. T. Porritt will give an account of the Neuroptera, Orthoptera, and Trichoptera captured, in the next number.—Ed.]

Southend, Epping Forest, and North London.—This season has so far been fairly good. The sallows at Southend produced the usual *Tæniocampidæ*, also *Xylocampa lithoriza*, *Calocampa exoleta*, etc.; while *Eupithecia pumilata*, *Anticlea badiata*, *Coremia ferrugata*, a few *Aleucis pictaria* and other geometers, were plentiful in the evenings. Unfortunately, the warm nights always brought a strong south-westerly wind, which made the sallows hard to work. *Lycæna argiolus* was the only notable butterfly I took. Epping Forest has proved very productive, *Drepana unguicula*, *Ephyra trilinearia*, and other common things swarm, and many others have fallen to my net for the first time. I have unfortunately missed the best time of the year (June), owing to an attack of influenza, and the weather now precludes any collecting. Noctuæ are common on sugar in our garden here. I am waiting for a decent night to try my luck further afield. No *Apamea ophiogramma* have emerged yet, but my pupæ have darkened, and show the pattern of this insect through their skin (these are pupæ obtained from larvæ feeding on the stems of ribbon grass). I hope to get them out in a day or two, if all goes well.—A. U. Battley, Amhurst Park, N. *July*, 1891.

Boxhill and Ashdown Forest.—Larvæ of *Cucullia verbasci* are very plentiful this year at Boxhill, and yesterday *Lycæna ægon* was flying in profusion at Ashdown Forest, also two *Euthemonia russula*, female, taken in good condition, and even *Argynnis selene* is still about.

Insects are very late this year, and, owing to that, I have missed many things.—A. J. Croker, South Norwood. *July*, 1891.

Dartmoor.—I have found *Acidalia promutata* abundant on the northern slopes of Dartmoor, at least fifteen to twenty miles from the sea. They were to be found by day resting on the granite boulders, which they closely resembled, and they also came freely to light. The weather has

been so cold in this neighbourhood, and vegetation so backward, that few insects are to be found, and larvæ are not so plentiful as usual at this time of the year.—JOHN H. STILL.

Liverpool.—The weather during the past month has rendered all searching for insects futile. I was at Hartford at Whitsuntide, but the only proceeds were a few *Panagra petraria* and pupæ of *Celæna haworthii*, both scarce. *Nyssia zonaria* has turned up in good numbers at Crosby. It was almost impossible to walk on the sand hills without stamping on them. *Tæniocampa gracilis*, too, has been fairly common, and *T. opima* exceedingly scarce, one male, which I took myself, is the only imago I have heard of, though several batches of eggs were found.—G. A. HARKER, Liverpool.

Aberdeen.—I sugared on the coast here on June 12th, and found the sweets very productive. Some very nice vars. of *Hadena dentina* turned up; *H. adusta* was abundant; a few each of *Viminia myricæ*, *H. thalassina*, *H. pisi*, and *Noctua plecta* completes the list. On June 13th, I tried the moors, but it was rather windy, and moths at sugar were consequently scarce. I succeeded, however, in taking a few each of *Viminia menyanthidis*, *H. rectilinea*, *Rusina tenebrosa*, and *H. adusta*. I netted *Bombyx rubi*, *Chesias obliquaria*, *Anarta myrtilli*, *Eupithecia satyrata* var. *callunaria*, *E. lariciata*, *E. pumilata*, *E. nanata*, *Demas coryli* (one at rest), *Coremia ferrugata*, *Fidonia piniaria*, *Melanippe fluctuata* (several nice vars.) and *F. atomaria* (as usual in swarms). On the heather, I found larvæ of *Noctua neglecta*, *Plusia interrogationis*, *Bombyx callunæ*, *Larentia cæsiata*, *Triphæna orbona*, *Scodonia belgiaria* and *Crocallis elinguaria*; on bilberry, *Hypsipetes elutata* (in swarms), *Cidaria populata* and *C. russata*; and on broom, *Noctua glareosa*. —ARTHUR HORNE, 31, Watson Street, Aberdeen.

Forres.—The season in the north of Scotland, so far as my experience goes, is not a very good one, at least so far as sugaring is concerned. On the coast it has been and is doing fairly well, but inland almost a complete blank. Many species that were common last year are very scarce this season, notably *Hadena rectilinea*, *H. adusta*, *Plusia interrogationis*, *Triphæna subsequa*, etc. I took a fine specimen of the latter at Burghead on June 29th, and went specially to Forres for this insect about the middle of July, and sugared where I found them last year, but not one single specimen fell to my lot. At the same time last year I met with some beautiful forms of *Agrotis corticea* along with *T. subsequa*, but it also was absent. The only NOCTUA that turned up in quantity was *Miana fasciuncula*, very dark red forms and rather different to the Aberdeen specimens, on which I took revenge and secured a long series. *Lycæna artaxerxes* has been very common along the coast south of Aberdeen this season, more so than I ever remember seeing before. *Aplecta occulta* is putting in an appearance at sugar on the sand hills, also *A. cursoria* and *A. tritici*. I took a long series of *Crambus dumetellus* near Aberdeen, an insect that had hitherto escaped my notice, as I often collect on the ground where I found them.—ID.

Kingstown.—In the middle of July, I was in King's County on the borders of the Shannon. The hot weather brought out a quantity of insect life. I was fortunate enough to capture one *Carsia paludata* on the 15th; and so on the next day I worked some hours in the heat of

the sun, bogtrotting, and got five more, but the insect was rare. I only saw about one every half hour, and, with a high wind blowing and a swarm of flies blinding the sight, it was difficult to capture. Other insects were very scarce, a few *Chelonia plantaginis* showing up, one *Plusia* (possibly *interrogationis*), and some very worn *Cœnonympha typhon*. On the day following, however, I captured two *Selidosema plumaria* in fine condition. At sugar I met with hosts of *Triphœna pronuba*, *Xylophasia monoglypha* and other pests, and found *X. lithoxylea* plentiful but worn, a good many *X. sublustris*, some of which were in good order. *Noctua festiva*, *N. augur*, *Cuspidia psi*, *Hadena pisi*, *Miana fasciuncula*, and a few *M. strigilis* were in evidence, also several *Phibalapteryx lignata*. At Howth, friends of mine have taken *Agrotis lunigera* and other good things. *Dianthœcia barrettii* has come out earlier this season, the *Silene* is in great bloom, but they do not seem to be attracted by it so much as in ordinary years. Three gentlemen have taken about one dozen between them.—W. DE V. KANE, Sloperton Lodge, Kingstown. *June 20th*, 1891.

Isle of Wight.—I captured the first *Sphinx convulvuli* that I have seen this season on August 29th at petunia blossom; it was in very fair condition, and I hope to secure some more. Sugar has proved attractive again, and in the woods the previous evening, 29 different species of NOCTUÆ visited sugared trunks or flower heads, including all the *Triphœnas*, excepting *subsequa*, and of which the most unusual was a single *Dianthœcia cucubali*, of which species I was surprised to take a second the following evening on sugared posts on the Downs. A single specimen of the second brood of *Viminia rumicis* also put in an appearance. Larvæ of *Agrotis ripæ* are not quite so plentiful as last year. I am also taking, upon the same foodplant (which I believe to be the Sea Atriplex), another larva, varying from bright green to brown with a yellow stripe on each side (? *H. oleracea*); this does not burrow in the sand like that of *A. ripæ*, but lies extended on the stems of the foodplant.—ALBERT J. HODGES. *September*, 1891.

Farnborough, Kent.—I noticed a freshly changed pupa of *Gortyna flavago* in thistle stem to-day, August 11th; the few nights I was out a fortnight ago, I found insects fairly plentiful; *Xylophasia hepatica* was a little worn, but I never met so many before, I generally take a dozen or so at sugar each season, but this year I discovered they have a habit of sitting on the largest grass stems close to the top, and, by hunting with a light after their flight, I found I could take, on an average, about eighteen during an evening—of course a great number were useless—still I got a fair proportion of good specimens. Of *Plusia gamma* I have not seen a single one this season. *Timandra amataria*, plentiful. Also a good number of *Thyatira batis*, *Gonophora derasa* and *Pericallia syringaria*, of the latter I captured several ♀'s depositing, but having been successful in breeding them this season I merely killed them. Last year I caught a ♀ which laid, and from the batch had twenty-seven imagines which nearly all paired, so I have or had a great number in the sleeve, I saw they had hatched a fortnight ago, but they remain extremely small and don't begin to grow much until the spring is well advanced; they pupate in a singular manner compared to other larvæ I have bred, attaching themselves by a few slight threads or slim network head upwards, only two out of the twenty-

seven were head downwards and fixed by the tail; the pupæ are nothing like the rest of the family I have bred, being shaped like a whip-top, and the old larval skin hanging like a long tail in every case.—H. Alderson, Hilda Vale, Farnborough.

Witherslack.—*Scotosia rhamnata* is another addition to the Westmoreland fauna; Mr. Threlfall and I captured a few in July. We obtained about 12 larvæ of *Depressaria capreolella* after several hours' careful searching, and a few of the bladder-like mines of *Peritlia obscurepunctella* in honeysuckle which I had never seen till Mr. Threlfall drew my attention to them.—J. B. Hodgkinson, Ellerslie, Ashton-on-Ribble.

Armagh.—The season up to the present has been most disappointing. Sugar has, night after night, proved a complete failure owing to the cold winds, and even favourable evenings failed to produce anything remarkable. Among my captures were: *Hadena pisi*, *H. thalassina*, *Noctua rubi*, *N. festiva*, *Gonoptera libatrix*, *Grammesia trigrammica*, and var. *obscura*, Tutt, *Miana strigilis* and *M. fasciuncula*. These last were not at all as abundant as usual, but exhibited considerable variation. The most were taken on June 22nd and 23rd. On July 3rd, I took a specimen of *M. strigilis* on a thistle-head in the afternoon. *Zygæna loniceræ* appeared in numbers on June 27th, when I took a lot of freshly-emerged specimens. The *Plusiæ*, which are usually well represented in my garden in June, were conspicuous by their absence; only a solitary *P. gamma* turning up. On July 27th and 28th I took a good number of *Bryophila perla* on the walls of the Cathedral. Just now *Triphæna pronuba* and *Xylophasia monoglypha* are in great abundance, a few dark examples of the latter have occurred. I have, I think, never seen as many "small whites" in one place as I saw in a field of oats on last Sunday morning, as I was driving out to take the duty at Loughgall. There must have been hundreds of them hovering over and settling on the oats. I could not stop to determine whether one or more species were present. Taken as a whole the season from the end of May to the present has been decidedly bad, and were it not for the consolations afforded by Coleoptera and golf, I should be on the verge of despair.—W. F. Johnson, Winder Teraace, Armagh. *August 19th*, 1891. [The "whites"—*Pieris rapæ*, *napi* and *brassicæ*—have been in great force at Deal during the last week.—Ed.]

Lyndhurst.—A fortnight spent at Lyndhurst last month produced far better results than a longer period last season. Although the weather was not a great deal better than during the corresponding period of 1890, lepidoptera were much more plentiful and some good species were taken. Unfortunately, however, sugar was again of but little use, and the list of Noctuæ taken is consequently very meagre. During the few fine days that we had, Rhopalocera swarmed. *Limenitis sibylla* and *Argynnis paphia* were very common, and I took four specimens of the var. *valezina*; but although *E. janira* was as common as ever, I only saw one of the bleached forms, and that did not exhibit the variation to any great degree. *Lycæna ægon* was in full force on all the heaths. I captured one extremely small ♀, as small as a typical *L. alsus* (*minima*). *Thecla quercus* was very common over oak and ash, but mostly kept out of reach. The best butterfly that I took, however, was *Apatura iris*, of which I took two ♀'s on July 26th; one of these after much coaxing deposited twenty-five ova which are now hatching.

The best species of *Heterocera* taken were the following :—*Zygæna trifolii*: very local and not common. I took one variety in which the spots on the upper wings are confluent and form a bar. I also found a cocoon of this specimen on a blackthorn stem at a height of about two feet. *Nudaria senex*: this species was very common at Matley Bog. It was to be seen in scores between 8.15 p.m. and 9 p.m., fluttering gently up the stems of the rushes, and was easily boxed. A walk through the bog in the daytime did not disturb a single example. *Lithosia complana* and *L. complanula* were fairly common on the lichen-covered heather near Ringwood, which is recommended for *E. cribrum*; the latter species, however, I did not take. One example of *L. muscerda* was taken at Matley by a friend. *Liparis monacha*: gradually becoming more abundant towards the end of the month. *Platypteryx lacertula*: one ♀ on July 15th. Is not this a very late date? *Thyatira derasa* and *T. batis* were common over bramble, but refused to come to sugar. *Cymatophora duplaris* was taken sparingly amongst the alders at Matley. *Cuspidia tridens*: a few on pine trunks. *Leucania lithargyria* and *L. pudorina* were in fair numbers amongst the rushes in the peat bogs. *Miana arcuosa*: one fresh specimen at Matley. *Acosmetia caliginosa*: one specimen at Stubby Copse —thanks to the "Practical Hints" in the *Record* for July, 1890. *Geometra papilionaria* was fairly common, at first in good condition, but during the latter part of the month they were worn. I took seven specimens in all, of these one was captured about 9 p.m., and all the remainder between 10.30 and 11 p.m. This insect generally flies at a height of about seven or eight feet—at least all that I saw and took were flying at about that height. The flight is very gentle, and the species is fairly easy to capture. *Hyria auroraria* (*muricata*): this species was very common, flying in the sunshine on the heaths. It was the most common in the damper portions of these heaths where the plantain (its food) grew in plenty. The following species were also captured in more or less abundance at dusk :—*Acidalia scutulata*, *A. bisetata*, *A. incanaria*, *A. immutata*, *A. emarginata*, *Eupisteria heparata* (*obliterata*), *Collix sparsata*, *Hypsipetes impluviata* (*trifasciata*), *H. elutata* (*sordidata*), the three *Melanthias*, *Eucosmia undulata*, *Cidaria testata*, *C. fulvata* and *C. pyraliata*. Amongst larvæ I obtained the following :— A few *S. ocellatus*, two *D. furcula*, and one *P. palpina* from sallow, *L. camelina* and *D. coryli* from beech, *Eupithecia pulchellata* from foxglove, *F. piniaria* and *T. piniperda* from pine, and *Hadena pisi* which was fairly common on *Myrica gale*.—Jas. A. Simes, 4, Cricketfield Road, Lower Clapton. *August 10th*, 1891.

York.—I am glad to report that we have been doing fairly well here these last two months; sugaring has been more productive than for many years, and still continues attractive. Such insects as *Acronycta* (*Viminia*) *rumicis*, *Leucania pudorina*, *Noctua rubi*, *N. augur*, *Apamea gemina*, *Plusia festucæ*, *Orthosia suspecta* and *Collix sparsata* have been common, *A.* (*Cuspidia*) *leporina* fairly so, considering that a few odd specimens only have been taken in previous years. *Acidalia immutata* was also more common than usual, but *Hydrelia unca*, which has been generally plentiful, was almost absent, only two specimens were I believe seen.—R. Dutton, York. *August 19th*, 1891.

Things are undoubtedly looking up again, and collecting here is at

present attended with very good results. Sugar once more seems to have regained its former attractiveness, and night after night each patch is well covered with visitors. At Askham Bog, close to the city, I have done most; *Collix sparsata* being very common, flying round buckthorn bushes at dusk, whilst *Phibalapteryx lignata* ranks among the most plentiful of Geometers. *Acronycta* (*Cuspidia*) *leporina* (all of the variety *bradyporina*) has been taken in fair numbers and in fine condition, and last night I captured at sugar a most beautiful variety of *Noctua rubi*, which is of a bright yellow colour. This species has been abundant this year.—S. WALKER, York. *July 7th*, 1891.

Clifton (*near Bristol*).—The season so far, though very backward through April, May, and the early part of June, has been a fairly favourable one, many of the common species being present in very large numbers and some of our uncertain visitants well represented. The lateness of appearance of some of the spring species as compared with last year is however very striking; *Tephrosia punctulata*, for instance, which I recorded in 1890 from April 19th to May 5th, I did not meet with this year till May 9th, after which I continued to find it until June 11th. *Pieris rapæ*, *P. brassicæ*, and *Acronycta* (*Cuspidia*) *psi* also were three or four weeks late as compared with last year's records. Sugar was an utter failure here during May: hearing of others' success I shall now be encouraged to make another attempt.—GEO. C. GRIFFITHS. *July 9th*, 1891.

Tilgate and the New Forest.—The season has not been much of a success with me. With *Sesia sphegiformis* I have done fairly well, but not much else, and they were quite three weeks late. On Thursday, July 10th, I went for a trip to the New Forest for a few days. I did not find insects plentiful, nothing came to sugar, and it could hardly be classed as a satisfactory expedition. *Limenitis sybilla* was fairly common, *Argynnis paphia* var. *valezina*, I did not see, but had hardly time to look for it. Larva beating was fairly successful; 2 *Notodonta chaonia*, 2 *N. dodonea*, 3 *Asphalia ridens*, with *Amphidasys prodromaria*, *Ennomos angularia*, and *E. erosaria* falling into the tray. The pretty little *Calligenia miniata* was fairly common at dusk. I had the pleasure, however, of making the acquaintance of two species new to me, *i.e.*, *Acosmetia caliginosa* and *Macroglossa bombyliformis*. Of the former, I took five flying in the sunshine on being kicked up in grassy rides; it is extremely local, and on being kicked up flies a short distance and then goes down again, and frequently will not again take flight but goes down to the bottom of the grass. Thus you may hunt out a corner they frequent until there are apparently none left, but on returning in an hour or so you may find more. Of *M. bombyliformis* I found a few larvæ feeding on Devil's Bit Scabious, and hard work it was hunting for them in the scorching sun, with a dozen forest flies as large as wasps or larger, flying about one. I am told it is difficult to rear; I have planted the Scabious in a pot and put the larvæ on it under muslin.—A. ROBINSON. *July 14th*, 1891.

Hants, Winchester.—In one little night expedition I first picked up three beautiful *Angerona prunaria*, one ♀ who has laid a few eggs—this insect I have never taken here before; they are of a rich orange throughout, without the dusky margin. I then put my sugar on, and on the way back took *Bisulcia ligustri* flying round an ash tree; she

has also laid some ova; this insect I had previously only taken at Lyndhurst. I then netted a couple of *Boarmia repandata* var. *conversaria*, although in taking the first my net came to grief. After picking a few unimportant things off the sugar, a small Geometer flew up into a big sallow, and on turning the lantern upwards, I saw a familiar object, in a fine pupa of *Apatura iris*. I spent an hour over that and other sallows and got no more, but I am sure it should be a good way to get them as the sallow leaf looks quite blue by lamp-light and the pupa pale green, the light colour caught my eye directly. On the way home I got two *Geometra papilionaria*, and have been for it again, but only exploded the fallacy that *G. papilionaria* does not come out before 12 p.m., as it flies at dusk like other Geometers. I have never seen *A. iris* in this wood, though I am often here, and I have beaten the sallows at all times of the year. It shows how little we know of the country round us. *Thyatira batis* and *Gonophora derasa* have come to sugar this year here, and *Rusina tenebrosa*, *Noctua augur*, and *Heliothis marginatus*, all of which are new to the immediate neighbourhood, where I sugar every year.—G. M. A. Hewett. *July 17th*, 1891.

Swansea.—I have done very little collecting till recently, the only things I have taken of note lately are one *Plusia orichalcea*, taken on a flower in the sunshine, August 3rd, one *Cosmia pyralina* at light last night, and one *Geometra papilionaria* on July 31st. I have also taken a few *Eupisteria heparata* in very good condition, surely very late for this insect.—R. B. Robertson. *August*, 1891.

Agrotis ravida.—I took a single specimen of this insect at sugar on the 15th inst. at Saltburn, Yorkshire.—T. Maddison, South Bailey, Durham. *August 19th*, 1891.

Biston hirtaria.—From the notes which have appeared in the *Record* recently, it would seem that this insect is rarely found on the various species of poplar. I have several times taken the imago on poplar trunks, but these have always been ♀'s. That the larvæ will feed freely on poplars I have satisfied myself this season, having found them devouring the young shoots of two species of the genus *Populus*; they also feed occasionally on lilac. Whatever the food, the larvæ always prefer the young shoots growing round the roots of the trees, and they are seldom found feeding at a greater height than four feet from the ground. As regards the distribution of the species, I can say nothing, beyond that I have always had an idea that it flourished nowhere so well as in the "parks" and "squares" of London—more especially in the northern and north-western districts. Perhaps some reader can tell us something of its habits and distribution on the Continent?—Jas. A. Simes, 4, Cricketfield Road, Lower Clapton.

I took the first specimen of *B. hirtaria* on May 11th on a lime trunk, and going to the same place about 6.30 the next morning, I took over a dozen. They were very abundant up to the 15th, after which they fell off in numbers and quality, only a few worn females remaining on the tree trunks. I took in all about forty specimens, seventy per cent. of which were females, and much less variable in shade than the males. I witnessed rather a curious instance of the "reasoning faculties"—if such a term can be applied to insects—being overcome by the "hereditary instinct," I had placed two fertile females in a pill-box, hoping to

obtain ova, only one deposited, and, forced by the same mysterious power which for years had controlled the ovipositing of her ancestors, at once commenced operations by probing every portion of the box likely to afford a suitable nick or cranny for the reception of her ova, but in vain. Nothing daunted, however, she next turned her attention to her companion, and after a moment's deliberation proceeded to insert her long ovipositor between the left upper and under wings, and disposed of ovum No. 1. As it would take up too much space to describe all the manœuvres attending the deposition of each ovum, I need only say that on the next morning no less than thirty ova were deposited on the under wing and in the interstices between the legs and thorax. I am keeping the specimen as a curiosity.—D. H. S. Steuart, Royal College of Science, Kensington, W. *July 21st*, 1891.

Sesia sphegiformis in birch.—I bred a specimen of *S. sphegiformis* from birch this year.—A. Robinson, Brettanby Manor, Darlington.

Larvæ of Nemophora fasciellus.—I have, this afternoon, been collecting a few larvæ of *Nemophora fasciellus*, but they were so few and far between that I think I must have been too late (I usually go for them about April 21st). They are most interesting, and a short note on their habits in the larval and pupal states may be interesting. Their case is a very beautiful one, shaped somewhat like a fiddle, and open at both ends; they feed by night, eating holes in the leaves of their foodplant (*Ballota nigra*), and in the day hide at the roots, where it is very difficult to find them, as they do not hold on, but allow themselves to roll further down among the roots when the plant is disturbed; and what seems to me a peculiar thing for a case-maker to do—they pupate in their cases beneath the surface of the ground.—W. Farren, Fern House, Union Road, Cambridge. *June*, 1891.

Bombyx quercus larva pupating in August.—Last Saturday, 29th August, I took in the Warren, Folkestone, a full-fed larva of *B. quercus* which commenced to spin up yesterday. It seems a strange time to find a full-fed larva of this species.—W. G. Mackmurdo, Aldersbrook, Wanstead. [Normally *B. quercus* hybernates small in the larval stage in the South of England, although occasionally it does so in the pupal stage. In the North of England and in Scotland the insect hybernates normally in the pupal stage and becomes what is generally known as *callunæ*.—Ed.]

The Lateness of the Season.—The following dates speak for themselves:—August 15th, *Notodonta ziczac*. 22nd, *A. lactana* (2). 24th, *N. dictæa*. All in fine condition.—C. Fenn, Lee.

Curious Foodplant of Smerinthus ocellatus.—A few days ago I took a larva of this species nearly full-fed on an isolated bush of wild plum. No other bushes or trees were within thirty yards.—Id.

Hadena porphyrea (satura) in Cambridgeshire.—I have still the capture of another rare species to record. During the last two nights of my stay at Wicken, I took from the sugar what I thought were *Hadena adusta*, a species I had never seen alive. As all my macros were sent, during the last week of my stay, direct to my friend Mr. Page to set, I paid no more attention to them until yesterday, when, taking them from the boards, I at once saw the error I had made and the value of my captures. The following records of the

capture of this species appear to be the only ones:—Newcastle-on-Tyne, at rest April, 1845, recorded V. R. Perkins, *Ent.* x., p. 99; Kent, Parry and Edney, July and August, 1875 (three specimens); Edney, (one specimen), 1873, *Ent.* viii., 229. Besides these there are the two records in Newman's *British Moths*. The April date of the first record above is a strange one. As is well known to a few, the species has quite recently been taken in Aberdeenshire, and amongst my long series of Aberdeen *adusta* I detected two specimens, one very small, and another very worn. There is no doubt that the species may be easily overlooked, as I practically overlooked the specimens I captured at the time, but its richer colour and the deeper coloured hind wings give it a very different appearance to *adusta* when carefully examined.—J. W. Tutt. *September 10th*, 1891.

SOCIETIES.

Entomological Society of London.—*September 2nd*, 1891.—Mr. Frederick DuCane Godman, M.A., F.R.S., President, in the chair. Mr. G. F. Scott-Elliott exhibited a series of various species of Diptera collected on *Ranunculaceæ*, *Papaveraceæ*, and *Cruciferæ*. He said that during the past summer he had studied about forty species of plants belonging to the orders named, and that they had all been visited by insects which were probably necessary for nectariferous flowers. The majority of the Diptera caught were not confined to one species or even genus, but in view of the unmodified character of the flower in the orders named this was only to be expected. Mr. Verrall observed that certain insects affected certain plants, but that the *Geraniaceæ* were seldom visited. The discussion was continued by Mr. M'Lachlan, Mr. Kirby, and others. Mr. W. L. Distant exhibited a specimen of the orthopterous insect *Hemisaga hastata*, de Sauss, which, in the Transvaal, he observed to attack and feed on *Danais chrysippus*, a butterfly well known from its protective character and distasteful qualities to have a complete immunity from the usual lepidopteral enemies. The *Hemisaga* lurked amongst the tops of tall flowering grasses, being consequently disguised by its protective resemblance to the same, and seized the *Danais* as it settled on the bloom. From close watching and observation Mr. Distant could discover no other danger to the life of this well-known and highly protected butterfly. Mr. T. R. Billups exhibited four species of Diptera, which he believed to be respectively, *Oxycera terminata*, Meg., *Pipezella annulata*, Meg., *Clidogastra puncticeps*, Meg., and *Oxyphora arnicæ*, L., taken at Oxshott, Surrey, on the 11th July last. He mentioned that all of them were recorded in Mr. Verrall's list only as "reputed British." He also exhibited a specimen of *Hypoderma bovis*, Deg., taken at Plumstead on the 29th July last. Dr. D. Sharp exhibited several species of *Forficulidæ*, and called attention to the diverse conditions of the parts representing the wings in the apterous forms. Mr. H. Goss exhibited living larvæ of *Scoria dealbata*, reared from ova. They were feeding on *Polygonum aviculare*, but not very freely; *Brachypodium sylvaticum* had been named as a foodplant for this species, but he did not find that the larvæ would eat this or any

other grass. The Rev. Dr. Walker exhibited, and read notes on, a collection of Lepidoptera, Hymenoptera, Coleoptera, Neuroptera, and Diptera, which he had recently made in Norway. Mr. Champion, Mr. Billups, and Mr. M'Lachlan took part in the discussion which ensued. —H. Goss, *Hon. Sec.*

South London Entomological Society.—*Thursday, August 27th*, 1891.—Mr. Tugwell exhibited *Bryophila perla* var. *suffusa*, from Folkestone, also vars. *flavescens* and *distincta* from Deal. Mr. J. E. Robson, a fine series of *Lycæna agestis*, with vars. *salmacis* and *artaxerxes*, including some very fine undersides and intermediate forms. Mr. Fenn, some beautifully set *Crambus contaminellus*, *Odontia dentalis*, *Hyria auroraria*, *Anerastia lotella*, *Crambus uliginosellus*, *Melia anellus* and *Sericoris conchana* from Deal and the neighbourhood. Mr. H. J. Turner, a bred series of *Pelurga comitata*, a bred series of *Hypsipetes sordidata* (*elutata*) fed on a mixed diet of hazel, whitethorn, willow, etc., showing the red, pale, dark, and banded forms; an *Arctia lubricipeda* very dark indeed for a southern form, and a living larva of *Stauropus fagi*. Mr. Frohawk, two female *Pararge megæra*, one with the central area dark as is typical in the male, also a series of *Pieris napi* with pale and dark forms captured on the same date. Mr. Carpenter, a series of undersides of *Thecla rubi*, showing variation in the white spots, also the banded form of *Ennomos angularia*. Mr. W. West, a specimen of *Nœnia typica*, with the right fore leg showing a double tibia, also a series of *Gnophos obscurata* from Lewes. Mr. Mera, living larvæ of *Cuspidia tridens*. Mr. Edwards exhibited specimens of the genus *Charaxes*, and read the following notes :—"The genus *Charaxes*, from the wide distribution and beauty of its species, combined with strength of wing, forms one of the most interesting of the Nymphalinæ. One species (*C. jasius*) is found in Europe on the shores of the Mediterranean; it is closely allied to an Abyssinian species. It also inhabits the eastern, western and southern portions of Africa, is found in Continental India, Ceylon, Andaman Isles, Malay Archipelago, Eastern Asia, as far north as China, also in Australia, but is limited in the Pacific Isles. Out of 80 known species, 50 belong to the Ethiopian region. Madagascar has 8 species, and Dr. Trimen says there are 15 in South Africa, 10 of which come from the neighbourhood of Natal. They are able to fly very fast, and come to rotten fruit and sugar. Larvæ.—Finely granulated, thickened about middle, without spines on body, head large, flattened, crowned with four spinose horns or processes, anal segment more or less bifid. Distant says the smooth spineless larva allies *Charaxes* superficially with the Satyrinæ. Pupæ.—Very thick, rounded, smooth, back extremely convex, head very bluntly bifid, anal segment with two small round tubercles inferiorly, and four others at its extremity round base of pedicel, back of thorax globosely prominent, not ridged. *Charaxes* shares with the South American genera *Aganisthos*, *Agrius* and *Prepona*, the distinction of being the most massively formed as well as the swiftest of known Nymphalinæ." Mr. Billups exhibited some rare Diptera and Ichneumonidæ, amongst others *Nemorœa strenua*, Meig., taken at Oxshott on the 11th of July last. As regards this species Mr. Billups stated that at page 320 of this month's *Ent. Mo. Mag.*, Dr. Meade described this species as not common, he had taken both sexes in Oxford-

shire in 1883, it was also in Miss Decie's collection captured at Westward Ho! and one specimen captured by Mr. Harwood, of Colchester. *Eristalis sepulchralis*, L., a male of this scarce Dipteron was taken at Plumstead by himself on the 17th of July last, as also a female of *Hypoderma bovis*, Deg. With reference to this species Mr. Billups said it was rare indeed to find it in the perfect imago stage, and that it belonged to the sub-family *Æstridæ*, Leach (bot-flies, breeze-flies), the larvæ living in sub-cutaneous galls or bots beneath the skin of various animals; the larvæ of this species being found in the month of May in galls or tumours on the backs of cattle. When fully fed, which is mostly in July, they work their way out and fall to the ground to pupate, the state of pupation lasting some 25 or 30 days. The species is to be found in all parts of the civilized world. It is a curious coincidence that Mr. Bignell in this month's *Ent. Mo. Mag.* records the capture of this species on the 9th of June, on a moor between Yelveston and Clearbrook, our member, Mr. Coryndon Matthews, having identified the species both for Mr. Bignell and Mr. Billups. *Phytomyza aquilegiæ*. This small species of diptera was reared by the exhibitor from some mined leaves of *Aquilegia vulgaris*, L. (the common columbine) growing in his own garden, the leaves being picked last September and kept until the following April, when the little fly began to emerge, its pretty little Hymenopterous parasite, *Rhizarcha ærolaris*, Nees., not emerging until nearly a month later. Mr. Billups also exhibited both sexes of the very handsome *Polysphincta varipes*, Gr., which he had reared from a cluster of cocoons presented to him by Mr. C. Fenn from the larvæ of *Odonestis potatoria*. Also a cocoon of *Attacus cecropia*, from New York State, presented to him by Mr. Turner on the 4th of May last, and from which he had reared no less than 48 specimens of a species of *Cryptus*, closely allied to our British species, *Cryptus digitatus*, Gmel., the females largely preponderating, there being 34, and only 14 males. Mr. Billups called attention to the curious arrangement of cells formed by this internal parasite in the cocoon of *Attacus*, the outer circle consisting of 12 cells, the second of 8, and the third or inner one of 4, so there must have been at least some 48 or 50 cells or internal puparia, which certainly seemed enormous considering the large size of this handsome species of Ichneumonidæ.—Ed.

Errata.—On page 166, lines 4 and 5, for "Mr. Tugwell, a short series of *Dioryctria abietella* bred from fir cones," read, "Mr. Tugwell a short series of *Dioryctria decuriella*, Hb., = *Nephophteryx abietella*, S.V., bred from shoots of Scotch fir bearing resinous nodes of *Retinia resinana*."—W. H. Tugwell. *September 2nd*, 1891.

Psyche villosella.—In the note of the meeting of the South London Entomological Society which appeared in the *Entomologist's Record* for September, p. 105, there is a notice of my paper on *Psyche villosella*, in which it is stated that "the female was never observed to leave the case"; I did not say this, but that I had never seen the skin of the pupa of a female of *P. villosella* projecting from the case; I have seen them emerge from the case. I did not say that the young larvæ left "the central portion of their cases free from pieces," but that I had observed they were able to lengthen the cases by additions either at the proximate or distant end.—J. Jenner Weir, Beckenham.

City of London Entomological and Natural History Society. —*Thursday, September 3rd*, 1891.—Exhibits:—Mr. J. A. Cooper a fine var. of *Abraxas grossulariata* from Forest Gate, having a solid black band across the wings, the yellow markings being entirely absent. Mr. Mera, a specimen of *Nonagria concolor*, dark vars. of *Hadena suasa*, and pale forms of *Agrotis ripæ* and *A. tritici*; also living larvæ of *Acronycta* (*Cuspidia*) *tridens*. Mr. Smith, *Liparis monacha*, a fine dark banded form of *Ennomos angularia*, and *Scotosia rhamnata*, all from Epping Forest; also varieties of *Ypsipetes elutata* from Lyndhurst. Mr. Nicholson, *Lithosia muscerda*, *Minoa euphorbiata*, a fine specimen of *Boarmia repandata* var. *conversaria*, dark forms of *Ypsipetes elutata*, and a specimen of *Sirex gigas*, all from the New Forest. Dr. Buckell exhibited a long series of *Acronycta* (*Cuspidia*) *megacephala*, bred this year from larvæ found on poplar trunks in North London last autumn. One of these was the variety *ochrea*, Tutt ("like the type, but with the ground colour of the anterior wings decidedly suffused with ochreous"). The remainder were examples of the type, but showed tendencies to variation in two directions:—(1). The pale blotch about the reniform becoming obsolete, thus giving the specimens a dark, unicolorous appearance; (2). the presence of a pale longtitudinal dash under the orbicular, showing a tendency towards a pale form (var. *turanica*, Stdgr.). Two specimens alone, had the reniform distinctly present, for, although some of the other specimens appeared to the naked eye to have a reniform, it disappeared when a lens was used. He also exhibited *Strenia clathrata* from Leigh, in which the ground colour was golden yellow, instead of "dingy white" as described by Newman; and a specimen of *Hesperia lineola* from the same locality having the left fore-wing about two-thirds the size of the right. He also showed some larvæ of *Demas coryli*, and pointed out that they varied from yellowish-white, through brown, to black, and that the tufts of hair were sometimes light brown, and sometimes black, according to the ground colour of the larva. Mr. Gates exhibited *Toxocampa pastinum* from Sevenoaks, *Bryophila glandifera* from Brighton, and *Spilodes palealis* from Herne Bay; also an albino of the common starling from Brentwood. Mr. Tutt, *Cuspidia megacephala* vars. *rosea* and *ochrea*; *Tephrosia biundularia* var. *delamerensis*, and a parallel black variety of *T. crepuscularia*, both from South Wales; also a series of *Agrotis obscura* and its varieties from Wicken. Mr. Goymour, *Vanessa polychloros*, *Bombyx quercus*, *Acronycta* (*Viminia*) *rumicis*, *Agrotis puta*, etc., from Suffolk. Mr. Simes, several species of preserved larvæ, mounted on the foodplants. These included *Papilio machaon*, *Callimorpha dominula*, *Liparis salicis*, *L. auriflua*, *Acronycta* (*Cuspidia*) *aceris*, *Cucullia verbasci* and *Pseudoterpna cytisaria*. Coleoptera:—Mr. Heasler exhibited *Nitidula obscura* and *Rhizophagus cribratus*. Mr. Beck, series of *Donacia crassipes*, *D. dentata*, *D. sericea*, *D. affinis*, *Lixus paraplecticus*, etc., chiefly from Christchurch, also a specimen of *Leptura sanguinolenta*, one of the rarest of the Longicorn beetles, which had not been taken in Britain for many years. Mr. Milton, *Colymbetes pulverosus*, *C. notatus*, *Agabus conspersus*, *Ilybius fenestratus*, *I. obscurus* and *Mordella fasciatus*; also a specimen of *Tabanus autumnalis*, and an apple twig infested with the scale insect (*Coccus agathinum*). Mr. Battley exhibited a flower of laburnum

picked the same day, and stated that he had seen some fresh male catkins of sallow during the last fortnight. He also exhibited a series of *Apamea ophiogramma* from Stamford Hill, together with the preserved larvæ, pupæ, and cocoons, and read the following notes on the life-history and habits of the species :—

"Notes on Apamea ophiogramma.—During the summer of 1890, I had the good fortune to take eight specimens of this somewhat rare species in our garden at Stamford Hill. These were taken on dates ranging from July 15th to August 5th, and were mostly worn. Another specimen came into my hands which was taken at Southgate during the last week in July. Hearing that the larvæ fed on the striped "ribbon grass" which is grown so extensively for ornamental purposes in our London gardens, I repeatedly searched several patches to which I had access. On May 22nd (1891), I noticed that the top shoots in several places were dying, and a further search revealed a small round hole either at or below the level of the ground. By cutting off these stems as low as possible, I obtained some larvæ, of which the following is a description. About one inch long, slender body, thickest at the third segment, tapering rapidly towards the head, and very gradually towards the anus. Head small, dark shining brown in colour. Dorsal area, dirty flesh colour, slightly darker towards the spiracular line. Ventral area, cream white. Spiracles black. There is a brown corneous plate on the second segment, having a lighter indentation down the centre, and another brown plate on the last segment, also divided by a transverse crack at one third of its extent from the head. The twelfth segment has four indistinct black spots arranged in a square, the same marks are also to be traced on the other segments. The whole surface of the head and body is beset with minute bristles. It feeds on the interior of the stems and roots of the ribbon-grass, its presence being indicated by the dying top shoots of the plant. By cutting off all the affected stems and digging between the roots, I obtained twenty-five larvæ which I put into a large garden-pot half full of earth, in which several roots of grass had been planted. They were evidently full-fed, so that the beginning to the middle of May would be the best time for collecting them. On June 3rd, I noticed that one of the larvæ had spun up, and on June 5th a larva which was lying exposed, pupated. The pupa is rather slender and very active, reminding one of a small likeness of *Cuspidia psi* or *C. megacephala*. Colour, bright reddish-brown, slightly darker on the back of the abdomen. Wing cases, semi-transparent yellowish-brown. It has two long curved spikes in the tail. Enclosed in a slight silken cocoon on, or just below the surface of the ground. The greater part of mine spun up against the sides of the pot, on the surface of the ground, but a few went about an inch under the surface. Fifteen pupæ were obtained, which emerged as follows :—July 10th, four specimens ; July 11th, three specimens ; July 12th, four specimens ; July 13th, two specimens ; July 15th, one specimen, making a total of fourteen specimens. One died in the pupa state. Judging from these dates, one would infer that *ophiogramma* all emerge at about the same time, and that if good specimens are wanted, the exact date must be chosen, a theory which seems to be confirmed by my experience. With regard to the time of day that these specimens emerged, the majority

appeared between noon and 7 p.m., only one emerged during the night, and none during the forenoon. I sugared for the perfect insect from the beginning of July till the middle of August, only a few evenings being omitted. My captures were:—July 9th, one specimen; July 15th, two specimens; July 18th, four specimens; July 31st, one specimen; August 1st, one specimen; August 7th, two specimens; August 8th, two specimens; making a total of thirteen specimens. The August specimens were all somewhat worn. These dates agree fairly with those of the bred specimens, and seem to show that the beginning to the middle of July is the right time for the imago. The methods of capture were various, eight being taken on sugar, three on the wing in the garden, flying over various plants, one in our conservatory, and one came to light in my bedroom. Of the 1890 specimens, five were taken at honey-dew, two on the wing, and one at light. I never saw them at flowers, or at any other attractions. The time of flight naturally varied according to the time of year, some of the July specimens being taken at 9.30 p.m., while the August specimens appeared soon after 8.30. Compared with the times of sunset, I find that they usually begin to fly about half an hour after sunset, and continue for perhaps three-quarters of an hour. None were seen after 9.30 except the single specimen at light, which appeared at 10.45. *Ophiogramma* comes freely to sugar, and it is probably only owing to the absence of information about its habits that it is not taken more commonly. It settles as far from the sugar as possible, and on several of my patches which were on standard rose trees, and other slender stems, it completely concealed itself on the opposite side, reaching its proboscis round the corner to the nearest drop of sugar. It is also very skittish, and will throw itself off backwards when you are some distance away, and falling down among the herbage, will be perfectly concealed. After missing several in this way one evening I tried the effect of a double dose of rum in the sugar, and took four the next evening without any trouble. When it first settles it keeps its wings half raised, and slowly vibrating, but as soon as the rum takes effect down go its wings, and it then sticks close to the bark. This, however, raises another difficulty; it is now rather hard to see on the dark bark of our London trees, the peculiar "festoon" marking taking away the triangular look of the insect. On the wing, it is easily seen and captured. Its flight is low and steady, and it seems to have no special object in hand, but rather aimlessly flies along. The light undersides of its wings however make it look much smaller than it really is, and it may easily be mistaken for *Caradrina morpheus*. The two specimens I have taken at light both behaved in a similar manner, so we may safely conclude that this is its usual habit. It enters the room slowly, flies up to the ceiling, touches it a few times, and then descending obliquely, settles on the wall. From the reports of various captures, *ophiogramma* seems to have been taken in several places near London during the past two seasons. It must be fairly plentiful in the neighbourhood of its foodplant, as out of some dozens of patches of this grass that I have examined this summer, every one showed traces of the ravages of the larvæ."—G. A. Lewcock and A. U. Battley, *Hon. Secs. September 4th*, 1891.

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HEREDITY IN LEPIDOPTERA.

By W. W. SMITH.

THE February number of the *Record* contains the report (p. 313) of a Meeting of the City of London Entomological and Natural History Society, held on February 5th. The paper read at the meeting by Mr. J. W. Tutt on "The Geometrid Genera, *Melanthia*, *Melanippe* and their Allies," would be of much interest to at least one section of entomologists, and judging from the meagre report, I can form only a vague opinion of the importance attached to the reading of the paper and the discussion of the subject. Mr. Tutt appears to have dealt with the evolution of colours on the wings, more especially with reference to the bands and wavy lines more or less complete in certain species of the group. The persistent tendency of some species in many different groups to vary, and in some cases to develop special colours, is well known to entomologists. But so few have investigated the natural causes or aspect of the subject that its perfect elucidation will remain for some time a great desideratum. Since Mr. South wrote some years ago on "The effects of certain meteorological conditions on the habits and economy of Lepidoptera," the subject has received the attention of many able observers. Some have studied its effects on the evolution of colours, and each year adds new facts towards a solution of the interesting problem. Owing to a long absence from England, I now know very little of the species of the group chosen by Mr. Tutt for their special bearing on the subject of his paper. But the advantage of having a good series from different parts of the British Islands, collected in different years, and accompanied

with notes on the seasons in each locality, was doubtless of great importance and aid in illustrating the paper. By this means alone can the effects of the seasons and climate in producing variation on any form be fully worked out. The experiments of Mr. Merrifield and others have shown that great variation can be produced by artificial methods, but the results in all cases cannot be accepted as an exposition of the natural causes of variation. They, however, will be the means of suggesting other and better methods, and lead to better results when studying the subject from a purely natural aspect.

The theory of the progressive development of bands on the wings of lepidoptera caused by the union or coalescence of lines in certain seasons and under certain conditions, is unquestionably based on a line of reasoning that will ultimately lead to the perfect elucidation of this form of variation, by it, the genealogy of many so-called species and varieties will be traced to this true source of origin. The variation of British lepidoptera affords the best of all opportunities for the full investigation of the subject. The many able and earnest workers resident throughout the country, and the Continental interchange of specimens, notes of experiments and discoveries, will always enable British entomologists to lead the way in the science of variation. The resolution recently adopted by some of the London societies to devote certain evenings to special groups or subjects is another step in the right direction towards dispelling any doubts, and adding new facts to the subject selected.

With reference to Mr. Tutt's remarks on reversion and the progressive development of Lepidoptera from dark to light forms, or *vice versâ*, I would remark that after much close observation on the subject in New Zealand, I unhesitatingly agree with Mr. Tutt in believing the former to be the right view of the two. In all cases where dark or melanic forms occur in our climate, they can readily be shown to be partial or perfect instances of atavism produced in certain districts invariably more humid than the localities where the lighter forms occur, and more typical of their ancestors formerly existing in the ancient and more humid climate of the Islands. The New Zealand climate has undergone considerable modification since the advent of European settlement, and its effects are working rapid and ruinous changes in the flora and fauna of the country. The changes in the environment and economy of

numerous species of Lepidoptera have caused the development of some remarkable phases of variation. By closely observing these phenomena for many years, it has of late thrown much light on the origin and development of several of our local species and varieties. Mr. Tutt, in his papers on Melanism, etc., has dwelt at length on the effects of certain localities in darkening British Lepidoptera, but, so far, that gentleman's efforts have been directed towards an explanation of the causes producing melanism only. When we study the subject in the opposite direction, we just as easily reach conclusions (in their bearing as the case may be) in the development of brighter and paler colours. The sub-family *Satyrinæ* comprise the blackest species of known Rhopalocera. They also constitute the second group in Bates' *Structural Classification of Butterflies*, and considering the colours and low structure of the group, they were, doubtless, among the first to appear in early geological times. I am inclined to regard black as the primary colour of Lepidoptera, and the one most suited to the cool, wet climates of the ages through which they have passed. The evolution of the numerous species constituting the group, or of the higher groups from the *Satyrinæ*, need not be discussed here; we have sufficient evidence of their great antiquity and of several species still retaining their primary colour from their zone of origin through geological time; it is, therefore, not difficult to understand how, under the ever-changing conditions and rapid modification of climates in modern times, numerous species should develop a tendency to vary in a given direction. The hereditary tendency to vary is more strongly marked in some groups than others, but I agree with Mr. Tutt in laying stress on this as an important factor in the production (under certain conditions) of Melanism, and it seems to me that we must take a much wider grasp of the subject than we have been accustomed to do when dealing with these important problems. The law of heredity among insects is comparatively unknown to entomologists, and until the science is perfectly studied very little sound progress will be made in developing our knowledge of the laws of variation.

The thought has frequently occurred to me that the peculiar and beautiful variation of certain groups or species operates more from within than without. It seems to me not to be the mere external influences of artificial environment that produce the variation (useful or otherwise) in a bred species, but to be due to the law of heredity operating in a given direction. It

is precisely the same in a state of nature when certain species are subjected to a rapid change of environment. They suddenly develop new colours, or their typical colours become greatly intensified. The closer the conditions of existence approximate to the zone in which a species was evolved, the more strictly typical will the colours develop. It is not so much a question of the origin of a species, as the conditions under which its colours were evolved, that interests us here. Yet I contend that heredity plays an important part with many species in developing peculiar forms of variation. For several seasons I have been experimenting with *Chrysophanus boldenarum*, with a view to ascertaining how far the colours of the imagines could be affected by varying degrees of dry and moist atmosphere. The species has varied greatly of late years in our district owing to the long continuance of dry seasons (*Record*, vol. i., p. 122; ii., p. 32), and with a desire to cause a reversion of the paler colours developed, I instituted some experiments by rearing the larvæ from the eggs under cool, moist conditions, and so far with good results. In the autumn (September) of 1889, we netted a good number of both sexes, and placed them in suitable houses to pair. In a few days we obtained about a dozen eggs which were deposited on the under sides of the leaves of their foodplant (*Lagenophora petiolata*). These, with many others which we subsequently obtained, were put into cool wet pots, and in due time emerged; we kept them under the cool shade of a thick pine tree, and kept their food and the soil and atmosphere in the pots as moist and cool as possible. On the zinc lids of the pots we placed small pieces of wood, over this was put a thick covering of calico kept constantly wet. By this method a cool atmosphere was generated in and over the pots; under the treatment a few larvæ died at various stages of growth, but more so during the first moult. The remainder, which fed up and pupated perfectly, duly emerged in the imago state in perfect condition. The contrast between the bred examples of both sexes, and specimens captured this season in a state of nature for comparison is very striking. The intense deep black of the males with the almost total suppression of the discal series of orange spots in the bred examples, and the pale ground colour with the abnormally marked series of purple and orange spots of examples taken this season on the sandy river flats, are cases which add considerably to our knowledge of the causes of the origin and development of local races and varieties. The bred specimens are the larger and

finer of the two, and here I may remark that it is the result of only one season's experiment.

Now it cannot be doubted that, under the influence of the long continuance of dry weather and hot sunshine, the species is rapidly developing a local variety, and it appears to me to be a case to illustrate how careful we should be when describing varieties, to note the conditions under which they were evolved, especially when the species under more favourable conditions rapidly reverts to the typical colours. Perhaps similar experiments conducted with the British "Carpet Moths" would enlighten us further on the subject. But I leave entomologists to draw conclusions from their own experiments, whether certain forms of variation are due to heredity, to seasonable derangement or artificial environment. The cases cited appear to me to be due to the former, borne from their zone of origin. If we consider the immense duration of time of the earlier geological epochs and their uniform conditions of temperature, we may form a fairly accurate idea of the origin and stability of the colours of insects. In any light we study the question, the value of the results would be greatly enhanced by a series of sound experiments conducted in close imitation of natural conditions, and especially bearing in mind the more important object in view.

Ashburton, N.Z. *June*, 1891.

VARIATION.

Black Varieties of Boarmia roboraria and Liparis monacha. —When at Mr. Edmonds' extensive larvæ breeding-ground at Windsor, I saw, among a number of good things, some very dark *Boarmia roboraria*, and several black *Liparis monacha* (which emerged while I was there), and amongst them a black female with only a few white specks near the thorax. I also heard of some black specimens of *Vanessa io* having been bred, though not then in Mr. Edmonds' possession. I may safely say that any one taking the trouble to go through these grounds will be amply repaid for doing so.—D. H. S. Steuart, Royal College of Science, South Kensington, S.W.

Leucania unipuncta var. asticta.—I find there is in the Museum here a specimen of *L. unipuncta* referable to the form *asticta*, Tutt. The spot at the base of the reniform is not quite obsolete, but it is of the same colour as the wing instead of being white. This specimen was taken in Jamaica by Mr. J. J. Bowrey.—T. D. A. Cockerell, Institute of Jamaica, Kingston, Jamaica. *August 10th*, 1891.

Variety of Epinephele janira.—On the 28th of July I took a curious variety of this insect. It was a ♀. The upper wings are much darker than usual, being almost black, whilst the under wings are nearly white. The upper part of the right underwing is slightly drab in colour, but in the rest of this wing and in the whole of the other underwing the colouring matter seems to be entirely absent, as if it had all got into the upper wings. I beat this insect out of a hedge, and its appearance when flying was most peculiar, the contrast between the two pairs of wings being so marked.—John Williams Vaughan, Jun., The Skreen, Radnorshire, Erwood, R.S.O. *August 22nd*, 1891.

Varieties of Saturnia pavonia (carpini).—I have this season bred some of the strangest aberrations of this species, reared from larvæ taken on the Longmynds, the principal range of hills here. The first to emerge of this species was a very dark ♂, which I propose to call *ab. infumata*, owing to the very dark colour of all the wings, this dark shade has so far invaded the whole colouring, that it has nearly expelled the ordinary orange colour from the hind-wings. Of this *ab.* I obtained two ♂s. In a very diminutive pair, ♂ and ♀, a brilliant rosy-crimson has suffused the principal markings; this colour so far predominating that the bluish part of the crescent of the eye is altogether wanting, and this crescent reduced to a broad rich crimson arc. The usually serrated line is scarcely indented at all, and broadly suffused with crimson. This charming *ab.* might well be styled *rosacea*. The larvæ of *pavonia* also vary a great deal; some have broad velvety rings around each segment; in others these are reduced to small rings around each tubercle; while the tubercles themselves offer a great many gradations. I have now feeding larvæ with the following tubercular colours; the type appears to be bright yellow, the next common colour is orange, then pink; while white, black, and purple are of rarer occurrence. The foodplants appear to be in this neighbourhood, meadow-sweet (*Spiræa ulmaria*) in the valleys, and the two sorts of heath (*Erica tetralix* and *E. cinerea*) on the hills. I find that the pupa often remains two years before yielding the imago.—F. B. Newnham, Church Stretton, Salop.

Black var. of Melitæa athalia.—The weather in the "Landes" has been very stormy for some days, much rain and wind breaking down trees, but it is now pleasantly cool. When the sun is out, *Melitæa athalia* is in swarms, especially on the flowers of heath. Only one black specimen with the red reduced to a marginal row of marks was seen.—T. A. Chapman. *September*, 1891.

Luperina testacea var. guenéei. On rearranging my *L. testacea*, I at once recognised a fine specimen of var. *guenéei*. It was taken, no doubt, by the late T. P. Brockholes, who used to collect on the banks of the Dee. It is identical with the only three taken at Rhyl. Mr. Baxter looked at it to-day, he noted it as distinct from his so-called *nickerlii* = var. *incerta* (*British Noctuæ and their Varieties*, vol. i., p. 140).—J. B. Hodgkinson, Ellerslie, Ashton-on-Ribble. *July*, 1891.

Gynandrous specimen of Fidonia piniaria.—A friend of mine took a specimen of *Fidonia piniaria* this season, with the wings on one side the colour of a male and on the other side of the female; one of the antennæ also being pectinated, the other simple.—James Warren, Jun., Capel House, Waltham Cross.

VARIETIES OF SMERINTHUS TILIÆ, PARARGE MEGÆRA AND HEPIALUS HUMULI.—The following varieties are in the possession of Mr. Edwin Gray, of Newstead, Bedford, and are I think worthy of notice. (1). A male specimen of *Smerinthus tiliæ*, having the olive-green cross bar and border of the upper wings replaced by a pale buff colour, the rest of the wings being paler than the ordinary form, with the usual amount of black scales. The hind wings very pale with a buff margin and yellow fringe. Thorax grey and very light olive, abdomen grey. The specimen was caught on a doorstep in Bedford last June. (2). A male specimen of *Pararge megæra*, having the ground colour of the upper wings replaced by white inclining to tawny-fulvous where it meets the smoky-brown markings, which are normal as are the hind wings. This white is of the same kind as sometimes appears in varieties of *Epinephele janira*, giving them a bleached appearance. This specimen was caught at Cromer in the middle of the present month. (3). A female of *Hepialus humuli* having the fringe and margin of the under wings bright orange and a pale shade of the same colour being diffused all over them, most intense on the under side where it is also present on the fore wings, though the upper side of the latter is normal; thorax orange. This variety was taken this season at Cromer.—D. H. STEUART, Red Court, Bedford. *August 29th*, 1891. [This latter is not at all an uncommon form.—ED.]

VARIETIES OF ZYGÆNA TRIFOLII.—Mr. Abbott is wrong (*Ent. Rec.*, ii., p. 155) when writing of the var. of *Z. trifolii*. It is the type that has the second pair of spots coalesced; var. *orobi*, Hb. has the same pair of spots distinct. The other vars. are as follows:—var. *filipendulæ*, Hb., basal and central spots coalescing; var. *glycirrhizæ*, Hb., central and terminal spots coalescing; var. *basalis*, all the spots united by a line of red of uneven width; var. *minoides*, all the spots united into a large blotch occupying all the disc. These are all narrow-bordered varieties. There are also thinly scaled varieties, varieties with ill-defined or fully-developed sixth spot, and a yellow variety (*lutescens*).—SYDNEY WEBB, Dover. *September*, 1891. [Dr. Staudinger unites *glycirrhizæ* and *filipendulæ*, Hb.-Gey. under the name of *confluens* and writes:—"mac. omnibus confluentibus," so that he would use but one name for these, together with *basalis* and *minoides*, a much less satisfactory division than Mr. Webb's. He also gives:—"*orobi*, Hb. 133, mac. mediis separatis; var. *syracusia*, Zell, minor, al. ant. maculis parvis, disjunctis, post. margine lato nigro." This latter var. comes from:—"Sicily, Spain and Mauritania (N.W. Africa)," but we get this small form in England. Var. *dubia*, Stdgr. *Cat.*, p. 21 = *transalpina*, Hb. = *medicaginis*, Ld. = *charon* Bois., described as:—"var. major, al. ant. macul. 5 vel 6, al. post. latius nigris." This form, which we also get, is recorded from the "Alps, Pyrenees and doubtfully from Greece" (Staudinger, *Catalog*, p. 47).—ED.]

In Messrs. Abbott and Hodges' notes on the *Zygænæ*, they both speak of the yellow variety of *Z. filipendulæ*, and the blotched or barred form of *Z. trifolii*. I have not had any experience of *Z. filipendulæ* this year, but in an old and disused brickfield at Gamlingay, on July 16th last, I found *Z. trifolii* in great abundance, although somewhat difficult to obtain, as it is an excessively wet and sloppy place, and what with water up to the shoe tops, and herbage up to the waist, one might

almost imagine himself fishing, rather than looking for "Burnets;' however, I was very lucky in finding a yellow ♂ *in cop.* with a barred ♀, from which I also succeeded in obtaining ova, but unfortunately all the larvæ are since dead. Like Mr. Abbott's *Z. filipendulæ*, my *Z. trifolii* is of a very beautiful lemon yellow, showing no trace whatever of red. I gathered a large number of cocoons, and was much pleased in breeding another pure yellow variety, but unfortunately it is somewhat a cripple, although quite good enough to keep. In addition to the above two varieties, I found on the next day, *viz.*, the 17th, two others which may fairly be said to be intermediate between the yellow form and the type, the first has the spots and underwings of a deep orange tinged with red, but still very different from the brilliant crimson of the type; the second has the spots on the upper wing of the normal coloration, but the underwings of the deep orange red as in the first. Yet another curious form is one in which the top basal spot on the left wing is yellow, all the rest typical. I also found a number of the blotched varieties, although by no means as commonly as Mr. Abbott, the type being much the more prevalent.—W. Bond Smith, Potton. *September*, 1891. [I took this yellow variety some years ago in North Kent, and named it *lutescens* in the *Young Naturalist*.—Ed.]

Varieties of Polia chi in the Leeds district.—During the last three weeks I have taken a large number of this insect at rest on stone walls, never in any other position. I have taken only three good examples of the var. *olivacea*, but have fresh specimens of every shade connecting it with the type. A local collector told me that one in twelve was the usual proportion; with me it has been about one in twenty-five. As to the form *suffusa*, noted by Mr. Robson, it seems to be almost as common as the type, and, as we find in the case of *olivacea*, intermediate specimens occur. Mr. Carrington informed me that "black" *chi* were taken in a certain wood near Leeds; so far, however, I have not met with this variety, though I possess some very dark *suffusa*. In var. *suffusa* the under-wings are smoky; in var. *olivacea* they are white, with at most a small blackish blotch on the margin.—W. Mansbridge, Luther Place, Horsforth, near Leeds.

Variety of Coremia ferrugata.—When collecting at Edlington Wood, near Doncaster, one day this spring, I captured a specimen of *C. ferrugata*, in which the costal half of the normal purplish bar in the right wing is obliterated, its place being occupied by ferruginous, which thus forms a broad dash along the costal margin, the left wing being perfectly normal. The specimen is quite fresh and in good condition.—Id.

Thyatira batis (type).—With reference to the note, *Entom. Record*, vol. ii., p. 108, I may say that two or three years ago I bred a *Thyatira batis* with the spots a delicate light brown, like that described by Mr. Alderson. It was the last to emerge of a few pupæ which I had, and is without the faintest trace of the rosy colour of the ordinary form. This gives it somewhat of a "washed-out" appearance, and to my taste detracts considerably from its beauty.—Joseph Anderson, Jun., Chichester.

Variety of the Larva of Smerinthus tiliæ.—I had a rather curious variety of this larva, found on August 25th, which, instead of the normal green colour, was a dingy violet shade. I am not aware

that this caterpillar is given to variation. I see no mention of the fact, either in Newman, Kirby, Buckler or Stainton. It has now turned into a pupa on the top of the soil in the pot.—ID. *September 11th*, 1891.

SCIENTIFIC NOTES.

GENERIC NOMENCLATURE AND THE ACRONYCTIDÆ.—My "assumptions" (*Ent. Record*, p. 106) as to the action of the Editor of the *Record*, I took from what Mr. Lewcock had written before, that that gentleman disclaimed the authorship of *Cuspidia aceris* because the Editor had himself substituted Dr. Chapman's generic name for *Acronycta*. If it was not so, will the Editor please tell us who was responsible for the appearance of the name in *Ent. Record*, 1890, p. 167? If I remember rightly in the report of the City of London Society elsewhere the species appears under *Acronycta*.—T. D. A. COCKERELL. [Mr. Cockerell is entirely wrong. (1). I did not "substitute" *Cuspidia* for *Acronycta*. (2). Mr. Lewcock neither suggested nor wrote that I did so. (3). Mr. Lewcock disclaimed responsibility because others had used *Cuspidia* before it appeared under his name and because it was well-known the names were Dr. Chapman's, and not because I "substituted" *Cuspidia* for *Acronycta*. (4). The name *Cuspidia* could have occurred at *Record*, i., p. 167, in one of two ways—either *Cuspidia* was in the report, or, the report was without generic names and I added it.—ED.]

"Dr. Chapman's recently proposed division of the genus *Acronycta* is adopted in *The British Noctuæ and their Varieties*, and if the genus is to be divided at all we hope it will stand, as it is the result of a very painstaking and careful study of the group on Dr. Chapman's part, and as it seems to us superior to any division which had previously been suggested."—G. T. PORRITT, *The Naturalist*, p. 278.

USE OF SPOTS ON LARVA OF CHÆROCAMPA EUPHORBIÆ.—I was interested when on the "Landes" with what I did *not* see of *Chærocampa euphorbiæ*. A *Euphorbia (paralias?)* growing on the shore had been eaten by it, and in one place there was much fresh frass. I could not find the larvæ, but I thought once I had done so, the stem of the *Euphorbia* had the leaves so eaten off, as to leave their bases as round coloured spots, and these, *C. euphorbiæ* obviously mimics, and thereby no doubt hides itself. This conclusion is very different to that to be drawn from its appearance in Capri, where I saw it two years ago. There it fed openly and most abundantly on a shrubby *Euphorbia*, and its aspect seemed to make it intentionally conspicuous as a warning to enemies. Can the same larva use the same markings in two such diverse manners, in different places and under different circumstances?—T. A. CHAPMAN, Firbank, Hereford.

STRANGE COPULATION.—On August 22nd, I found *Charæas graminis* ♀, *in cop.* with *Noctua xanthographa* ♂.—W. MACKMURDO, Wanstead.

ACTION OF CHLORIDE OF POTASSIUM ON GONEPTERYX RHAMNI.—A friend who used to collect, showed me two specimens of *G. rhamni*, which, after being kept for between two and three years in a bottle of chloride of potassium, developed the deep orange blotches at the

extremities of the fore wings, which are sometimes said to be found in varieties of *rhamni*.—James Warren, Jun., Capel House, Waltham Cross.

Protective resemblance in Iodis vernaria larvæ.—Referring to Mr. Hewett's note (*ante*, p. 138) on *I. vernaria* larvæ, what strikes me as interesting (from my own observations) is that they hatch green, turn brown in the autumn, hybernate that colour, retain it in the spring, until, with their last skin, they re-assume the bright green colour of the newly-hatched larvæ, which they retain in the pupal stage. The ova are also most interesting, flat, cylindrical, and deposited one upon another in little steeples of about ten in each, looking, under a glass, like so many cheeses piled one upon another.—W. Farren, Cambridge. *July*, 1891.

Mr. Farren is quite right about *Iodis vernaria*. I kept a female to lay, and the eggs are, or were, most extraordinary, and they hatched green.—G. M. A. Hewett, Winchester.

Notes on Collecting, Etc.

Notes of the Season.—*Cambridge*.—In addition to my captures noted in the *Record* (p. 134), I have taken a nice set of *Gelechia næviferella*, *Ditula hartmanniana*, *Antithesia salicella*, and many odd things, macro and micro; notably four specimens one evening of *Xanthosetia zœgana* var. *ferrugana* on a dry bank in the Fen, no other specimens of the species being seen, typical or otherwise. They are very striking, their brown colour being so different to the yellow of the type. *Bryophila impar* seems to have been scarce this year. I only took ten specimens, although I worked hard for them nearly every morning for over three weeks. Three were found on July 30th, the rest singly, with the exception of two on August 17th, and Messrs. Tutt and Porritt, who were with me on that day took one each. I captured the last one two days later. *Nonagria neurica* has been conspicuous by its absence, partly owing to the weather having been too bad for me to go after it regularly. The only specimens I know to have been taken this year were two taken by Mr. Jones of this town last week.—W. Farren, Fern House, Union Road, Cambridge. *August*, 1891.

The Island of Eigg.—On the 10th of July, two or three hours spent in collecting on this island (situate on the west coast of Scotland) resulted in the capture of the following eight species of insects: *Vanessa urticæ*, *Satyrus semele*, *Cœnonympha pamphilus*, *Abraxas grossulariata*, *Anaitis plagiata*, *Eubolia limitata*, *Camptogramma bilineata*, and *Cidaria immanata*. As the climate is extremely humid, I hoped to find some melanic varieties, but the *immanata* alone exhibits much tendency in this direction. The two specimens of *Vanessa urticæ* which I took are unusually large and well marked, but, on the other hand, the *A. grossulariata* are small and pale, measuring in fact but 1½ in. across the wings, while the same species taken here expands 1¾ in., and Newman's figure is nearly 2 inches. These insects were abundant, sitting on the fronds of the bracken—what the larva finds there to feed upon I do not know. On the mainland—in the neighbourhood of Arisaig—*Erebia æthiops* swarmed; I took one handsome

specimen with the white ocelli unusually large, and some varieties of the underside, also *Geometra papilionaria* and *Plusia festucæ*.—FRANCIS GAYNER, Beech Holm, Sunderland.

Winchester.—Larvæ seen pretty abundant. I have taken a lot of *Sphinx ligustri* and *Smerinthus ocellatus*, and a fair lot of *S. tiliæ*. *Lobophora sexalata* and *Ephyra orbicularia* are in fair numbers on the Lyndhurst sallows, the latter on the low branches, and they drop at a touch, also *Hypsipetes impluviata* on the alders in fair numbers, but they are delicate. The commoner larvæ, *Notodonta dromedarius*, *N. ziczac*, etc., seem plentiful. I have taken several *Cucullia lychnitis* larvæ here on the flowers of the white mullein. They answer Mr. Owen Wilson's description exactly. I took one *Sphinx convolvuli* at the flowers of *Nicotiana affinis* on the 8th, quite fresh, but no more have come, which is a nuisance, as it cuts up the evening. One must wait for them after getting one. They are singularly invisible for so large an insect. I have taken two very small *Apatura iris* larvæ. *Spilosoma lubricipeda* emerged on the 4th from this year's larvæ.—G. M. A. HEWETT Winchester. *September 15th*, 1891.

Deal.—July 4th to August 4th.—During this time, which was perhaps a little less cold, wet and miserable than the rest of this wretched season, collecting could only be accomplished at the risk of getting wet through, and this was not at all an uncommon occurrence. So late was the season that many June species were in full swing at the end of July, and all data for future reference is absolutely useless. Most collectors know Deal, so it is waste of time to go into details; the following are my principal captures, and I have given the date of the first appearance of each species :—July 4th. *Homœosoma sinuella*, *Anerastia lotella*, *Crambus chrysonuchellus*, *Chrosis tesserana*, *Eubolia lineolata*, *Nyctegretes achatinella*, *Agrotis ripæ* (2), *A. corticea*, *Hadena dentina*, *Leucania comma*, *Xylophasia sublustris* and *Mamestra albicolon*. July 6th. *Eupœcilia rupicola*, *Lycæna alsus*, *Aplecta nebulosa*, *Herbula cespitalis*, *Platytes cerusellus*, *Agrotis valligera*, *Hadena chenopodii*, *Mamestra anceps*, *Caradrina morpheus* and *C. blanda*. July 7th. *Peronea comariana*, *Acidalia imitaria*, *Spilonota neglectana*, *Axylia putris*, *Mamestra persicariæ*, *Nœnia typica*, *Apamea basilinea*, *Noctua augur* and *Hadena thalassina*. July 8th. *Ebulea crocealis*, *Eudorea pallidulalis*, *Conchylis inopiana*, *Timandra amataria*, *Sphaleroptera ictericana*, *Eupœcilia dubitana*, *Cuspidia megacephala*, *Caradrina alsines*, *Apamea gemina*, *Noctua triangulum* and *Thyatira derasa*. July 9th. *Crambus uliginosellus*, *Hydrelia unca*, *Zygæna trifolii*, *Nudaria senex*, *Sericoris conchana*, *Leucania pudorina*, *Acidalia immutata*, *Catoptria fulvana*, *Schœnobius forficellus*, *Argyrolepia mussehliana* and *Lithosia mesomella*. July 10th. *Orthotœnia striana*, *Lithosia pygmœola*, *Cledeobia angustalis*, *Paraponyx stratiotalis*, *Acidalia emutaria*, *Crambus inquinatellus*, *Agrotis tritici* and *Homœosoma binœvella*. July 10th. *Dianthœcia capsincola*, and *Dicrorampha simpliciana*. July 11th. *Hypenodes albistrigalis*, *Chesias spartiata*, *Botys fuscalis*, *Aphelia pratana*, *Hyria auroraria*, *Leucania straminea*, *Hydrocampa stagnalis* and *Scoparia cembræ*. July 13th. *Cuspidia aceris*, *Melanippe galiata*, *M. rivata*, *Callimorpha dominula*, *Acidalia promutata*, *Ephippiphora trigeminana*, *Oncocera ahenella*, *Scoparia dubitalis* and *Agrotis nigricans*. July 14th. *Leucania conigera*, *Cidaria fulvata*, *Sciaphila nubilana*, and *Habrostola urticæ*. July 15th.

Cœnobia despecta and *Herminia cribralis*. July 16th. *Miana furuncula*, *Crambus warringtonellus*, *Acidalia scutulata* and *Plusia chrysitis*. July 17th. *Argyrolepia subbaumanniana*, *Pterophorus microdactylus* and *Heliothis marginata*. July 18th. *Boarmia repandata*. July 20th. *Lycæna ægon*, *L. corydon*, *Sciaphila perterana*, *Conchylis gigantana*, *Tortrix icterana*, *Phoxopteryx comptana*, *Sericoris cespitana*, *C. francillonana*, *Pterophorus phœdactylus*, *P. parvidactylus* and *Eubolia bipunctaria*. July 21st. *Liparis salicis* and *Aphelia osseana*. July 22nd. *Melia anella*, *Miana literosa* and *Eupithecia subnotata*. July 23rd. *Odontia dentalis* and *Spilonota aceriana*. July 24th. *Ebulea sambucalis*, *Nola cucullatella*, *Lycæna agestis*, *Odonestis potatoria* and *Cidaria pyraliata*. July 25th. *Ephippiphora fœneana*, *Conchylis alternana*, *Apamea ophiogramma* and *Rivula sericealis*. July 28th. *Eudorea lineolalis*, *Pelurga comitata*, *Nudaria mundana* and *Cleora lichenaria*. July 31st. *Crambus contaminellus*, *Cerigo cytherea*, *Amphipyra tragopogonis*, *Agrotis suffusa* and *Noctua baja*. August 1st. *Eupœcilia hybridellana*, *Strenia clathrata*, *Aspilates gilvaria*, *Semasia rufillana*, *Peronea aspersana* and *Arge galatea*. August 3rd. *Emmelesia affinitata*. Sugar was of little use. I captured a dark brown unicolorous ♀ of *Odonestis potataria*, and have a few larvæ, from ova laid by her, now feeding. *Cleora lichenaria*, *Agrotis ripæ* and *Apamea ophiogramma* are, as far as I know, new to the Deal list. I also collected a number of pupæ of *Odontia dentalis*, and have bred a long series. In all, excluding Tineæ, I noticed 245 species of lepidoptera during the time of my stay.—C. Fenn, Eversden House, Burnt Ash Hill, Lee, Kent.

St. Anne's-on-Sea.—On the few favourable days we had at the end of April we did fairly well on the sallows, taking *Tæniocampa gracilis* (very plentifully), *T. gothica*, *T. instabilis*, *T. rubricosa* and *T. opima*. A few hybernated specimens were also to be seen, *Calocampa exoleta*, *Agrotis suffusa*, etc. From that time until this month the wind kept pretty well in the east, when moths came freely to sugar. *Viminia rumicis* seems the common moth this season, but unfortunately I was too late for it, and did not get many good specimens. I also took *Hadena adusta*, *H. dentina*, *H. pisi*, *Cuspidia psi*, *Leucania comma*, *Miana strigilis*, *M. fasciuncula*, *Grammesia trilinea*, *Mamestra albicolon*, *M. brassicæ*, *Apamea gemina*, *Heliothis marginatus* (2), *Noctua festiva*, *N. plecta*, *A. basilinea*, *Agrotis exclamationis*, *Mamestra sordida*, *Euplexia lucipara*, *Rusina tenebrosa*, *Agrotis corticea*, etc., and some worn *T. stabilis* and *T. gothica* on June 17th. I did not get *M. strigilis* until June 17th, nor *M. fasciuncula* until June 26th; but I missed three days sugaring before the latter date as the wind was so high. On that date moths simply swarmed to sugar. It was a very close hot day, with a good deal of thunder and much rain. With respect to *M. strigilis* and *M. fasciuncula*, I noticed particularly that the former is invariably the larger moth, here at any rate. Of course the two overlap as it were, but, take them all through, *strigilis* is far larger, and this is especially noticeable on the sugar, when you see ten or twelve of each sort together. The 26th was certainly one of the best nights I ever recollect for quantity, but I did not get anything in particular except a few *Mamestra albicolon* and one beautiful *Agrotis corticea*, a very dark velvety looking moth, with the fringe and tip of the upper wing very light and shiny. I think I made rather a find on Saturday: I was exploring round our cricket field with

some of the boys, and, on an old heap of rubbish all among some nettles, I came across a lot of *Tinea imella* and took about thirty. I think this moth must be rather rare, as my friend, Mr. Hodgkinson, who named them for me, said he had never taken it himself, and he had collected for fifty years.—T. BAXTER, St. Anne's-on-Sea.

Lake District.—On July 6th I arrived at Keswick for a few weeks' collecting. The weather during my stay was on the whole fine, but seemed to affect insects in a way that made them sluggish, and absence of sunny days made the Diurni scarce, so that I had to work hard for what I did get. The best insect I took was *Erebia cassiope*. Newman's *British Butterflies* was my guide as to localities for this, but I only took it just below Styehead Tarn, at the head of Borrowdale. It occurs here in a little valley, I think about 1,000 feet above the sea level, down which runs a brook, the river Derwent being the outlet of the Tarn. It did not, however, appear to be common here, probably because I was too late for it, as most of the specimens I took were worn, some badly so. I visited the spot twice. The first day (July 10th) was sunny, but a fresh breeze swept down from the Tarn. I arrived about midday, and stayed for rather more than an hour, during which I captured eight specimens, which were almost all I saw. It is by far the easiest butterfly to catch of any I know, as it never makes the slightest attempt to dodge the net. Soon after one o'clock it disappeared altogether, although the sun was still shining. To-day, on my way home, I had the misfortune to drop my collecting box, containing the eight specimens of *E. cassiope*, amongst some heather and bracken. A two hours' systematic search over half an acre was fruitless; the box and specimens must be there now! On July 8th, I carefully searched the greater part of the southern and western slopes of Helvellyn for the same insect, but failed to find it although the day was favourable for its flight. On the 11th, an expedition for it to the Red Skrees, near Ambleside, met with no better success; but although the western slope near the top seemed very likely ground for it, and the day was oppressively hot and still, with an entire absence of sun, I had not a fair chance. On the 13th, I made an early start for Styehead Tarn again, though it was the dullest of mornings, with a cold wind blowing. I arrived at about 10.30, but saw nothing of *cassiope* for an hour, owing to the dull weather; when fortune favoured me, for the only glimpses of sunlight, it seemed, in the whole district came down my valley. These glimpses were of very short duration, and few and far between, nevertheless most precious, for immediately on the appearance of the sun, *cassiope* appeared, although when the sun was not shining I could not find a single specimen even by most careful searching. Once I caught three specimens in hardly more than thirty seconds of sunshine, and altogether I took nine in about two hours. The rule seems to be, no sunshine, no *cassiope*. I brought home a living ♀, but although I fed her she died in a week without having laid. Of other Diurni, I took *Argynnis selene* (much worn), *A. aglaia* (fine) and *Cœnonympa davus*. Of the latter, five specimens on Helvington Moss, near Kendal (2 ♂'s and 3 ♀'s; 1 ♂ fine, the rest very poor). Beating was not of much use, but produced *Asthena luteata* (2), *Metrocampa margaritaria*, *Abraxas ulmata* (always sluggish), *Cidaria populata* (1), *Melanthia ocellata* (1), *Nudaria mundana* (1), *Aplecta herbida* (1), *Platypteryx falcula* (1), *Larentia pectinitaria*

(abundant everywhere) and *Eupithecia virgaureata* (worn). *Tanagra chærophyllata* was abundant, flying amongst bracken, and a few *Hepialus hectus* and *H. velleda* at dusk. *Fidonia atomaria*, *Anaitis plagiata* and *Cidaria suffumata* were common on heaths, and I took one *Coremia munitata*. Tree trunks produced *Notodonta dictæoides* (1) and *Bisulcia ligustri* (1), nothing else of note. Larvæ were decidedly scarce, but I turned up one each of *Notodonta chaonia* and *Amphidasys prodromaria* and a few *Polia chi*. In one place only, I found larvæ of *Eupithecia pulchellata*, not only in the spun up bells of foxglove, but, in a younger stage, inside the capsules from which the bells had already fallen off. Sugar was very poorly patronised.—F. H. Wolley Dod, Collingham, Newark. *August 23rd*, 1891.

Bedford.—I spent the month of August at Bedford, during which time I did a little collecting with my friend Mr. Edwin Gray, who is well acquainted with the locality. The Rhopalocera were very poorly represented, partially owing, no doubt, to the lack of sun, all the warm weather being concentrated into the last week. We took the following in fair abundance: *Pieris napi*, *P. rapæ*. *P. brassicæ*, *Epinephele janira*, *Pararge megæra* and *E. tithonus*. Occasional specimens of *Lycæna icarus*, *Polyommatus phlæas* and *Gonopteryx rhamni* were met with, and the total closes with one of each of the following: *Vanessa urticæ*, *V. polychloros*, *V. io* and *Pyrameis cardui*. We did not have time to collect the Heterocera, hence the smallness of the list, which only includes the following:—*Hepialus sylvanus*, 1; *Lithosia complanula*; *Chelonia caja*, several (I am now feeding up larvæ of the latter on laurel and ivy). *Liparis chrysorrhœa* [1] occurred in numbers; one morning early, in a distance of four miles, I counted about 150 pairs, and could have counted many more had I looked. I do not know whether this species has been unusually abundant elsewhere this season, but the larvæ swarmed all about Kensington in July. *Uropteryx sambucata*, several; *Epione apiciaria*, 1; *Rumia cratægata*, 2; *Crocallis elinguaria* and *Ennomos tiliaria*, 1; *Acidalia aversata*; *Cabera pusaria*, several; *Abraxas grossulariata*, common; *Melanippe subtristata*, *M. montanata*, *M. fluctuata*, several; *Coremia ferrugata*, 2; *Eubolia cervinaria*, 6; *E. mensuraria* and *E. palumbaria*, common; *Ptilodontis palpina*, 1; *Notodonta dictæa*, 1; and several specimens of the following:—*Leucania lithargyria*, *L. impura*, *L. pallens*, *Hydrœcia nictitans*, *Axylia putris*, *Xylophasia polyodon*, *Cerigo cytherea*, *Mamestra brassicæ*, *Apamea oculea*, *Agrotis nigricans*, *Triphœna subsequa*, *T. orbona*, *T. pronuba*, *Noctua festiva*, *N. xanthographa*, *Cosmia diffinis*, *Plusia gamma* and *Catocala nupta*. We were most successful in pupæ digging and larvæ hunting, getting a great number of the former, about 200 in three diggings. I took a pupa of *Smerinthus populi* as early as the 9th of August, and several more pupæ fell to our trowels in the course of the month, of which the most abundant was *Cosmia diffinis*. I also took one of *Notodonta dictæa*, which emerged the next day, and one of *Agriopis aprilina* emerged on the 20th. Amongst the larvæ taken were specimens of *Smerinthus ocellatus*, some of which Mr. Gray took on apple, others I found on willow; and the contrast in colour of the two lots, strikingly illustrated

[1] For years *L. chrysorrhœa* has been rather scarce. *L. auriflua* has been very abundant this year. From the remark *re* larvæ at Kensington, I should say the species is certainly not *chrysorrhœa*.—Ed.

the phenomenon of "protective resemblance," the one a dark rich apple green, the other a very pale silvery-white green. *Query*: Could the change take place in one generation? and would larvæ, bred from the same batch of ova—the one lot on willow, the other on apple—differ so very strikingly in colouring? Two of the apple-fed larvæ had a row of red spots on each side, just over and between the spiracles. Not having met with this variety hitherto, I should like to know if it is of common occurrence. We also took *S. tiliæ* on elm, and *Sphinx ligustri* on lilac. Mr. Gray was also fortunate in finding several larvæ of *Chærocampa porcellus*[1] and *C. elpenor* feeding on the purple loose-strife (*Lythrum salicaria*) growing on the banks of the Ouse. One of the former, which was of a pale green when captured, on changing its skin became of a dark olive brown; till now I had imagined that the brown variety of this larva was always brown. The last larva we took was a full-fed specimen of *Cossus ligniperda*. On the whole I should think that the district of Bedford would amply repay careful working. I think the facts most worthy of notice were the times of emergence, etc., of some of the captures—for example, a specimen of *Ptilodontis palpina* at rest on poplar, August 9th, a pupa of *Notodonta dictæa* taken on the 9th at poplar, hatched on the 11th, and a pupa of *Agriopis aprilina* taken on the 15th, emerged on the 20th. I took about two dozen pupæ of *Cosmia diffinis* at elm, and a few moths just hatched; these pupæ continued to emerge from the 15th to about the 30th, at intervals of a day or two, but I did not obtain any ova.—D. H. S. Steuart, North Leigh, Prestwich, Lancashire. *September 17th*, 1891.

Essex Marshes.—I have obtained 16 *Phorodesma smaragdaria* larvæ, and know of about 200 others taken on the same ground by different collectors. I was not surprised at only taking 16, as I was informed at the railway station that five other entomologists had been there during the previous week. I am afraid this insect will share the fate of other good local things and become extinct, at any rate in this locality.—Ambrose Quail, 15, Stamford Hill, Stoke Newington. *Sept. 21st*, 1891.

Isle of Man.—The weather here during the past week or so has been more or less wet, and very cold, after sunset, consequently, I have been able to do but very little collecting. Sugaring has proved a failure so far. On the 20th and 21st of June, I sugared in the woods behind Glenduff, in the parish of Lezayre, and the only insect taken was one solitary *Gonoptera libatrix*. On June 22nd, I took six *Fidonia piniaria*, flying in the sunshine at 11.30 a.m., in the pine woods behind Glenduff, and at 5 p.m. on the same day I was fortunate enough to take a fine large *Amphidasys betularia*, at rest, on the trunk of a lime tree in front of Glenduff house. The insect apparently had not long emerged from the chrysalis state. My best captures of the season have been *Dianthœcia cæsia*, *D. capsophila*, *D. capsincola* and *Sesia philanthiformis*. On the 10th of this month (August), I went to Andreas, at the north of the island, for a few days, and took the following butterflies on the morning of the 11th:—*Pieris rapæ*, *P. napi*, *Vanessa urticæ*, *Pararge megæra*, *Satyrus semele*, *Epinephele janira*, *Cœnonympha pamphilus*, *Polyommatus phlœas* and *Lycæna alexis*. On the evening of the same day I took the following moths at sugar:—

[1] Was this feeding on *Lythrum*?—Ed.

Xylophasia polyodon, *Miana strigilis*, *Triphæna janthina*, *T. orbona*, *T. pronuba*, *Nœnia typica*, *Hadena oleracea*, and other common species. I am looking forward to taking *Cirrhœdia xerampelina* the week after next.—H. Shortridge Clarke, 2, Osborne Terrace, Douglas. *August 19th*, 1891.

Notes on Breeding Agrotis lunigera.—On July 22nd, 1890, I took some *A. lunigera* at Portland, and, finding that five of the ♀'s were too worn to set, I placed them in a bandbox with some honey on a small piece of sponge, to try and get ova. I looked at them every day but could not see any eggs, and, at the end of ten days (three of the moths having died meanwhile), I let the survivors go, and thought that the experiment was a failure, until, being about to throw away the sponge used for the honey, I happened to notice some ova therein, and on examining it carefully, was surprised to find that the cells of the sponge were full of eggs which had evidently been deposited by the moths as far inside as they could reach, and as much concealed as possible. There were no eggs on the *outside* of the sponge. I had not placed any foodplant in the box, as, at the time, I was not certain of what it consisted, and as the box was simply a cardboard one with smooth sides, the sponge was the only place affording concealment; or were the eggs deposited in the sponge because it was the only thing available in the nature of food?

The ova commenced to hatch out on August 3rd, and were fed on dandelion leaves; on this commencing to fail at the end of September, I gave them slices of carrot, which they took to all right, and continued this diet until the dandelion was again available in the spring. The larvæ continued to feed from August right through the winter up to the end of April, that is to say, some of them did, as the slices of carrot were always eaten more or less even during the severe weather of last winter. They were kept in two large flower-pots under an open window facing the north, and led an entirely subterranean life, the four inches of earth in the pots being honeycombed by their burrows. I often looked at the pots after dark, but never saw any larvæ on the surface, except once when their food was short, and a few were wandering about looking for more, when, on seeing my light, they immediately retreated into their holes backwards. The food, too, was invariably eaten from the bottom, never on the top or edge, the slices of carrot being scooped out on the underside. On several occasions I noticed a dandelion leaf sticking straight up in the pot, having apparently been grasped in the centre and partially dragged into the hole occupied by the larva, just as if it had been bent and forcibly stuck into the ground. The full-fed larvæ agreed with the description given in Newman, except that they were decidedly ochreous in colour (was this due to the carrot diet?), and that they had the usual *Noctua* dark triangular mark on each segment.

I stopped giving them food on April 30th, and, on looking at the pots on May 25th, there were eight larvæ on the surface, apparently dried up, but on looking again on May 31st, these eight had evidently just turned to pupæ, which were cream coloured all over. They gradually changed to a deep red colour, the red commencing at either end and extending inwards, a white band round the centre of the pupæ remaining visible for some days—the last trace of white not

disappearing until June 10th. On June 30th, I turned out the pots, and, in addition to the eight pupæ on the surface, found I had seventy-two more which had formed a brittle cocoon of silk and earth. There were also a large number of dead larvæ. Out of these pupæ I bred thirty-one perfect moths and two cripples, the first emerging on the 12th, and the last on the 27th of July. Some days afterwards, I opened the remaining cocoons, and found a large number contained the dead larvæ only, and in seven instances the perfect imago, which had failed to emerge. I still have thirteen pupæ, which may be lying over, but are possibly dead. I should add that one specimen (emerged 25th July) is perfectly hermaphroditic—the right side, antenna, crest of thorax, both wings and anal tuft, being male, and the left side correspondingly female, so I feel somewhat repaid for the trouble they gave me to pull through. The larvæ were too crowded or I might have had better success, and no doubt the railway journey, on bringing them from Portland to Shorncliffe in February, did not conduce to their welfare.—E. W. Brown, Shorncliffe. *August 27th*, 1891.

Notes on Stilbia anomala.—As I have again been successful in taking this insect in some abundance, I think a few notes upon it may perhaps be acceptable to readers of the *Record*. I worked for it on six nights at the beginning of August, *viz.*, the 1st, and the 3rd to the 7th inclusive, the locality being a high and exposed position on Cannock Chase. Owing to the lateness of the season, the insect was only just out on the 1st, and consequently in first class condition. I took three on August 1st, twenty-five on the 4th, forty-eight on the 5th, and twelve on the 7th; the remaining two nights, the 3rd and 6th, were cold and windy, the latter being also very clear, and at such times they do not appear to fly at all. They began to make their appearance about 7 p.m., and continued till about 8.30. The insect is very conspicuous on the wing, the ample lower wings making it appear almost white when flying: it gets up suddenly out of the heather and short grass, flies ten or twelve yards, and then drops down again, folding its dark upper wings closely over the lower ones, and thus in a moment becoming almost invisible, so that, unless one marks very exactly the spot where it falls, it is impossible to detect it. Frequently, however, it will fly up again almost directly, when, of course, it may be "snapped" with the net. *Anomala* continues out for some time, but very soon loses its freshness, and many of the specimens I took, even under such favourable circumstances, are more or less imperfect. The female makes its appearance a week or more later than the male; I never saw one, but my friend Mr. Freer, of Rugeley, going up to the ground about a week later, succeeded in taking three, his total catch on that evening being seventy-seven. The weather undoubtedly exercises a considerable influence on the flight of *anomala*, my largest number (forty-eight) being taken on a very still evening, when the flies were exceedingly troublesome and a thunderstorm was impending; while, on August 6th, when it was very cold, though fine, and a strong N.W. wind was blowing across the Chase, not a specimen was to be seen. Mr. Freer and I repeatedly crossed the ground during the daytime, but never succeeded in disturbing any *anomala*, though two specimens flew off palings in the early evening. We occupied our

time, while waiting for *anomala* to appear, in searching for the larvæ of *Anarta myrtilli*, which were fairly abundant on the higher shoots of the heather, as were also those of *Eupithecia nanata* on the flowers of *Erica cinerea*.—CHAS. F. THORNEWILL, The Soho, Burton-on-Trent. *August 26th*, 1891.

HATCHING OF STAUROPUS FAGI.—The hatching process of *S. fagi* is most interesting. The eggs, when first laid, are a creamy white, but a day or two before the larvæ hatch they assume the colour of a plum with the bloom on; presently a minute black spot appears, it gets larger, and with a glass you can see the head of the insect eating round the shell till the hole is large enough, when out bursts the head and two pairs of long prolegs like those of an ant, and with this it wriggles about till one segment after another comes out, and it then looks far more like an ant than anything else; these legs are for ever on the move, and the head rocks from side to side. First it eats its eggshell, then sleeps, and walks about in search of food. For two days it appears only to eat the hairs on the leaves on the brown stipules of the stems; the third day it attacks the leaves. This is all I can describe, at present, of their life-history.—E. BAZETT, Springfield, Reading.

ORTHOTÆLIA SPARGANIELLA.—I have found *O. sparganiella* in some abundance this season. This interesting TINEINA is just about in the pupal state. Those searching for it should carefully examine plants of *Sparganium tamosum* growing by the sides of ditches; the infested plants will be known by the central leaves being withered. The plants should be cut off low down and carefully opened, a plant generally contains a single pupa, but sometimes two and even three will reward the collector's search. The pupæ should be laid on damp sand in a flower-pot, and slightly covered with fine chopped moss, the pot covered with a piece of muslin, and placed out of doors in the shade.—J. MASON, Clevedon Court Lodge, Somerset. *July 15th*, 1891.

CUSPIDIA LEPORINA AT WANSTEAD.—On August 21st, I took a full-fed larva of *Acronycta* (*Cuspidia*) *leporina* off aspen; it has now changed to a pupa in the wood of the breeding cage.—W. G. MACKMURDO, Wanstead.

STRANGE FOODPLANT OF ACRONYCTA (CUSPIDIA) ACERIS.—*A.* (*Cuspidia*) *aceris* feeding on oak, was new to me.—T. D. A. CHAPMAN, Firbank, Hereford.

PLUSIA MONETA AND APAMEA OPHIOGRAMMA AT NORWICH.—About the third week in July, my little girl (aged six) found a moth hanging under a shelf in the house. It was duly boxed, and given to me on my return home. It was a species quite new to me, and a search through Newman's *British Moths* failed to determine its identity. I took it to Mr. Atmore of Lynn, who at once pronounced it to be a specimen of *Plusia moneta*. It is a very fine and perfect specimen; I should say but just emerged on the day it was taken. I have taken four specimens of *Apamea ophiogramma* in my garden this season, none of them, however, in "cabinet" condition.—M. A. PITMAN, 11, Park Lane, Norwich.

TRICHOPTILUS PALUDUM ON THORNE MOOR.—On July 18th, I took a specimen of this species on Thorne Moor. I believe this is the most northerly locality yet recorded for the species in Britain.—G. T. PORRITT, Greenfield House, Huddersfield. *September 10th*, 1891.

EPIONE VESPERTARIA.—Whilst out collecting on Strensall Common last Thursday evening with my friends, Messrs. Walker and Dutton, I obtained two female specimens of *Epione vespertaria* at rest on dwarf sallow (which is the foodplant of the larvæ). They were both in fine condition, and evidently just emerged. One of them before dying laid 37 eggs, the other 8. The eggs when first laid are white, and in the course of a day or two change to a beautiful coral-pink colour. The above mentioned date is unusually late for this species to be on the wing, and is, I believe, the latest on record, August 10th being about the latest date on which it had been previously taken here. The usual date of emergence is from the 6th to the 10th of July. The earliest date on which I have known the imago to be taken is June 30th, on which date I have taken a few specimens. Its time of flight is just about dusk, and is continued until late into the night. It also flies (and much more commonly) on warm sunny mornings about 6 a.m., although its appearance is sometimes retarded until about 9 a.m., this of course depending upon the amount of sunshine. It appears particularly averse to cloudy and windy mornings, the passing of a large cloud across the sun being sufficient to cause it to cease flying. Its flight in the morning usually lasts about an hour, although odd specimens may be seen for a longer period. The specimens taken at night are usually finer and richer in colour than those taken in the morning. I have noticed that after it has been out some time it generally flies earlier in the morning than when first emerged, the reason for which seems to be that it is then somewhat worn, and more susceptible to the rays of the sun. [How?—ED.] Varieties sometimes occur, but are rare. I have one of a deep brick-red colour, and there are others thinly scattered about in collections. Another form, which sometimes occurs is that in which the border is deepened. The female is very rarely indeed taken in the morning, but almost always at night at rest on the dwarf sallow, and requires careful search. It is very sluggish, and is seldom taken on the wing. Occasionally varieties of the female occur in which the border, instead of narrowing off at the tip of the wings, is continued right through. The larvæ are obtained by sweeping the dwarf sallow about the middle of June, and are not difficult to rear. The female larvæ are larger and stouter than those of the male. Singularly enough, the proportion of female larvæ swept generally exceeds that of the male. —WILLIAM HEWETT, 12, Howard Street, Fulford Road, York. *September 15th*, 1891.

COSMIA PYRALINA AT CHICHESTER.—Two fine specimens of this rather local moth were taken in a garden at Whyke, close to this city: one on July 30th, the other in the second week in August. Both insects came to sugar.—JOSEPH ANDERSON, JUN., Chichester.

NOTES ON COSSUS LIGNIPERDA.—For some years I had been accustomed to take five or six imagines of *ligniperda*, with an occasional larva. In 1889, when with my friend, Mr. Culpin, searching for *Catocala nupta*, we discovered how to take the full-fed larvæ of *Cossus* in considerable numbers. In September the larvæ walk around to find a suitable place for their winter cocoons, and we discovered that they can be found plentifully in the stumps of willow trees that have been cut down. It is necessary to first rip off the bark of stumps, under which will be found a number of cocoons; then, if the wood is at all rotten,

split it (the stump) in every possible place, and the cocoons will be found almost anywhere. I have taken numbers, I may say dozens, in this way. The stumps can be visited at intervals, after the first time, and while there is any wood, *Cossus* will be there. I believe the larvæ again travel in the spring, so that possibly it would pay to visit the stumps then. For date I may mention I found the larvæ on the move this year on September 6th. If the young larvæ are required (for preserving), the rough pieces of bark should be broken off willow trees, any time in the winter will do for this. The above facts may be known, but I have never seen it recorded.—A. Quail, 15, Stamford Hill, Stoke Newington.

Stauropus fagi in Epping Forest.—I took a fine full-fed larva of this species on beech on Saturday last, and a friend of mine took another. These larvæ have been comparatively plentiful here this autumn, one collector having taken seven, and many other entomologists a few each.—Jas. A. Simes. *September 7th*, 1891.

Agrotis pyrophila at Sligo.—It may be of interest to record that *Agrotis pyrophila* has turned up here. I have taken four on flowers of ragwort, whilst searching for *Epunda lutulenta*. I am not aware of the species being previously recorded in Ireland. *E. lutulenta* appears very scarce this season, or it is late.—P. H. Russ, Culleenamore, Sligo. *September*, 1891.

Larvæ of Cucullia lychnitis.—There is no fear of the larvæ of *Cucullia lychnitis* being confused with those of *C. verbasci* at all events. They are quite small still, a lot of them, whereas *C. verbasci* has been in the pupa for quite a month, and they are of a green tinge as opposed to the white of *verbasci*. The markings correspond most exactly with Mr. Owen Wilson's description. They are on the flowers and seeds of the white mullein, and very local.—G. M. A. Hewett, Winchester. *September*, 1891.

Light at Swansea.—I have invented an impromptu moth-trap for the past three nights, which, I think, works remarkably well. All the rooms in this house have French windows opening inwards. I place a table about two or three feet from the window and put two lamps on it, one a little way from the other, and leave the windows open till about 12 o'clock, when I go to bed. But before proceeding there, I partially close the windows, and leave about ten inches or so open, and then tie the catches together to prevent the window opening wider or closing altogether, and place a chair between them. On the moths coming to the light, they find the window against them, struggle bravely on along the incline produced by the slanting windows, and eventually find themselves in the room, which, being moderately high, with light-coloured paper, white ceiling and a white cloth on the table, they seem to have no inclination to leave. On the other hand, if they do not come straight in along the incline, they keep to the glass and go either up or down, either case landing them inside. They also find it very difficult to retreat, as there is only an exit of about ten inches. I visit this room at intervals during the night if I chance to wake; if not, I leave it till the morning, when I find the ceiling, walls, etc., studded with moths. I am writing this during my third night of watching, so can only give a correct list of captures for the past two nights; these are—35 *Hydræcia nictitans* (some beauties), 15 *Noctua umbrosa*, 2

Selenia illunaria, 1 *S. lunaria*, 1 *Notodonta dictæa*, 1 *N. camelina*, 1 *Cidaria russata*, 4 *Acidalia aversata* (2 banded vars.), 2 *Triphæna janthina*, 1 *Hadena pisi*, 1 *H. oleracea*, 5 *Melanthia ocellata*, 1 *N. baja*, 7 *Coremia unidentaria*, 3 *C. ferrugata*, 2 *Eupithecia pumilata*, 1 *Melanippe galiata*, 1 *E. subfulvata*, 3 *Eupithecia tenuiata*, 5 *Boarmia rhomboidaria*, 2 *N. triangulum*, 1 *Leucania pallens*, and 1 *Metrocampa margaritaria*, besides lots of others. Nothing whatever comes to sugar, though there are plenty of NOCTUÆ flying about, the ornamental heaths being the attraction. I have taken a few *Agrotis tritici* and one *A. præcox* by shaking the crests of the sand-rush.—R. B. ROBERTSON, Sketty Park, Swansea. *August*, 1891.

SPHINX CONVOLVULI IN THE ISLE OF MAN.—On the evening of the 25th August, Mr. Devereux captured at light a fine male specimen of *Sphinx convolvuli*. The insect is in fair condition, with the exception of the left underwing, which is slightly damaged. It measures 5¼ inches across the wings from tip to tip, and is now in my collection. During the severe gale on the night of the 25th, the insect was probably blown into the enclosure across from Douglas Head.—H. SHORTRIDGE CLARKE, 2, Osborne Terrace, Douglas, Isle of Man. *September 4th*, 1891.

MICROPTERYX THUNBERGELLA.—This species is very common in Chippenham Fen, where I get them swarming about the "Bird-cherry" blossom, and the young fir-cones. One day I saw them so thick in these last, that I boxed fifteen in one large chip box off the cone.—W. FARREN, Cambridge. *July*, 1891.

SOCIETIES.

SOUTH LONDON ENTOMOLOGICAL SOCIETY.—*September 10th*, 1891.—Mr. Russell exhibited a long series of *Argynnis selene*, captured in North Hants in July and August; Mr. Carpenter, *Dianthœcia albimacula*, bred from Folkestone, also *Pericallia syringaria*; Mr. Frohawk, bred and captured *Polyommatus phlœas* for comparison; Mr. Joy, two specimens of *Boarmia repandata* from Grange-over-Sands, one intensely black, like those captured and bred by Mr. G. T. Porritt at Huddersfield. This was taken on the outskirts of a larch wood. Mr. Adkin, a series of *Psodos coracina* showing some variation in the band and ground colour; Mr. Fenn, a fine variable series of *Agrotis corticea* from Deal, extending in ground colour from the palest grey to black; Mr. Barker, *Arctia villica* with the apical spots more or less united, *Spilosoma lubricipeda*, with the transverse row of spots showing a distinct band, also a dark *A. caia*; Mr. Short, vars. of *Arctia caia*, the forewings with the pale parts tinged with red, also *Nemeophila plantaginis*; Mr. Tugwell, specimens of English, Scotch and Irish *Melitæa aurinia*, and drew a comparison between vars. *scotica* and *hibernica*. Mr. Turner, various Coleoptera. Mr. Weir drew attention to the fact that there were in existence specimens of *A. caia* with black antennæ. Mr. Carrington, with reference to Mr. Joy's exhibit, said that melanism was now generally supposed to be due to the darkening of surfaces and trunks of trees, by smoke, etc., or to dark geological strata, the process of

"natural selection" tending to preserve and intensify the darkest forms in such positions or localities. Mr. Tutt also made some remarks with reference to this exhibit on the lines of the papers lately completed in the *Entomologist's Record*, etc.—Ed.

September 24th, 1891.—Mr. South exhibited specimens of *Arctia caia* with smoky-brown antennæ, one from Japan, another British, and said that the ordinary Japanese form of *caia* was known as var. *theosoma*, Btl. Mr. Tugwell also exhibited two specimens with dark antennæ, both at least thirty years old, and captured or bred in London. Mr. Weir said that the form with dark antennæ appeared to be rare, and that attention should be paid to the subject another year; he also alluded to the fact that *theosoma* did not represent unconditionally the Japanese form, as some of the latter specimens ran insensibly into British ones. Mr. Weir exhibited a male *Bombyx mori* and its cocoon, the latter found at large on a mulberry tree in his garden, the imago not emerging until September. Mr. Adkin exhibited a number of specimens bred from a miscellaneous lot of larvæ sent from Scotland last year, including *Notodonta dictæa*, *N. dromedarius*, *Odontopera bidentata* and *Dianthæcia nana* (*conspersa*) with North Devon specimens for comparison, also *Cabera exanthemaria*, and specimens, doubtfully this species, presenting the *pusaria* var. *rotundaria* characteristics of approximating transverse lines. Reference was made to the *C. pusaria* var. *rotundaria* exhibited by Messrs. Atmore and H. J. Turner some time ago. Mr. Fenn exhibited a fine series of the second brood of *Cidaria russata*, large in size, together with the three female parents from which the ova were obtained. Mr. C. G. Barrett remarked on the even tendency in the markings (angulation of transverse lines, etc.), and Mr. Fenn, whilst stating that the angulation of the lines in the fore wing was unreliable, drew attention to his article in the *Record* last year and pointed out that the angulation in the hind wing was the reliable test between this species and *immanata*. Mr. Fenn also remarked that the specimens had been seven weeks emerging, some were now in pupa, and some of the larvæ were apparently about to hybernate. Mr. Fenn also exhibited *Acidalia immorata* from Sussex, *Cosmia diffinis* from Reading, *Agrotis exclamationis* vars. from various localities, *Dasypolia templi* from Barnsley, and the spring brood of *Melanippe galiata* from Deal. Mr. Tugwell exhibited a specimen of *Epinephele tithonus* from Devon with extra ocelli on the fore wings, and *S. janira*, with one small extra spot. Mr. Tutt referred to specimens captured by Major Still, to a series in his own collection captured near Wye, and said that extra ocelli were also frequently developed on the hind wings. Mr. Carrington and Mr. Hawes reported similar specimens, whilst Mr. Briggs recorded them from Wandsworth Common and Wimbledon. Mr. Carpenter exhibited female *Lycæna icarus*, all more or less showing male coloration, also *Thecla betulæ* and drew attention to the sexual dimorphic coloration on the undersides. Mr. Briggs, two smoky *Melitæa artemis* from Gloucestershire, whilst Mr. Barker exhibited *Leucania albipuncta* captured at Folkestone this year (It was also noted that others had been taken), *Lycæna agestis*, showing variation in the border of orange spots, also three forms of *Bombyx castrensis* (males), one unicolorous pale ochreous specimen being noticeable [I have an

exactly similar female.—Ed.]. Mr. Billups, a specimen of *Deilephila capensis*, captured at sea, some 472 miles from Gibraltar, by the captain of a vessel on which three came on board. Mr. Frohawk, drawings and living specimen of a tick taken from the neck of a fox terrier, a week before. Mr. H. Moore, a beautiful series of the Orthopteron, *Ædipoda fasciata* from Trocadero near Cadiz, showing great variation. Mr. Weir remarked on the protective coloration, etc., shown by the species.—J.W.T. [I think the above report will show how strong a hold "Variation" is obtaining on the minds and sympathies of entomologists.—Ed.]

City of London Entomological and Natural History Society. —*Thursday, September 17th*, 1891. — Exhibits:—Mr. Tutt, several beautiful vars. belonging to the *Record* Exchange Club, including:— (1). *Strenia clathrata*, belonging to Mr. Sydney Webb, in some of which the spaces between the transverse lines were filled in with darker so as to develop a banded form, in others the spaces were reduced to a minimum and formed fine lines in the centre of the wing. (2). *Coremia unidentaria*, belonging also to Mr. Sydney Webb, with the central band much reduced; a typical *C. unidentaria*, bred by Mr. Nelson Richardson from eggs laid by a dark red-banded var., a red-banded *unidentaria* bred with typical black-banded specimens from a dark red banded var., also part of a brood of *C. ferrugata* which had bred true, with one of the parents. (3). *Gracilaria stramineella*, which some of the members of the Exchange Club considered to be a var. of *G. elongella*. (4). A beautiful black var. of *T. biundularia* captured by Captain Robertson in South Wales (the black in this resembles the intense black in the Huddersfield *Boarmia repandata*), also a var. of *Agrotis vestigialis*, deeply suffused with reddish. (5). *Boarmia repandata* var. *conversaria*, two forms, one with the ground colour pale grey, the other with the ground colour dark grey, but both having the band equally distinct. Mr. Clark exhibited *Agrotis ashworthii* bred from larvæ taken in Wales. He remarked that these larvæ fed entirely on the blossoms of the dandelion, concealing themselves by day at the roots of the plant. Mr. Battley, *Cerura vinula*, *Nola cucullatella* and *Eupithecia subnotata*, together with parasites bred from each. He also exhibited a number of cocoons of *Eriogaster lanestris*, part of which had been formed among dead hawthorn leaves and the rest among paper shavings, the first being much darker than the others. He stated that the silk appeared to be almost white in both cases, but after the cocoon was partly formed the larva injected into it a brown liquid, which caused the dark colour. Mr. Tutt remarked that he had noticed a similar instance of protective coloration in the cocoons of *Halias chlorana*, which almost invariably assumed the colour of the surrounding objects, if the larvæ had been in the same situation for two days before spinning. If, however, they were placed under the different conditions immediately before or after they began to form their cocoons, they made them to accord with the colouring of the objects from which they had been removed. Mr. Quail exhibited life-histories of *Saturnia carpini* and *Cymatophora flavicornis*, also a preserved larva of *Phorodesma smaragdaria* and an ichneumoned larva of *Cuspidia alni*. Dr. Buckell, living larvæ of *Caradrina morpheus*, six weeks old. He remarked that Newman states that this species "feeds throughout the

autumn and winter until the following May, when it makes a cell rather than a cocoon just under the surface of the earth, in which it changes to a pupa," and that Merrin says that the pupa is found in May and June "spun up in a leaf or an earthen cocoon attached to the foodplant." On the other hand, he had noticed that the larvæ were full-fed about the end of November, when they bury, and spin distinct earthen cocoons, in which they remain as larvæ till the end of the following May, when they change to pupæ. It was therefore important to leave the cocoons in damp earth all the winter, or the larvæ would dry up. Several members confirmed these statements, Mr. Battley saying that if the larvæ were brought into a greenhouse about January they would pupate at once, and emerge in March or April. Mr. Bayne exhibited a series of *Odonestis potatoria* bred from Aylesbury larvæ, also a yellow male of the same species from Epping Forest, and *Cosmia affinis*, *Miana literosa*, *Cerigo cytherea*, *Plusia iota*, *P. v-aureum*, *Habrostola triplasia*, *H. urticæ*, etc., from the same district. Mr. Smith, *Catocala nupta* and *Ypsipetes elutata* (*sordidata*) from Epping Forest. Mr. Milton, *Halias quercana* bred from Epping larvæ; also the following Coleoptera:—*Dytiscus marginalis*, *D. circumflexus*, *Cetonia aurata*, and *Philonthus splendens*. He also exhibited specimens of a wasp, and remarked that the cyanide had changed the yellow bands and legs to red. Other exhibits in Coleoptera were made by Mr. Bayne, who brought a specimen of *Prionus corarius* from Loughton; and Mr. Clark, who showed *Sphodrus leucopthalmus*, *Necrophorus ruspator*, *Toxotus meridianus* and *Nascerdes melanura* from Folkestone. Mr. Clark stated that he had seen a specimen of *Sphinx convolvuli* which was taken a few days ago at Southend. Mr. Battley had found the larvæ of *Phorodesma smaragdaria* fairly plentiful at Benfleet, and imagines of *Lycæna adonis*, *L. corydon*, *Acidalia ornata*, *Aspilates gilvaria*, and several other chalk species near Reigate. Mr. Smith had beaten three larvæ of *Stauropus fagi* in Epping Forest, and several others were recorded from the same locality.—G. A. Lewcock and A. U. Battley, *Hon. Secs.*

Lancashire and Cheshire Entomological Society.—*September 14th.*—Mr. C. H. H. Walker read a paper on "Nerves and Nervous Systems," describing the general structure of the nervous system of a typical insect and comparing it with that of a spider, pointing out the close affinity, which differs only when the economy of the subject renders it necessary. The paper was illustrated with carefully executed blackboard drawings. Among the numerous exhibits the president showed specimens of the new *Tortrix donelana* from Galway; Mr. Walker, curious varieties of *Vanessa antiopa* which he had bred from Canada, the black subterminal band and the blue spots being quite absent and the yellow border very wide; Mr. Melville, a fine specimen of *Chærocampa nerii*, captured at Prestwich in 1846; Mr. Newstead, several cases of life-histories including the full history of *Sirex gigas*, which he stated had been very common this year; Mr. Prince, a fine variety of *Arctia caja*, bred by him this year, the forewings of which were almost entirely brown and the black spots on the hind wings formed a thick dark marginal band; Mr. Gregson, a series of *Lithosia sericea* taken this season; Mr. Harker, *Dianthecia barrettii* from Howth. —F. N. Pierce, *Hon. Sec.*, 143, Smithdown Lane, Liverpool.

The Entomologist's Record AND JOURNAL OF VARIATION.

No. 10. Vol. II. October 15th, 1891.

VARIATION.

Variation in British Lepidoptera.—When the introduction of the Linnæan or binomial system of nomenclature, and the example and enthusiasm of the great Swede and his contemporaries, had imparted new life to the study of nature, there was a tendency everywhere towards a multiplication of specific names. Hence, in the earlier manuals and catalogues, forms which we now know to be merely varieties or conditions, are accorded full specific rank. As time went on, and knowledge increased, naturalists began to see that many of these were merely subsidiary forms, and reduced them to the rank of varieties. More extended studies showed that in some cases even this position was not tenable, and so the names were sunk as mere synonyms. Many varieties were, however, retained, but the real significance of such forms was not understood; no system of classifying them had been tried; no attempt been made to account for their origin. In a word, no Darwin had arisen to instruct naturalists to penetrate, if possible, into the *arcana naturæ*. Now that the fauna and flora of the British Islands has been, to a large extent, well worked out, naturalists, who are not on the one hand merely collectors, nor on the other purely biologists, have begun to turn their attention to other matters than simply amassing material; and amongst other things have commenced to give a more serious study to the subject of variation and its origin. That the study of variation, as it occurs in wild animals and plants, is still in its infancy must be admitted. At the same time sufficient attention has been paid to it to show that not only is it one of much interest but of no little difficulty. For its proper elucidation a large amount of material, both in specimens and in observations, is necessary. When this has been collected, it is possible that problems which are still obscure may be cleared up. As a help to this desirable result we therefore welcome a recently published work[1] on one group of the British Lepidoptera, a class of the Insecta which, not only on account of the number of species contained in it, but from its popularity with collectors, affords ample material for the study of variation. In the text of his book Mr. Tutt does not enter upon the subject of the cause

[1] *The British Noctuæ and their Varieties.* By J. W. Tutt. London: Swan, Sonnenschein and Co. Vol. i. 1891.

of the varieties, but in the introduction he refers briefly to some theories thereon; and, in a series of articles on "Melanism and Melanochroism" in *The Entomologist's Record*, he has discussed at considerable length one aspect of it. The chief feature of *The British Noctuæ and their Varieties* is the careful manner in which all marked variations from the type of each species are described. There seem to be a few species—but a very few—in which there is scarcely any variation. On the other hand there are some which are quite protean in their inconstancy of coloration and markings. Taking, however, the majority of the species, the rule seems to be that each has several well marked varieties. Although the main object of the book is merely the discrimination of the varieties which exist, and not a discussion of their distribution (though localities are often mentioned) or origin, yet a study of it will show that in the NOCTUÆ, just as in animals and also in plants, some variations have intimate connection with the localities they inhabit, and hence—it may be supposed—have the cause of their origin in the conditions which surround them—in other words, their environment. In many cases British specimens are somewhat different from Continental examples of the same species; and specimens from South Britain differ from North British ones. As a rule, though by no means invariably, there is a tendency in the latter to melanochroism or melanism, but in some species the very opposite is the case. Amongst the NOCTUÆ, there are, according to Mr. Tutt, three modes of variation:—(1). in general coloration, (2). in the markings of the wings, and (3). in the size and shape of the insect. All these may be combined in one specimen.

Although Mr. Tutt calls all forms which differ distinctly from the type "varieties," it is evident that all the forms so designated are not of equal value or rank. Staudinger's division of forms into "varieties" and "aberrations," seems to be a preferable mode of classification, but doubtless Mr. Tutt has reasons for the plan he has adopted. An "aberration" is a varietal form which occurs along with the type. It may occur only once, or very rarely, or it may be not unfrequent. A "variety," on the other hand, is a form, which in some locality or country, has supplanted the type, and which, though only a "local race," might readily be taken (as indeed has happened in some cases) for a distinct species. Whilst the difference between an aberration and a variety thus seems to be sufficiently great, it must not be forgotten that gradations between them sometimes occur; and, moreover, that what is an aberration in one country may attain the rank of a variety in another, or *vice versa*, and that even the type of the species might have to be considered in some circumstances as no more than an aberration.[1] In other families of the Lepidoptera, we have in Scotland several well marked examples or varieties or local races, *e.g.* the var *artaxerxes*, F. of *Lycæna astrarche*, Bgstr.; var. *subochracea*, B. White of *Zygæna exulans*, H. & R.; var. *borealis*, Stdgr. of *Spilosoma fuliginosa*, L.; var. *ochracea*, B. White of *S. menthastri*, Esp.; var. *scotica*, B. White of *Thera juniperata*, L. etc.; and amongst the NOCTUÆ there are also some forms which are recognised as local races, as, for example,

[1] For example, if in a country where a local race had supplanted the more widely diffused typical form, the latter occurred occasionally, it must be regarded—strictly speaking—as an aberration only, so far as that country is concerned.—F.B.W.

the var. *myricæ*, Gn. of *Acronycta euphorbiæ*, F. It seems probable, therefore, that some of the numerous forms mentioned by Mr. Tutt are varieties, in the Staudingerian sense, or local races, whilst others are merely aberrations. With the large amount of material that Mr. Tutt has, and his experience in this family, we may hope that some day he will point out which of the named forms are to be looked upon as varieties, and which as aberrations. More than half of the species have yet to be dealt with by Mr. Tutt, but, amongst those already treated of, a number of varieties which occur in Scotland are mentioned. Probably many others also occur, but as there is no definite statement to that effect we will not mention them just now. So far as can be gathered from a brief examination of the descriptions, the following Scottish varieties are melanochroic or melanic, *i.e.* they are darker (although not necessarily suffused with black) in colour than the type of the species :—

Cymatophora duplaris L. β *obscura* Tutt; *Asphalia flavicornis* L. β *scotica* Stdgr. and γ *rosea* Tutt; *Acronycta rumicis* L. α *salicis* Curtis; *Leucania lithargyria* Esp. γ *ferrago* F., δ *extralinea* Tutt, and ε *fulvescens* Tutt; *L. impura* Hb. α *fuligosina* Haw.; *L. pallens* L. β *ectypa* Hb. and γ *rufescens* Haw.; *Tapinostola fulva* Hb. γ *punicea* Tutt, ξ *fluxa* Tr., and η *neurica* St.; *Hydræcia nictitans* L. δ *erythrostigma* Haw. and ε *obscura* Tutt; *H. micacea* Esp. δ *brunnea* Tutt; *Helotropha leucostigma* Hb. α *albipuncta* Tutt; *Xylophasia polyodon* L. α *obscura* Tutt, β *brunnea* Tutt, γ *infuscata* B. White and δ *æthiops* Stdgr.; *X. rurea* F. ε *putris* Hb. ξ *combusta* Haw. and ι *nigro-rubida* Tutt; *Mamestra furva* Hb. γ *infernalis* Ev.; *Luperina testacea* Hb. γ *cinerea* Tutt and δ *nigrescens* Tutt; *Caradrina taraxaci* Hb. α *sordida* Haw. The following varieties are paler than the type :—*Cymatophora or* F. α *scotica* Tutt and β *flavistigmata* Tutt; *Tapinostola fulva* Hb. β *ochracea* Tutt and δ *pallida* St.; *Xylophasia zollikoferi* Frey α *pallida* Tutt; *X. rurea* F. α *argentea* Tutt, β *ochrea* Tutt and δ *flavo-rufa* Tutt; *Miana fasciuncula* Haw. β *cana* Stdgr. Some of the following varieties do not fall into either of the above groups, whilst the position (so far as can be learned from the description) of others is somewhat doubtful :—*Acronycta menyanthidis* Vw. β *scotica* Tutt (pale?); *Tapinostola fulva* Hb. ε *pygmina* Haw. (pale?); *Apamea gemina* Hb. α *rufescens* Tutt, β *intermedia* Tutt and α *remissa* Hb.; *Charæas graminis* L. α *gramineus* Haw., β *tricuspis* Esp., γ *rufa* Tutt and δ *rufo-costa* Tutt. From these lists it will be seen that considerably more than half (28 to 18) of the varieties mentioned are melanochroic (in the sense in which that term is used), thus supporting the statement made above, that in North British specimens there is usually a tendency to a darkening of the coloration. We look forward with interest to the continuation of Mr. Tutt's valuable work.—F. Buchanan White, M.D., F.L.S., F.E.S. (from the *Scottish Naturalist*, Oct., 1891).

Polia chi vars. suffusa and olivacea.—In the *Ent. Record*, *ante*, p. 200, I think Mr. Mansbridge's note is rather misleading. First of all the hind wings of var. *olivacea* are not always "white." The colour of the hind wings varies according to sex equally in the type, var. *olivacea* and var. *suffusa*. Mr. Robson's var. *suffusa* has a very distinct deep grey ground colour in both sexes. When Mr. Mansbridge says that var. *suffusa* seems almost as common as the type, I feel certain

that he is referring to the sexes, and calls the females var. *suffusa*. Bradford is the great centre for var. *suffusa*. I have a fairly long series from Mr. Mansbridge's locality, Leeds, but the specimens are practically typical, the females slightly darker grey than the males, but not the peculiar dark grey in both sexes required to form var. *suffusa*. I may be wrong, but I do not think Mr. Mansbridge refers to Mr. Robson's variety when he speaks of var. *suffusa*.—J. W. Tutt. *October*, 1891.

Dark vars. of Cymatophora duplaris.—I think it will be found that the *C. duplaris* on Cannock Chase are all, more or less, black. I have bred a beautiful specimen this year from the only larva I had, and my friend, Mr. G. Baker, has done the same, both being nearly black. —Charles F. Thornewill, The Soho, Burton-on-Trent. *September*, 1891 [It would be interesting if Mr. Thornewill would inform us whether he gets the type or var. *obscura*, or both (*vide British Noctuæ and their Varieties*, i., pp. 4-5).—Ed.]

Thyatira batis (Type).—On looking over a series of *Thyatira batis* taken here in 1887, I find three specimens with the light spots entirely devoid of rose-colour, and notice the same in a specimen I took in South Devon last July. All the examples mentioned are in fresh condition. Among the full-fed larvæ of *Smerinthus tiliæ* that I pick up pretty commonly here, I notice that the green colour of the larva while, feeding, is generally replaced by a dull livid bluish-brown, violet, or even dusky rose-colour, after the larva has descended the tree and is seeking a place for pupation. Probably Mr. Anderson's larva (*Ent. Rec.*, vol. ii., p. 200) was in this stage when found, and had doubtless been of the usual light green colour previously.—R. M. Prideaux, Clifton, Bristol.

Variation in and abundance of Melitæa artemis near Carlisle. —In the middle of April last my nephew kindly went for me to Orton Moss, six miles from Carlisle, to obtain some larvæ of the above, of which he returned with between 400 and 500 (mostly small, but less likely to be ichneumoned on that account), gathered with handsful of the dead leaves. When he revisited the spot for food (Devil's Bit Scabious, *Scabiosa succisa*) the day was dull, and larvæ were only to be seen when odd ones crept up to bask in the occasional gleams of sun; constant visits were necessary for fresh food, until a kind and practical friend gave me "the tip" to try honeysuckle which they took to and fed up well, although plenty of ichneumons emerged later on. Another visit early in May for more revealed the fact, that owing to the invasion of a flock of starlings with a few cuckoos, there was scarcely one to be found.

Out of a hundred pinned by my nephew, quite fifty were varieties, in fact there were not more than a dozen of the typical *artemis*, and some of them are "gems." One is transparent black with a blood-red spot on each wing, another without any scales at all, another with the left underwing pink like *Euchelia jacobææ*, two or three with a bright chain of canary-coloured spots, one similar to a small dull *Colias edusa*, and several again with broad deep black borders, and others more like small *Hipparchias* than "Fritillaries." I have altogether a row and a half of vars., and I may add there were very few of the varieties developed. I should like some opinion as to the "disease" and "pigment" theories. The larvæ were kept in a tub under a shed, out of doors.—J. B. Hodgkinson. *September*, 1891.

SCIENTIFIC NOTES.

AGROTIS TRITICI var. SUBGOTHICA, Haw., and AGROTIS JACULIFERA, Guen.—In *Ent. Rec.*, i., p. 10, Mr. Butler's attention was drawn to an error *re* the use of *Agrotis subgothica*, Haw. In *Ent. Rec.*, i., p. 31, Mr. Butler referred to Grote's *Check List* as his authority. I pointed out the error in the July number of the *Canadian Entomologist*, p. 159, and Mr. Grote has now put matters straight by sinking *subgothica*, Haw., altogether as an American species. In future the American species will be called *jaculifera*, Guen. (*Canadian Entomologist*, xxiii., p. 202). It will therefore be necessary for Mr. Butler to rename this species in the Museum collection.—J. W. TUTT.

DOUBLE PUPATION.—I think I have before observed that this has been noticed in several species of *Bombyx*. It is well known to occur in *B. mori*, the common silkworm moth, when, of course, the cocoons are valueless for commercial purposes. Mr. Bond noticed that in such cases, the sexes were male and female (a pigeon's pair). Did Mr. Hewett examine his?—SYDNEY WEBB, Maidstone House, Dover. *July*, 1891.

GENERIC NAMES IN THE ACRONYCTIDÆ.—I am not now discussing the theoretical or practical importance of the characters disclosed by Dr. Chapman in this sub-family of the Owlet Moths, but I wish to draw attention to the reason given for employing the new names. Dr. Chapman says (*Ent. Rec.*, Sept., p. 150):—"As to the names, my difficulty was that none of the many names that have been heaped up as sub-genera in this genus admitted of the meanings I wanted." To this I say that if every new meaning carries with it new names there will be an end of stability in generic nomenclature. If new specific characters are detected one would not rename the species, and the law of priority is to be equally enforced as to genera. It admits of discussion as to whether the characters disclosed by Dr. Chapman in his painstaking studies are of practical value, or to be considered as the exclusive basis of genera in the *Acronyctidæ*. I believe other groups of moths may afford characters, by exclusive attention to which existing classificatory arrangements might be altered. Did the new systematists allow themselves to rename their new generic divisions by excluding all older terms, we should be plunged into pitiable confusion. In this genus *Acronycta*, or *Apatela*, as I prefer, following the law of priority, to call it, I believe all the European groups are represented in North America, where I have discovered *Jocheæra* and *Arctomyscis*. Other groups, such as *Merolonche* and *Eulonche*, appear to be only North American. Genera appear to me, as a rule, to be better founded upon characters taken from the imago, although all the stages afford valuable indications of the relationship between the species.—A. R. GROTE, Bremen. *October 1st*, 1891.

ADDITION OF TORTRIX STEINERIANA var. DOHRNIANA TO THE BRITISH LIST.—I find the species exhibited as *Tortrix donelana* at the Lancashire Society's meeting is *T. steineriana* var. *dohrniana*, the pine-feeding species allied to *T. viburnana*[1] mentioned in the *Ent. Record* (i., p. 32). Messrs. Adkin and C. G. Barrett each exhibited some bred, but apparently

[1] The correct spelling of this name is *viburniana*, Fab., *Mantissa*, ii., 229.—ED.

half-starved, specimens at the South London meeting last night, and there is no doubt about the determination. I have a fairly long series from Germany, received from Herr A. Hoffmann. This particular var. is abundant on the Continent in some pine forests, "Silesian Mountains, Eastern Hungarian Mountains, Hercynian Mountains," whilst the allied var. *lusana*, H.-S. 330, comes from the "Alps," and the type from the "Alps and the French and Hungarian Mountains." The species is, therefore, new to Britain, but is not new to science, and *donelana* will have to be relegated to oblivion. It is a most interesting addition to our fauna notwithstanding.—J. W. Tutt. *October*, 1891.

Expansion of Wings.—I have been able to observe this in *Liparis salicis*, a species well suited for observation, owing to the marked contrast between the yellow blood and the white wing scales (I see, by the way, that some of our entomologists are not sure that the fluid is blood. I do not presume to dogmatise on the matter, as I have not a microscope of sufficiently high power to determine the presence or absence of corpuscles, but the fact mentioned by Mr. Reid, that the fluid which exudes from a pricked wing subsequently coagulates, points to the presence of fibrin therein). The presence of the blood along the lines of the nervures was very manifest, but I could see no evidence of its passing thence into the general inter-membranous space. It was evident, however, that blood was poured directly into the space, entering it at the base of the costal margin. I suggest the following hypothesis in explanation of these appearances. That blood is first injected into the vessels in which the tracheæ lie, and, by unrolling the tracheæ, expands the membranes, and that, subsequently, blood is independently poured between the membranes, and that the fibrin resulting from its coagulation strengthens the wing.—F. J. Buckell, Canonbury Square. *August 4th*, 1891.

I have been breeding *Lasiocampa quercifolia*, another species which has a large quantity of blood poured into the wing between the membranes. I was much struck with the fact that one specimen (a large and fine female), after the complete expansion of the wings, had several small globules of the yellow blood collected on the outside of the upper surface of the superior wings. Thinking the exudation was simply due to an excess of blood, and never having noticed such a phenomenon before, I thought I would leave the fluid to see if it was possible that it would be absorbed again. As I had expected, it was not, but the globules on evaporation formed small, black solid fibrinous masses on the wings. Dr. Chapman thinks the wing was scratched as the moth forced her way out of the cocoon, hence the exudation. I think, now, that something of the kind must have occurred.—J. W. Tutt. *September 25th*, 1891.

CURRENT NOTES.

Dr. Wood has bred *Aplota palpella* from larvæ living gregariously in silken galleries on the surface of a moss (*Homalothecium sericeum*) on which it feeds, the moss growing on an old sandstone wall. The first emergence took place on July 19th, and a worn specimen was taken wild on August 15th. A description of the larva occurs in the *E.M.M.*

Mr. Eustace R. Bankes describes the larva of *Eupœcilia pallidana*, which was first found feeding in seed-heads of *Jasione montana* some few years ago. He also records (*E.M.M.*) *Acrolepia marcidella* and *Ephestia pinguis*, from the Isle of Purbeck.

Major-General Carden captured seventeen specimens of *Callimorpha hera* in the neighbourhood of Teignmouth in five days, in August last.

Mr. E. W. Janson died at Stroud Green on September 14th, aged 69. He joined the Entomological Society of London in 1843, was Curator from 1855–1863 and Librarian from 1863–1874. He did a great deal of good work as a Coleopterist.

The Rev. G. H. Raynor's collection is to be sold on October 27th, at Stevens' sale rooms. The beautiful condition of the specimens in this collection is sure to attract a number to the sale rooms.

This has been a great year for rarities, among the NOCTUÆ especially. *Nonagria concolor* has been taken by Mr. Mera, in Suffolk.

Our dipterists would appear to be in a very unhappy condition. Five determinations made by Dr. Meade and three by Mr. Brunetti, for Mr. Billups resulted in a mass of error, published in the *Entomologist* for September, and corrected by Mr. Verrall in the October number of the same magazine.

The pine-feeding *Tortrix steineriana* var. *dohrniana* (*vide Ent. Rec.*, i., p. 32) has been added to the British list as *Tortrix donelana*.

The City of London Entomological Society have papers, etc. for each meeting during the winter, until the end of April, 1892.

The further contributions of Mr. Butler's "Notes on the Synonymy of Noctuid Moths," which have from time to time appeared in the *Transactions of the Entom. Soc. of London*, have been refused by the Council. Had they been overlooked by a competent practical specialist they would have been most useful, and the break in their continuity would have been much more serious than it is.

M. Camilla Schaufuss, editor of the *Insekten-Börse*, Meissen, Saxony, has asked me to bring the following before the notice of the readers of the *Entomologist's Record*:—"All entomologists, who have been or are still doing literary work in the Science, and those who have made any specially interesting excursions as well as those who now possess important collections, are kindly requested to send photos, notes of their lives, etc.; biographies and photos of deceased colleagues would be very welcome. It is intended ultimately to present them to the entomological departments of the various museums in the world."

BIBLIOGRAPHY.

ADDITIONS TO THE BRITISH LIST AND CHANGES IN NOMENCLATURE.

LEPIDOPTERA.

Saturnia pavonia, Linn. (*carpini*) vars. nov. *infumata* and *rosacea*, Newnham (*Ent. Rec.*, p. 198).

Zygæna trifolii, Esp. Mr. S. Webb differentiates vars. *orobi*, Hb., *filipendulæ*, Hb., *basalis* and *minoides* (*Record*, p. 199).

Zygæna filipendulæ, Linn. Vars. *ochsenheimeri*, Zell., *cytisi*, Hb., *ramburii*, Ld., *cerinus*, Robson, *mannii*, H.-S. and *chrysanthemi*, Esp. differentiated (R. South, *Entom.* pp. 234-235).

The following changes in nomenclature have been proposed by M. Sven Lampa, and are now used extensively by Scandinavian and Continental lepidopterists; although, I believe, not yet brought to the notice of scientific British lepidopterists:—

Lycæna ægon, Auct., replaced by *argus*, L.; *argus* by *argyrognomon*, Bergstr.; *Sesia asiliformis*, Rott., by *vespiformis*, L.; *Hepialus velleda*, Hb., by *fusco-nebulosa*, De Geer (1778); *Cymatophora or*, F., by *ypsilon-græcum*, Göze (1781); *Moma orion*, Esp., by *alpium*, Osbeck (1778); *Rusina tenebrosa*, by *umbratica*, Göze (1781); *Tæniocampa populeti*, Tr., by *populi*, Ström (1783); *Panolis piniperda*, Panz., by *griseo-variegata*, Göze (1781); *Xanthia flavago*, Fab. (*togata*, Esp.), by *lutea*, Ström (1783); *Epione parallelaria*, Schiff., by *vespertaria*, Thnbg. (1784); *Boarmia glabraria*, Hb., by *jubata*, Thnbg.; *Tephrosia punctularia*, Hb., by *scopularia*, Thnbg. (1784); *Gnophos obfuscaria*, Hb., by *myrtillata*, Thnbg. (1792); *Scodiona belgiaria* var. *favillacearia*, Hb., by *fagaria*, Thnbg. (1784); *Cidaria* (*Thera*) *simulata*, Hb., by *cognata*, Thnbg. (1792); *Cidaria* (*Coremia*) *spadicearia*, Bkh., by *ferrugata*, Cl.; *C. ferrugata*, L., by ab. *corculata*, Huen.; *C.* (*Oporabia*) *dilutata* (Bkh.), by *nebulata*, Thnbg. (1784); *C.* (*Emmelesia*) *albulata* var. *griseata*, Stdgr., by ? *subfasciaria*, Bohem (1852); *C.* (*E.*) *decolorata* by *flavo-fasciata*, Thnbg. (1792); *Cidaria* (*Asthena*) *luteata*, Schiff., by *flavicata*, Thnbg. (1784); *C.* (*Hypsipetes*) *trifasciata*, Thnbg., Bkh., by *autumnalis*, Ström. (1783).

The following varieties have also been described by M. Lampa:—*Argynnis aglaia* ab. *aberrans*; *Sphinx pinastri* ab. *fasciata*; *Sarrothripa undulana* ab. *glaucana*; *Bisulcia ligustri* ab. *sandevalli* (this would appear to be the var. *coronula*, of Haworth); *Agrotis* (*Noctua*) *brunnea* ab. *nigricans*; *A.* (*Noctua*) *plecta* ab. *anderssoni*; *Tæniocampa incerta* ab. *pallida*; *Scopelosoma satellitia* ab. *brunnea*; *Anarta melanopa* ab. *wiströmi*; *Angerona prunaria* ab. *spånbergi*; *Hibernia defoliaria* ab. *holmgreni*; *Psodos coracina* ab. *wahlbergi*; *Lythria purpuraria* ab. *mevesi*; *Lobophora halterata* ab. *rudolphii*; *Cidaria dotata* ab. *johansoni* (a beautiful specimen of this var "much shaded with grey-brown" was taken at light in Wicken last July); *C.* (*Coremia*) *quadrifasciaria* v. *thedenii*.

The following have also been described:—*Asphalia flavicornis* var. *finnmarchia*, Schöy., 1881, *Ent. Tid.* p. 121 (this will probably replace *scotica*, Stdgr.). *Arsilonche albovenosa*, Göze, v. *murina*, Auriv., 1880, p. 37, v. *albida*, Auriv., 1880, p. 38 (this latter will probably replace var. *argentea*, Tutt, *British Noctuæ*, i., p. 28).—*Entomologisk Tidskrift*, 1885, pp. 212-213.

DIPTERA.

Sciomyza dubia, Fln., captured at Oxshott, August 16th, 1890, and Lynton, June 17th, 1883 (G. H. Verrall, *Entom.*, xxiv., p. 235).

Oxycera terminata, Mg., possibly British, but the record, *l.c.* = *Pachygaster leachii*, Curt. *Pipunculus geniculatus*, Mg. (? British). *Pepizella annulata*, Mcq., the record *l.c.* = *P. flavitarsis* ♀. *Clidogastra punctipes*, Mg., the specimen recorded *l.c.* as this species does not belong to the genus. *Oxyphora arnicæ*, Fln. = *O. miliaria*, Schrk. *Sapromyza platycephala*, Lw., the record *l.c.* is erroneous, it does not belong to *Sapromyzidæ*. *Chlorops hypostigma*, the record *l.c.* is erroneous, the specimen does not belong to *Chloropidæ*. *Pteropœcilia lamed*, not yet

recorded from Britain. Those recorded as this species = *Toxoneura muliebris*, Har. (G. H. Verrall, *Entom.* xxiv., pp. 235-236).

NOTES ON COLLECTING, Etc.

NOTES OF THE SEASON.—*The Norfolk Broads.*—Jupiter Pluvius had unfortunately taken up his quarters in the district before us, and used every trick he knew, thunder, lightning, deluges, and cold mists to follow, to produce an extra three or four inches of water in all the marshes. The lateness of the season was very noticeable, everything about a fortnight behind time. We settled down, a party of three, at Horning on July 29th, to work the neighbourhood for anything macro-lepidopterous and not too utterly common; but especially to hunt out *Nonagria cannæ*. Working at dusk and at light were equally profitless; *Gastropacha quercifolia*, *Lithosia griseola* and var. *stramineola*, *Nudaria senex*, *Epione apiciaria*, and *Acidalia marginata* were the only captures till August 5th. When we first took *Leucania brevilinea* they were in perfect condition, evidently just out, but very scarce, as our take never exceeded nine in one evening; last year they were plentiful, and many much worn by August 1st. Not one came to the light this year, and all we took were flying at dusk or settled feeding on flowering grasses; possibly they may have been more plentiful later on in the month. Honeydew and grasses appeared the most fashionable resorts for the NOCTUÆ, *Leucania impura* and *pallens* simply swarmed, and we managed to pick out an *Apamea ophiogramma* and about a dozen *Helotropha fibrosa* from among the common rabble. Amongst larvæ I may mention *Chærocampa elpenor* feeding on *Menyanthis trifoliata* (bog-bean), *Clostera reclusa*, *Eupithecia valerianata*, very numerous, most of them, however, were ichneumoned, and had a very annoying habit of looking quite healthy till full-fed, when they proceeded to spin cocoons in sand in a most delusively orthodox manner, but a week or so after would be found much elongated and bent round in the cocoon, quite rigid and filled with minute green larvæ; *Saturnia carpini*, both pink and yellow tubercled varieties, on *Spirea ulmaria*; *Notodonta ziczac*, *Papilio machaon* was very plentiful, but the greater number very late, some still in the first skin. I had two especially dark through all their changes, even the last skin having the green, usually the groundwork, reduced to small streaks and spots. The pupæ from both are of a bright pink hue. *N. cannæ* was certainly the feature of the expedition. Having found a few pupæ last year after much search, and a great destruction of "He Gladdon" (the Norfolk name for *Typha latifolia*; "She Gladdon" being applied to *T. angustifolia*), we started off for the same spot, and as we managed to get enough pupæ for a nice series each during the three days we worked for it, perhaps a short account of our method of working for them may be useful to anyone who, fired by our success, may start forth to go and do likewise. He must certainly first equip himself suitably for the purpose, and india-rubber waders or fishing stockings he must have, unless he prefer rheumatism. The waders are preferable, coming up higher, and fishing stockings have been known to get filled, in which case they are not very comfortable; he

must also take a strong and sharp knife to cut off the *Typha* stems, a bag to put them into when cut; and a strong plank, for crossing dykes and more than usually bottomless bogs, is also very useful. First to find the foodplant. Strong beds by the edges of rivers or broads do not seem of much use; straggling or overgrown patches in small ponds in the bog are more likely. *Typha latifolia* is the favourite, but where small patches of it are surrounded by *T. angustifolia* beds, the latter may produce a goodly number. Plants with the two inmost leaves fading and yellow should be chosen, though if the larva has but lately entered a fresh stem the leaves will be scarcely affected, and many healthy-looking plants, especially with *latifolia*, may produce a larva, the hole where it has entered will often serve as a guide to inhabited stems. In searching *latifolia* it is best to take one central leaf in each hand and gently pull them apart when the pupa, or larva, will be seen, if there, by looking down the hole thus opened; but in *angustifolia* the leaves wrap round one another more and cannot be opened from the centre, so the outer leaves should be peeled off till one be found marked with a round semi-transparent spot like a black bruise on the leaf, which is caused by the hole eaten almost through the leaf by the larva before pupating for emergence. The tip of the knife may be carefully inserted, and the thin piece readily removed, to make sure the owner is within. The stem should be cut off some six inches below this hole. Naturally a great many *N. typhæ* are found at the same time, but they are very easy to distinguish. The larva of *cannæ* is green, and its frass, when fresh, is green, and when dry, nearly white, and has at all times a curious transparent and glutinous appearance; the hole for emergence is very circular, and the central leaves are spun together with silk just above it; the larva pupates head upwards, and the pupæ has a very distinct beak, enclosing the palpi, pointing upwards. The larva of *typhæ* is pinkish brown, and the frass is a warm sienna brown; there is generally a mass of it at the top above the pupa, the first thing that meets one's eye when pulling apart the central leaves; the emergence hole is of irregular shape, and of course beneath the pupa, as *typhæ* pupates head downwards; the beak is not nearly so large as in *cannæ*, and stands out at a right angle from the pupa. The best treatment for the pupæ is to stick the lower end of the cut stems containing them in wet sand in flowerpots, and stand them in a large box with plenty of ventilation, and water them freely every day, to keep the stems from drying, in which case they often shrink and crush the pupæ. The larvæ should be treated in the same manner, and if they crawl out of their old stems, fresh green ones must be provided for them, and they will rapidly eat their way in. Mine began to emerge on August 23rd, and continued up to September 12th. The imagines show great variation of colour from a light buff, generally found in the females, and no doubt protective as resembling dried leaves of the *typha*, through warm reds to a dark leaden brown, but these dark forms are not frequent.—E. Augustus Bowles, Myddelton House, Waltham Cross, Herts. *September 25th*, 1891.

Reading.—At Reading, moths have been much more plentiful this summer than they have been for some years, but butterflies scarce. I have taken *Hypenodes albistrigalis* and *Acidalia straminata* here for the first time. *H. albistrigalis*, by stirring the brambles in the beech

woods, and one or two at sugar. *A. straminata*, by brushing the heath during the afternoon and evening—a good series. After finding the larvæ of *Boarmia roboraria* last year, I have been following it up this summer, and have taken the moth freely in the same woods, at rest on tree trunks (often high up), stretched out as big as it can make itself and easily seen. I got two more *Argynnis paphia* var. *valesina*, both in our beech woods, and three others have, I hear, been taken among the beeches some sixteen miles from here. *Heterogenea limacodes* and *Aventia flexula*, beaten from oak bushes and trees. *Anticlea cucullata* has turned up again this year. Two I got were quite in the wood among *Asperula odorata*, I wonder if it ever feeds on that. *Eupœcilia flaviciliana*, netted again on the same hill as last year. A fair lot of *Nonagria geminipuncta*. *Selenia lunaria*, beaten from bushes in June. *Lithosia mesomella*, *L. aureola*, *Asthena blomeri*, *A. sylvata*, *Hepialus sylvinus*, *Lobophora lobulata*, *Tephrosia consonaria*, *T. biundularia*, *Eupisteria oblitaria*, *Cerigo matura*, *Noctua stigmatica*, and the *Drepanulidæ* are some of the things which were particularly abundant. *Zonosoma linearia* was especially swarming, and, as Dr. Buckell remarks, out a long time, from the middle of June till the end of August. At the end of July, and throughout August, they took to coming to sugar in scores. *Zonosoma omicronaria*, *Eupithecia venosata*, *Coremia quadrifasciaria*, *Anticlea rubidata*, *Lobophora halterata*, *L. viretata*, *Acidalia inornata*, *Emmelesia decolorata*, *Ptilodontis palpina*, *Hyria murinata*, *Erastria fasciana*, *Epione advenaria*, *Liparis monacha*, *Dianthœcia nana*, *Lithosia complana* and others were tolerably frequent. *Cidaria silaceata*, *Eucosmia undulata*, *Boarmia consortaria*, *Acronycta* (*Cuspidia*) *leporina*, *Halias bicolorana* and *Sarothripa undulana* occasional. *Stauropus fagi* being so abundant this year, I thought that there was an unusually good opportunity to look out for the little ways of the animal. A grand moth like this ought to do something to distinguish itself, but it does not after all. It was found at all hours of the day, from early morning until dark, on all sides of the tree and at all heights from the ground. Three out of four moths were found on small trees; but then, our beech woods, though of old standing, are cut severely, and there are twenty small trees to one of fair size, so that says nothing. *S. fagi* seems just to come out and sit on a tree in a very commonplace fashion. They were found over a period of two months, from the middle of May till the middle of July. Eggs of these, laid on June 2nd, began to hatch June 18th. The little larvæ ate nothing for a day or so, then fed up well sleeved on apple. They often fought when they crossed each other's paths, and a number lost legs or portions of legs in these battles; but this loss did not always prevent their pupating, whether it will interfere with the proper emergence of the moth, I cannot say. In hunting for the larvæ of *S. fagi*, it paid better to search than to beat. Like the moths they are to be found for a long time. I got them fully grown at the beginning of August, and lately, I have taken some quite young ones, which will evidently feed as long as the leaves remain good. I have found them in nearly all our woods, mostly on beech, but some on birch and oak. These *fagi* did not spin up in the green leaves on the tree, as Newman says, but always in dead leaves at the bottom of the sleeve, on the side of the sleeve itself, and in the woods I have found them crawling on the

ground in search of a pupating place. Sugar has attracted very well all the summer, excepting just when the lime trees were in blossom, and then *Cosmia pyralina* came to it all alone by itself. To-night, for instance, I am writing this after returning from sugaring, the result of which is 32 fine *Xanthia citrago* and a few *Asphalia diluta* and *Catocala nupta*, besides netting *Luperina cespitis* and *Tapinostola fulva* between times. The species I have taken at sugar this summer are as follows :— June.—*Apamea unanimis*, *Dianthœcia cucubali*, *Miana fasciuncula*, *M. strigilis*, *Dianthœcia capsincola*, *Xylophasia hepatica*, *X. rurea*, *Thyatira batis*, *Gonophora derasa*, *Rusina tenebrosa*, *Grammesia trigrammica*, *Axylia putris*, *Agrotis exclamationis*, *Neuria reticulata*, *Apamea basilinea*, *Acronycta* (*Cuspidia*) *megacephala*, *Hadena oleracea*, *H. genistæ*, *H. thalassina*, *H. dissimilis*, *Dipterygia scabriuscula*, *Xylophasia sublustris*, *X. lithoxylea*, *Euplexia lucipara*, *Noctua brunnea*, *N. festiva*, *N. plecta*, *Triphœna pronuba*, *Aplecta nebulosa*, *A. advena*, *A. prasina*, *A. tincta*, *Mamestra sordida*, *Apamea gemina*, *Mamestra persicariæ*, *M. brassicæ*, *Agrotis segetum*, *A. corticea*. July.—Some of the species taken in June became more plentiful this month. Additional things were :—*Acronycta* (*Bisulcia*) *ligustri*, *A.* (*Cuspidia*) *leporina*, *A.* (*Viminia*) *rumicis*, *Leucania impudens*, *L. comma*, *L. turca*, *Cymatophora duplaris*, *Xylophasia monoglypha*, *Cosmia pyralina*, *Apamea didyma*, *Noctua stigmatica*, *N. triangulum*, *N. augur*, *Triphœna comes*, *Miana bicoloria*, *Leucania pallens*, *Caradrina morpheus*, *C. alsines*, *C. taraxaci*, *Cerigo matura*, *Hadena dentina*, *Agrotis strigula*, *A. sylvata*, *Acidalia aversata*, *Larentia olivata*, *L. viridaria*, *Hypenodes albistrigalis*, *H. costæstrigalis*, *Zonosoma linearia*. August.—*Noctua stigmatica*, *Cosmia pyralina*, *Caradrina alsines*, *C. taraxaci*, etc., which were out at the end of July, came more freely this month. Other things were :—*Xylophasia scolopacina*, *Cosmia affinis*, *C. diffinis*, *C. trapezina*, *Dianthœcia cucubali*, *Triphœna fimbria*, *Amphipyra tragopogonis*, *A. pyramidea*, *Nœnia typica*, *Mania maura*, *Noctua c-nigrum*, *N. plecta*, *N. xanthographa*, *N. umbrosa*, *N. rubi*, *Phlogophora meticulosa*, *Hyaræcia nictitans*, *Gonoptera libatrix*, *Agrotis nigricans*, *A. tritici*, *A. puta*, *Caradrina quadripunctata*, *Leucania lithargyria*, *Catocala nupta*, *Hadena trifolii*, *Cidaria truncata*, *Lithosia griseola*, and var. *stramineola*, *Nudaria mundana*, *Scotosia rhamnata*, *S. dubitata*. Sept.— This month's things are not much out yet, but up to now have come *Xanthia citrago*, *Anchocelis rufina*, *A. litura*, *Xanthia circellaris*, *Hadena protea*, *Asphalia diluta* and *Apamea leucostigma*, the last named in a beech wood high on the hill, and far away from any *Iris* or rush. Larvæ also have been plentiful. *Endromis versicolor* larvæ from eggs found on birch fed up well, and also several lots of the larvæ which I found later, all are spun up. Remarkably like little bunches of sawflies these larvæ are when young and when they separate, each one looks very like a great green catkin on the birch twigs. I have also found larvæ of *Notodonta carmelita* on the birch. These were not sitting on the twigs as *Endromis versicolor* does, but on the underside of the leaves, along the stalk and midrib, making the leaves hang heavy with their weight. By carefully searching maple, I got a good many larvæ of *Lophopteryx cuculla* resting or feeding always along the edge of the eaten leaf. In looking for these I found a larva of *Acronycta* (*Cuspidia*) *alni* sitting on the upper side of a maple leaf in a curved position, right in the middle of the leaf and looking very conspicuous. I searched

well near this, but, as usual, could not find another. This species always occurs singly with me. Larvæ of *Notodonta trepida* crawling down oak trees to pupate, middle and end of July. Those of *N. trimacula*, beaten from oak at the end of August, full-fed. *N. dromedarius* and, of course, *N. camelina*, fell frequently enough by beating birch. *Dicranura furcula* on sallows, *A.* (*Cuspidia*) *leporina* on birch, *Tethea subtusa* on aspen. *Catocala promissa* larvæ found in chinks of bark of oak, they are hard to find, being so much like the lichen covering the tree. When taken it tumbles about exactly like the larvæ of *Cucullia verbasci*. *Chærocampa elpenor*, *Macroglossa bombyliformis*, *Demas coryli*, *Asphalia flavicornis* and *Geometra papilionaria* were very abundant in the larval state. Other larvæ too numerous to mention occurred. I have just now found one larva of *Anticlea cucullata* on *Galium mollugo*, and hope to get more.—W. Holland. *September 11th.*

St. Anne's-on-Sea.—I have noticed that some insects are very early and others very late. *Agrotis cursoria* appeared on July 30th, the earliest date I have ever seen it. *Depressaria nanatella*, *Peronea aspersana* and some other August moths were all out in July. On the 1st, on the banks of the Wyre, I took *Eupœcilia vectisana*, and two-thirds were worn, although supposed to come out in August, and *Sericoris littorana* was not to be seen at all. I had a splendid day on the 1st, we went to Poultin, the old capital of the Fylde, and then into a lane —a new one to me—and worked our way to Cleorleys and the banks of the Wyre, and took *Gelechia mulinella*. *G. instabiliella* were plentiful, *G. mouffetella* and several odd *Gelechiæ*, of which I do not yet know the names. *Eupœcilia vectisana*, *Sericoris conchana*, *S. lacunana*, *S. urticana*, *Sciaphila subjectana*, *Harpipteryx harpella*, *H. nemorella*, *Depressaria costosa*, *D. liturella*, *Swammerdamia pyrella*, *Ebulea crocealis*, *Hydrocampa stagnalis*, *Botys fuscalis*, *Lithocolletis ulicicolella*, three sorts of *Coleophora*, but I cannot name them. *Cidaria fulvata*, *Larentia didymata*, *Coremia unidentata*, *C. ferrugata*, *Melanippe sociata*, *M. montanata*, *Hypsipetes elutata*, *Abraxas grossulariata*, *Œ lematophorus lithodactylus*, *Hesperia silvanus*, *Liparis chrysorhœa*, etc., but very few butterflies, only one *Satyrus tithonus*, a few *Pieris napi* and *P. brassicæ*. It was a dull day, so perhaps that may account for it a little. I also got a few larvæ of *Dianthœcia cucubali* in seed pods of red campion, and saw some larvæ of *Eriogaster lanestris* in quite an early stage (black); they evidently are very late. In the Christmas holidays I collected a number of thistle stems, with larvæ of *Ephippiphora scutulana* in them, but have only succeeded in getting about a dozen out.—T. Baxter, St. Anne's-on-Sea. *August 4th*, 1891.

Tunbridge Wells.—I do not think any entomological reports have ever appeared from this beautifully wooded district, so send you a few notes of what I have taken this season at sugar and light. On the whole, I consider this season has been a fairly good one for sugar, certainly for quantity if not quality. The following insects I took at sugar and light in woods round this town:—*Sphinx ligustri*, *Zeuzera æsculi* (2), *Hepialus hectus*, *H. lupulinus*, *H. sylvinus*, and *H. humuli* (common), *Lithosia complanula* (several), *Euthemonia russula* (♂ very common on Broadwater Forest at end of July), *Chelonia caja* and *C. villica* (common), *Arctia fuliginosa*, *A. lubricipeda* and *A. menthastri* (very common). *Liparis monacha* (1 ♂ on gas lamp), *Uropteryx*

sambucata (common), *Rumia cratægata* (common), *Venilia maculata* (common), *Metrocampa margaritaria* (common), *Selenia illunaria* and *S. lunaria* (common), *Odontopera bidentata*, *Crocallis elinguaria* (common), *Ennomos tiliaria* (common on lamps), *Amphydasis betularia* (1 at light), *Boarmia rhomboidaria* (common), *Tephrosia crepuscularia*, *Pseudoterpna cytisaria*, *Geometra papilionaria*, *Nemoria viridata*, *Hemithea thymiaria* and *Acidalia ornata* (one of each), *A. aversata* and *A. remutata* (common), *Timandra amataria* (3), *Cabera pusaria* (common), *C. exanthemaria* (several), *Strenia clathrata* (3), *Panagra petraria* (several), *Numeria pulveraria* (common), *Fidonia piniaria* (♂ common), *Larentia didymata* (several), *Ypsipetes elutata* (common), *Melanippe subtristata*, *M. galiata*, *M. fluctuata*, *M. montanata* (several), *Camptogramma bilineata* (common), *Cidaria immanata* (common), *C. populata*, *C. ribesiaria*, *C. testata* (common), *Eubolia mensuraria* and *M. palumbaria*, *E. bipunctaria* (common), *Tanagra chærophyllata* (several), *Platypteryx falcula* (1 on lamp), *Gonophora derasa* (5 at light), *Thyatira batis* (swarmed at sugar early in June). My friend Mr. R. E. V. Hanson (one of the few collectors here), caught over 20 specimens of *T. batis* at sugar. *Cymatophora diluta* (common), *Bryophila perla* (1), *Acronycta* (*Cuspidia*) *tridens* (several), *A.* (*C.*) *psi* (several), *A.* (*C.*) *aceris* (1), *A.* (*C.*) *megacephala* (1), *A.* (*Viminia*) *rumicis* (1), *Leucania lithargyia* (common), *L. comma*, *L. impura* and *L. pallens* (common), *Hydræcia nictitans* (swarmed at sugar), *Xylophasia rurea* (very common at sugar), *X. lithoxylea* and *L. polyodon* (too common); I took one black variety each of *L. polyodon* and *X. rurea*, *Dipterygia pinastri*, 1 (usually common), *Cerigo cytherea* (1), *Luperina testacea* (1), *Mamestra brassicæ* (common), *M. anceps* (1), *M. persicariæ* (common), *Apamea basilinea* (1), *A. gemina* (several), *A. oculea* (common), *Miana strigilis*, *M. fasciuncula*, *M. furuncula* (swarmed at sugar), *Grammesia trilinea* (common), *Caradrina morpheus* (several), *C. cubicularis* (2), *C. alsines* (2), *Rusina tenebrosa* (1), *Agrotis puta* (2), *A. suffusa* (3), *A. exclamationis* (common), *A. porphyrea* (1), *Triphæna janthina* (1), *T. orbona* and *T. pronuba* (common), *Noctua plecta* (common), *N. c-nigrum* (2), *N. triangulum* (common), *N. brunnea*, *N. festiva*, *N. rubi*, *N. baia* and *N. xanthographa* (common), *Tæniocampa gothica* (2), *Anchocelis pistacina* and *A. rufina* (several), *A. litura* (several), *Cerastis vaccinii* (3), *Scopelosoma satellitia* (common), *Xanthia silago* (*flavago*), 6, *X. fulvago* (*cerago*), several, *X. ferruginea* (*circellaris*), several, *Cosmia trapezina* (common), *Agriopis aprilina* (6), *Phlogophora meticulosa* (common), *Euplexia lucipara* (common), *Aplecta herbida* (3), *Hadena adusta* (several), *H. proteus* (several), *H. dentina* (1), *H. oleracea* (common), *H. pisi* (several), *H. genistæ* (1), *Calocampa exoleta* (1), *Xylina rhizolitha* (2), *Anarta myrtilli* (several on Broadwater and Ashdown Forests), *Plusia chrysitis* (several), *P. iota* (several), *P. pulchrina* (6), *P. gamma* (common), *Gonoptera libatrix* (common), *Amphipyra tragopogonis* (1), *Nænia typica* and *Mania maura* (common), *Euclidia mi* (2). I took very few Rhopalocera owing to want of time and bad weather. At Abbott's Wood near Hailsham, one afternoon in July, *Argynnis paphia* (4), *A. aglaia* (2), *A. adippe* (2), *Melanargia galatea* (2) and *Thecla quercus* (1). I usually find September and October the best months for sugar in this district.—R. A. Dallas Beeching, Tunbridge Wells *October 1st*, 1891.

Pitcaple.—Insects are still very scarce, and treacle is of no use, but larvæ are more abundant than usual. The following, among others, are my captures for the last fortnight:—*Smerinthus populi*, abundant; *Arctia fuliginosa*, common; *A. mendica* I turned up for the first time a few days ago, and in a short time picked up a large number; *Orgyia fascelina*, a few, larvæ of this species are excessively late this year; *Demas coryli*, a few; *Bombyx rubi*, not uncommon; *B. callunæ*, three. I have searched the hills for miles upon miles, and have only taken the above; a few years ago it would have been quite possible to have taken them in cartloads; *Saturnia carpini*, rather scarce; *Dicranura furcula*, plentiful; *D. vinula*, very common; *Notodonta camelina*, common; *N. dictæa*, a few; *N. dictæoides*, under a dozen; *N. dromedarius*, a few dozens (I have not had time to work up the larvæ of this species yet); *N. ziczac*, fairly plentiful; *Thyatira batis*, scarce, only a few; *Cymatophora fluctuosa* and *C. or*, both rather scarce; *Acronycta* (*Viminia*) *menyanthidis* in large numbers. I have now searched a wide district for this species with splendid results. *A.* (*V.*) *myricæ*, fairly plentiful; *Dianthœcia capsincola*, a very few; *D. conspersa*, not a great number; *Hadena adusta*, abundant; *H. pisi*, common; *H. rectilinea*, rare; *Habrostola urticæ*, common.—W. Reid, Pitcaple. *September 15th*, 1891.

Kingstown, Ireland.—I have had a little leisure, only a few days at a time, for entomology, but have been rather unfortunate in my captures. On the coast I have taken a few *Agrotis* where I expected swarms, a few *cursoria*, *tritici*, and *valligera*. The latter, however, seem to me rather remarkable, tending to have the white markings brown, and, in two instances, this variation is strongly marked. Two or three *Helotropha leucostigma* and var. *fibrosa* have turned up, and one fine *Luperina cespitis* ♀. The scarcity of moths is well shown in my captures of only 5 *Miana furuncula* and 2 *M. literosa*! On ragwort among the sandhills, scarcely anything to be seen except some *Hydræcia nictitans*, some of which, however, are very good forms. Naming them from Mr. Tutt's *British Noctuæ and their Varieties*, they appertain to the *nictitans* type, being somewhat small, deep red coloured, sometimes blackish, with white stigmata. But a few var. *erythrostigma* are among them, and also a few *grisea-flavo*, which is the first time I have met this variety. The district was a peculiar one—a narrow line of sandhills, with a fen running for miles parallel to it. I certainly expected better luck, but hope to try a few days more, when these high winds have subsided. I took a good series of pupæ of *Nonagria typhæ* in the stems of *Typha latifolia*, and found 2 on the 15th, which were already empty, and 2 more have emerged since from those I collected. This insect must have an extended emergence, for I took several larvæ, one of which was only half grown at the time I met with the empty pupa cases. I notice that the larvæ of *Smerinthus ocellatus* straggle on through the season in a similar way. I have now 12 almost full-fed and 2 about half an inch long. Also some of the same batch of ova were still green and plump a fortnight ago; but an accident has prevented my learning whether they were fertile and would hatch out.—W. F. V. de Kane, Sloperton Lodge, Kingstown. *September 22nd*, 1891.

Epping Forest.—When beating for larvæ I generally use a sheet, at

the two sides of which are fastened sticks, and with the assistance of a friend to hold one end, I hardly lose a larva. I have beaten, or seen beaten at Monkswood the following larvæ, between August 30th and September 27th. Whilst beating an eye should be kept open for *Thecla betulæ* at High Beech and Fairmead Bottom. *Smerinthus ocellatus* (sallow), *Halias prasinana* (beech, etc.), *Dasychira pudibunda*, common (beech, sallow, etc.), *Drepana lacertula* (off birch), *D. binaria* (oak), *D. cultraria* (beech, common). I have also taken the following:—*Dicranura furcula*, 1 (birch), *D. vinula*, several (sallow), *Stauropus fagi*, 1, saw about a dozen (beech and oak), *Lophopteryx camelina*, several (beech and whitethorn), *Notodonta dictæoides*, 1 (birch), *Notodonta ziczac*, several (sallow), *N. chaonia* (?), 1 (beech), *Phalera bucephala*, common (beech), *Demas coryli*, common (beech), *Acronycta* (*Cuspidia*) *psi* (whitethorn), *Rumia luteolata* (whitethorn), *Eurymene dolobraria*, several (oak, beech, etc.), *Amphidasys betularia* (beech), *Iodis lactearia* (oak, I think), *Eupithecia vulgata*, all these were by day, but beating by night produces the same species in greater abundance.—A. QUAIL, 15, Stamford Hill, N.

Barnsley.—The very late spring, extending well into June, prevented me from doing any collecting until about the middle of that month. In my first excursion I found larvæ plentiful but very small, in fact, many of the trees in this district were not in full leaf. Insects have also been very late; for instance, *Melanippe tristata* were not out until June 29th, their usual time being about the first week in June. However, they turned up plentifully this year, which is not always the case. On July 1st, I observed the larvæ of *Pædisca occultana* were in profusion, the high wind dislodging them and causing them to swing in webs from all the fir trees. I brought home some and reared them.—J. HARRISON, 7, Gawber Road, Barnsley.

Chatham District.—The weather up to September has been very unfavourably wet and windy, resulting in more than one wet jacket, but the usual species commonly found here occurred, such as *Melanargia galatea*, *Pararge megæra*, *Argynnis aglaia*, etc. The following, however, were conspicuous by their absence from their usual haunts, *viz.*:—*Vanessa atalanta*, *V. polychloros*, *V. cardui*, *Thecla w-album* and *T. rubi*. Our new El Dorado for *Lycæna adonis* has in two visits resulted in about 40 captures, some of which are in appearance similar to both ♂ and ♀. A young friend with me discovered a quantity of larvæ of *Bombyx rubi* feeding on some plants amongst grass and wild thyme, they are now taking to bramble. In addition occurred a moth which, according to Newman's *British Moths* is only taken in Devonshire, *viz.*, *Toxocampa craccæ* (? *T. pastinum*, ED.). *Hesperia comma* was in evidence, as also *H. linea*; and why should not *H. lineola* be found, if looked for?—J. TYRER. *September*, 1891

Streatham (*Surrey*).—While spending three weeks at the above locality, from the end of August, I devoted a great deal of my time to collecting Lepidoptera, but owing to the unfavourable weather that prevailed during the greater part of the time, there were very few species to be found. By working the lamps I took the following:—*Ennomos angularia*, *E. tiliaria*, *Melanthia ocellata*, *Coremia unidentaria*, *C. propugnata*, *C. ferrugata*, *Pelurga comitata*. *Hydræcia nictitans*, *Luperina testacea*, *L. cespitis* (1), *Heliophobus popularis*, *Amphipyra tragopogonis*

Pyralis fimbrialis (2), *Endotricha flammealis*, *Pionea forficalis*, etc. On fences, *Boarmia rhomboidaria*, *Cosmia trapezina*, *Pyralis farinalis*, *Peronea sponsana*, *Semasia wieberana*, etc. At dusk I took a *Platypteryx hamula*, and saw another which I unfortunately missed.—A. Ford, Claremont House, Upper Tower Road, St. Leonards-on-Sea.

North Bucks.—I have this year spent a month in North Bucks, on the edge of Whittlebury Forest, and worked there diligently during the whole of July, but the results on the whole were not very satisfactory. I was too late for *Hesperia paniscus*, which, however, is to be found there (I believe) pretty freely; but *Leucophasia sinapis* was still flying in some numbers. The best insects I took were *Boarmia roboraria*, of which I took a few off tree trunks, and *Phorodesma bajularia*, which was fairly common at one place in the wood, but of which many specimens were very much faded. I also got some very good *Aventia flexula*. Can any one inform me how to get this insect? I took it flying at dusk along hedges on a turnpike road, but never got more than one specimen at a time.—Charles F. Thornewill, The Soho, Burton-on-Trent. *September*, 1891.

Warrington.—All my exertions of late have been directed to larvæ hunting and beating. I have taken a large number of *Lophopteryx camelina* and *Notodonta dromedarius* larvæ; plenty of *Acronycta* (*Cuspidia*) *leporina*, and more *A.* (*Viminia*) *menyanthidis* larvæ than ever I got before. *Saturnia carpini* larvæ a few. I also got a fair lot of *Notodonta ziczac*, a few *N. dictæa*, one *N. dictæoides*, *A.* (*Cuspidia*) *megacephala*, *Amphidasys betularia*, and about a score of *Trachea piniperda*. *Smerinthus ocellatus* and *S. populi* were, as usual, very plentiful, but I did not go in for any.—J. Collins, Warrington. *September 21st.*

Howth and Liverpool.—I have been to Howth in search of *Luperina barrettii* mainly. We had a good time there and I was lucky enough to get six of the above rarity. It is a brute to catch, frequents the most inaccessible places it can find. I always used to think the price the insect fetches exorbitant, but having stood for twelve nights wet and dry, in a place where a slip would have meant broken limbs, and a constant look out had to be kept for falling stones, with the result of getting four good specimens and two bad ones, I am inclined to think it is fair enough. We found *Dianthœcia capsophila* common and worn, *Eupithecia venosata* also, very large specimens. There was little else among the macros except very fine *Lycæna alexis*. Among the micros we found *Eupœcilia albicapitana* and *Sciaphila colquhounana* and larvæ of *Eudorea lineolalis*, *Gelechia leucomelanella* and another *Gelechia*. Amongst macro larvæ we found *Cleora lichenaria*, I believe new to Ireland, *Eubolia palumbaria*, what I take to be a strange form of *Larentia didymata* (unfortunately it got wet with ammonia, and damaged) and *Plusia chrysitis*. *Fumea nitidella* was abundant on the rocks and another case-bearing moth perhaps a *Solenobia*. I have bred some scores of this (female) but never a male, and, as no one has ever bred a male, the species is still *incog.* Here in Liverpool, there has been nothing doing to speak of. The weather has put a stop to collecting. *Cœnonympha davus* we found common a week or two ago, and *Sesia bembeciformis* has been abundant in Sefton Park. This latter is much given to saccular distension, about nine out of ten seem to suffer from it.—Geo. Harker, Liverpool. *July 31st*, 1891.

Weybridge, Chingford, Darenth, Essex Marshes, etc.—On June 21st a pair of *Amphidasys betularia* were brought to me. They paired the same night, and remained together until dusk the following day, thus imitating *Biston hirtaria*. I am rearing a brood of larvæ from the resulting ova. On June 25th, at Weybridge, I captured a male *Drepana lacertinaria* and a worn *Eurymene dolobraria*, male, also one specimen of *Melanthia albicillata*, on a fir trunk. Common NOCTUÆ were plentiful in my apology for a garden during the latter part of June, both at sugar and at the flowers of the rocket. On June 30th, I took *Acronycta* (*Cuspidia*) *psi*, with its wings over its back at 12.20 p.m. On July 5th, *Angerona prunaria* was taken near Chingford, and again on July 15th and 22nd, but on neither occasion was a ♀ seen. *Ephyra linearia* (*trilinearia*), which had been taken on June 10th, was still plentiful and in fair condition. *Melanthia bicolorata* (*rubiginata*) was abundant. On July 6th common NOCTUÆ came freely to sugar on the outskirts of Highgate Wood. I note as to weather:—There had been heavy rain and a distant thunderstorm in the afternoon—sky clear—wind S.W. strong. On July 11th, I visited Darenth Wood, where I took a ♂ *Drepana falcataria* (*falcula*) in good condition. (The persistence of the two birch "hook-tips" this year has been, I think, very unusual. My friend, Mr. Bayne, has netted them week after week from May 31st till July 12th. Ordinarily we meet with them the last fortnight in May and first week in June, and again—second brood—the first week in August. Why this unusual "thusness"?) Darenth also yielded *Hecatera serena* on palings, *Geometra vernaria* blanched by wet, a pair of *Macaria notata* (which I sleeved on a sallow branch, and from which I eventually got some ova. These were all attached to the outer side of the muslin sleeve, and all deposited singly. I have a few of the larvæ feeding on sallow), a specimen of *Melanthia bicolorata*, (*rubiginata*) with the bar very nearly completed, one *Melanthia albicillata* and several *Melanippe procellata* and *M. rivata*. Darenth Wood affords ground for very interesting geologico-entomological observation. The lane leading up by a pretty steep ascent into the wood from the south is chalk, but the wood itself has a sandy soil lying over the chalk. *M. procellata* was plentiful, with *Phibalapteryx tersata* and *Scotosia vetulata*, so long as the soil was chalky and clematis growing, but in the wood itself, although so near, not a specimen of either was seen.

On July 15th, a specimen of *Aventia flexula* was taken at Chingford at dusk, also *Miana arcuosa* and *Thyatira batis*. *Zanclognatha tarsipennalis* was plentiful and *Uropteryx sambucata* was swarming to a degree I have never before seen. July 19th and 26th found me on *Hesperia lineola* ground. The first day was unfavourable—strong wind, heavy showers, the second day, however, was about the best entomological day we have had this year. I captured about four dozen specimens of the new "skipper." Other things taken on one or other day were *Acidalia emarginata* and *A. imitaria*, *Eupithecia scabiosata* (*subumbrata*), *Lithosia lurideola* (*complanula*), *Calamia phragmitidis* (one specimen seated on a reed stem), *Euclidia glyphica*, one specimen (again, as I think, an unusually late date), *Acidalia immutaria*, worn, *Eubolia bipunctaria*, one specimen. The geological formation being good sound London clay, it was interesting to meet with this chalk insect, although, of course, the chalk is not very far off, on the other side of the river.

On August 1st, I took *Apamea ophiogramma*, one specimen flying in my garden at dusk.—F. J. Buckell, 32, Canonbury Square. *August 4th*, 1891.

Plymouth.—Collecting during the first nine months of this year has been much interfered with by unfavourable weather; but, although we have not tried sugar, we have obtained some good moths in the intervals of fine weather, and a fine lot of larvæ during wet weather in August and September. In February, *Larentia multistrigaria* and *Phigalia pedaria* (*pilosaria*) came to light; in March we bred *Tephrosia biundularia*;[1] in April the best things at the sallows were *Pachnobia rubricosa* and *Tæniocampa gracilis*, whilst *Lobophora carpinata* (*lobulata*) was found at rest; in May we captured *Tephrosia consonaria*, *Eupisteria obliterata* (*heperata*), *Bapta temerata*, *Ligdia adustata*, *Eupithecia pusillata*, *nanata*, and *abbreviata*; in June, *Tephrosia crepuscularia*,[1] *luridata* (*extersaria*) and *punctularia*, *Zonosoma porata*, *Panagra petraria*, *Numeria pulveraria*, *Eupithecia exiguata*, *Hypsipetes trifasciata* (*impluviata*), *Coremia designata* (*propugnata*), *Cidaria siterata* (*psittacata*) hybernated, *Cidaria corylata*, *silaceata*, and *Aspilates ochrearia* (*citraria*); in July, *Argynnis aglaia*, and *adippe*, *Calligenia miniata*, *Callimorpha dominula*, *Nemeophila russula*, *Heterogenea asella* (*asellus*), one ♀, *Thyatira batis*, *Cymatophora duplaris*, *Agrotis strigula* (*porphyrea*), *Erastria fasciana* (*fuscula*), *Angerona prunaria*, including varieties ♂ and ♀, *Eurymene dolobraria*, *Cleora lichenaria*, *Pseudoterpna pruinata* (*cytisaria*), *Asthena sylvata*, *Macaria notata*, *Melanippe tristata*, *procellata*, *unangulata*, *Anticlea rubidata*, *Cidaria picata*, *populata*, *dotata*, *Gnophos obscuraria*, *Eupithecia virgaureata*, and *Eucosmia undulata*; in August, *Argynnis paphia*, *Drepana falcataria* (*falcula*), *Leucania conigera*, *Stilbia anomala*, *Triphæna interjecta* and *Eupithecia absynthiata*; in September, *Agrotis puta*, and *Eugonia erosaria*. Our captures of larvæ were:—In April, *Polia flavicincta*, *Epunda lichenea* and *Cleora lichenaria*; in May, *Miselia oxyacanthæ*; in June, *Pœcilocampa populi*, *Notodonta ziczac*, moth emerged in August, we find this species double brooded, and *Xylina socia* (*petrificata*); in July, *Lophopteryx camelina*, *Notodonta dromedarius*, *Gortyna flavago*, *Cucullia verbasci*, *chamomillæ* and *Eupithecia pulchellata*; in August, *Smerinthus ocellatus*, *Hylophila prasinana*, *Cossus ligniperda*, *Bombyx rubi*, plentiful, *Drepana lacertinaria* (*lacertula*), *Notodonta dictæoides*, *trimacula* (*dodonea*), *Demas coryli*, plentiful, *Cuspidia leporina*, ten on alder, *C. alni*, five on alder, and *Hadena pisi*, abundant on *Pteris aquilina*; in September, *Smerinthus tiliæ*, *Stauropus fagi*, four, *Notodonta ziczac*, *Thyatira batis*, *Moma orion*, and *Bisulcia ligustri*.—H. W. Basden-Smith, 6, Hillsborough, Plymouth. *September 21st*, 1891.

Hants and Dorset.—I was in Bournemouth during the early part of August, and having the good fortune to experience fine weather I made several entomological excursions in the neighbourhood. The immediate vicinity of the town did not afford very much sport, but I found *Satyrus semele*, *Lycæna ægon* and *Epinephele tithonus* all very abundant and in fine condition. *Pseudoterpna cytisaria* was also very common, but other moths were decidedly few and far between. I visited Little Alum Chine for *Leucania littoralis*, but it did not put in an appearance, though I

[1] *T. crepuscularia* occurs normally in March, *T. biundularia* in May and June.—Ed

got *Axylia putris*, *Phytometra ænea* and *Gnophos obscurata*. A visit to Corfe Castle produced *Eubolia palumbaria*, *Selidosema plumaria* and *Gnophos obscurata*. Swanage, which I invaded shortly afterwards, proved a more profitable field for entomological operations. My special object was to catch *Hesperia actæon*, and at first I failed to find the locality. This, however, was not an unmixed evil as it led to my getting some famous sport with *Bombyx quercus*, which was literally swarming on the cliffs above the town. The wind was very strong, and *quercus* was almost impossible to catch, but the quantity was so great that it was difficult to avoid an occasional accident, and I got a couple of males, as well as one each of *Lycæna alsus*, *Eubolia bipunctaria* and *Aspilates citraria*. Soon after twelve o'clock I found one very restricted locality for *actæon*. The insect, however, was very scarce here, and difficult to obtain owing to the wind and the rugged nature of the ground, and an hour's work only producing one specimen I determined to try the other side of the bay. A walk of about a mile and a half brought me to a promising grassy slope close to the sea, and here *actæon* at once appeared. I soon had a dozen, nearly all females, and subsequent visits to this spot resulted in my getting a fine series, as well as one *Lycæna corydon*, a lot of *Zygæna filipendulæ* and *Lycæna agestis*. Other insects seen in this favoured spot were *Melanargia galatea*, *Satyrus megæra*, *S. semele*, *Lycæna alexis*, *L. ægon*, *Vanessa urticæ*, *V. io* and *V. cardui*. I have heard and read a good deal about the probable extinction of *actæon*, but such an event certainly seemed very remote when one saw the hundreds of "skippers" that rose as if by magic out of the grass and herbage whenever there was a gleam of sunshine. They were nearly all *actæon*. I took one *H. thaumas*, but this species and *sylvanus* really seem here to bear about the same proportion to *actæon* as it elsewhere to them. The seclusion of the Swanage locality, and the impracticable, not to say dangerous nature of the ground—I had, on an average, about three falls for every specimen I took—will probably serve to protect the "skippers" for a good many years to come. On August 19th I left Bournemouth, accompanied by the other members of my family, for Lyndhurst, starting early with the intention of landing at Brockenhurst and working through the woods to our destination. In Stubby Copse we met with *Vanessa polychloros*, but could not catch him. *Satyrus ægeria* and other members of the common herd were very abundant, and a few very worn specimens of *Argynnis paphia*, *A. adippe*, and *Limenitis sibylla* appeared also. We saw one or two var. *valezina*, which were battered almost beyond recognition. *Gonopteryx rhamni* abounded in the more open spots. After a few more ineffectual shots at *polychloros* we emerged upon the heath and took *Anarta myrtilli* in beautiful condition, but other moths were not forthcoming, a few *Cosmia trapezina*, *Boarmia repandata*, various species of *Cidaria* and *Eubolia palumbaria* being all that appeared, and these mostly worn. Shortly after one o'clock my sister with a really good stroke brought down *Apatura iris*—a very worn male. In Beeching Lane we again found *polychloros*, *Ennomos angularia*, *Ephyra punctaria*, and a swarm of very seedy *Thecla quercus*. In due course we arrived at Lyndhurst, and in the evening set out for Hurst Hill Enclosure. No sooner was the sugar on the trees than several *Catocala sponsa* appeared. They were very skittish, however,

and we only got one which was taken with the net while hovering about a tree. Later on we got *Noctua rhomboidea*, *Amphipyra pyramidea*, one *Selenia illustraria* and *Cosmia trapezina*. A terrific fall of rain next day put a stop to our operations, but we got one *Triphæna ianthina* which flew into our sitting-room at the Crown Hotel. Fortunately the evening of the 21st was fine and hot. *Catocala sponsa* came freely to sugar, and we got some grand specimens, as well as one *C. promissa*, more *Amphipyra pyramidea*, *Noctua rhomboidea*, *Mania maura*, etc. I also saw several *Thyatira batis* and netted one in very fair condition. The evening's work brought our visit to a close, and we left next morning, having made a fair number of captures in the Forest, considering the wet weather and the short time at our disposal. —E. G. Alderson, Worksop, Notts.

Berkshire.—During August and the first fortnight of September I worked for lepidoptera at West Woodhay, near Newbury. The result was not altogether unsatisfactory after the poor sport of last year. Sugar did not pay until September, when *Xanthia citrago*, *X. fulvago* (*cerago*), *X. flavago* (*silago*), *X. circellaris* (*ferruginea*), *Gonoptera libatrix*, together with a good number of commoner insects came pretty freely. *Luperina cespitis* came well to light. Altogether 20 examples of this insect were taken in my moth trap. Other insects taken by this means were numbers of *Neuronia popularis*, *Hydræcia nictitans*, *Noctua rubi*, and *N. umbrosa*, a few *Charæas graminis* and *Epione apiciaria*, *Xanthia flavago* (*silago*) and 1 *Asphalia diluta*, with plenty of commoner insects. Is it not unusual for *A. diluta* and *X. silago* to be attracted to light? I had never taken them in this way before. *Triphosa dubitata* was one of the commonest insects, appearing in scores. Sunflowers proved attractive to many species. Among others taken upon them being *Cidaria russata*, *Triphosa dubitata*, *Hydræcia micacea*, *H. nictitans*, *Noctua rubi*, *N. c-nigrum*, *N. xanthographa*. *Triphæna pronuba*, *T. comes* (*orbona*), *T. ianthina*, *Plusia gamma*, and *Phlogophora meticulosa*. Only one *Triphæna interjecta* was taken, and that at light. The only insect new to the district was *Plusia festucæ*, of which I found a pupa upon cut grass in a water-meadow near Hungerford. Larvæ of *Sphinx ligustri*, *Chærocampa elpenor*, *Smerinthus populi* and *Macroglossa fuciformis* (the latter by Miss Kimber) were the only representatives of the Sphingidæ found. *Catocala nupta*, together with a host of others, for the most part unrecognisable corpses, fell a victim to the allurements of a bottle of beer and sugar intended to catch wasps, of which we have had a perfect plague this season.—J. H. D. Beales, Beech Hurst, Poole. *September 27th*, 1891.

Sphinx convolvuli at Clevedon.—I captured my first *Sphinx convolvuli* last night (a fine ♀), at the flowers of the tobacco plant (*Nicotiana affinis*), and saw a second. This insect is a little later than usual this season. Does the species breed in this country? One would conclude that it does from the fine condition of the specimens taken so far west. I did not see a single specimen last season, although I watched diligently.—J. Mason, Clevedon Court Lodge, Somerset. *August 29th*, 1891.

Abundance of Larvæ.—I suppose the abnormal abundance of larvæ of common species in our apologies for gardens in the suburban districts is general. My garden is kept for entomological

purposes and is a tangled mass of shrubs and weeds. *Spilosoma lubricipeda* and *S. menthastri* are in immense numbers, so is *Mamestra persicariæ*. How clearly this variable larva proves that it has practically no close connection with its neighbour in our list, *M. brassicæ*. The larvæ vary from the palest green, through every shade of purplish and red to deep brown, some even being ochreous in colour. These three species clear as they go—weeds, raspberry, birch, elder, syringa, sallow, honeysuckle, all come alike. *Gonophora derasa* is on the raspberries and endless *Pygæra bucephala* on the birches, one of which they have cleared completely, a sleeve I put on a poplar branch with ova of *Clostera anachoreta* was soon cleared by a brood of *Smerinthus populi*, the eggs of which must have been on the leaves and so enclosed in the sleeve. *Nænia typica*, *M. brassicæ*, *Hadena chenopodii*, *Caradrina morpheus*, *Platyptilia gonodactyla* (now emerging) have also been or still are in abundance.—J. W. Tutt, *September 24th* 1891.

Hadena satura at Yaxley.—You may be interested to know that in addition to records you mention, *H. satura* is stated in the "Fenland" list to have been taken at Yaxley Fen.—George Balding, Ruby Street, Wisbech. *September 28th*, 1891.

Societies.

City of London Entomological and Natural History Society.—*Thursday*, *October 1st*, 1891.—Exhibits:—Mr. Mead, *Deilephila euphorbiæ*, bred from larvæ taken on the banks of the Scheldt; also a long series of *Noctua festiva* from Scotland. Mr. Battley, light and dark forms of *Cuspidia psi* from various districts, a pale variety of *Cidaria corylata* from Epping, also a partly silvery specimen of *Polyommatus phlæas* and a female of *Lycæna alexis* with light spots on the tips of the wings, both from Benfleet. Mr. Simes, a series of *Orthosia suspecta* from York. Dr. Buckell also exhibited a very variable series of this species from York, and some indistinctly marked specimens from Aberdeen; also living larvæ of *Acidalia immutata*, bred from eggs deposited by moths taken at Leigh. Mr. Tutt, two specimens of *Hadena satura* from Wicken, and one from Aberdeen; also for comparison, *H. adusta* from various localities, including one very strongly marked and variegated example from Unst. He pointed out that although the upper wings of these two species were much alike, *satura* invariably had the hind wings darker than *adusta*. Mr. Clark exhibited *Arctia menthastri* from the north of Ireland, the specimens being much more buff in colour than the south of England form. Mr. Bayne, a series of *Cirrhœdia xerampelina* from Aylesbury, and a specimen of *Ennomos erosaria* from Epping Forest. Mr. Prout, various specimens showing asymmetrical markings or malformations, including *Xanthia silago*, *Arctia lubricipeda*, *Noctua xanthographa*, *Triphæna orbona*, and *Lomaspilis marginata*; also a very pale specimen of *Melanippe sociata* (*subtristata*). Mr. Milton, a bred series of *Plusia chrysitis*; also, in Coleoptera, *Byrrhus pilulæ* and *Hypera rumicis*. Mr. Heasler, specimens of *Cis bilamellatus*, taken in fungus at Mitcham

last February. He also mentioned that he had seen an albino specimen of the sparrow at Westminster.—G. A. Lewcock and A. U. Battley, *Hon. Secs.*

South London Entomological Society.—*Thursday, October 8th*, 1891.—Mr. W. H. Tugwell exhibited a very fine selection of Scotch specimens of *Agrotis agathina*, *A. strigula* (*porphyrea*), *Noctua castanea* and var. *neglecta*, and *N. sobrina*. Of the first three species he also exhibited English specimens for comparison, the English *strigula* and *agathina* being in general much redder than the Scotch examples. He also exhibited a specimen each of *Hadena porphyrea* (*satura*) and *H. adusta* for comparison. Mr. Jäger, a beautiful series of *Agrotis ripæ* from Essex including some very fine white vars., and *Callimorpha hera* and its var. *lutescens* bred from ova. Mr. A. Robinson, a bred series of *Nonagria cannæ* from Norfolk, including very red, very pale, and almost black varieties, undoubtedly the finest series of British *cannæ* ever seen. He also exhibited bred *Viminia* var. *myricæ* and *Retinia resinana*. Mr. Adkin exhibited a series of *Sesia muscæformis* from the Isle of Man and Cornwall, also two specimens of *Tortrix steineriana* var. *dohrniana*, bred from larvæ feeding in firshoots in Galway, Ireland. He also read a long description, under the name of *donelana*, of the imago and larva, the damage it had already done, and an account of its first discovery in Ireland. Mr. C. G. Barrett also exhibited two bred specimens of the same species, and said that, in spite of the strange foodplant he thought the specimens were *T. viburnana*. Mr. Tutt remarked that the species was, as he expected, as soon as its connection with pine was announced, the well known *Tortrix steineriana* var. *dohrniana*, an insect not uncommon in the mountainous districts of Central Europe, and referred to in the *Entomologist's Record*, vol. i., p. 32, when the provisional naming of *Tortrix teucriana*[1] was being discussed for the Folkestone form. He also stated that he possessed a series from Herr A. Hoffmann, and was well acquainted with the species. Mr. Barker exhibited a series of varieties of *Ematurga atomaria*. Mr. West, a specimen of *Catocala nupta* curiously streaked with yellow on the hind wings. Mr. Dennis, a specimen of *Gonopteryx rhamni*, which, having been eight months in cyanide, had the colour of the tips of the anterior wings and the anal angle of the left posterior changed to a yellowish red. Mr. Turner, *Zygæna meliloti* from the New Forest, *Xylophasia monoglypha* var. *infuscata* from the north, *Hepialus velleda* from north and south for comparison of size, *Limenitis sibylla* with its closely allied species *L. camilla* from the south of France, and also *Anthocharis cardamines* with the somewhat similar Continental *A. belia*. Mr. Short, a long series of *Noctua xanthographa* from Folkestone and Hampstead — the Folkestone ones being decidedly lighter in colour, a nice series of *Tapinostola bondii*, a varied series of *Bryophila perla*, a very variable series of *Miana bicoloria*, and a short series of *Gnophos obscuraria*— all from Folkestone. It was recorded that Mr. Mera had taken *Tapinostola concolor* in a new locality, *viz.*, Suffolk.—Ed.

Entomological Society of London.—*October 7th*, 1891.—Dr.

[1] I am of opinion that some of our Essex coast workers breed the allied *T. unicolorana*, Dup. ix., 240, fig. 6, p. 103=*asphodilana*, H.-S., 35, and distribute it as *T. viburnana*, which, by the by, should be spelt *viburniana*.—Ed.

Sharp referred to the death, on the 14th September last, of Mr. E. W. Janson, who had been a member of the Society since 1843, and who had formerly filled the offices of secretary and librarian respectively. The Rev. Dr. Walker exhibited a long series of several species of *Erebia*, and of *Argynnis pales*, which he had recently captured near Roldal, in Norway. Mr. W. L. Distant exhibited specimens of *Danais chrysippus*, with its two varietal forms, *alcippus*, Cram. and *dorippus*, Klug., all which he found together in the Pretoria district of the Transvaal. Mr. Jenner Weir, Colonel Swinhoe and Mr. Distant took part in the discussion which ensued as to these forms and their distribution. The Rev. W. F. Johnson sent for exhibition specimens of *Velia currens* from stagnant water near Armagh; also a specimen of *Nabis limbatus*, killed whilst holding on to its prey, a very hard species of Ichneumon. Mr. Saunders thought that, from the nature of the Ichneumon, the only chance the *Nabis* had of reaching its internal juices would be through the anal opening, as recorded by Mr. E. A. Butler in a similar case, in the *Ent. Mo. Mag.*, October, 1891. Mr. F. P. Pascoe exhibited two British species of Diptera unnamed. He said they had been submitted to Mr. R. H. Meade, but were unknown to him, and are probably new to the British list. Mr. R. Adkin exhibited two specimens of a supposed new species of Tortrix (*Tortrix donelana*, Carpenter), bred from larvæ found on pine trees at Tuam. Mr. C. G. Barrett said he examined the specimens with great care, but he did not consider that they belonged to a new species. He was unable to distinguish them from *Tortrix viburnana*. Mons. A. Wailly exhibited preserved larvæ, in various stages, of *Citheronia regalis*, which he had bred from ova received from Iowa, United States. He said that the natives called this larva the Hickory Horned Devil, and that the specimens exhibited were the first that had been bred in this country. Mons. Wailly further exhibited three female specimens of *Antheræa yama-mai* bred from cocoons received from Japan; also a nest of cocoons of *Bombyx radama*, received from the west coast of Madagascar. Prof. J. B. Smith, of the United States, and Col. Swinhoe took part in a discussion on the habits of the larvæ of *Citheronia regalis*, and as to the period at which they dropped their spines prior to pupating. Dr. Sharp exhibited several specimens of a weevil, *Ectopsis ferrugalis*, the ends of the elytra of which bore a close resemblance to the section of a twig cut with a sharp knife. He said he had received the specimens from Mr. G. V. Hudson, of Wellington, New Zealand, who stated that they were found resting in large numbers on dead trunks and branches of *Panax arborea* in the forests. Mr. G. C. Champion stated that the species of *Forficulidæ*, captured by Mr. J. J. Walker, R.N., in Tasmania, and exhibited by himself at the meeting of the Society in April last, was, he believed, referable to *Anisolabis tasmanica*, Bormans, described in the "Comptes Rendus" of the Ent. Soc. Belgique, 1880, p. lxviii. The Rev. A. E. Eaton made some remarks on the synonymy of the *Psychodidæ*, and stated that since August, 1890, he had identified all of the British species in Mr. Verrall's list, except *Sycorax silacea*. Mr. Gervase F. Mathew, R.N., communicated a paper entited "The Effect of Change of Climate upon the Emergence of certain species of Lepidoptera." A discussion followed, in which Mr. Stainton, Mr. Barrett, Dr. Sharp, and Mr. M'Lachlan took part.—H. Goss, *Hon Secretary*.

The Entomologist's Record AND JOURNAL OF VARIATION.

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THE GENUS ACRONYCTA AND ITS ALLIES.

By Dr. T. A. CHAPMAN.

(*Continued from page* 175.)

ACRONYCTA (Cuspidia) strigosa.—I have had infertile eggs, larvæ, pupæ and imagines of this species for several years, but had completely failed to get fertile eggs until this year, when Mr. Farren of Cambridge sent me a moth which laid over two dozen eggs.

In 1890, for example, I had a number of pupæ and obtained nine moths. Among these moths, sleeved over a growing thorn bush, nine pairings were observed to take place, but in no instance with a satisfactory result. I believe others have been more successful, and am therefore unable to say wherein my procedure was faulty. *Alni* sometimes pairs in the same useless manner and did so in every instance in 1890, whether I or the season was to blame in either or both instances I cannot say. In previous years the same arrangements had been very successful with *alni*. The egg is the smallest of the *Acronyctas*, being only ·74 mm. in diameter and is transparent and colourless; the structure is that of the other species of the genus, the ribs about 41 in number. The inner egg shrinks away from the outer, leaving a clear margin, but, the inner egg remaining colourless, this is not so self-evident as in the coloured species. In eggs laid on glass the development of the larva is easily observed. When ready to hatch, the larva presents very little colour except the brown jaw tips, a faint indian ink in the head, and indications of brown round the margin where the dark segments lie, can just be made out; the position of the larva in the egg-shell being identical with that of *psi*, *tridens* and all the other *Acronyctas* so far as I have observed, *viz.*, with the head under the vertex

of the egg-shell and the body coiled round, with the back against the circumference. All the eggs hatched (on three consecutive days) between 9 and 11.30 a.m. I think this is a favourite hour for *Acronycta* eggs to hatch, but it can hardly be so pronounced in other species as here, or I should, I think, have made some observations on the subject in some instance or other (Egg, Pl. VIII., fig. 7).

The young larva, when hatched, eats up the dome of the egg-shell, unless disturbed, leaving the base fixed to its attachment. Like most of the others, this larva also likes to eat its moulted skin, and invariably does so after each moult, yet I have rarely seen this actually being done, the evidence usually being the disappearance of the cast skin, except a few fragments. I do not know on which side of the leaf the egg is laid. In the wild state, it is certainly laid solitarily, in Cuspidian fashion.

The following are the notes taken this year of the larva of *strigosa*. [I see I make some confusion as to the 2nd segment being pale or dark, really it is pale, but the plate takes sufficient colouring to rank it with the dark segments on a superficial view] (Newly hatched larva, Pl. IX., fig. 1).

July 12th, 1891.—One moth of *strigosa* received by post from Mr. W. Farren. July 13th.—Has laid 24 eggs on glass. July 14th.—Has laid 6 more eggs, those first laid already show a slight coil, and are very transparent. July 21st.—Of the eggs noticed on the 13th the first hatched at 9 a.m. At 1 p.m. all hatched but two, of which one was addled. The young larvæ eat the whole of the upper dome of egg-shell. They are very flimsy and transparent, with hairs nearly half their own length (length of larva about 1·6 mm.); the dark segments have some brownish tinting dorsally. The dark segments are 4.5, 8.9 and 12, the pale 2.3, 6.7, 10.11, 13 and 14, and hairs pale, finely serrated or spicated as are those of *tridens* and others. Hairs in 11 about two-fifth length of others and proportionally fine and tubercles less marked. *Psi* and *tridens* are really very delicate little larvæ at this stage, and *strigosa* only differs in degree, but is much more delicate in appearance. Head tinted with indigo, looks dark to the naked eye. July 22nd.—Larvæ rest underneath the leaf, but will take the upper surface when the leaf is upside down, they sit curled in horseshoe shape and eat holes into the leaf, but not through the upper cuticle, the holes being placed irregularly round the larva. July 25th.—When full-grown, in this (1st)

skin, the whole larva retains a pellucid transparency, to a degree much beyond any other *Acronycta*. The 3rd segment is somewhat opaque with a yellowish shade, the dark segments 2, 4.5, 8.9 and 12, have the appearance as if the dark portion were really a plate laid on dorsally; this aspect is assisted by the circumstance that the dark portion is dorsal only and is rounded at the angles, so that a pale wedge intrudes between the dark portions of the adjoining dark segments 4.5 and 8.9. The head is now densely black and shining with 12–16 black hairs. The 2nd segment has a black plate with three black hairs on each side, two along the anterior margin and one towards the posterior angle; on each side, below this, is a plate with two hairs, and lower, laterally, another with a large black hair and a shorter behind. Dorsally, and behind the plate, are, one on either side, a reddish-brown patch, or one might say, the rest of the segment is dorsally reddish-brown, divided by a colourless dorsal line; 3rd segment colourless, dorsal tubercle with two hairs, 4th segment dorsal tubercles with two hairs. The dorsum around the tubercles, which are black, is rich red-brown, stopping short before the lateral tubercle which is in exact line with the supra-spiracular of 5th. The 5th segment is the same, except that four trapezoidals, each black with one hair, are all included in the coloured area. 8 and 9 have the same large red lozenges including trapezoidal tubercles black. On 3, 6.7, 10.11 the tubercles are ust tinted with dark, getting blackish to the edges. On 12 they are again black and a lighter shading of the dark area includes the supra-spiracular tubercles. 13 follows the rule of the pale segments with reversed trapezoidals (as usual); 14 has a pale plate, just tinted with fuscous, somewhat pyramidal in form, and carrying 8 hairs. The hairs are all black, the longest about one and a half the diameter of the larva. The 11th segment requires fuller notice. The tubercles are very small and the hairs about half the length of the others; at first view there are no posterior trapezoidal tubercles. On the other segments the large tubercles are angular and fit together, and even in the full-grown (in first skin) larva, are still in this obvious relation to each other, though floated somewhat apart. Here the anterior trapezoidals are minute and rounded, and no posterior trapezoidals are anywhere to be seen. There is, however, between segments 11 and 12 what appears to be a narrow subsegment, rounded and cushioned like an ordinary segment; this carries two minute tubercles with fine hairs, and

its posterior margin is coloured continuously with the 12th segment, making it look like an appendage thereto, but it is really a part of 11, the tubercles being its posterior trapezoidals. The minute tubercles of 11 are raised on protuberances, of which one carries both anterior, and one both posterior trapezoidals. The post and sub-spiracular tubercles and the marginal tubercles are smaller than the others. There are small plates at the bases of the anal prolegs, and there is a curious black point in the incision between segments 3 and 4 in the centre of the dorsum. Comparing with *tridens*, the point on the 3rd segment cannot be found in that species, but the anatomy of the 11th is the same; the 4th segment looks paler than the 5th, the pale segments are more opaque, their whiteness not glassy as in *strigosa*, the tubercles of the pale segments are black or nearly so, and the dark of the dark segments includes the supra-spiracular tubercle and is square from segment to segment. July 26th.—Newly moulted in 2nd skin little difference from 1st skin, is still a white larva with dark dorsum to the dark segments, whilst *tridens* of the same age is a black larva with sundry markings, and looks solid compared with the delicate look of *strigosa*. Both appear to regard the skin as edible. July 29th.—When full-grown in 2nd skin is still very like the larva in 1st skin, the pale segments are still so pellucid and free from colour, and the dark segments are so also, except dorsally, that, had such a larva been presented to me, say last year, I should have felt positive at first glance that it was still in the 1st skin, and, even at that, was more glassy, delicate and pellucid than any other *Acronycta* I had seen. Of course recognising it as a Cuspidian, I should, on examining it, have been thrown into doubt, by noticing that the tubercles possessed some pale secondary hairs, just as occur in the 2nd skin of *tridens*, etc. No Cuspidian (except *aceris*) having more than one hair to a tubercle in the first skin; the dorsal tubercles of 3 and 4 being regarded as double and having two hairs. *Viminia* has several hairs of equal value to a tubercle; when *Cuspidia* acquires more than one, they are obviously one primary, and the others secondary. The other points of difference from the 1st skin are length 4 mm., a slight indication of a dull dark line dorsally in the line of the anterior trapezoidals observable in the pale segments, at least on their margins contiguous to the dark segments, a broad white porcellanous band in the line of the posterior trapezoidals

broad enough to include them. This is not visible in a direct dorsal view, but is quite distinct on viewing somewhat from one side. It is very distinct on 3, 6, 7, and the anterior half of 10; traces of it also exist on the margins and angles of the dark parts of the dark segments, most clearly on 4, where the dark mark is rather narrower, and against the dark hind margin of 11, it is also to be traced as a very narrow line across 10 and 11. On the dark segments, where it is invisible, it appears to be overlaid by the dark area. The trapezoidals and supra-spiracular tubercles have each one dark hair; those of the other tubercles, the secondary hairs, and also the hairs of 11 are white. The general tint is much dominated by the green intestinal contents. *Tridens* at this stage is a dark larva with abundant markings, etc. July 30th.—Several have entered the 3rd skin and present an aspect very similar to the 1st and 2nd. Head on first moulting is quite white, except jaws pale brown. August 1st.—The majority are now in the 3rd skin. In 3rd skin, they are still satisfied to leave one cuticle of the leaf, whilst *tridens* of the same age eats the whole thickness of a cherry leaf. Each larva likes to get a leaf to itself, and prefers the upper side. Length newly changed, $3\frac{1}{2}$–4 mm.; full-fed, 6-7 mm. The sides are now pale glassy-green, the dorsum presents a nearly continuous dark (blackish-brown) stripe; this is the dark marking of the "dark" segments almost unchanged in extent, but darker, and reinforced by dark markings on the pale segments, on these, the dark dorsal band is narrower, not including the posterior trapezoidals as it does on the dark ones. It is interrupted across the incision between 2 and 3, on 3 and 4 it includes the dorsal tubercles (conjoined trapezoidals ?), on 6 and 7 it is continuous, on 10 it is nearly interrupted behind the anterior trapezoidals, and has a lateral wing passing behind posterior trapezoidal, the colour on this and 11 is paler than elsewhere; on 11 it forms a double patch, one to each anterior trapezoidal with a green line between, and includes also the posterior trapezoidal (as it did from 1st skin). 13 and 14 are quite transparent and colourless, the white sub-dorsal band now margins the dark dorsal band, *i.e.*, it is nearer the dorsum where the dark band is narrower and is not continuous through 6 and 7, being interrupted by the large green posterior trapezoidal tubercles, it is continuous round segment 12, behind the large dark boss of tubercles. 5, 8, 9 and 12 look larger than the other segments owing to their dark area being

broader, but this is not truly the case except very slightly as to 5, and considerably as to 12, the tubercles being raised on a low hump. The tubercles in the dark area are black, all the others are pale, but in some specimens the circum-spiracular tubercles are indicated by a slightly darker shade. The supra-spiracular tubercle has one dark hair, otherwise the hairs follow the colour of the tubercles. The post-spiracular tubercle is quite obvious with two hairs. The sub-spiracular has several pale hairs, the secondary hairs are not more developed than in previous skin. In 2nd skin the tubercles were colourless except on the dark part of the dark segments. The head is black. The general green tint seems to be that of the fluids, not of the intestinal contents. One or two best grown ones have the white mark as a broad continuous dorsal band including the trapezoidal tubercles, on which the dark bands appear to be overlaid. When full-grown in this (3rd) skin, they sometimes eat the whole thickness of the leaf, and whilst often carrying the head with the front vertical to the surface on which they rest, some now adopt the "*rumicis* attitude," at least for the head, *i.e.*, jaws forward and front of head nearly parallel to the surface on which the larva is. The 5th segment is not raised from the surface. August 5th.—Several laid up for moult. *Tridens* of same age moulted two days ago. The weather is very cold, about 60°, instead of that usual at this season. August 6th.—Most laid up, two have changed into 4th skin, length 10 mm. Sits curled round in pot-hook form, that is with head against 9th segment, but without the bend at 9th segment which gives the form of an interrogation mark to the resting position of some species. It eats the whole thickness of the leaf. When first moulted, the head is quite pale, and, as it gets dark, is first brownish in the honeycomb pattern seen in many larval heads, it finally gets quite black except that the vertex on either side remains brown in many specimens (like *alni* in 4th) and the clypeus is dark green with a green line outside the suture. A conspicuous feature is the prominence of the 12th segment, which terminates abruptly behind the tubercles, both as to colour and by sloping precipitately from the tubercles to the anal prolegs, the 13th and 14th segments being as it were partly under the 12th to produce this effect, and the anal prolegs projected posteriorly. The 11th is still lower than the others, and tubercles and hairs very small and short. August 9th.—All now in 4th skin. Those full-fed about 11 mm. It often sits

in *rumicis* attitude, with a lateral bend at 6 and 9, but never curls right round as when younger. The head varies much in coloration, or rather in the extent to which the black yields to ochreous above, green in front, peach-blossom on the cheeks, and pinky-cretaceous in the ocellar region. In one or two, the head is black with a tawny spot on each vertex and a green line down each side of the clypeus. In another, the clypeus and a great streak on each side are green, there is a great patch of peach on each side of this, more again behind the ocelli, and a greenish-cretaceous patch behind this—the tawny vertex is large and has several subsidiary portions below, the black being reduced to a wide margin round the tawny patch extended a little below, and a black streak along the ocelli. In one specimen, the black is reduced to a few spots, the tawny above and the peach below are continuous—there is a black streak along the extreme margin of the corneous head below and behind. The rich pinkness of the peach colour varies a good deal, in many it is as rich as the patches in *Thyatira batis*. The dorsum of the 2nd segment, as the larva is at rest, looks to be part of the head, being of the same colour and texture, several hair bases in it being tawny, as is one on the head. The dorsal dark band is now quite continuous with a definite margin, very broad in 2, 5, 8 and 9, and so narrowed in 6 and 7 as to include only the anterior trapezoidals. These tubercles are all black with tawny tips. The tubercles elsewhere are green with, in some places, a wash of indian ink, so as faintly to indicate them by a different tint. The trapezoidals and supra-spiraculars have each one black hair, a primary one, and several smaller secondary ones also black, of which one is often larger than the rest, thus the first secondary hair on the 6th anterior trapezoidal is larger than the primary one on 11. The post-spiracular has several hairs, one of which looks dark in some lights, the sub-spiracular and marginal have each several long pale hairs, of which it is difficult to say that any one in particular is the primary one. The posterior trapezoidals of 5, 8 and 9 and all of 12 are especially large, this results in a suggestion of a hump on 5, chiefly due to attitude, and a decided one on 12. The dorsal mark is faintly margined by yellow, rapidly shading into the green sides, there is an indication most marked on 10 and 11 of a tawny (paler) dorsal line, and this continues as a darker (deep purple) narrow line down the green posterior portion of 12th, and the green 13th and 14th segments. The rest of the

larva is green of slightly varying shades, the thoracic legs even being green, and is so transparent that the tracheal trunks are easily seen. The general surface, at least dorsal to the spiracles (spiracles black with a white centre), is tolerably closely studded with very minute black hairs, so minute that they do not interfere with the general green tone of the green portion, but they give a darker tone to the back, which is really a purplish-chocolate, rendered blackish-brown by these hairs. As Mr. Buckler notes, the posterior trapezoidals are placed more apart and to the front than is frequently the case; there is, nevertheless, a tendency to a sulcus between the anterior and posterior, forwards it is rather a depression behind the anterior, terminating against the posterior, on 9 it is very distinct, in 10 it is marked, and in 11 it culminates in the apparent division of the segments into two sub-segments between the trapezoidals, the posterior here being far behind the anterior. These are much smaller than in any other segment. On 10, and to some extent, in 9, the posterior trapezoidals have a greenish mark stretching across but not quite reaching the opposite one, suggesting a tendency to a lozenge-mark like that of adult *alni*. August 11th.—25 agree with this description, and several are laid up for moult, but three differ in being altogether smaller, especially in size of head and in plumpness. They are $9\frac{1}{2}$ (barely 10) mm. in length, and two are laid up for moult. They differ also in the character of the pale border to the dark dorsal band, which, especially in 6 and 7, has more of the character of the 3rd skin, and the dorsal line on 13 does not extend into 14. The head in the 3rd skin was black, here it is the same as others in 4th; in one with pale peach, in the two others has only the tawny tips and green clypeus. It would seem that these mean to have a moult more than the others, which look as if the next skin might be the last, as they are larger than *tridens* was in the 4th skin. *Tridens* are now in 5th skin, and are much larger. August 12th.—Two of the three just noted have moulted; most of the larger are laid up for 4th moult. August 14th.—Two other (one since detected) small ones have moulted, also 12 or 15 of the larger, amongst these, one with a fine smoky tint overlying the green, altogether a very dark larva. In the 5th (last) skin, the larva often sits in *rumicis* attitude, but the bending of the anterior segments is more in the form of an arch and less of an angle at the 5th segment, the curve extending backwards to the 8th or 9th

segment. The legs of 4th segment touch or cross the prolegs of 7th. The head is prone (vertex backwards, jaws forwards), and in connection with this there is a certain amount of retraction of the 2nd segment within the 3rd, and even of 3rd within 4th, so that the dorsal tubercle of 3rd, instead of facing upwards, faces forwards, being on the edge of the fold formed by the front of the segment being folded inwards. The long hairs directed forwards are those of the 3rd segment. These hairs measure nearly 8 mm., those on 12 and 13, 5–6 mm., the others along the dorsum 2–3 mm. The rich chocolate back has the same outline as in the previous skin, and the tubercles are light and dark in the same way; the tubercles in it are black, often with a pale or even nearly white point at the base of the hair. The band is bordered by a yellow line, which is orange close to the chocolate band. There is also a tendency to a pale dorsal line. The 11th segment still has hairs much shorter than any other, the 12th segment forms quite a hump, culminating at the posterior trapezoidals. It may be noted that all the tubercles remain very distinct, more so indeed than in any other, even *alni* or *megacephala*, and do not become fused or lost as in *psi* or *leporina*. The posterior trapezoidals in 5 form prominent projections, but that segment can hardly be called humped; 8, 9, and 10 have similar though smaller prominences. The spiracles are white in a black circle, that on 12 very large and distinct. Prolegs with a beautiful pink tint. Head in one or two nearly black, on most deep umber on vertex, passing into peach towards the mouth, and with varying amounts of black marbling. The form, and in some instances marking, very like *megacephala*. In one specimen the green is overlaid by a deep smoky tint, but not so dark but that the dorsal band with its paler margin is easily distinguishable. The whole surface is studded with the minute hairs or hair points noticed in the last skin; these are black and more pronounced in the dark dorsal streak. One of small ones laid up for moult August 16th. August 17th.—Two small are laid up. August 18th.—All the smaller laid up except the 1st; which has changed into the last skin, so that it is now obvious that the mass are 4-moulters, the 4 exceptional ones 5-moulters. The 5-moulters in 5th skin do not differ much from 4th skin, the broad stripe on back is less deep in colour than in last skin, less definite in its margins, and has not the distinct orange and red margin of dorsal line. On the 10th segment the posterior trapezoidal, though within the brown band, is green, and looks like an inva-

sion of the brown band by the green sides ; in the last skin it is included in the band. The hairs also are shorter than in last skin. The cast heads are very definite, in the 3rd skin all are small and black, in 4th they are coloured, but in the 4-moulters (type) the change in size is marvellous. In the 5-moulters the change is proportional to that in previous skins, and the head of the 5th skin corresponds more nearly to that of the 4-moulters, but is decidedly larger. The head of the 5-moulters in last skin appears to be decidedly larger than the type, but, being on living larva, is not easy to compare accurately. In the last skin, the tubercles in the dorsal band are black with a pale circle round the base of the primary hairs, and there are one or two secondary hairs of more importance than the others, which have pale bulbous bases. The tubercles on the pale area also have distinctly a primary hair (except the marginal), but they are less strikingly differentiated from the others. There is an indication on 7 and 8 of a pre-spiracular tubercle, one hair being present. On the marginal tubercle, the hairs are pale and more numerous, the tubercles forming a marginal eminence, and the hairs a fringe in the manner, though not so decidedly, of *megacephala*. Beneath the marginal there is, on the segments unprovided with legs, a ventral tubercle with several pale hairs and other scattered hairs nearer the middle representing one or more tubercles, but without any raised base. In the dark specimen, the tubercles of 13 are black, and the circumspiracular tend to have some dark tinting on their margins, the darkness of the green area consists in the hair-points being very black, the skin generally being denser and more opaque, certain ill-defined brownish clouds, of which the most definite forms a waved arch on each segment passing over the spiracles, and others most marked above and in front of the supra-spiracular tubercle. August 19th.—7 of the 4-moulters have this evening become dark coloured, and, when offered some rotten wood, at once commenced to burrow into it. In this state the dorsal tubercles become very distinct and the arched position noted by Mr. Buckler and the prominent angle given to 5, 8, 9 and 10 are obvious. That six-sevenths of the brood were 4-moulters only was undoubted, but that so large a proportion as 15 per cent. should vary to 5 moults is remarkable. The great jump from 4th to 5th skin as measured by the size of the head and the large proportion of exceptions, would suggest that *strigosa* has not acquired the habit of being a 4-moulter for so long or so

completely as *alni* has. When ready to pupate, the larva will bore into rotten wood, or go into a stem of reed or elder, or will, like *psi* and *tridens*, form a cocoon on or under the surface in sawdust or loose rubbish. In rotten wood, which seems to please it best, it prefers, like *alni*, to go in horizontally in a perpendicular face, and then bore upwards; but it differs altogether from *alni*, in that when it has closed the opening, to appearance in much the same way, the diaphragm so made is the actual top (or outlet) of the cocoon proper, there being no inner structure. The space excavated measures 14 mm. by 5 mm., and is lined with a little silk, and here and there by a few chips removed apparently in giving a proper shape to the cavity. The thin silk operculum coated with chips, which forms the outlet of the cocoon, often shows no indication of the exit of the moth. The sides of the opening made, which is an irregular slit, falling together again.

The pupa (Pl. III., fig. 3) is 13 mm. in length, wings 8, abdomen 5, width little over 3 mm. Pale greenish-brown, with a darker dorsal line, the leg and wing cases so transparent that the incisions of the segments within are very distinct, and the tracheal vessels running down the antennæ, legs, etc., are obvious. The whole pupa looks extremely delicate and fragile. The outlines of the fat masses are visible through the abdominal walls. The spiracles are dark raised rings, and are the only solid looking parts of the pupa, there are two bristles in front between the eyes, the pair at the bases of the antennæ are also distinct; the sculpturing is extremely fine, and only distinct along the anterior margins of the abdominal segments as very minute close pitting. The anal armature consists of two dorsal and six ventral spines. These are long compared with the size of the pupa. The ventral set are regularly disposed at equal distances, the outer ones set at an angle of 45°; all are hooked downwards. The amount of corrugated base is very small, but from the spreading of the spines they get well entangled with the silk of the cocoon, at the base of the spines there is a sloping area of longitudinal wrinkles, beneath there is a transverse ridge at the base of the spines bounding some fine radiating ridges. The hooks at end of the spines form more than a semi-circle.

(*To be continued.*)

CURRENT NOTES.

Owing to the success of last year's *Special Index* for the *Record*, another will be published this year. As we have been unable to supply any of the later applications for the last, and only a limited number is printed, it is necessary for those who want the Index to the present Vol. to make early application to Mr. A. J. Hodges, 2, Highbury Place, N. Its use to actual scientific workers is undeniable. The price will be 1s. Every record will be indexed.

Our monied Lepidopterists will hear with pleasure that Messrs. Reeve & Co. intend bringing out a work on *The Lepidoptera of the British Islands*, by Mr. C. G. Barrett, F.E.S. The work will be published in 5s. monthly parts (12 parts for 54s., if paid in advance), the number of parts apparently indefinite. Until Part 1 is to hand, it will be impossible to estimate the cost of so comprehensive a work. To those who can afford an annual subscription of 54s., until the work is complete, it will be invaluable. To those who cannot, a small paper edition will be issued in vols. (no. indefinite) at 10s. per vol. A Monograph of British Hemiptera-Heteroptera by Mr. E. Saunders, at 36s. for 8 parts with plates, or 8s. without, is also being brought out by the same firm of publishers.

In the *E.M.M.* Mr. J. Edwards differentiates the British species of *Haltica*; Mr. N. M. Richardson describes the larva of *Hypsipetes ruberata*, and Mr. Sheldon the larva of *Eupœcilia sodaliana*.

Mr. E. Saunders adds a new Hemipteron named *Henestaris holophilus*, Burm., *Hand.*, II., i. p. 292 = *geocoriceps*, Antess., to the British fauna. It has been captured near Herne Bay, Whitstable, Sheppey and Whitsand Bay.

Mr. H. T. Stainton (*E.M.M.*) states that *Helozela hammoniella*, Sorhagen, is a prior name for *Tinagma betulæ*, Wood.

A supposed new species of *Micropteryx*, for which the name of *caledoniella* is proposed, is described (*E.M.M.*) by Mr. A. F. Griffith. It is "very similar to *purpurella*, but the forewings are brighter and more regularly and completely reticulated with golden, and the anal spot is more distinct; the fringes uniformly pale golden." "Sutherland, probably from birch."

Mr. C. G. Barrett states that all the male *Spilosoma mendica* seen in the north of Ireland were of the pale variety.

Coleophora leuconipennella captured at Denton, is added to the British fauna by Mr. C. G. Barrett on the strength of one specimen taken in 1890.

NOTES ON COLLECTING, Etc.

NOTES OF THE SEASON.—*Somerset.*—Ivy is now coming into bloom here, and a few of the moths usually found at its flowers are putting in an appearance. Sugaring has been very productive the last fortnight, in fact I generally find it so for a week or two before the masses of ivy are in bloom. I took 15 *Sphinx convolvuli* last month, most of them in fine condition, and all captured at the flowers of the tobacco plant.—J. MASON, Clevedon Court Lodge. *September 30th*, 1891.

St. Anne's-on-the-Sea.—The season with us has been an exceptionally good one, although August and September have proved unpropitious. *Peronea hastiana* has disappointed us; we intended to breed a large number, but with all our efforts have succeeded in obtaining about 150 pupæ only. *Gracilaria stramineella*, *Depressaria ocellana*, *yeatiella*, *heracleana*, *subpropinquella*, *arenella* and *nanatella* have all turned up, but owing to the bad weather we have not paid much attention to them. Having collected a lot of stems of *Ænanthe crocata* with larvæ and pupæ inside, we bred hundreds of *Depressaria nervosa*, and had to stop setting them from sheer monotony. *Eppipiphora populana*, *Choreutes scintillulana*, *Gelechia temerella* and *sororculella* turned up in good numbers. Round the gas lamps we have also had fair sport, *Neuria popularis* and *Luperina cespitis* turning up in good numbers with swarms of *L. testacea*. About a fortnight ago I got two *Platyptilia gonodactyla* on a lamp, and yesterday we had a fine imago of *Acherontia atropos* brought us, which had come to the light at a signal-box, and was kept for us by the signalman, who affirmed its identity not as a moth but as a bat, and informed us that it squeaked.—Holmes Baxter, St. Anne's-on-the-Sea. *October 9th*, 1891.

Reading.—Until this last week, when we have had really cold nights with a touch of frost, I have to record a really favourable time for sugar. At one locality near here, *Xanthia citrago* have been quite extraordinary as regards numbers, but I have taken no varieties nor have I heard of any having been taken. One collector and myself took about 180 one night, and, a week later, I heard they were still swarming in hundreds, but we could not spare the time as *X. aurago* was then out and the space and time for finding them is so limited; this year was better than the last three, for we got on an average 16 each night between us, and with them a fair sprinkling of the rosy orange var. At the same time *X. gilvago* favoured us with occasional visits, two to four each night, also *Epunda lutulenta*, of which hitherto about one each year has been taken here, my friend and I secured seven. I have not heard whether any of the other collectors have seen it. We have had several new names to add to our list of captures, *Noctua glareosa* being one of them, but that we could not follow up for the same reason that drew us from *X. citrago*. I have also only tried one evening for *Sphinx convolvuli*, which did not put in an appearance, although the garden was full of flowers, including the tobacco plant. My best evening for captures was on September 14th, on which night we took over 300 specimens, chiefly *X. citrago*, *Asphalia diluta*, *N. glareosa* and *Hadena protea*.—E. C. Bazett, Reading. *October 5th*, 1891.

Aberdeen.—This season in the north of Scotland has been the worst I have ever experienced. I hoped that the autumn might turn out well after such a bad summer but in this I am disappointed. I sugared in a wood near here to-night (Saturday, October 10th), and the following list gives the result of my captures:—2 *Cerastis vaccinii*, 1 *Anchocelis rufina*, 1 *A. litura*, 1 *Scopelosoma satellitia*, 1 *Agriopis aprilina*, and a few *Chesias spartiata* at rest on broom. What a change from what I have seen in the same wood at this time of year!—A. Horne. *October 12th*, 1891.

York.—There has been a great falling off in the captures in our immediate neighbourhood since September. With but one or two excep-

tions, sugar has been very unproductive so far as the autumn species are concerned, *Asphalia diluta*, *Anchocelis rufina* etc., being very scarce. I took a fine specimen of *Luperina cespitis* on Strensall Common in September, my first capture of this insect, and I had another take, new to me, on September 30th, *viz.*, a fine example of *Ennomos fuscantaria*, ♀, which has given me a nice lot of ova. Considering the great quantity of ash around York, this species may not be uncommon, but the trees being of good size, beating for the larvæ would be a tiresome job. I am pleased to record that the larvæ of *Eupithecia albipunctata* is in plenty this year, and, as I have taken a fair number, I hope to breed the var. *angelicata*, which this spring was bred by one or two of my York friends in good numbers. This species must feed till almost the close of the year as they are to be found to-day no bigger than if just hatched, whilst others graduate up to full-fed. I specially noticed that the *angelica* growing in those parts of the wood where the late storms would strike most, yielded very few larvæ, whilst in the more sheltered parts plenty were obtained.—S. Walker. *October 19th*, 1891.

North London.—Larvæ are swarming. *Mamestra persicariæ* and *Arctia lubricipeda* devour everything that comes in their path, in which they are assisted by *M. brassicæ*, *Hadena oleracea*, *Euplexia lucipara*, *Nœnia typica*, *A. menthastri* and many others. Tree-feeding larvæ are also common. *Megacephala* larvæ may be found in plenty on the trunks of the black poplars which have been planted so extensively in this part of London. I have usually found them commonest on sunny days, half curled round in a crack of the bark, and basking in the sun. A nice lot of *Phorodesma smaragdaria* larvæ, from Benfleet, are now feeding on some plants of wormwood and southernwood in our garden. They have surely been more plentiful this year, for about 260 were taken by myself and three friends on the same ground. I found 110 on a patch of wormwood about the size of a kitchen table.—A. U. Battley, Sussex House, Amhurst Park. *September 30th*, 1891.

Tiverton.—I do not consider that the present summer has been a very prolific one in this county owing to the windy, wet, unsettled weather prevailing during the greater part of the last two months. During the fine spell in June I took a good many *Leucophasia sinapis;* these butterflies seem most restricted in their range, and feebly fly one after another, following the same route. I failed to find any of the second brood. *Argynnis euphrosyne* and *A. selene* were abundant, and *Nola cristulalis* was common on the trunks of apple trees. On May 18th, a ♀ *Arctia fuliginosa* laid eggs which hatched on June 7th, the young larvæ fed well and grew rapidly. The first spun up on July 23rd, the imago appearing on August 15th. *Demas coryli* has been most abundant, and seems to be by no means particular in the date of hatching. The first imago came out in the pupa box on May 1st; on the 15th a ♀ laid eggs which hatched on June 10th, and were pupæ by August 13th. On June 10th, I beat a ♀ from beech—ova on June 11th—the larvæ are now turning. Throughout August I procured at least 150 larvæ of all sizes from the beech hedges, and I think it quite possible to take as many more. Considering the habit the larvæ have of spinning quite a small web and living in it between united leaves, it is extraordinary that any can be procured by beating. They

are most easily reared, and when small in the feeding boxes make a slight noise like the scratching of a pin on paper, as they increase in size the sound more resembles the ticking of a watch. The larvæ of *Notodonta dromedarius* were fairly plentiful on birch from 29th July to 10th August. I took *Sphinx ligustri* and *Chærocampa elpenor* at honeysuckle, at which flowers *Plusia iota*, *Cucullia umbratica* and *Odonestis potatoria* were numerous, and I also captured at honeysuckle three specimens of *Xylophasia rurea* var. *combusta* on one evening, and another on the next. Mr. C. G. Barrett, who has seen two of the insects, makes the following remarks :—"No. 1. *X. rurea* var. *combusta*, a beautiful dark specimen of this red form. No. 2. *X. rurea* var. *combusta*, a curious specimen on account of the shape of its orbicular stigma." *Hadena dentina*, *Apamea gemina*, *Leucania comma*, *L. pallens* and many of the common NOCTUÆ swarmed on the flowers of the rhododendrons during the first week in July. On June 6th, the pupa of *Acronycta alni* hatched, the larva having been brought me in September last by a boy who found it when picking blackberries. *Euclidia mi* and *E. glyphica* were fairly numerous, but although these moths are accounted common, I have not yet ever found them very abundant. I took *H. tenebrata* (*arbuti*) in plenty, flying in the hottest sunshine from 12 to 3 in the afternoon, about the middle of June. Many of the common Geometers did not show in great numbers owing no doubt to the weather—the "Thorns" have been more or less plentiful. *C. elinguaria* very common, *Odontopera bidentata* also. Besides these I took *E. dolobraria*, *Selenia lunaria*, *Ennomos alniaria*, *erosaria* and *quercinara*. In June, *Coremia designata* was in plenty on the trunks of apple trees, and sparingly up to date (end of August), *B. gemmaria*, *T. luridata*, *G. papilionaria*, *E. porata*, *Asthena blomeri*, *L. adustata*, *L. rivata*, *C. ribesiaria*, *C. silaceata*, *E. affinitata* and *E. decolorata*. On 13th June I captured, flying at dusk, a few specimens of *M. unangulata*, but never saw any except on that one evening. The *Eupithecia*e are represented as follows :—*E. coronata*, *exiguata*, *irriguata*, *virgaureata*, *scabiosata*, *oblongata* and *castigata*; and the Micros, by *N. swammerdamella*, *H. nemorella*, *Cerostoma radiatella* (varieties), *E. pseudospretella*, *E. fenestrella*, *H. fabriciana*, *H. pflugiana*, *P. tripunctana*, *C. musculana*, *H. cirsiana*, *D. sulphurella*, *C. flavicaput*, *G. campoliliana*, *L. luzella* and very many others. The larvæ of *Pieris rapæ* have been more than usually abundant, and have caused damage to several garden flowers, particularly to the tropæolums and mignonette (Newman mentions this particularly), indeed larvæ of all sorts have been by no means scarce. I have now some 400 to 500 feeding and have also a large number of pupæ.—J. N. STILL, Tiverton. *August 28th*, 1891.

Liverpool.—This year has been pretty bad here, worse than last. The rain has spoilt everything. However, larvæ have been fairly plentiful lately, especially *Cuspidates*, such as *Notodonta dictæa*, *N. ziczac*, *N. dictæoides*, *N. dromedarius*, *N. camelina* and *Drepana falcula*. *Heliothis marginata*, too, has been fairly common on restharrow on the sandhills. I was in Simonswood Moss on Saturday, the 19th inst., and just at dusk, as we were leaving for the station, the place became alive with *Celæna haworthii*, mostly in bad condition, as this species always seems to be. I had never seen it in a quantity before; the specimens were obtained through laborious searching amongst the heather. If any one does not

know how to take it, 6.30 is the time of the day. I see I am credited in the *Record* with getting pupæ of *Celæna haworthii*, this should have been *Glyphipteryx haworthana*, the pupæ of which may be found in old heads of cotton grass in April.—G. A. HARKER, Liverpool. *Sept. 24th*, 1891.

Essex Marshes.—A visit to the *Phorodesma smaragdaria* ground on Saturday, September 12th, proved very successful. My cousin and myself were probably two of the entomologists Mr. Quail speaks of (*Ent. Record*, vol. ii., p. 207), and we succeeded in finding 53 larvæ in less than two hours. I might mention that about 45 out of the 53 larvæ were taken on two small patches of wormwood, no more than a few yards square, both the patches being quite close together. About 150 other larvæ that I know to have been taken this year came almost entirely off the same two patches.—RUSSELL E. JAMES, Hornsey Lane, N.

LARVÆ BEATING IN HANTS.—I took ninety-four *Boarmia roboraria* larvæ at Lyndhurst, and hope some will come through the winter. I also took forty-three *Gonophora derasa* larvæ last night here.—G. M. A. HEWETT, Winchester.

STRAY NOTES ON CERTAIN LEPIDOPTERA.—*Biston hirtaria.* I found several batches of eggs of this insect on the bark of lime trees, also one batch on an elm. The freshly-laid ova of this species seem to be of three different colours—yellow, green, and bright metallic purple—they all, however, turn nearly black before hatching. *Ennomos angularia.* I found the young larvæ of this insect plentiful in Kensington Gardens this year, feeding on lime, they are easy to find if sought for before the larvæ of *Orgyia antiqua* put in an appearance. In habits and appearance the young larvæ closely resemble *Eupithecia assimilata.* They eat clean-cut round holes in the leaves, and these holes never coalesce. The adventitious shoots of the lime seem to be their favourite resort, and they should be looked for at the end of May. I bred an exceedingly variable series from the larvæ I took in Kensington Gardens this year, some being exactly like *Ennomos fuscantaria*, and one was entirely suffused with brown. *Eupithecia pulchellata.* I have often wondered how this insect was got at by its parasites, living as it does closely shut up inside the foxglove flower. This year I had the good fortune to catch an ichneumon in the very act. I saw this fly apparently sitting on a foxglove flower, and, on looking closer, I saw that it had thrust its ovipositor and nearly all its abdomen through the petal, and on opening the flower I found a wretched, squirming *pulchellata* larva impaled. The ichneumon must have made a very good shot as the larva was a very little one. *Stilbia anomala.* The proportion of males I have captured to females is about 100 to one, and I should like to know if this is the usual percentage. There is a striking difference in the flight of the two sexes: that of the male being exactly like a geometer. Indeed, when *Cidaria testata* and *populata* are about, you cannot distinguish them by their flight. The female, however, buzzes about like a NOCTUA and keeps close to the heather, and only flies about two yards at a time. *Notodonta dictæoides.* Truly this insect is a terrible cannibal, but, as far as I can judge, it only devours its own species. I laid down about 250 ova on a good-sized young birch tree, which I enveloped in muslin. The larvæ had plenty of room, nevertheless, I caught them eating one another on several occasions, and the older they grew the more

cannibalistic they got. For experiment's sake I placed a nearly full-fed *N. dictæoides*, a half-grown larva of the same species, two *N. camelina*, and two *N. dromedarius*, about half-grown, into a little cage; the smaller *N. dictæoides* was gone next day, but the other larvæ were never touched, although they were together nearly a week.—Richard Freer.

Hybernation in egg-state of Calocampa solidaginis and Oporabia filigrammaria.—I do not think it is generally known (at least, I could obtain no reliable information at the time I made the inquiry) that *Calocampa solidaginis* deposits about the end of September, remaining in the egg-state throughout the winter, until about April 26th, before hatching, and will take to hawthorn as a substitute for bilberry. I noted that a good many examples were taken last year. I should like to hear if anyone's experience corresponds with mine. *Oporabia filigrammaria* also has the same habit, only they hatch in March and feed up very sharp, as they are full-fed and out of sight by the middle of May.—J. Harrison, 7, Gawber Road, Barnsley.

Eupithecia dodoneata at Sligo.—I have no doubt all the specimens captured by me (about a dozen) were taken at dusk flying along hawthorn hedges; we have no oak anywhere near here. This agrees with Mr. Atmore's experience, and probably the larvæ could be obtained by beating the hawthorn.—P. H. Russ, Sligo. *Sep. 25th*, 1891.

Single-broodedness of Cidaria silaceata.—I have bred *Cidaria silaceata* for the last ten years, and during that time I have only once had two insects emerge at the end of August, and they were much smaller than those from the pupæ which lie over the winter and emerge in May. I collect the larvæ of *C. silaceata* in August, and I find them on willow herb (*Epilobium angustifolium*). I have also found the larvæ feeding on *E. montanum*. The insect is on the wing in June, and there is only one brood in the season in this locality.—John Finlay, Meldon Park, Morpeth. *September 30th*, 1891. [In the Isle of Wight, August, 1889, I took several *C. silaceata*, all small and very dark, decidedly a second brood.—Ed.]

Nonagria concolor in Suffolk.—Whilst collecting in Suffolk last July I captured a single specimen of *Nonagria concolor*. The species has since been identified by Mr. Tutt.—A. W. Mera, 79, Capel Road, Forest Gate.

Sugaring for Gonophora derasa and Thyatira batis.—Apropos of a remark in Mr. Simes' article (*Ent. Record*, p. 183) that "*Thyatira derasa* and *T. batis* were common over bramble, but refused to come to sugar," I should like to suggest to entomologists that they should often try sugaring sprays of bramble blossom, instead of trees, or in bushy localities where there are no trees. I have always taken *T. batis* and *G. derasa* more freely by this method than by any other, besides numbers of other Noctuæ, among others I may mention *Miana strigilis* and *M. furuncula*, *Cerigo cytherea* (abundant), *Xylophasia hepatica* (very abundant), *Agrotis puta*, *Aplecta nebulosa*, *Noctua triangulum*, *Luperina cespitis* etc. Geometræ may also be taken more freely thus than at the sugared trees; I have repeatedly met with *Larentia olivata*, besides *Gnophos obscurata*, *Acidalia scutulata* and many commoner species. Those sprays on which the young berries are forming will be found to hold the sugar best.—R. M. Prideaux, 9, Vyvyan Terrace, Clifton, Bristol. *September 25th*, 1891.

STATHMOPODA PEDELLA IN NORFOLK.—Mr. Farren's note on the capture of *Stathmopoda pedella* in the "Fens" (*ante*, p. 134) reminds me that the species has again occurred here sparingly, amongst alders of course. Until this year, I had not seen the insect alive for three or four years, but at one time it was so plentiful here, that, in 1886 or 1887 (I think the latter year) I took sixty specimens one evening in an hour. It then occurred on some old alders close to the town, which trees, I am sorry to add, were cut down during the following winter. From 1887 to July this year, not a single specimen could be found, although, curiously enough, there are some old alders opposite those which have been felled, and separated from them only by a narrow road. It is not surprising that Mr. Farren should be pleased to meet with such a good and exceedingly local species as *S. pedella* undoubtedly is. This insect, when at rest, more resembles a Coleopteron than it does a moth.—E. A. ATMORE. *August 28th*, 1891.

EUPITHECIA PYGMÆATA PROBABLY DOUBLE-BROODED.—Jupiter Pluvius still rules supreme. Yesterday, however, I made an attempt to do a little collecting, and was surprised to find *Eupithecia pygmæata*. I obtained four specimens by beating a fence on the roadside near Lynn. Two of these are in fine condition, and the others, by no means worn. This suggests the probability of there being two broods of this species here, for I took several specimens in the same place on June 15th this year. A little later, about the end of the month, worn specimens were observed, and then no more were seen until August 26th. *E. pygmæata* occurs, I believe, at Wicken; and I shall be glad to know if Mr. Farren has had a similar experience as to times of appearance. I now remember having taken worn specimens in a fen near this town during the second week in July this year.—ID.

SPHINX CONVOLVULI IN HANTS.—A fine *Sphinx convolvuli* in good condition except for a slight chip out of the right upper wing, was brought to me on September 26th. It had been found at rest on a geranium in a green-house, where it had doubtless been attracted the previous night by a plant of *Nicotiana affinis* in blossom. Here is a hint to entomologists to leave their green-house doors open at night.—(Miss) A. I. MARINDIN, East Liss, Hants. *October 4th*, 1891.

THE WICKEN FORM OF EUPÆCILIA VECTISANA. The Editor's ? to my record of the capture of *E. vectisana* (*ante*, p. 134) brought me a letter from Mr. E. R. Bankes to the effect that he was not surprised to see the ?, as he considered *vectisana* purely a coast species; and, as there had been some difference of opinion as to its being *vectisana* or not, Messrs. Warren, Richardson and Griffiths having considered it *vectisana*, and Messrs. Tutt and Thurnall being doubtful, whilst I myself, although not having sufficient knowledge of the group to venture a definite opinion, yet saw that it certainly looked very different to the forms of *vectisana* I have had from other localities, being very distinctly marked instead of almost plain, and like no other British species. I sent some to Mr. Bankes to see; he, doubtful about them, sent them to Mr. C. G. Barrett, who wrote:—"Those queer looking Wicken specimens are undoubtedly *vectisana*," and then adds:—"I certainly never expected to see *vectisana* appear in so striking an aspect as in the specimen marked $\frac{1}{68}$; indeed, most of these specimens far surpass what I have seen before." The specimen

alluded to ($\frac{n}{os}$) has the ground very clear and the markings almost black.—Wm. Farren, Cambridge. *October 6th*, 1891. [My want of exact knowledge about this species makes me bow to the opinion expressed by my friend Mr. Barrett, but I am still rather dissatisfied with the determination, and trust Mr. Farren will be in a position to give us further information next year, especially regarding its early stages.—Ed.]

Abundance of Bombyx rubi larvæ.—Larvæ of *Bombyx rubi* are very common here this year, about five persons having obtained 300, and without having searched more than three times each; the best time to find them appears to be in the early morning with a heavy dew.—A. A. Bradburne, Brockhurst, Church Stretton.

Erratum.—At the beginning of my notes on collecting in Bedfordshire (*Ent. Record*, vol. ii., p. 206), for *Liparis chrysorrhœa* read *Liparis auriflua*.—D. H. S. Steuart, North Leigh, Prestwich, Lancashire. *October 8th*, 1891.

Societies.

Entomological Society of London.—*November 4th*, 1891.—Mr. W. F. Kirby exhibited a series of a very dark-coloured form of *Apis* reared by Mr. John Hewett of Sheffield, from bees imported from Tunis, and which he proposed to call "Punic Bees." They were larger than the black *Apis unicolor*, Latr., of Mauritius and Bourbon, and were almost entirely black, except in the legs, which were of a more or less reddish colour. Mr. C. G. Barrett exhibited five melanic specimens of *Aplecta nebulosa*, reared by Mr. Collins of Warrington, from larvæ collected in Delamere Forest, Cheshire, and described by him in the "Proceedings of the Lancashire and Cheshire Natural History Society" as *A. nebulosa* var. *robsoni*, in honour of Mr. John E. Robson of Hartlepool. Mr. Barrett also exhibited a beautiful variety of *Argynnis aglaia*, taken in Norfolk by Dr. F. D. Wheeler, and two specimens (male and female) of *Lycæna argiades*, taken in August, 1885, on Bloxworth Heath, Dorsetshire, by Mr. C. O. and Mr. A. Pickard Cambridge respectively. Mr. H. St. John Donisthorpe exhibited a collection of Coleoptera, comprising about thirty-six species, made in a London granary in 1890 and 1891. The genera represented included *Sphodrus*, *Pristonychus*, *Calathus*, *Quedius*, *Creophilus*, *Omalium*, *Trogosita*, *Silvanus*, *Lathridius*, *Dermestes*, *Anthrenus*, *Corynetes*, *Ptinus*, *Niptus*, *Anobium*, *Blaps*, *Tenebrio*, *Calandra*, *Bruchus*, etc. Mr. A. B. Farn exhibited a series of specimens of *Eubolia lineolata*, bred from eggs laid by a specimen taken at Yarmouth. The series included several remarkable and beautiful varieties, and the size of the specimens was much above the average. The Rev. Dr. Walker exhibited specimens of *Argynnis ino*, *A. pales* and *A. frigga*, from Norway. Mr. B. A. Bower exhibited, for Mr. J. Gardner, specimens of *Nephopteryx splendidella*, H.-S., *Botys lupulinalis*, Clk. and *Bryotropha obscurella*, Hein., taken at Hartlepool last June and August. Mr. R. Adkin exhibited two very dark specimens of *Peronea cristana*, from the New Forest. Colonel C. Swinhoe exhibited, and remarked on, types of genera and species of moths belonging to the Tineina, all

of which had been described by Walker, and placed by him amongst the *Lithosidæ*. Mr. H. Goss exhibited specimens of *Callimorpha hera*, taken in August last by Major-General Carden in South Devon, and observed that the species appeared to be getting commoner in this country, as Gen. Carden had caught seventeen specimens in five days. Mr. Goss said that the object of the exhibition was to ascertain the opinion of the meeting as to the manner in which this species had been introduced into this country. A long discussion on this subject and on the geographical distribution of the species ensued, in which Mr. G. T. Baker, Mr. Stevens, Mr. Barrett, Colonel Swinhoe, Mr. M'Lachlan, Mr. Verrall, Capt. Elwes, Mr. Fenn, Mr. Jacoby, and others took part. Mr. C. J. Gahan contributed a paper entitled "On South American species of *Diabrotica*: an Appendix to Part II." Mr. M'Lachlan contributed a paper entitled "Descriptions of new species of holopthalmous *Ascalaphidæ*." Mr. W. L. Distant communicated a paper entitled "Descriptions of four new species of the genus *Fulgora*." Mr. F. Enock read a paper entitled "Additional notes and observations on the life-history of *Atypus piceus*." Every detail in the life history of this spider was most elaborately illustrated by a large number of photographs, made by Mr. Enock from his original drawings, and shown by means of the oxy-hydrogen lantern. A discussion followed, in which Mr. C. O. Waterhouse, Dr. Sharp, Mr. G. C. Champion, the Rev. A. E. Eaton, Mr. P. Crowley, and others took part.—H. Goss, *Hon. Sec.*

City of London Entomological and Natural History Society.—*Thursday, October 15th*, 1891.—Exhibits:—Lepidoptera.—Mr. Boden, a series of *Hesperia lineola* taken near Strood in September, and a dark specimen of *Melanargia galathea*. He also showed the specimen of a *Noctua* bred from a tomato, previously exhibited on August 6th. This insect had since been identified as *Prodrenia littoralis*, Boisduval, a species hitherto unknown in Britain. He stated that he had failed to obtain any information as to the locality from which the tomato came, but expressed an opinion that seeing how extensively this fruit was now cultivated in England, it was quite possible that the insect might become naturalized in this country. The larva was brown, with a pig-like head, and fed on the interior of the tomato during the night, resting during the day, in a straight posture, outside the fruit. The cocoon, which he also exhibited, was formed just under the surface of the sand at the bottom of the garden-pot in which the insect had been bred. Dr. Sequeira, *Xanthia silago*, *Epione apiciaria*, *Scotosia dubitata*, *Emmelesia affinitata*, *Cidaria silaceata*, a very small specimen of *Abraxas grossulariata*, and many others. Mr. Quail, life-histories of *Eurymene dolobraria* and *Pericallia syringaria*; also a specimen of *Polyommatus virgaureæ*, taken on a thistle head at Birling Gap, near Seaford, August 4th, 1891. The specimen was a male, in good condition, being, however, slightly worn and appearing to have been on the wing for some days. Mr. Clark, a series of *Dianthœcia capsincola* from the north of Ireland; also specimens of *Noctua festiva* and *N. conflua* from various localities. Mr. Southey, *Noctua rubi*, *N. festiva* and *N. triangulum*, with preserved larvæ of each. Dr. Buckell, *Noctua festiva* from London district and York, and so-called var. *conflua* from Aberdeen, *N. sobrina* from Perth, *N. augur* from Highgate and *N. rubi* from Suffolk and Muswell Hill. Amongst the latter was a

specimen in which the area between the transverse line just beyond the reniform and the hind margin, was unusually dark. There was also a dark shade at the base, and the black dot under the orbicular had become expanded into a longitudinal dash. Mr. Hill, a living larva of *Notodonta dictæoides* from Epping Forest. Mr. Prout, various species from Sandown, Isle of Wight, including *Satyrus hyperanthus* var. *arete*, *Agrotis lunigera*, *Bryophila glandifera*, *Aporophyla australis*, *Cidaria picata*, *Iodis vernaria*, *Emmelesia alchemillata* etc. Messrs. Tutt, Bayne, Milton and Battley also exhibited their series of the genus *Noctua*, and Mr. Horne of Aberdeen sent a very variable series of *N. festiva* from his district.

Coleoptera :—Mr. Cripps, *Silpha lævigata*, *Quedius tristis*, *Q. molochinus*, *Ilybius fuliginosus*, and *Agabus guttatus*. Mr. Heasler, *Quedius umbrinus*, taken among reed refuse on the sides of Barking Creek. Mr. Milton, *Cryptocephalus aureolus*, *Philonthus fucicola*, *Æpus marinus* and *A. roboni*.

Mr. Tutt then read a paper on "The genus *Noctua*, with special reference to *N. festiva* and *N. conflua*," of which the following is a brief summary :—

"Our limited genus, which we call *Noctua*, is only a part of the comprehensive genus *Agrotis* in its broader form as accepted on the Continents of Europe and America. Of our species in *Noctua*,—*N. subrosea* and *N. fennica* belong rather to our limited genus *Agrotis*, whilst *augur* should be placed apart (it has been suggested by Butler to restore *Graphiphora* for this purpose). This genus, closely allied to, but yet fairly separate from *Agrotis*, contains some very interesting species from the point of view of variation, but there is not the same polymorphic character exhibited by the species as in the latter genus. *Noctua festiva* is the most variable species both in colour and markings. *N. dahlii* and *N. neglecta* offer a wide range of colour variation, whilst *N. glareosa* varies from pale whitish-grey to intense blackish, and *N. xanthographa* goes through an almost similar range. *Festiva* var. *conflua* of Treitschke has for a long time puzzled our British lepidopterists, more particularly it would appear, because writers in the entomological magazines have of late years referred to the Shetland form of this species, as well as to the small Scotch *festiva*-like form, under the name of *conflua*. These Scotch specimens are undoubtedly *festiva*, the Shetland species being the true *conflua*. There is one special point of variation in the genus worthy of notice; I refer to the C-like mark passing round the orbicular in the three closely allied species *triangulum*, *ditrapezium* and *c-nigrum*. It is formed of two quadrate spots—one, between the orbicular and reniform, the other, beyond the orbicular (nearer to the base). In *c-nigrum*, these two spots are always joined by a line passing under the orbicular; in *ditrapezium*, they are more often joined than not,—in my own series about three-quarters are thus joined; in *triangulum*, there are much fewer specimens having them joined than distinct. The shape of the mark thus made varies greatly, from two solid blocks with a line joining them, to a solid-looking letter C, whilst frequently the normally quadrate spots become somewhat triangular in shape, and thus tend more or less to obsolescence. It is remarkable that the same superficial mark is developed in *Tæniocampa gothica* and goes through the same gradations." The history of

Graphiphora augur var. *helvetina* was then referred to, and the parallel variation in *Noctua baia*, *N. sobrina*, *Agrotis subrosea* and *A. hyperborea*, in the direction of glaucous forms on the one hand and red forms on the other, was fully entered into. The grey type of *N. depuncta*, as apart from our British form, var. *mendosa*, Hb., was then considered, and reference was made to the extreme colour variation of *N. glareosa* and *N. xanthographa*. Of the former species, Mr. Tutt read :—" This species has a wide variation in ground colour, which extends from a pure whitish-grey to black, the characteristic short black transverse marks, however, being very constant in all its forms of variation, and standing out conspicuously even in the darkest specimens. These darkest specimens are, I believe, almost peculiar to the Shetland Isles, and are excessively rare elsewhere, although there is a record by Mr. Wylie in the *Entomologist's Record* etc., vol. i., p. 11, of three black specimens having been captured in 1887, near Perth. There is also a beautiful variety tinged with a delicate rosy colour, as was mentioned in *The Brit. Noct. and their Vars.*, i., 11, as being of frequent occurrence in those species of *Cuspidia* and *Viminia*, which have a similar grey ground colour. Esper's diagnosis of this species is:—'Alis cinerascentibus, punctis baseos et pupillis stigmatum nigris, strigis tribus posterioribus albidis' (*Die Schmet. in Abbildungen* etc., p. 387). Our own pale specimens are distinctly of two forms—one, of a pale whitish-grey, the second, of a pale lilac-grey, the former being the more common form found on the Continent, the deepening in tint of some of our specimens being, perhaps, a foreshadowing of the intense melanism which is so characteristic of those from the Shetland Isles and probably from the Scotch Highlands. The *hebraica* of Hübner is almost typical, having 'the space between the two outer transverse lines of a rather darker grey' (*Sammlung europäischer Schmet.*, fig. 642). I have never seen specimens actually intermediate between the grey and black form but Mr. Wylie writes :—'During 1887, I took a great number of this species, varying from black to the normal type, with many intermediate forms and rosy vars' (*Ent. Rec.*, etc., vol. i., p. 11)."

He then drew attention to the pallid form of *N. triangulum*, to the superficial resemblance between *N. c-nigrum* and *Tæniocampa gothica*, to the sexual dimorphism of *N. ditrapezium* and to the very rare occurrence of the red type of *N. stigmatica*, the British specimens being principally var. *tristigma*, St. It was remarked that the chestnut-marbled and red forms of *N. dahlii* were principally sexual in England, but that in Aberdeenshire and Ireland the red form was common to both sexes. The occasional occurrence of *N. flammatra* in Britain was noted, as also was the double-broodedness of *N. rubi* and *N. plecta*. The want of variation in *N. umbrosa* was remarked, the rest of the time being occupied with *Noctua festiva* and *N. conflua* (the paper will appear in next No.). At the end of this paper Dr. Buckell pointed out certain differences between *augur* and the typical species of the genus *Noctua*, and made some remarks on the variation of *Noctua rubi* and *N. xanthographa*. Mr. Tutt referred to the seasonal dimorphism in the former species, and mentioned the capture of a very pale specimen of *G. augur* by Mr. Dutton at York this year.

Thursday, November 5th, 1891.—Exhibits: Mr. Mead, *Miselia oxyacanthæ*, *Miana strigilis* and *Euplexia lucipara*, all from Epping Forest.

Mr. Southey, a fine series of *Geometra papilionaria* from the New Forest. Mr. Riches, *Hemerophila abruptaria* from Hornsey Rise, including two very dark specimens, and a bred series of *Depressaria heracliella*. Mr. Hollis, pale varieties of *Vanessa urticæ*, living specimens of *V. atalanta* and *V. cardui*, and a curious variety of *Arctia lubricipeda*. In the opinion of some of the members, the latter had been caused by the insect passing through a flame. Dr. Buckell, various species illustrating the difference between northern and southern forms of the same insect. These included *Luperina testacea* vars. *cinerea* and *nigrescens*, Tutt, from Hartlepool, a grey specimen of *Noctua festiva* from Aberdeen, *Apamea basilinea*, greyer than the London form, from Hartlepool, *A. gemina* from Aberdeen, with dark central band reaching completely to inner margin, *Hadena pisi* from Hartlepool, of a greyish ground colour, and for comparison, specimens from Aberdeen and London; also, on behalf of Mr. Lewcock, a spider, found in a garden at Fulham, about the middle of October. Mr. Battley, a collection of Lepidoptera taken in his garden at Stamford Hill, including *Vanessa polychloros*, *Zeuzera æsculi*, *Tanagra chærophyllata*, *Gonophora derasa*, and many others; also varieties of *Abraxas grossulariata*, bred this season, and a very pale specimen taken at Enfield in 1879. Mr. Clark, a series of *Retinia resinana* from Perth. Dr. Sequeira, various species taken in his garden at Cassland Road, South Hackney, including *Vanessa cardui*, *Sesia tipuliformis*, a dark specimen of *Hemerophila abruptaria*, *Scotosia dubitata*, *Plusia chrysitis*, *Dipterygia pinastri* and *Amphipyra pyramidea*. Mr. Hill, Lepidoptera from a garden at Hampstead, including *Sphinx ligustri*. Mr. Tutt, a fine variety of *Agriopis aprilina*, belonging to Mr. Mason, of Clevedon, also varieties of *Ennomos angularia* and *Miana furuncula*. Mr. Bayne, *Luperina testacea* and *Ennomos tiliaria*. Mr. Simes, varieties of *Ypsipetes elutata* and *Lycæna alexis*, *Hadena protea* from Bute, and dark forms of *Agrotis lucernea* from Aberdeen. Mr. Nicholson, *Gonepteryx rhamni*, *Dipterygia pinastri*, *Cucullia umbratica*, *Heliothis peltigera*, *Mania maura* etc., from his garden at Clapton. Mr. Huckett, bred specimens of *Ennomos angularia* and *Himera pennaria*. Mr. Smith, *Lycæna adonis*, *L. alsus*, *L. ægon*, *Thecla betulæ* etc., taken this season. Mr. Prout, *Triphæna pronuba*, *Hadena oleracea* and *Melanippe fluctuata* from Dalston, several specimens showing a tendency to melanism; also a series of *Anchocelis pistacina* from the Isle of Wight. Mr. Milton, *Chærocampa elpenor*, *Smerinthus tiliæ* and *Cossus ligniperda*, all from Stamford Hill, also a specimen of *Sphinx ligustri*, bred from a larva found at Bethnal Green. He also exhibited in Coleoptera, *Chrysomela graminis*, *C. menthastri*, *Clerus formicarius* and *Silpha thoracica*; and in Hymenoptera, *Xiphyra dromedrius*, *Lampronata setosa* and *Chrysis cyanea*. Mr. Heasler, *Homalota immersa*, taken in fungus at Mitcham.

Dr. Buckell then read his paper on "The Lepidoptera of a London garden," in which he summed up the results of his experience between 1881 and the present time in two Islington gardens of the "cultivated back yard" order. The record showed that in all 63 species had been captured, distributed as follows:—4 species of Rhopalocera, 3 Sphinges, including 1 specimen of *Macroglossa stellatarum*, 6 Bombyces, 31 Noctuæ, including *Apamea ophiogramma*, *Agrotis saucia*, *Triphæna comes* (*orbona*), *Tæniocampa incerta* (*instabilis*) and *Orthosia ypsilon*, 19 Geometræ,

including *Urapteryx sambucata*, *Crocallis elinguaria* and *Amphidasys betularia*. Dr. Buckell incidentally called attention to the need that existed for the compilation of a list of the fauna of the London district. He expressed an opinion that the task was one that might very properly be accomplished by the Society, and urged the Council to take the matter in hand.

Messrs. Tutt, Sequeira, Battley, Prout, Hollis, Gates, Southey, Riches, Milton and Clark continued the discussion on the subject, many interesting records being given, and, on the motion of Mr. Tutt and Dr. Sequeira, a vote of thanks was accorded to Dr. Buckell for his kindness in bringing the subject forward.

Mr. Bellamy asked for some information respecting the hour at which NOCTUÆ came to sugar and ivy in the autumn. Mr. Battley stated that during the last few weeks he had rarely noticed any insects on sugar after 6 p.m., from 5 o'clock to 5.45 being the best time, but they came to ivy considerably after that time, some of them being observed settling at 8 p.m. Mr. Tutt thought it was owing to the fact that some species preferred sugar to ivy, while others came more freely to the latter, and that the ivy insects had their natural time of flight at a later hour than those that came to sugar.

Mr. Prout stated that his series of *Anchocelis pistacina* were taken on sugar, immediately after dark.—A. U. BATTLEY and G. A. LEWCOCK, *Hon. Secs.*

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—*October 12th*, 1891.—Mr. C. E. Stott read a paper entitled "Notes on *Celæna haworthii*," in which he described the haunts of this species, cautioning the would-be captor of the necessity of very gently approaching the heather on which the insect rests, otherwise it would take fright and drop to the roots, from which it is almost impossible to extricate it. The author then gave a short history of its earlier stages, and concluded by describing the different local varieties. The paper was illustrated by specimens of the species. Mr. J. Collins read "A few remarks on *Aplecta nebulosa*," stating he had bred five melanic forms from Delamere, for which he proposed the varietal name of *robsoni*, in honour of the well-known entomologist Mr. J. E. Robson of Hartlepool. Mr. Collins exhibited the five specimens, with others bred at the same time. The secretary read a communication from Mr. J. W. Tutt, who wrote that the specimens of *Tortrix donelana* exhibited at the last meeting had, at the South London Entomological Society, been stated to be *T. steineriana* var. *dohrniana*, and that the name of *donelana* would therefore fall to the ground. But it was pointed out that *donelana* had already been referred to *steineriana*, but incorrectly so. Mr. Townsing showed a remarkable gynandromorphous specimen of *Orgyia antiqua*, the head of which possessed the male structure, while the body was that of the female. Mr. Harker, a variety of *Vanessa io*, the ground colour of which was fulvous brown, apparently owing to the thinness of the scales. Mr. Gregson, a very variable series of *Dianthœcia conspersa*, including the melanic form. Messrs. Townsing and Prince, dark forms of *Abraxas grossulariata*; and Mr. Pierce (the secretary), *Retinia resinana* and their resinous nodules from the fir trees.—F. N. PIERCE, *Hon. Sec.*, 143, Smithdown Lane, Liverpool.

The Entomologist's Record AND JOURNAL OF VARIATION.

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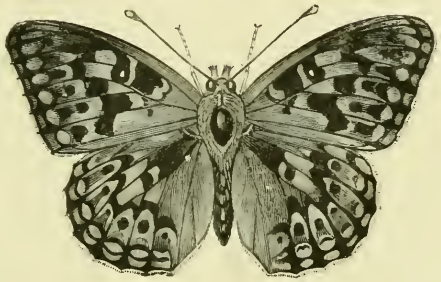
VARIATION.



Variety of Argynnis aglaia.

This beautiful variety of *Argynnis aglaia* was captured this year (1891) at Bevendean near Brighton, and exhibited by me at the City of London Entomological Society's meeting of November 19th. The specimen differs essentially from the typical male of this species in the great increase of the size of the black spots, and consequent suppression of the ground colour. It will also be noticed that the sides are slightly asymmetrical, the right pair of wings being much darker than the left. The most important points of variation in the fore-wings, compared with the type, are as follows:—(1). The blending of the second and third costal streaks into a black patch, the excessive development of the discoidal blotch (or fourth streak), and the union of the fifth and sixth streaks into another blotch. (2). The union of the lunular black marks parallel to the hind margin with the parallel row of dots, thus forming a transverse series of black patches. (3). The excessive enlargement of the zigzag series of black marks running down

the centre of the wing. (4). The thickening of the nervures (with black scales) towards the outer margin. On the hind wings there is (1). An almost entire failure to form the black lunular marks on the extreme outer margin (especially on the right side). (2). The zigzag line in the centre of the wing is particularly well developed, whilst the area between this and the outer margin is shaded with very opaque black scales which quite obscure the ground colour. (3). The nervures are also broadly black. The fore-wings show the slightest possible traces of a concavity in the centre of the outer margin, but otherwise the specimen appears to be quite normally developed. It is strange that the under-side shows the spots which are united above, as distinct, and not much more than the normal size, whilst those near the apex of the wing are rather less developed than usual. The space between the extreme edges of the hind wings and the outer row of silver spots is abnormally broad.—J. A. Clark, The Broadway, London Fields.

Variation in Noctua festiva and N. conflua.[1]—"These are the most variable and interesting of all the species in this genus. The interest in them has been greatly enhanced owing to the discovery in the Shetland Isles of forms totally unlike those obtainable in England, Ireland and, so far, on the mainland of Scotland, Of these Shetland examples, which are the true *conflua*, Mr. J. Jenner Weir writes:—"This insect varies much; some resemble the ordinary varieties of *conflua*, others are in coloration more like *N. dahlii*, and others are very like *N. brunnea*; all are darker than the normal *N. festiva*. Some have a hoary appearance, and indeed present such singular differences that I do not doubt, if the more remarkable aberrations were examined separately, they would in the absence of links, be regarded as distinct species" (*Entomologist*, vol. xiii., p. 289); and, writing of "the Lepidoptera of Unst," the same gentleman remarks again of true *conflua*:—"A most beautiful series of this species was captured, some of a very rich chestnut colour with well-defined markings, as rich in colour as *N. brunnea*; and others of the var. *conflua* with markings almost obsolete. Of these, three varieties are figured,[2] Nos. 8, 9 and 10" (*Entomologist*, vol. xvii., p. 2). Of the general variation of ordinary *Noctua festiva*, Newman writes:—"This moth is exceedingly variable. Through the kindness of friends I have at times possessed hundreds of specimens, of which I can truly say that no two were exactly alike" (*British Moths*, p. 349). The endless variation to which this species is subjected, the remarkable connection between this and the small race, erroneously known as *conflua*, which is captured on the moors of North England and in Scotland, together with the occurrence of the true *conflua* (agreeing exactly with Icelandic specimens) in the Shetland Isles with *festiva*, make this one of the most interesting of our Noctuæ.

The small form of *festiva*, generally known as *conflua* in Britain and on the Continent, is not the *conflua* of Treitschke, which represents the Shetland and Iceland form lately introduced into our lists as var. *thulei*. I have not the remotest doubt that this true Iceland and Shetland *conflua*

[1] Part of a paper read before the City of London Entomological Society, October 15th, 1891.

[2] The figures are very bad, and utterly useless for reference.—J. W. T.

is a good and distinct sub-species, having nothing in common with the small specimens of *festiva* which are picked out from hundreds of the larger forms by our Scotch collectors, and distributed broadcast into our English collections as *conflua*. This error was due primarily to Newman, who treated this small race of *festiva* as a distinct species under the name of *conflua* in his *British Moths*, p. 394, erroneously supposing that these small *festiva* were Treitschke's *conflua*. Of Newman's so-called *conflua*, Mr. Reid of Pitcaple writes:—"There is no difference between the specimens sent out from Aberdeenshire as *festiva* and *conflua*. Collectors pick out all the small specimens and call them *conflua* (because it is so in Newman's *British Moths*), and all the large ones and call them *festiva*. They (both large and small) occur together here in all localities, almost from the sea-level to several hundred feet above the sea" (*in litt.*). I have some two hundred specimens in my series from different localities in Scotland and England, and it is impossible to get from the mainland of Scotland, so far as we at present know, a single form that cannot be obtained occasionally in our Kent woods. Some of my smallest examples are from Kent, and some of my largest from Perth and Aberdeen. Of course, local environment causes some little difference in the appearance of such a common species, and a tendency to glaucous is more frequent in the Aberdeen and Darlington districts than elsewhere, the reddest specimens I have ever seen coming from Perth and Chattenden (Kent), widely distant localities enough. True *festiva* and our forms erroneously called *conflua*, in their reddest varieties are bright red, more like the red of bright *Noctua rubi*, but even brighter than the brightest of these, still there is none of the dull-brown colour in these *festiva* vars. that is characteristic of the true Icelandic and Shetlandic *conflua*, the reddest of which resemble somewhat in colour the red-brown type of *N. baia*. These specimens, too, have a differently shaped wing as mentioned by Herr Hoffmann in his extract quoted below, and this is quite a constant character, whilst no Scotch *conflua*, so-called, exhibit this essential character, whatever their size. That the so-called *conflua* of Scotch localities are anything more than *festiva*, I fail to see, whilst, at the same time, I consider that the Shetland race is so far differentiated that it can be at once separated from any forms of *festiva* known. I treat, therefore, all our English and Scotch *festiva* as such, dropping altogether Newman's erroneous use of the name *conflua*, and at the same time treat our Shetland specimens as a distinct sub-species under the name of *conflua*, Tr. Those who have not the Shetland sub-species will of course find it difficult to follow out the intricate muddle that has been woven round this species, but I believe I can safely say that in no part of the mainland of Great Britain has the *conflua* of Treitschke been taken, and although undoubtedly some of our *festiva* may to a small extent superficially resemble some of the forms of the allied sub-species, there can be no possible doubt in determination. Of the true *conflua* in Iceland, Dr. Mason writes:—"Very abundant and variable; this was first described as a species from Icelandic specimens, and differs from the form usually called *N. festiva* var. *conflua* in British collections from its smaller size; the only British specimens of this form which I have seen were taken by the late John Sang, at Wolsingham in Northumberland" (*Ent. Mo. Mag.*, xxvi., p, 198); whilst we also read:—"The

Rev. Dr. Walker exhibited a few *Noctua conflua*, illustrating the varied forms of this species occurring in Iceland; and Dr. Mason said that the only British specimens of *N. conflua* which he had seen resembling the Iceland form of the species were taken at Wolsingham, Durham" (*Trans. Ent. Soc. Lond.*, 1890, p. xxxvii.). I believe that these two references apply to the same specimens, although the county is named differently in each by Dr. Mason. It appears, too, that the Wolsingham specimens only "resembled" the Icelandic *conflua*, which is the nearest statement I can make of British (except Shetlandic) specimens. So far, I believe we have never obtained the true *conflua* on the mainland of Great Britain. Concerning the *conflua* from Shetland, Herr Hoffmann writes:—"On the authority of Dr. Rössler, I consider *conflua* a var. of *festiva*. I saw eight specimens of *conflua* from the Shetland Isles, which differ as much from the *conflua* of Altvater from the mountains of Norway and Lapland, as they vary among themselves, at least in colour. First the Shetland form has narrower wings, and the fore wings have the apex more pointed, although this is not shown in the figs. in the *Entomologist*, 1884, plate 1, figs. 8, 9, 10. In colour, they vary from dark grey-brown to reddish-brown and to a reddish-ochreous. In Iceland, according to Staudinger, quite similar forms occur. Dr. Rössler considers *conflua* the mountain form of *festiva*; whilst ova of *conflua*, brought by Dr. Bodemeyer from the Silesian mountains, produced, in Wiesbaden, only *festiva* in all its varieties, but no *conflua*. Part of these, which came out late in the autumn as a second brood, were found to come nearer to *conflua* than to the typical *festiva* of our flat country. Dr. Rössler has probably tried a large number, and formed his opinion accordingly. Dr. Staudfuss writes to me:—'Dr. Wocke has likewise reared a second brood from Altvater, which, more or less forms an approach to *festiva*.' According to Dr. Staudfuss, *festiva* occurs only in the heart of the Riesengebirge, and he found two larvæ at an elevation of 4,000 feet, which produced *festiva* not differing in the least from the form of the flat country. *Conflua* has never been taken in the Riesengebirge, whilst this form further east on the Schneeberg and Altvater at considerable elevation, seems to represent *festiva*. On the moors of the Upper Hartz, there occurs a small pale form of *festiva*, but I have never found anything approaching *conflua* in that locality. Professor Frey gives localities for *festiva* not only from the lower regions of the Swiss mountains, but also Sils-Maria in the Upper Engadine about 5,500 feet high, and therefore on the borders between the lower and upper Alps: for *conflua*, only the Berner Alps, Belchen, Engethal and Eigenthal. The last three are at a height of 3,000 feet, and therefore on the boundary between the lower region and mountain region. I only give these details for comparison, to show that *conflua* does not represent unconditionally the mountain form, as *festiva* occurs everywhere in the mountains at the same elevation as *conflua*, even much higher" (*Stett. ent. Zeit.*, 1884, pp. 360-362). It would appear certain from this, that Continental entomologists, like ourselves, erroneously call the small specimens of *festiva*—*conflua*, and have not yet differentiated correctly the form known under this name, and it is probable that those from the Alps are simply small *festiva*, like our own moorland forms, but those from Lapland and probably those from Norway are true. It is certain that the var. *borealis* is a true *conflua* variety, for

Zetterstedt writes :—"Similar to *N. brunnea*, Fab. or *N. fragariæ*, Bork., but certainly distinct, it is so much smaller, etc." (*Insecta Lapponica*, 941). At the same time, ordinary *festiva* are taken side by side with it in Norway, but these are considered perfectly distinct by Scandinavian lepidopterists; *vide Entom. Tidskrift*, 1885, p. 53. Staudinger writes of *conflua* :—"Perhaps an Alpine and northern variety of *festiva* or a Darwinian species," and gives as localities "Northern Europe, Silesian Mountains, the Alps, Iceland and Labrador" (*Catalog*, p. 83). Of these, the specimens from the Silesian Mountains and the Alps are probably only *conflua*-like vars. of *festiva*, but this is not necessarily so. My friend, Mr. Reid, I know, believes it possible that the higher mountainous districts in Perth and North Scotland might produce the real Shetlandic form, but up to the present time, I have not seen any from the Scotch mainland. With regard to these Scotch *festiva*, which we have been accustomed to call *conflua*, Mr. A. Horne of Aberdeen writes :—"I am now convinced that this variety does not occur in Aberdeenshire, nor, in fact, in any of the northern counties of Scotland. I have taken *N. festiva* in, I think, all the counties from Kincardineshire up to and including Orkney, but they do not appear to be smaller or paler at any one place than another. At Forres, the majority are of a red colour. In Professor Trail's *List of the Lepidoptera of the Dee* (Aberdeenshire) is found the following :—'*N. festiva*, abundant, rather local.' '*N. conflua*, abundant.' I think this is the principal cause of Aberdeen collectors sending away their specimens as *N conflua*" (*in litt.*); whilst Mr. Reid writes :—"*N. festiva* has been sent out as *N. conflua* by many Aberdeen collectors for 'exchange' purposes, and the fact that *festiva* never figured in the 'Exchange List' speaks for itself, besides I have been told by a collector, that 'if we call them *festiva*, we should never get rid of them.' Professor Trail's list, however, has much to answer for in perpetuating the blunder. Although some collectors have worked a great part of the northern counties of Scotland, I do not think the high mountains have ever been worked for *conflua*. I have no doubt, the narrow-winged, unicolorous form occurs freely in such localities. Mr. Tait of Inverurie, has a few which he captured in Aberdeenshire. I have taken them myself on some of our high moors, and I have seen others that have been captured high on our hills. I cannot say whether the variety has been captured in the mountains of Perthshire" (*in litt.*). Mr. Maddison writes :—"My specimens of *N. conflua* from Lapland, appear to differ slightly from my Morayshire and other Scotch specimens, in their somewhat paler colour and narrower fore wings, but I cannot say that the difference appears to be much marked" (*in litt.*); whilst Mr. Sydney Webb says :—"If we can claim *conflua* at all, it seems to me that it must be through the Shetland specimens and not through the Aberdeenshire or Perthshire ones. Stress is particularly laid, on the Continent, on the narrow fore wing, and certainly the Shetland specimens possess this in a marked degree" (*in litt.*). The true *festiva* as well as *conflua* occurs in the Shetland Isles.

We may now consider them separately. (1) *Noctua*, Linn., *festiva*, Hb. Under this name I include all our British forms except the *conflua* from the Shetland Isles. The variation in ground colour extends from a pale whitish-grey to a deep red, and in markings from exceedingly well-developed black quadrate marks between the stigmata

and beyond the orbicular, as in figs. 2 and 3 of Newman's *British Moths*, p. 348, to a total absence of any dark markings whatever. The *conflua*, as figured in Newman's *British Moths*, p. 349, are only small specimens of *festiva*, and not the true *conflua* of Treitschke. The species is polymorphic, and it is only possible in the most general way to classify the forms we get. Some of the specimens from northern localities have a strong tendency to develop a glaucous shade, whilst others from exposed localities and moorland districts, have a tendency to be dwarfed in size, although in our southern woods, there are frequently very small specimens captured. One rarely sees at large, such fine large specimens as some of the North London collectors supply us with for our cabinets, and one only sees occasionally from our southern woods such deep red-brown specimens as are obtained near Perth. The Aberdeen specimens sometimes tend to reddish-brown, but this is of a rare occurrence. Hübner's type may be described as follows :—"The anterior wings slaty-grey at the base, the extreme outer margin pale red to the subterminal line, the colour then becomes dark red from this line to midway between the stigmata ; the transverse lines grey, the reniform outlined in grey, the orbicular pale pinkish. Hind wings dull grey, fringe red, a dark shade on hind margin, transverse line and dark lunule" (*Sammlung europ. Schmet.*, fig. 114). This type has no trace of black markings on the anterior wings. In general variation, we are first struck with the range of colour, which is very great, although not so extensive as in some other species in the same genus. The great mass of specimens are coloured with whitish-grey, yellow-ochreous or red, extending in some specimens (principally Scotch ones) to bright reddish-brown, of the same shade as in *N. rubi* var. *quadratum* of Hübner, to which some specimens bear more than a superficial resemblance. Two other (almost purely Scotch) forms occur, one, of a deep grey, the other, of a purplish-red or plum-colour, the purplish tint being produced as in certain forms of *N. sobrina*, *N. baia*, *Agrotis hyperborea* and many other species. There is another Scotch form, dull reddish-brown in colour, common in Aberdeenshire districts, which is much darker than any of our more southern forms. In general appearance, too, there is great difference, some specimens are very mottled, others have a distinct dark quadrate spot between the stigmata and another beyond the orbicular, whilst sometimes the basal area (to the central shade) is very pale (grey, ochreous, etc.) the outer area being much darker. When the extreme outer margin, beyond the subterminal is also pale, the insect has a banded form, and sometimes this band is most striking in its development. The stigmata vary but little ; they are generally pale in colour and well developed. Only in one specimen of a long series are the two quadrate spots joined by a line under the orbicular, although an occasional specimen shows a tendency that way. There is also considerable difference in the development of the transverse lines, but the only one of these that occasionally presents any striking character, is the median shade, which often stands out conspicuously dark on a pale ground colour. In size there is great variation, and our exposed localities, in the north of England and Scotland, produce the small specimens which Newman erroneously called and figured as *conflua* in his *British Moths*, p. 349. Hübner's type is a very rare form, and I am indebted to Mr. Wylie, of

Perth, for perhaps the best specimen I have ever seen of it It has the basal area to the central shade of a clear bluish or slaty colour, the outer area being of a bright red. Of this type Guenée writes:—"If we only referred to the phrase in the *Wien.-Verz.*, 'dunkelrothe und perlfarbige,' and to the position of these species among those NOCTUÆ 'pupurfarbig,' with *delphinii* and *purpurina*, we should be left in great doubt, but the figure of Hübner, which was perhaps even made from the Thérésien collection itself, which is in fact half purple and half pearly grey, and which represents well, however, our *festiva*, will serve to explain the difficulty" (*Noctuelles*, vol. v., p. 331).

(2) *Noctua*, Linn., *conflua*, Tr.—The narrow and more pointed fore-wings of the Shetland specimens known by the above name, as well as the difference in tint from any form of *festiva*, at once single this out as distinct from the latter species. The line of demarcation between this and *festiva* is as clearly definable as that between many other species generally recognised as distinct. Treitschke's description of the type is as follows:—"*Apamea conflua. A.* alis anticis hepaticis, maculis ordinariis pallidioribus, strigis obsoletis confluentibus." "*Conflua* is not much larger than *Ap. strigilis.* The fore wings are liver-coloured, marbled more or less with yellowish- or reddish-brown. It is more ochreous on the outer margin and around the paler stigmata. Of the basal transverse line only a blackish dot is visible; the orbicular is very large and pale, whilst in the position of the end of the claviform is a small black spot. The reniform is large, whilst, between the stigmata and beyond the orbicular, are dark quadrate and triangular marks. Before the paler fringe is a pale wavy transverse line, followed by a dark brown band. The hind wings have a pale ochreous ground colour, with a darker lunule and pale yellowish fringe" (*Die Schmet.* etc., vol. v., Pt. 1, p. 405). Most of the specimens of *conflua* have a deep brownish coloration, some being more ochreous, and others red, the latter tint often being distinctly observable in the central area. It is rare that the ground colour is entirely red, but I have such specimens in my series. Compared with the polymorphic *festiva*, this is a constant species, but still it varies considerably within narrow limits. The red-brown form, as described above, is the type, the commoner grey-brown form is the *borealis* of Zetterstedt, whilst there is another most striking form, greyish-brown in colour as in *borealis*, but without the dark quadrate spot. I am doubtful whether Zetterstedt's *diducta*, which he compares with *Cerastis rubiginea*, is a var. of *conflua*, but, as it is treated as such by recent Scandinavian authors, I would include Zetterstedt's description. There is some doubt whether Guenée, like Newman, simply looked upon small *festiva* as *conflua*, for he writes:—"It is always very rare. I believe that it is found in the environs of Paris, for in M. Boisduval's collection there is a specimen mixed with his *festiva*, and which he, no doubt, reared with them" (*Noctuelles*, vol. v., p. 332). Boisduval's fig. 3 (*Icones*, Plate 83) is a real Icelandic-looking *conflua*, with "dark inner and outer margin, central and costal areas slightly ochreous, pale stigmata, and dark red quadrate spot between them."—J. W. TUTT. *October*, 1891.

VARIATION IN COLIAS CÆSONIA.—"At rest, the roseate underwinged females of October may be known a hundred yards away in a clover-

field. The females of the early and midsummer broods differ from those of late summer and autumn in the very pale yellow, almost white, colour of the underside of all the wings. In August, this pale yellow deepens, and in early September, reddish streaks appear along the veins of the hind wings beneath, while in October, the entire under surface of the secondaries and the tips of the primaries are heavily streaked or solidly red. The broad outer border of black in some females contains a few, more or less distinct, yellow spots, as we see in the female *eurytheme* or *philodice*, but a majority of the individuals entirely want these spots, although the border is much less intense than in the males. The colour of the underside of the wings of the male is much deeper in autumn than in early summer, being a light orange, and on the upper side of the primaries the fresh males of October have the black outside border well covered with a beautiful dusting of red scales. In males examples of the August brood only a few scattered (red) scales are to be observed, while a careful examination of many specimens taken in early summer failed to show to the writer a trace of this autumn feature. However, hand-bred specimens might show it, but as I have reared only late summer larvæ, I cannot settle the question. Near the base of the front margin of the hind wing in the male is a large, oblong, orange-coloured spot of a mealy appearance. I have noticed the same on the male of *Colias eurydice*. One female, taken in August several years ago, has the ground colour of the upper side of the front wings white, an approach to the albino, while on the upper side of the hind wings of many of the October specimens the dark streaks and shades from the black border reach almost to the base of the wings.—R. R. Rowley, Curryville, Mo. (From the *Entomological News*, Philadelphia. *September*, 1891.)

Variety of the Larva of Cuspidia leporina.—Among the larvæ of *Acronycta* (*Cuspidia*) *leporina*, which I took off birch on Wimbledon Common in September last, there was one which had no erect fascicles of short black hairs on the back.—J. F. Bird, Rosedale, 162, Dalling Road, Hammersmith, W. *October 19th*, 1891.

Variation of Nonagria cannæ.—The range of variation of Mr. Bird's and my own series of *N. cannæ* is similar to that of Mr. Bowles (*ante*, p. 226). It includes the normal red buff males, the normal light buff females, two fine smoky-brown males nearly as dark as black *N. typhæ*, but more "mousy" in colour, and one smoky female.—A. Robinson, 1, Mitre Court Buildings, Temple, E.C. *October 7th*, 1891.

Variety of the Larva of Biston hirtaria.—I see a note in the *Entomologist's Record*, vol. ii., p. 156, regarding a pale variety of *Biston hirtaria*. On looking at my notes of this year, I find that, when those I had in captivity were full-fed, they were pale, while those I then found on the trunks of the apple trees, about to pupate, were dark. I may mention that those in captivity were, during the early part of their lives, kept in glass bottles with wide mouths covered with muslin, so that they did not suffer from want of light. As it was a wet season, those at liberty would have been more exposed to wet, and this may have had something to do with the difference in colour. I kept some of the dark forms, but did not separate the pupæ.—C. A. Bird, Rosedale, 162, Dalling Road, Hammersmith, W. *Oct. 19th*, 1891.

Eugonia fuscantaria (Variation of larva).—Having bred, this season, a series of the above species, I was particularly interested regarding the great variation in the larval state, not only in colour, but in form also. I am aware of the great difference in coloration of many larvæ, especially among the Geometræ; but I had not previously noticed any variation in form. The larvæ pupated very slowly, owing to which reason I had some in pupa before many of the late ones were an inch in length. The earlier larvæ fed up well on ash, in a wooden receptacle. They were green until the final moult, thus agreeing with the description in Newman; but, after the last change, decided humps were developed and the larvæ soon lost their green colouring, and (when full-fed) much resembled those of *E. erosaria*, but with the humps scarcely so pronounced. On the other hand, the remainder of the brood were fed up in a large tin, and only a small proportion of these were humped, the majority being almost smooth and retaining their bright green colour until pupation. There were some intermediate forms, but not many. I do not find any marked variation in the imagines.—Alfred T. Mitchell, 5, Clayton Terrace, Gunnersbury, W.

Dianthæcia capsophila and D. carpophaga.—I have collected *D. capsophila* in very considerable numbers from time to time, and also bred them from the N., S.E. and W. of Ireland, and have seen numbers of the Isle of Man specimens; and there is absolutely no approximation to *carpophaga* that would puzzle any but a tyro. *D. carpophaga*, however, is a variable species, and sometimes the darkest specimens look to an inexperienced eye like worn *carpophaga*, but it never, so far as I have seen it, acquires the true colour.—W. F. de V. Kane, Sloperton Lodge, Kingstown. *October 20th*, 1891.

I quite agree with Mr. Kane, in considering it best to treat *D. capsophila* and *D. carpophaga* as distinct species.—W. Reid.

Banded var. of Agriopis aprilina.—I have bred an usually fine form of *Agriopis aprilina* from pupæ collected the first week in September at the base of an oak. It is the finest and darkest of seven or eight very large specimens from the same tree. It has the central area between the elbowed and basal transverse lines filled in with black, making a decided central band.—J. Mason. [I have an exactly similar specimen in my cabinet, given to me by Dr. Chapman.—Ed.]

Dark vars. of Cymatophora duplaris.—I have to-day seen the *Cymatophora duplaris*, bred by Mr. George Baker, and mentioned by the Rev. C. F. Thornewill in the *Ent. Rec.*, vol. ii., p. 220, and I may say that I have met with specimens quite as dark in this neighbourhood, in fact, the series I possess of this insect and captured here are, taking the whole of them, darker than those in Mr. Baker's collection.—John Hill, Little Eaton, near Derby. *November 11th*, 1891.

Varieties of Lycæna bellargus.—Whilst collecting near Folkestone on September 13th, I took a very fine variety of *L. bellargus* (*adonis*). The specimen was a male, the upper side of a very dark slate colour, almost black; and on September 15th I took another specimen similar to the first. On September 20th I captured a female of the same species, the colour of the male (of a very bright blue), with a row of black spots inside the fringe on the upper side of the fore-wings, and a row of bright red spots on the margin of the hind-wings.—W. J. Austin, Radnor Street, Folkestone.

SCIENTIFIC NOTES.

WING STRUCTURE.—Upon reading Dr. Buckell's request in the July number of your instructive journal, it occurred to me that I might be somewhat fortunately situated for making an attempt at verifying Kirby and Spence's statement. First, because I was in possession of several cocoons of large Bombycid moths, some of which might contain pupæ which would be good subjects for investigation; and secondly, although not a microscopist myself, we have a microscopical section in connection with our Society, and I was sure of obtaining the able and willing services of some of the members of it. So I examined my cocoons. There was one, and one only, of the lot, that was of any value for the purpose—a small *Callosamia promethea*, which seemed to have fully matured before it died.

I mentioned the subject to one of the younger members of the section, and read to him Dr. Buckell's request. He responded with "let us try."

I may state here that the investigation extended over several weeks; that I took notes of the observations, compared and corrected them, and, when there was conflict or uncertainty, made further observations to make sure. When the outer covering of the pupa was removed, the winglet was seen to be well coloured and scaled; when removed, it measured just over three-eighths of an inch from joint to apex, and one fourth of an inch across the widest part, which possibly might have expanded to one and a half or two inches. The first view of it under the glass suggested compression,—lateral and longitudinal; the minute scales were so crowded on one another that they almost stood erect. When the scales were removed, the transverse corrugations were disclosed, crossing the winglet at various angles, but to call them foldings seems to convey a wrong impression, drawings or gatherings would be more correct; they had an exact resemblance to some gatherings in ladies' dressmaking. Longitudinally, the foldings were unmistakable; but with nothing like the regularity of a fan, as stated by Kirby and Spence; they were of quite unequal length and depth, some were but slight depressions, others too deep to get the scales removed from them. None of them extended from the base to the outer angle of wing; one would commence near the base, run deep and terminate in a loop, another would begin about the middle of that one, run beyond it and out, others formed plaits on the outer angle. These foldings would account for the broken lines of the transverse corrugations. The front edge of the winglet had a singularly knotted appearance, which I could make nothing of at that time.

The next effort was to lay bare the nervures. To this end, I soaked the winglet in water; it came out an elastic gelatinous mass. The effort to separate the upper and under membranes was unsuccessful; on examining the under side, it was seen that the membrane had parted over some of the heavy nervures at the base of the wing, disclosing their structure completely. The end next the joint of one then turned upward, and I could see into the hollow tube as far as the bend would allow, the walls appearing to be very thin. Inside they were smooth with a waxy look. A general survey of the exterior reminded

me of an earthworm severely contracted. On close inspection they were seen to be segmented, one end of the segment was prominently rounded, sloping suddenly to the other end which entered the rounded end of the one next it. Here also, as far as I could see, the term "folded" is not appropriate. The condition of the costal edge of the winglet was now clearly displayed, but very difficult to describe. If a piece of stiff twine is laid on the table, doubled back and forth in as short bends as it is possible to give it, held in place and viewed from above, it gives a good idea of the appearance of the front of the winglet viewed edgeways; cut the bends on the side representing the centre of the wing, and it forms a strong resemblance to the upper surface of its costal edge. Crimped or crimpled would be a suitable term to express the condition. These views were obtained, and could only be obtained when the winglet was saturated with moisture.

Kirby and Spence seem to have made their description from observations on butterflies. From what we know of insects, we should be warranted in expecting as much diversity in this as in other departments of their history.

This is but a meagre outline of views obtained, and thoughts suggested, by an intensely interesting series of observations, made in a direction that offers an almost unlimited field for investigation.—J. Alston Moffat, Curator of the Entomological Society of Ontario.

Protective colour variation of Dianthœcia conspersa.—I bred a variety of *D. conspersa* last year from larvæ obtained in Cornwall. The white is entirely replaced by buff, with a slight greenish tinge (the latter especially noticeable on emergence) in two of the specimens bred, and in four others there is transition in all degrees, but with predominance of the buff, from the type to the variety. The hills in the district are metamorphic, varying in colour from slaty-grey to blackish, and they are covered with lichen, especially the yellow lichen. Query—Is this a protective variation? It seems possible if not probable, as the larvæ were taken from *Silene inflata* and *S. maritima* near the coast.—W. S. Riding, Buckerell Lodge, Honiton, Devonshire. *Oct. 4th*, 1891.

Generic position of Polyommatus bœtica.—At a meeting of the City of London Entomological and Natural History Society, held on June 18th, the proceedings of which were given in the *Ent. Rec.*, vol. ii., p. 119, the position of that ubiquitous butterfly which is there called *Lycæna bœtica* was brought forward, a letter from Mr. Culpin, from Brisbane, having been read advocating its exclusion from the genus *Lycæna*. It would seem as if the idea had then been thought new. But it is included, or perhaps, I ought to say, replaced in the genus *Polyommatus* under the name *P. bœticus*, by Mr. de Niceville in his *Butterflies of India, Burmah and Ceylon*, vol. iii., published last year.

Mr. de Niceville is undoubtedly entitled to be considered an authority on Indian butterflies, and he has given the subject of the classification of the family of the *Lycænidæ* that occur in India very careful attention. He has recorded, in the work above referred to, his reasons very fully.—C. A. Bird, Rosedale, 162, Dalling Road, Hammersmith, W. *October 24th*, 1891.

The generic position of Dianthæcia barrettii.—I wholly dissent from Mr. Buckler in assigning this species a place in the genus *Luperina*. Mr. Tutt says (*in litt.*) that "however necessary a

Dianthœcia facies may be for protection etc., in the imago stage, the affinities will be best found in the larvæ." It is therefore incontestable that the imago conforms to the *Dianthœcia* type ; so much so indeed that the melanic var. of *D. nana* often passed for *D. barrettii*. The antennæ are of the *Dianthœcia* character, not that of *Luperina ;* the emergence of the moth is that of a *Dianthœcia ;* the pupa is distinctly *Dianthœcian* with the well-marked protuberance at the end of the wing cases. Staudinger and Wocke rank *luteago* as a *Dianthœcia*. It feeds in the larval stage on *Silene,* which is the characteristic food of this genus. But Mr. Buckler and Mr. Dobrée say that the larva is similar in habits to that of *Luperina*. How ? The head and first segment are exactly that of *Dianthœcia*. The shape also similar to *D. capsophila*, and sometimes the larva of the latter is almost as pale as that of *D. barrettii*. The only point alleged is its being an internal feeder ! And the extraordinary thing is, that the greater portion of the species in *Luperina* are *not* internal feeders. Some of them eat the roots of plants, as *L. cespitis*, others eat the shoots and leaves, but hide only among the roots, *e.g.*, *L. testacea*, *L. nickerlii* and *L. virens*. *L. rubella* is the only one that is, I believe, an internal feeder, the rest eat grass, or various portions of low plants, just as *D. capsophila* does, to my knowledge, when the capsules are not to be had. In fact, when *capsophila* larva is nearly full-fed, it lives, like many Noctuæ, in the sand or earth, and eats capsules, leaves or stems of the *Silene* at night. I have bred *D. barrettii* as far as the larval stage, and the larva is a *Dianthœcia* larva, except that it is blanched like every internal feeder. It, however, also eats leaves and twigs above earth occasionally. Returning again to the imago, the shape and pattern is that of the *Hadenidæ*, none of the marked characters being wanting. The *Luperinas* are conspicuously devoid of these, and are rightly not so grouped. If we are to overlook this, and class a species from one characteristic of the larva only, we may as well remove *D. barrettii* to the *Sesiidæ* and place it next *musciformis*.—W. F. de V. Kane, Sloperton Lodge, Kingstown. *October 20th*, 1891.

I consider *D. barrettii* a true *Dianthœcia*, the larvæ may have a superficial resemblance to those of the genus *Luperina*, but I am told by people who should know something about the matter, that they (the larvæ) are really *Dianthœcia*. The pupæ are true *Dianthœcia*, and the imagines are certainly in a more natural position among the *Dianthœciæ* than among the species of *Luperina*. The foodplant should also be considered, but to my mind, the structural difference of the pupa is the best argument in favour of the insect being considered a species of *Dianthœcia*. —W. Reid, Pitcaple, N.B. *November 4th*, 1891.

Current Notes.

I would call the attention of our subscribers to the fact that it would save some trouble to send the shilling for the *Special Index* to Vol. II. of the *Ent. Record*, with the annual subscription.

The meeting of the London Entomological Society on the 2nd inst., was a very enjoyable and successful one. Mr. Merrifield's *exhibit* proved most conclusively that his low temperature experiments had

produced disease in the specimens operated on, and that this disease had been accompanied by partial melanism, as almost all the perfect specimens were richly coloured, and the more or less crippled specimens were dark. His *paper* was meant to prove that cold had produced the melanism, which it indirectly had done, if the cold was the cause of the general crippling apparent. Mr. Baker referred certain *Lycænæ* to *Thecla*, basing his conclusions on the fact that the neuration of the Lycænids removed, were identical with that of *Thecla*, and differed from all other species in *Lycæna*. Mr. Bateson had made experiments on the coloration of cocoons of *Eriogaster lanestris* and *Saturnia carpini*, and attempted to disprove Mr. Poulton's hypothesis, that the larvæ of these species could spin either a pale or dark coloured cocoon according to their surroundings. His paper is sure to lead to further experiment in this direction.

Deilephila livornica is recorded from Carrow, near Norwich, having come to the light of an electric lamp in September. This species is generally captured in or near nurserymen's gardens in England, and are undoubtedly imported in the earlier stages. I have two pairs thus captured.

Apamea ophiogramma larvæ (identified by Mr. South) are said to have been taken in September, in Nottingham, and buried in cocoa-nut fibre about October 14th, but had not pupated ten days after (*Ent.*, p. 298). This is rather strange after Mr. Battley's experience, *Ent. Rec.*, *ante*, p. 191. Perhaps these larvæ will, when the moths appear, prove to be some species other than *ophiogramma*. Mr. Gardner has captured the rare *Botys lupulinalis* and *Nephopteryx splendidella* at Hartlepool.

Mr. N. M. Richardson (*E.M.M.*) publishes the life-history of *Plutella annulatella*.

Mr. Douglas describes a new species of *Aleurodes* (*A. rubicola*) from Blackheath; whilst Mr. Newstead exhibited no less than six new species of *Coccidæ* at the meeting of the Lancashire Society, on November 9th.

An extensive partial double-brood of *Stauropus fagi* has occurred at Reading this autumn, a considerable number having been bred and captured during October by Messrs. Holland and Clarke. One was captured by Mr. Barnes as late as November 6th.

The papers on "Melanism and Melanochroism in British Lepidoptera" have been reprinted, and can now be had bound in cloth for *2s. 6d.*

NOTES ON COLLECTING, Etc.

Retrospect of a Lepidopterist for 1891.—The year 1891 is drawing to a close, and again I would draw the attention of our lepidopterists to a brief summary of the year's work. From a collector's point of view, the season has varied excessively with the locality, and comparatively near localites have differed remarkably. Taken all round, the season has been, perhaps, a better collecting season than last, in spite of the fact that 1891 will be long remembered by meteorologists as the year in which summer never came. Our Kent collectors send up a wail of woe; so, also, do the Scotch lepidopterists. Not one redeeming feature seems to have enlivened the hearts of the workers on the south-east coast, the north-east coast (Aberdeenshire) and Liverpool.

Yet, at St. Anne's-on-Sea (so near the latter place) the season has been everything that could be desired. My few excursions into Kent produced good results. The season at Reading, Freshwater and York has been remarkably good, and from Sligo come the same encouraging reports. Butterflies have not been over abundant, with the exception of the *Pieridæ*, *Hesperia lineola*, *H. actæon* and *paniscus*, which appear to have swarmed in their own particular localities. A record of that occasionally introduced visitor to our shores, *Polyommatus virgaureæ* may be found in the pages of the *Ent. Record*, but there appears to be nothing else special, recorded. Among the Sphingidæ, *Sphinx convolvuli* has occurred somewhat freely, also a few specimens of *Acherontia atropos*, and one *Deilephela livornica* recorded from Norwich; whilst, among the Sesiidæ, *Sesia formicæformis*, *S. musciformis* and *S. sphegiformis* have occurred freely, each in its own favoured haunts, and *S. scoliæformis* has been bred from birch in Rannoch. *Lithosia sericea* (*molybdeola*) and *L. caniola* have occurred again, and a great take of *Callimorpha hera* is recorded. *Limacodes testudo* appears to have been more than usually common, whilst Messrs. Farren and Jones had rare sport with *Macrogaster arundinis* (*castaneæ*). The yellow variety of *Zygæna filipendulæ* has been turned up in the Isle of Wight. The finding of eggs of *Endromis versicolor* in some numbers by Mr. Holland, closes the most important records of the Bombyces. Of the Cuspidatæ, *Stauropus fagi* (two broods) comes well to the front, having been fairly abundant both in the imago and larval stages. The larvæ of the commoner *Notodontæ* have been very abundant. But it is among the NOCTUÆ that the greatest work has been done. *Cymatophora ocularis* turned up in some numbers at Wicken, as also did *Cuspidia strigosa* in the same locality. *Cuspidia alni* larvæ appear to have been common, whilst larvæ of *Viminia menyanthidis* have been more abundant than of late years. The second brood of *Viminia albovenosa* was found in the Fens, the first brood having been excessively abundant. *Leucania albipuncta* has occurred as usual on the south east coast; whilst Messrs. Bird, Bowles and Robinson are to be congratulated on showing us, at last, how to take *Nonagria cannæ* in some numbers. *N. neurica* var. *arundineta* and *Leucania brevilinea* have been much scarcer than usual, but Mr. Mera is to be congratulated on having turned up *Nonagria concolor* comparatively near London. I understand that this species has occurred in about its usual abundance in the old locality, but a new home for the species may soon lead to some of us being able to get types for our collections. The rearing of *Pachetra leucophæa* by Dr. Chapman, from ova, obtained by Mr. Jeffrey from Kentish parents, leads me to point out that the parents came, if not from the same locality, from a very near one to that in which the species was reputed to have been taken some years ago. I took *Mamestra abjecta* in Wicken Fen, and the life-history of *Apamea ophiogramma* having been worked out by Mr. Battley, we may reasonably hope that our cabinets will soon be better supplied with this species. The rarer *Caradrinidæ* appear to have been absent or overlooked as there is only the record of Mr. Hodges' Guernsey specimens.[1] The life-history of *Agrotis lunigera* has been worked out

[1] These I have now seen, and they are undoubted *Caradrina superstes*, H.-S., the rarest of all our species, both on the Continent and in Britain.

by Lieut. Brown, whilst the less common *Agrotidæ* appear to have been as abundant as usual in their respective haunts, *Agrotis ravida* in some numbers, and *A. candelarum* var. *ashworthii* being perhaps the best of them. *Triphæna subsequa* has occurred but sparingly; the differentiation of *Noctua festiva* and *N. conflua* has been worked out; and *N. stigmatica* has occurred in some numbers in the central part of the Thames Valley. *Dasycampa rubiginea* has turned up in several localities, and our Reading friends have supplied us with quite a nice lot of *Xanthia aurago* and its vars., whilst *Cosmia pyralina* has been more than usually common; *Dianthœcia irregularis* larvæ were very abundant, at Tuddenham, the suggestion that *Dianthœcia capsophila* is a var. of *D. carpophaga* has been again mooted, *D. cæsia* has also occurred rather freely, and *Dianthœcia luteago* var. *barrettii* has been well to the fore. *Polia nigrocincta* has appeared in its usual haunts, and *Hadena satura* has again turned up in "Fenland." *H. atriplicis*, confined almost entirely to Upware in Britain, has occurred, and *Cucullia scrophulariæ* bred, although its identity with *C. lychnitis* has been suggested. *Plusia orichalcea* still occurs in its old abundance in the "Fens," and Capt. Robertson must get the aid of one of the fen-workers to prove how common it is at Swansea. *Plusia moneta* is again recorded a few times, showing its continued existence here. *Stilbia anomala* has been here and there abundant, and the "Crimsons" have again appeared in the New Forest. I cannot leave the NOCTUÆ without referring to the specimen of *Prodenia littoralis*, bred by Mr. Boden from a tomato. The species is found in "Crete, Syria, Canary Isles, etc."

Of the Geometers there is less to note. The usual Highland species have occurred. *Phorodesma smaragdaria* seems to increase in numbers the more the larvæ are worked, and, whilst we have to bewail the total destruction of the locality for *Acidalia ochrata*, our Welsh collectors have taken *A. contiguaria*, and our Lewes friends keep up the supply of *A. immorata*. *Eupithecia extensaria* has been interbred sufficiently to make it cease to be rare,—*E. pygmæata*, *E. consignata* and *E. dodoneata* are all much more wanted species of the genus. Our York friends gave us *E. albipunctata* var. *angelicata* this year, for which we were very thankful. Mr. Farren has bred a beautiful lot of *Anticlea sinuata*; *Phibalapteryx lapidata* has been taken sparingly at Rannoch, whilst *Cidaria reticulata* has occurred again as usual. No rare *Deltoides* or *Pyrales* are recorded except *Botys lupulinalis* (from Hartlepool); perhaps, the two *Hypenides* are the next best. Our two leading Hereford lepidopterists have bred *Phycis hostilis* again, *Melia anellus* occurred very sparingly at Deal, whilst the taking of *Dioryctria splendidella* by Mr. C. G. Barrett at Southwold, by Mr. Jones at Wallasey and Mr. Gardner at Hartlepool, shows the peculiar localities of this species. *Crambus myellus* appears to occur regularly now in Perthshire, whilst *C. dumetellus* is common in Aberdeenshire. Of the TORTRICES and TINEINA we have several records, of which the most important are to be found in our "Current Notes" from month to month. Perhaps one of the strangest of these records is that of Dr. Chapman, who discovered that the larva of *Micropteryx calthella* is provided with antennæ. Besides the records of Dr. Chapman; Dr. Wood, Messrs. C. G. Barrett, Elisha, Bankes, N. M. Richardson,

C. Fenn, A. F. Griffith, W. Farren, T. Baxter and Lord Walsingham are well to the front. It is advisable, before leaving the collecting portion of our work to notice the success of Dr. Chapman in hybridising *Amphidasys prodromaria* and *A. betularia*, and that of Mr. W. H. B. Fletcher in crossing *Zygæna loniceræ* with *Z. filipendulæ*, and *Z. loniceræ* with *Z. trifolii*.

From the collector to the chief articles in our magazines is an easy step, and here, far and away the best are those of Drs. Chapman and Wood. It is doubtful whether anything so good, relating to the physiological aspect of entomology, has before been brought before the entomological public. Mr. Fenn's diagnosis of *Cidaria truncata* and *C. immanata* is, perhaps, the best paper of its kind printed this year; whilst the notes of Dr. Buckell and other entomologists on "Wing Expansion" are increasing our physiological knowledge in another direction. The *Monograph of British Pterophorina* brings up our knowledge of this group to date, and many a macro-collector, who does not generally dabble in micros, will be enabled to study this group. A cheap monograph on the group has long been a desideratum. The series of papers on "Melanism and Melanochroism in British Lepidoptera" has been brought to a close, and can now be obtained bound in cloth in a separate volume.

The Societies all round have done well. The Entomological Society of London has gone on in its prosperous way. Series of papers of the utmost scientific value have been printed. The City of London Society has done, perhaps, more scientific work than any humble Society has ever before attempted, as the list of papers read before the Society, and published month by month in the *Record*, testifies. The South London Society, under one of our very best collectors, has not a barren record this year. Two years' reports in one volume were published early in the year. The Annual Exhibition was a great success. Last year's Report is in hand, and, when Mr. Tugwell leaves the chair, if he can only get this part of the work well forward, he can certainly look back to a successful year of office. The Lancashire and Cheshire and the Birmingham Societies do their best, and run the London Societies close, but have, I believe, not yet adopted any systematic plan of printing their scientific papers.

Of the publications, the *Transactions of the Entomological Society of London* are quite up to their usual excellence. May I again appeal to entomologists to aid this, our leading society, by becoming members, as its scientific publications are only limited by its income? The *Entomologist's Monthly Magazine* still holds the even tenor of its way, undisturbed by the petty jealousies of its commoner rivals. The *British Naturalist* has some most interesting entomological matter. Collectors of exotic species can still get a considerable amount of descriptions of new Chinese, Japanese and Indian Lepidoptera and Coleoptera from the *Entomologist*, amounting to eighty pages in the present volume. Our own magazine, essentially popular in its contents, increases in favour with the public, who appear to have got at last something to their taste, and a magazine that they can read from beginning to end and understand the whole.

Of independent works valuable to British lepidopterists, there is very little to record. Local lists of the Lepidoptera of Leicestershire, Suffolk

and Dover have appeared. A very comprehensive *History of the British Butterflies*, which should be in the hands of all macro-lepidopterists, and must prove a delight to all our younger students, has been written by Mr. Dale, and can be obtained from Mr. Robson of Hartlepool. *The British Noctuæ and their Varieties*, vol. i., deals exhaustively with the early families of the group, and vol. ii. is nearly ready for subscribers. Mr. C. G. Barrett has a large and comprehensive work on British Lepidoptera in hand; and this meagre list appears to deal with all the material outside the journals.

From this it may be seen that lepidopterists, in looking over the twelve months' work, will do so with mixed feelings, and although there is little enough of actual scientific value to record, a few valuable additions have been made to our knowledge, which must prove of the utmost value in the advancement of our science, and help us towards that perfection at which we all aim, but which must, from the nature of our studies, take us an enormous time to reach.—J. W. Tutt.

Notes of the Season.—A Fortnight at *Rannoch*.—On the 6th of August, my brother and I left Edinburgh, for Rannoch in Perthshire, which locality is probably known to all entomologists, at all events by reputation. It is thirteen miles from the nearest railway station, which is at Struan, on the Highland Railway, where we arrived at about 2.30 in the afternoon. After a drive through magnificent scenery of moors, mountains and rushing rivers, we arrived at the Bun Rannoch Hotel at about 4.30, where we received a hearty welcome from Mrs. Macdonald, the landlady; and I here take the opportunity of recommending this hotel to any one desirous of spending a pleasant time at Rannoch. I was fortunate enough to meet with another entomologist staying in the hotel, who very kindly informed me what was to be done at the time. *Erebia epiphron* (*cassiope*) was over, as also was *Cœnonympha typhon* (*aavus*), but *Erebia æthiops* (*blandina*) was just coming out, and was common in its special localities. He also recommended us to make the acquaintance of Mr. T. W. Salvage of Brighton, who was staying in the neighbourhood, and whose long experience of the locality would greatly assist us in finding the best localities for the species occurring in the neighbourhood. We did nothing the first night, except that while taking a short walk along the shore of the Loch before dinner, we captured a specimen of *Larentia cæsiata*. The next morning was windy and showery, which condition of weather continued for the rest of the day. I was about starting out to try a little larva beating (the weather being, as I thought, too wet and windy for imagines), when I was fortunate enough to meet with Mr. Salvage, and arranged to spend the day with him. We accordingly started in search of *Larentia flavicinctata* (*ruficinctata*), one of the best Geometræ to be got at that time of the year at Rannoch. The best way of obtaining this species is by searching for them at rest on the limestone rocks on the mountain sides. They are difficult to find, as their colour almost exactly resembles the colour of a yellow lichen growing on the rocks. They almost invariably (so my companion informed me) choose the limestone rocks, and it is of hardly any use looking for them elsewhere. We found it much too windy for obtaining this species, for after careful searching on the side of Shiehallion for about an hour, my companion had taken 2 specimens, and myself none. We took, however, several fine *L. cæsiata*, which is,

of course, a good deal commoner than *L. flavicinctata*. It is to be obtained in the same way as the latter, but is more difficult to see on the rocks, as its grey colour exactly harmonises with the colour of the rocks. Besides finding them in this way, we kicked several out of the heather as we walked through it. We were obliged to give up searching the rocks for these two species owing to the wind, so, as the sun came out for a time, we started for another locality with the intention (if the sun continued shining) of netting a few *E. æthiops* (*blandina*). This species is very local, and at Rannoch seems to be confined to an open space in a wood about four miles to the east, near the banks of the Tummel, the locality being about 150 yards long by 20 yards wide. On the way to this place, crossing a bog on the mountain side, we saw a few *Cœnonympha typhon* (*davus*), and I netted three good specimens. These were the only specimens of the insect which I took, though I fancy I saw a few more on the road between Rannoch and Pitlochry. Having reached the locality for *E. æthiops*, the sun favoured us for a little while, and we were able to net a fair number in good condition in a short time, the males being the most plentiful. My experience with this species coincides with that of Mr. F. H. Wolley Dod with *E. cassiope* (*Ent. Rec.*, vol. ii., p. 205), *viz.*, they will not fly unless the sun is shining, but the moment the sun comes out, out comes *blandina* all round you. I took a few larvæ of *Cymatophora or* from some small aspens on the banks of the Tummel. These larvæ spin up between two leaves during the day, very much in the same manner as *Asphalia flavicornis*, except that the latter as a rule spins one leaf folded in half, whereas *C. or* spins two leaves together. On returning to Rannoch I was presented with a splendid *Plusia chrysitis* by a young lady, who had found it on the hotel wall. In the evening I netted *Caradrina quadripunctata* (*cubicularis*), *Cidaria immanata* and *C. fulvata* in the hotel garden, which completed my first day's collecting at Rannoch. The next day the weather was again very unsettled, and I spent most of the morning setting my captures of the previous day. In the afternoon I took a walk with my brother to the locality for *Erebia æthiops*, and netted a few more specimens of this insect, together with a good lot of *Larentia didymata*, which was swarming everywhere, and another specimen of *Cidaria immanata*. *L. didymata* was certainly the commonest insect I observed during my stay at Rannoch, appearing in almost every place I visited, and quite oblivious of weather. I did not, however, see many females, and those I did see were much paler than the males, and not in such good condition. I also took some more larvæ of *C. or*. I sugared in the evening, but not a single moth came to the sweets. The next day being Sunday, I did not do any collecting, but along the southern shore of the Loch we noticed *L. didymata* in great quantities, notwithstanding the rain which was falling steadily most of the time. I took a worn specimen of *Thera firmata* off the trunk of one of the pine trees in the Black Wood. Monday was a magnificent day, and I was soon out with my net. I walked along the south shore of the Loch for about a mile and a half, when I struck across the rough ground on the left of the road, shortly before reaching the Allt Druidhe Burn, intending to work my way up the mountains along the south of the loch. I had not gone very far before *L. cæsiata* began to appear commonly among the heather. They were, however, difficult to capture,

as they always flew so that the sun was straight in my eyes when I started in pursuit, and it is not the easiest ground one could choose to run over after them. I managed, however, to secure a few good specimens. Working on, I came to some limestone rocks rather high up on the mountain sides, which I searched thoroughly for *L. flavicinctata* (*ruficinctata*) and was fortunate enough to find 8 fine specimens. *L. cæsiata* was very common too in the same localities, and I also netted 5 specimens of *Cidaria populata*, unfortunately in rather worn condition, but presenting very marked variation from the southern specimens, one or two being almost black. Descending from this place I came into a beautiful birch wood called Carie Wood, where I took a specimen of *C. immanata*. I then walked on towards the Black Wood, netting on the way a magnificent specimen of *Vanessa urticæ*, very large and dark, especially on the under side, which in the underwings is very nearly as dark as the underside of the underwings of *V. io*. On reaching the Black Wood I was somewhat disappointed at not seeing anything but *L. didymata*, but I suppose I did not penetrate far enough into the wood. On the way back to Rannoch I obtained a good specimen of *Melanthia bicolorata* (*rubiginata*), and also some larvæ of *C. or* on some aspens growing by the bridge where the road crosses the burn at Carie. During the next four days the weather was very unsatisfactory, being very windy with a good deal of rain, and consequently very little collecting could be done. The only new species taken were :—*Stilbia anomala*, 1 specimen on the banks of the Tummel on the 11th. This specimen was taken in the afternoon in broad daylight, which fact does not coincide with Mr. Thornewill's note (*Entomologist's Record*, vol. ii., p. 209), and I may add that another specimen was seen in the daytime on the 15th, but was too worn to keep. *Eubolia limitata* (*mensuraria*), 1 on August 11th on the banks of the Tummel, and 4 specimens in Glen Sassun on the 12th. This species, however, was well over, all the specimens I saw and took being considerably worn. On the 12th, I took 3 fair specimens of *Anaitis plagiata* at rest on the rocks on the side of Craig Var, on the north side of the village. On the 15th, I had another day's collecting with Mr. Salvage, our chief object being larvæ, particularly those of *Notodonta dictæa*. We searched aspens in Carie Wood for this species, but the strictest search only produced 1 specimen. We consoled ourselves, however, by taking a good many more *C. or*. Other larvæ taken this day were 2 *Bombyx rubi* by the roadside on the south of the Loch, and 1 *Acronycta* (*Viminia*) *menyanthidis* in the same situation, and from birch we beat 2 *A. flavicornis* and one each of the following, *viz.* :—*Notodonta dromedarius*, *N. camelina*, *Drepana lacertinaria* (*lacertula*) and *D. falcataria* (*falcula*), besides a good many others unknown to me. Of imagines I took another *V. urticæ*, very dark on the underside, but not so much so, nor so large, as the specimen taken on the 10th ; 1 *Charæas graminis*, 1 *Cleoceris viminalis*, 2 *Crocallis elinguaria* in which the median band in the forewings is much paler than in the southern specimens, being nearly the same as the ground colour of the wings, and a dark *C. immanata*. The next day, Sunday, August 16th, was devoted to a walk to the top of Shiehallion, from which we obtained a magnificent view. I noticed a great many *L. cæsiata* on the mountain, and *C. populata* was also fairly common, but having no apparatus

with me, I was not able to take more than one specimen. I noticed a good many particularly dark forms of the latter species. Monday, the 17th, was about as bad as it could be as regards weather—high wind and drenching rain all day. I did no collecting, but made an inspection of some of the magnificent insects which Mr. Salvage possesses, exhibiting some of the most striking varieties and forms from various part of Scotland. Tuesday, the 18th, was my last day at Rannoch, and I spent the day collecting with Mr. Salvage. I took a few more *E. æthiops* (*blandina*), the females of which were now well out and the males getting rather worn, and one *Pieris napi*, which species is very strongly marked on the underside in this locality. We were more fortunate with the larvæ of *N. dictæa* this time, some aspens growing by the side of Tempar Burn producing a fair number. I took between 20 and 30 in about an hour. I also took 3 larvæ of *Smerinthus populi* in the same locality, which I believe from Rannoch produce rather a good form of imago. *C. or* also occurred again here. In this place also Mr. Salvage took two larvæ of *Dicranura bifida*, which, though he has thoroughly worked the locality for some 15 years, he has never before met with at Rannoch. The next day, my brother and I started on our homeward journey. We drove from Rannoch to Pitlochry and walked through part of the Pass of Killiecrankie, where *E. æthiops* was in profusion, and a specimen of one of the large species of *Argynnis* dashed past us: it was the only butterfly of the genus I saw in Scotland, and was, I suppose, *A. aglaia*, though it flew too quickly to be able to say for certain. We took the train from Pitlochry to Perth, changed to the express to London, arriving at King's Cross at about 8.30 the next morning, very tired, but very well satisfied with our first trip to Scotland. On the whole I did as well as I expected, as I never expect to do very much on my first visit to a locality. The weather was not as good as it might have been, or doubtless the list of captures would have been greater. I was fortunate in securing the help of an entomologist thoroughly acquainted with the locality, which is certainly a splendid one, but one in which you must know where to look for the species you want or you won't get them. Take *E. æthiops* for example; this is abundant in the place where I obtained it, but is extremely local, and one might walk many miles in the best of weather, and never see a single specimen, and the same remark holds good of other species. I ought perhaps to have done more night work, but as Mr. Salvage, who sugared a few times whilst I was there, did not take anything at it, I do not so much regret having neglected it. In conclusion, I cannot but recommend Rannoch as a thoroughly good locality, and one which will well repay a diligent collector, and I hope that this, my first visit, will be the forerunner of many others.—HENRY A. HILL, 132, Haverstock Hill, Hampstead. *October 4th*, 1891.

King's Lynn.—Up to the middle of July, the season here was quite past the average, and I succeeded in taking several good local species. I have found light in the form of gas lamps unusually attractive, and amongst the species taken by its means within two or three hundred yards of my house, I may mention one *Senta ulvæ* (a dark var.), two or three *Acidalia emutaria*, *Neuria saponariæ*, and *Leucania straminea*. A day in the fens near this town, in the middle of July, gave my brother and me plenty of work, for no less than one hundred

and seventy-five species (Macros and Micros) were observed, a large proportion of which we deemed worth boxing. On this day, *Euthemonia russula* (males), *Hyria auroraria* and *Hydrelia unca* were observed to be common, and a number of each of them in fine condition were boxed. Did time permit, I should like to have enumerated a few others; but amongst the Micros, taken in some numbers on that day, were *Phoxopteryx diminutana*, *Sericoris micana*, *Pædisca oppressana*, and *P. bipunctidactylus*. In short, the season, up to about the middle of July, was certainly the best we have had for many years.—E. A. Atmore, King's Lynn, Norfolk. *August 24th*, 1891.

York.—There appear to be conflicting opinions as to the season which is now rapidly passing away, but I must say, it is the best season I have experienced for many years, especially for sugar. During June, July and August, one had no difficulty in always securing a good bag, several species being quite common, some especially so, as *Leucania pudorina*, *Apamea gemina*, *Plusia festucæ*, *Noctua rubi*, *Graphiphora augur*, *Dyschorista suspecta*, etc. The latter species was very abundant, one might have taken hundreds, yet some of the generally common species were not at all plentiful. Geometers I did not find so plentiful as in previous years. *Cuspidia leporina* was fairly common, considering that I had only taken two or three specimens before this season, but on favourable evenings this year I took as many as half-a-dozen, whilst I had the pleasure of getting a few ova and feeding up the beautiful larvæ. I have sugared a few times during the past month, but insects are exceedingly scarce. I have just spent a day searching for the larva of *Eupithecia albipunctata* which produces the variety *angelicata*, and have got a fair number.—R. Dutton, Castle Mills Bridge, York. *September*, 1891.

Torquay.—My visit to Torquay lasted from July 20th to Aug. 13th. During that time we hardly had one really warm night, whilst on some nights there was a strong wind which had a disastrous effect upon our bag. The days were often cloudy and windy, just the reverse of what entomologists love. *Acontia luctuosa* was the insect of the season, and this was very abundant in the same field where I first took it many years ago, and, had the weather been more propitious, I should have had a fine long series. *Leucania putrescens* was not nearly so common as it is sometimes, the most I took on one evening was, I think, fourteen, whilst on some evenings not a specimen was secured, and as a rule, only three or four. *Agrotis lucernea* was fairly common on one or two nights; *A. lunigera* scarce; *A. obelisca* only one, but probably we were early for this species. Of common Noctuæ the following occurred more or less freely: *Leucania conigera*, *Caradrina blanda*, *L. lithargyria*, *A. puta*, *Triphæna janthina*, *T. interjecta*, *Mamestra persicariæ*, *Apamea oculea*, *M. brassicæ*, *Phytometra ænea*. Among the Geometers were *Acidalia osseata* (*humiliata*), *Melanippe procellata*, *Hemithea thymiaria*, *Cidaria pyraliata*, *Gnophos obscurata*, *Larentia olivata*, *Acidalia imitaria*, *Cidaria picata* and *A. promutata*, the latter very scarce, though formerly it used to be common in this locality. Among the Pyralides, *Botys asinalis* and *flammealis* were both fairly common. The Crambidæ were represented by *Crambus perlellus*, *C. inquinatellus* and *C. carnella*; the latter not nearly so plentiful as I had found it on a former visit, and, curiously enough,

out of about thirty, sixteen were taken on one morning. Among the "Plumes" *Marasmarcha phœodactyla* and *Aciptilia baliodactyla* were extremely abundant. The disappointment of the visit was *Lithosia caniola*, of which we only took one specimen. In a good season, Torquay would well repay a visit, but sugaring, upon which so much depends at Torquay, was far from being productive, except on two or three nights this year.—E. C. Dobrée Fox. *October*, 1891.

Folkestone.—Anchocelis rufina was very plentiful here at sugar in September, together with a few *Xanthia ferruginea*, *A. pistacina*, *Agriopis aprilina* and *Agrotis puta*, while *X. silago* was swarming one evening at the scabious flowers.—E. W. Brown, Shorncliffe Camp, Folkestone.

Newbury.—I have not been able to work very constantly or regularly here this season, except in June, early July, and the end of last month. Most weeks I have had but one evening's collecting, and it is hardly fair to judge a season from such casual experiences, but I should on the whole consider the season a good one, except for sugaring, which with me has been a total failure. Some insects appeared here in considerable numbers, which before have only occurred singly, *Lobophora sexalisata*, *Lithosia mesomella*, *Acidalia emarginata* and *Platyptilia bertrami* for example. *L. sexalisata* flies immediately before dusk; all my specimens were taken among sallow. *Acidalia emarginata* I found by searching bramble hedges after dark, they hang with outspread wings from leaves and twigs, and are very conspicuous by lamp light. *P. bertrami* is usually taken only after dusk. In a piece of swampy ground hundreds of this species were flying at night early in July, but hours of laborious beating in the daytime failed to disturb a single specimen from among the heather, rushes and yarrow (*Achillea ptarmica*). The little swamp I speak of yielded a nice series of *Nudaria senex*, some *Leucania pudorina*, *Schrankia turfosalis*, and *Hypenides costæstrigalis*, all fresh additions to our local list. Butterflies appear to have been very scarce, especially the *Vanessidæ*, but the great failure of the season here has been the sugaring; throughout the summer it has been curiously unproductive. In June some *Grammesia trilinea* and *Miana strigilis* were attracted, and three or four nights early in July yielded about two dozen *Leucania turca*, but this was the only species present, although sugaring produced such good results at this very time at Reading and elsewhere. I tried six different hunting grounds in this district but met with the same disappointing results in them all. The last week in September proved slightly better, but even then the insects were few, my largest "take" on a single night being 5 *Xanthia citrago*, 2 *Cerastis vaccinii*, 2 *Anchocelis lunosa*, 1 *A. rufina*, 10 *A. litura*, 2 *A. pistacina*, 1 *Catocala nupta*, and 2 *Agriopis aprilina*.—M. Kimber, Cope Hall, Newbury. *October 6th*, 1891.

Marlborough.—I was at Marlborough for a week at the beginning of August. Instead of *Noctua depuncta*, which I meant to take, persistent sugaring produced 2 *Triphæna pronuba* and 1 *Noctua xanthographa*. I netted nice series of *Peronea aspersana*, *P. variegana*, *P. schalleriana* and *Pœdisca solandriana*; and took *Scoparia cembræ* and *Crambus falsellus* singly. In the flower heads of Valerian (*V. officinalis*) I found numbers of *Eupitheciæ* larvæ, which, from descriptions, I believe, will prove to be *Eupithecia valerianata*, a species only added to the

Marlborough list last year.—M. KIMBER, Cope Hall, Newbury. *October 6th*, 1891.

North London.—I have not much of interest to record since my last note. *Amphidasys betularia*, which was very easy to rear, showed itself sublimely indifferent as to its manner of pupation, a large proportion especially of those reared under a fern case turned on the surface of the earth, others dived into the earth and there changed; in no case was a cocoon spun. I have found the larvæ of *Hadena pisi* commoner than usual at Hampstead this year. I should think, from the number of pupæ of different kinds I met with in digging at Chingford recently, that any member, who is in a good pupa-digging locality, ought to have a rich harvest. I find a fern trowel the best to use, the long narrow blade will explore corners and angles, into which an ordinary trowel will not go. During the hot close weather, from September 6th to 12th, insects were very plentiful. I sugared at Wimbledon on the 9th (the day had been bright and very hot, afternoon somewhat hazy, night clear, wind S.W., very little of it), and never saw sugar so attractive, although a worn *Triphæna fimbria* was the only thing out of the common. Light was very attractive during the same week.—F. J. BUCKELL. *October*, 1891.

St. Anne's-on-Sea.—The weather during the holidays has been simply dreadful here, nothing but wind and rain; but, notwithstanding this, we have managed to get some moths together. We took several well marked *Agrotis cursoria* on the ragwort, at the beginning of August, a few *A. præcox*, two *A.* var. *aquilina* and the common moths, but none in abundance; also, *Gelechia terrella*, *Coleophora artemisiella*, etc. I had a few days on the Moors at Longridge, near Preston, but as the weather was so bad I did not do much. We took, however, *Cidaria populata*, *Pœdisca occultana*, *Grapholitha geminana*, *Penthina sauciana*, *Peronea caledoniana*, *Tortrix viburniana* and a few others. At the Salt Marsh, at Fleetwood, I managed to get a nice series of *Coleophora tripoliella*, and some very darkly marked *Peronea schalleriana* in a lane near. Also *Eupœcilia vectisana*, *Crambus salinellus* and others. I was late for *Gelechia instabiliella*, there were plenty, but most of them worn. I have tried sugaring lately but have seen nothing except the relics of the past summer, the September moths not having yet put in an appearance, with the exception of *Hydræcia nictitans*, which seems very abundant. *H. micacea* is an absentee this season, I have not seen a single specimen. *Anchocelis litura*, *A. lunosa*, *Orthosia lota*, not yet out. *Peronea hastiana* seem very scarce this season. I have been out several times but have not succeeded in getting many larvæ; I fancy a great many were killed during the storm we had the third week in August, which shrivelled all the heads of the sallows as if they had been frozen, and made them go black.—T. BAXTER, St. Anne's-on-Sea. *September 19th*, 1891.

Wisbech.—On the whole, the present season has been a very good one. Sugar appears to have been more attractive than usual, though the majority of things taken at it have been of a very common order, *Cuspidia leporina* being about the best. *Nonagria typhæ* has been abundant during the past month, but *Calamia lutosa* scarcer than usual. *Hydræcia micacea* has been taken sparingly, as also has *Trichiura cratægi* at street lamps. *Gortyna flavago* quite common on lamps, as

also *Eupithecia centaureata* and sundry other common species.—G. Balding, Wisbech. *September 28th*, 1891.

South-east Devon.—I spent about a month in South-east Devonshire during August, but the weather was wet and stormy the whole time. I took but little at sugar, the only captures worth recording being two good specimens of *Cosmia pyralina*. I tried light for three nights, and was a little more successful. I did not find larvæ plentiful, and was altogether much disappointed.—Douglas A. Onslow, Selby Lodge, 28, Carlton Hill, N.W. *October 20th*, 1891.

Clevedon.—I have done some little pupæ digging this autumn, and I never found them in such numbers; the work has been quite exciting, and though rather back-aching it has paid well.—J. Mason, Clevedon Court Lodge. *October 30th*, 1891.

Weymouth.—I have had four ivy searching expeditions, and have found insects generally very scarce; where dozens should have been, very often have found none at all, and, taken all through, I have only come across one insect—*viz.*, *Xylina petrificata*, worth the boxing. As regards larvæ, *Bombyx rubi* and *B. quercus* are to be found in numbers, the former more easily when the sun is shining; they get, if on heath, more to the top, and, if near bramble, more into the open, apparently enjoying the warmth.—A. Forsyth, Weymouth. *Nov. 2nd*, 1891.

Hastings District.—This has not been a good season for lepidoptera here, but I managed to turn up a few good things during the year. When sweeping for Coleoptera on the cliffs on July 13th, I found a fine specimen of *Sesia ichneumoniformis* in my net. This is an addition to our district list. I took another a few days later, in a wood near St. Leonards, by sweeping; but, although I worked for it in several likely localities, I did not find another. By "mothing" on the cliffs on July 15th, I netted a nice specimen of *Nola centonalis*, this is also an addition to our district list. At the same locality, *Acidalia osseata* was very common during July, and *Eubolia bipunctaria*, *Stenia punctalis*, *Platytes cerusellus*, *Homœosoma sinuella*, *Sphaleroptera ictericana*, ♂ very common, ♀ by no means so, for although I netted dozens of ♂'s, I did not see more than half-a-dozen ♀'s; *Conchylis francillonana* (new to this district), *Platyptilia trigonodactyla*, all these were more or less common; and I also took a few *Gelechia rufescentella*. At Guestling I took *Argynnis paphia*; *A. selene* and *euphrosyne* were both very abundant. By beating I got a few *Calligenia miniata*, *Lithosia mesomella* (1), *Phorodesma bajularia* (1), *Hemithea thymiaria* and *Eupisteria heparata* (both common), *Acidalia scutulata*, *A. aversata*, *A. emarginata* (common, but local), *Ennychia octomaculalis*, *Botys fuscalis* (common), *Rhodophœa consociella*, *R. tumidella* and many more. By beating in various woods near the town I obtained the following:—*Lithosia griseola*, *L. complanula*, *Ourapteryx sambucata*, *Timandra amataria* and *Panagra petraria* (both common), *Larentia didymata* (very abundant), *L. pectinitaria*, *Emmelesia affinitata*, *E. decolorata*, *Coremia propugnata*, *Melanthia ocellata*, *M. albicillata*, *Melanippe unangulata*, *Gonophora derasa*, *Triphœna janthina*, *T. interjecta*, *Plusia chrysitis*, *Rivula sericealis* (common), *Herminia grisealis*, *Endotricha flammealis*, *Botys lancealis*, *Ebulea crocealis* (common), *Pionea stramentalis* (I managed to take a small series of this, it is very local in this district), *Scopula olivalis*, *S. prunalis* (both very common), *Tortrix forsterana* (several),

Peronea schalleriana, *P. ferrugana*, *Teras caudana*, *Dictyopteryx holmiana* (locally common), *D. bergmanniana*, *D. torskaleana* (both abundant), *Penthina pruniana*, *Aspis udmanniana*, *Phoxopteryx lundana* (common), *Catoptria hohenwarthiana*, *C. cana*, *Xanthosetia zöegana* (common), *Talæporia pseudo-bombycella*, *Scardia cloacella*, *S. granella*, *Adela degeerella*, *A. viridella*, *Swammerdammia cæsiella*, *S. griseocapitella*, *Hypolepia costella*, *Harpipteryx harpella*, *Phibalocera quercana* (common), *Harpella geoffroyella*, *Dasycera olivierella*, *Gracilaria alchimiella*, *Pterophorus fuscodactylus*, *P. tetradactylus*, *P. pentadactylus*, *P. pterodactylus* and many more. *Hepialus hectus* was abundant in every wood, as also were *H. lupulinus* and *H. humuli* in every meadow. On fences I found *Nola cucullatella*, *Acidalia promutata*, *A. incanaria*, *Acronycta psi*, *Xylophasia lithoxylea*, *Batodes angustiorana*, *Diehrorhampha petiverana*, *Gelechia populella*, *Chrysocorys festaliella* and many more common species. At Bexhill, *Fidonia piniaria* occurred in the pine woods, and *F. atomaria* swarmed on the heaths. By working the lamps I obtained the following:—*Smerinthus populi*, *Lithosia quadra* (2), *Arctia fuliginosa*, *Selenia illunaria* and var. *juliaria* (both very common), *Crocallis elinguaria*, *Ennomos tiliaria*, *Amphydasys prodromaria* (1), *Geometra papilionaria* (1), *Ligdia adustata*, *Eupithecia centaureata*, *E. subfulvata*, *E. absynthiata*, *Coremia ferrugata* (abundant), *C. unidentaria*, *Cidaria miata*, *C. russata* (common and very variable), *C. immanata*, *C. silaceata* (3), *C. testata*, *Anaitis plagiata*, *Cilix spinula*, *Bryophila perla*, *Nonagria fulva*, *Hydræcia nictitans*, *Heliophobus popularis* (common), *Luperina testacea* (common and variable), *Xanthia cerago*, *X. silago*, *Cosmia trapezina*, *Catocala nupta*, *Scoparia angustea*, *Crambus geniculellus*, *Melia sociella*, *Ephippiphora bimaculana* and several others. Very few species came to sugar, and what did turn up were very common, such as *Leucania pallens*, *Xylophasia polyodon* (abundant), *Gonopteryx libatrix*, *Nœnia typica*, *Mania maura*, etc. I netted two ♀ *Bombyx quercus*, from each of which I obtained fully 100 ova; I also took a fine ♂ *Angerona prunaria* flying in the early evening in August in a wood near here. Most species appeared quite three or four weeks later than usual, owing, I suppose, to the wet weather which prevailed during the greater part of the summer and autumn.—A. Ford, Claremont House, Upper Tower Road, St. Leonards-on-Sea. *Nov. 10th*, 1891.

Howth, etc.—*Agrotis agathina* was abundant, and I took three pairs *in copulâ* and secured ova. They have all hatched out lately, during my absence, except two or three, but the larvæ are hidden in the plant, at least by day. The members of the Exchange Club may be interested to hear that I was successful in the expedition to Howth for *Dianthœcia barrettii* in June last, and captured some specimens. Also that, having procured ova, I have been investigating the life-history and habits of the earlier stages of this rare insect, and have made careful drawings of the larvæ and pupæ. I await the result with much interest. Mr. Curzon, then at Howth, gave me some ova, and also dug out a pupa which emerged. I was more successful in rearing the larvæ than at first I anticipated.—W. F. de V. Kane, Sloperton Lodge, Kingston, Ireland.

Romsey.—Moths have been abundant here, but butterflies, with one exception, scarce. The small "white" has appeared in extraordinary numbers. I succeeded in taking a few *Heliothis dipsaceus* for the first time in the New Forest, but rather worn, and have also taken for the

first time in this neighbourhood *Plusia festucæ*. I saw a moth sitting on a blade of *Poa aquatica*, evidently just emerged, and, on hunting about, soon found half-a-dozen empty cocoons and then one full one which emerged soon after. The larva seems to bend down a blade of the grass, and to spin across the angle a thin white cocoon, which is very conspicuous.—E. Buckell, Romsey, Hants. *October 1st*, 1891.

King's Lynn.—I have nothing worth noting concerning my captures this month, save, perhaps, the appearance of *Eupithecia pygmæata*, of which species I took four specimens (two of them in fine condition) on September 6th. This sun-loving species occurred here as usual about the middle of June this year. Turning to my notes, I find that on June 15th I captured a dozen specimens, about half of them in good condition. My experience of *E. pygmeata* this season points to the existence of a second brood. *Cerastium glomeratum* (mouse-ear chick weed) is, I believe, the principal food of its larvæ here, for although I have so far found but one larva, the capsules of this plant have been freely patronised by larvæ on the ground where I take the perfect insect.—E. A. Atmore, King's Lynn. *September 30th*, 1891.

Canterbury.—I have taken this autumn *Orthosia macilenta*, *O. lota*, *Anchocelis rufina*, *Xanthia cerago*, *X. silago*, *X. aurago*, *Hoporina croceago*, *Anchocelis litura*, *A. pistacina*, *Hadena proteus*, *Miselia oxyacanthæ*, *Agriopis aprilina*, *Xylina semibrunnea*, and one *Orrhodia erythrocephala* var. *glabra* on October 31st.—J. Parry, 1, Church Street, Canterbury.

Culleenamore.—Ivy is now nearly over, and owing to bad weather it has not been very productive. *Calocampa vetusta* and *Phlogophora meticulosa* were fairly abundant. *Orthosia lota*, *O. macilenta*, *Orrhodia vaccinii* and *O. spadicea* were rare, and the usually abundant *Xylina petrificata* entirely absent. The season, though, altogether has been a good one.—P. Russ, Culleenamore, Sligo.

South Devon.—Here, in South Devon, the season has been very unsatisfactory, sugaring almost a failure, I cannot count more than half a dozen fair nights, on each of them there was considerable wind. Frequently on warm, cloudy nights with a westerly wind, no insects have turned up. Light in August and September (I did not try it earlier) was more successful, and different species seemed to have their own special nights for flight, *e.g.*, *Neuria popularis*, *Cleora lichenaria*, *Cidaria silaceata*. Larvæ have been fairly abundant, but decidedly below rather than above the average. It seems to me the unusually severe and protracted winter (worse in Devon and Cornwall than elsewhere) destroyed many pupæ and hybernating larvæ. *Lycæna ægon* is very abundant on the downs, all over the Lizard promontory, much more so than the common *Lycæna icarus*. I took the larvæ of *Hecatera serena* in 1890, at Mullion, in abundance. It was feeding on *Crepis virens*, and in no instance did I find it on either of the sow-thistles, though they were very abundant. The larvæ feed at night on the inside of the flowers, but are easily taken during the day by gently shaking the plant into a net. They seemed difficult to rear, as many died away when nearly full-fed (I tried change of diet to the sow-thistles, but it was refused), and a few were ichneumoned. Out of more than 100 larvæ I succeeded in rearing only 18. Some dozen or so of these died in the pupal stage.—W. S. Riding, Honiton, Devon. *October*, 1891.

Durham and Saltburn.—So far as my experience here this summer goes, it has been a very poor season. Both sugar and light were failures; the same result happened on my journey to Scotland in July, though on the two or three moderately fine days we had, GEOMETRÆ were abundant. On the other hand, at Saltburn in York, in August and September, sugar was very productive, so that its failure or success seems to have been curiously local. My Scotch friends all speak in the most desponding terms of their want of success. Last year was extremely good for sugar (or treacle, as they say in Scotland), this year the reverse; perhaps next year the times will have changed again, and we north-countrymen shall have a better record.—T. MADDISON, Durham. *October*, 1891.

Willesden.—I visited my favourite field again this year in May and June, and found some species unusually plentiful, which looked as if the season was going to be a better one. For instance, *Heliaca arbuti* was the first to appear, and I took a very large number in fine condition; as soon as this was over, *Ino statices* came on in equal force. My last visit to this particular spot was on June 20th, when by that time *I. statices* was quite a pest, for not infrequently three or four would be seen upon a single clover blossom; the females then were more plentiful than the males. *Euclidia mi* was out in abundance at the same time, but I did not take many. Last year *Tanagra chærophyllata* swarmed, but this year it was only just emerging when I left, being later than last year. Amongst other species that occurred in the same field was *Emmelesia albulata*, which was very common on one side only. A good specimen of *Drepana hamula* also fell to my net.—J. M. ADYE. *December 2nd*, 1891.

Hampshire.—Having from time to time noticed the different reports on sugaring this year, I might add that my experience coincides with several. At the end of June and beginning of July I made two or three attempts, and not seeing a single insect I did not repeat the experiment until near the middle of September, when there seemed some improvement, which enticed me to continue. On the 20th of that month the weather was unusually stormy, rain falling in torrents the whole day more or less, and, if anything, was rather worse in the evening, so having always good luck on such nights I did not fail to sugar extra trees. On approaching the last one with my brush, I observed a considerable number of specimens, which were attracted evidently by the sugar of the previous evening having been revived by the rain. I was therefore careful not to disturb them, and lighted my lantern almost immediately, when I counted between twenty and thirty on the tree. Most of them were *Phlogophora meticulosa*, with one or two *Anchocelis lunosa*, *Xanthia silago*, *Orthosia macilenta* and two fine *Xylina petrificata*. The other trees, strange to say, only produced a very few, including another *X. petrificata*. I took four more of this latter species in the best condition on other nights following. I understand that sugaring has been again very bad in the New Forest.—ID.

NEUROPTERA, TRICHOPTERA AND ORTHOPTERA.—*Wicken and Neighbourhood.*—As I was at Wicken this year, a great part of the time Mr. Tutt was there (from August 5th to 19th), a few notes on the insects taken in other orders than Lepidoptera may prove interesting as supplementary to Mr. Tutt's paper on the Lepidoptera, which appeared in the

Record, vol. ii., p. 176. A good deal of my own attention was of course also devoted to the Lepidoptera, but as Mr. Tutt has sufficiently treated of them, I need not add more to his notes. Mr. R. McLachlan joined me on August 11th, and we worked together until the 15th, our chief object being if possible to turn up the local *Erotesis baltica*, of which only some half-dozen specimens have as yet been taken in Britain, and all, except one in the Norfolk Fens, at Wicken Fen. When Mr. McLachlan arrived I had one fine specimen on my setting boards, taken within a day or two of my arrival at Wicken, but unfortunately all our efforts failed to turn up another. Perhaps we were too late for the species, but quite as likely the very unfavourable weather we experienced accounted for our non-success. It is a very delicate species, and no doubt its habit, like that of its allied genera, is to fly gently over the ditches at sunset in the calmest weather. As it was, all the time we were there it was either wet, or a much too strong wind was blowing on the Fen, to allow any of this group of insects to fly freely. Even *Leptocerus aterrimus* was only very occasionally seen on the wing, though plenty of specimens could be swept out of the herbage. Next to *E. baltica*, perhaps the most interesting species was *Pyrrhosoma tenellum*, which was found commonly on the ditches on Chippenham Fen on the only visit we made there, on the 13th. Curiously, it was not seen on Wicken Fen at all, though I had found it there in June the previous year, up to which time it had only occurred in Britain on heaths near Weybridge, and one or two other similar south of England localities. Its usually common relative, *P. minium*, was not seen at all. The district altogether proved very unsatisfactory for Neuroptera and Trichoptera; indeed the paucity of species in a locality so exceedingly promising in appearance was most extraordinary, and although the weather was certainly much against us, we were reluctantly forced to the conclusion that many of the species we naturally expected in such a locality were not there at all. The few species for which Tuddenham is given were taken on the 14th, the only occasion of our visit there. When the locality is not stated, the record refers in all cases to Wicken.

Neuroptera.—*Sympetrum striolatum*; *S. sanguineum*, not uncommon, but not nearly so abundant as I found it on Wicken Fen in August two years ago; *Æschna grandis*, common, and often seen "hawking" for insects at dusk, a habit, I believe, not indulged in by any other dragon-fly. Several specimens of another *Æschna* (probably *cyanea*) were seen, but not captured. *Lestes sponsa*, common on both Wicken and Chippenham Fens; *Ischnura elegans*, common; *Agrion pulchellum*, common on both Wicken and Chippenham Fens; one or two others of the common Agrions, I think, also occurred, but as none were set, cannot say with certainty which they were; *Pyrrhosoma tenellum*, common on Chippenham Fen. *Nemoura* (species ?), one species common at Chippenham, but I am a little doubtful as to which it is; *Raphidia xanthostigma*, Chippenham Fen; *Hemerobius marginatus*, and one or two other commoner species of the genus occurred at Chippenham; *Chrysopa flava*, *C. vittata*, *C. alba*, *C. tenella* and *C. aspersa*, all at Chippenham; *C. flavifrons*, not uncommon at Wicken.

Trichoptera.—*Phryganea varia*, abundant and variable; *Agrypnia pagetana*, common; *Colpotaulius incisus*, common; *Grammotaulius nitidus*, not uncommon on Wicken Fen; *Glyphotælius pellucidus*;

Limnophilus rhombicus, common, but the specimens small; *L. flavicornis*, abundant; *L. marmoratus*, probably the most abundant species seen; *L. stigma*; *L. vittatus*; *L. auricula*, Tuddenham; *L. hirsutus*, in the Fens, and I think also at Tuddenham; *Silo pallipes*, Tuddenham; *Molanna angustata*, common; *Leptocerus aterrimus*, abundant, but the specimens small; *Mystacides longicornis*; *Erotesis baltica*, one specimen only at Wicken Fen; *Œcetis lacustris*, not uncommon; *Holocentropus picicornis*, abundant; *Tinodes wæneri*, Tuddenham; *Lype phœopa*, several at Tuddenham; *Rhyacophila dorsalis*, several at Tuddenham.

Orthoptera.—*Stenobothris viridulus*, common, I believe, though some of the specimens I captured for examination were the green var. *mollis* of *S. bicolor*, which without close attention might readily be mistaken for it; *S. elegans*, not uncommon at Wicken, and I think occurred also at Tuddenham; *S. bicolor*, abundant at Wicken and equally so at Tuddenham; it was exceedingly variable in colour; the purple var. *purpurascens* was common at Wicken, and the green var. *mollis* was probably equally so; *Gomphocerus maculatus*, at Wicken and Tuddenham; *Odontura punctatissima*, Mr. McLachlan beat out a nice specimen in "the lane" at Wicken; *Mecanema varia*, beaten out of the trees in plenty at Chippenham Fen; *Xiphidium dorsale*, in abundance and of all sizes on Chippenham Fen, also on Wicken Fen, but less commonly.—Geo. T. Porritt, Huddersfield. *October 27th*, 1891.

Polyommatus virgaureæ near Beachy Head.—On August 4th last, a young collector (Arnold Brown, of South Hackney), a friend of mine, captured a specimen of *Polyommatus virgaureæ* on a thistle flower in Birling Gap, between Seaford and Beachy Head. The insect is a ♂ in fair condition, but had evidently been on the wing some time. It is now in my possession.—R. W. Robbins, 79, Chardmore Road, Clapton Common.

Habits of Retinia resinana.—I had several pupæ of *Retinia resinana* sent to me, but failed to rear any. I noticed that if the pupa pushed its way quite out of the resinous mass it was sure to die; in some others where I was successful the stems of fir were put in wet sand in a perpendicular position, and these emerged only when the pupa was held partly in. I have not noticed this with other stem-feeding species.—F. N. Pierce, 143, Smithdown Lane, Liverpool. *September 2nd*, 1891.

Demas coryli.—My brother sent me up a number of larvæ of this species from the neighbourhood of Cheltenham. This larva spins up in a leaf at each change of skin. A study of the larva suggests grave doubt whether this species is not out of place amongst the Noctuæ, where Mr. South has placed it. The analogy between it and the *Orgyias* seems very evident.—F. J. Buckell, 32, Canonbury Square. *October 8th*, 1891.

Hadena porphyrea (satura).—From personal experience I can give a few hints about this species:—1st. The full-fed larva cannot well be mistaken for that of any other species, although it does resemble some varieties of *Hadena adusta*. It is of a pale green, but the peculiar brownish colour of the dorsal surface at once distinguishes it from all other larvæ I have even seen. 2nd. It feeds by night on the expanded flowers of honeysuckle and whins (gorse); it also eats other plants, but prefers the flowers. I have an idea that this species will yet be turned up in some numbers in Aberdeenshire. I expected

to have taken it myself this year, but the total failure of sugar has prevented me, or at least has made it impossible for me to do so. By the way, I almost forgot to say that the larvæ are full-fed by the middle or end of June.—W. Reid, Pitcaple, Aberdeen.

Habits of Plusia orichalcea.—Captain Robertson's capture of *Plusia orichalcea* is interesting, as it adds another locality for this local and beautiful species and he should work for the larvæ on *Eupatorium cannabinum* (hemp agrimony). Some entomologists beat for the young larvæ in October, and hybernate them; I always find this unnecessary as I can find them easily in the spring, and save "loss and trouble" hybernating them. They are a good size and fairly easy to find about the last week in May and first in June. They eat pieces out of the centre of each side of the leaf to the midrib, and the end of the leaf losing its support hangs down and fades, many leaves on a stem served in this way looking very conspicuous. Carefully (as they drop off) bend the stem down, and the larva will probably be found resting on the underside of a leaf, if young, or if full-fed, with its hind-claspers grasping the main stem, and its front legs holding on to the underside of one of the bent leaves. If it is not on the stem first noticed, look on all near, its presence will soon be evident by *fresh feeding*.—W. Farren, Fern House, Union Road, Cambridge. *August 26th*, 1891.

Scopula decrepitalis at Glasgow.—Amongst some insects I had brought me by a young collector to name, I found a *Pyrale*, which is undoubtedly *Scopula decrepitalis*.—T. J. Henderson, Glasgow. *October 10th*, 1891.

Times of Emergence.—I most decidedly agree with Mr. Farren on the "times of emergence" question (*ante*, p. 139), and I can add one species at any rate to the list which he gives, *viz.*, *Notodonta dictæa*, which has a most inconvenient habit of emerging between ten and eleven p.m. I have bred it now for several seasons successively, and find this an invariable rule. The males, too, must be killed as soon as possible after the wings are dry, or they will be worthless as specimens in the morning.—Charles F. Thornewill, The Soho, Burton-on-Trent. *September 2nd*, 1891.

Mites.—I find the following preparation very useful in getting rid of mites. It consists of equal parts of oil of thyme, oil of aniseed and spirits of wine. I find this efficacious both for destroying them in imagines and also for prevention. I went through a large collection for a friend of mine three years ago, which was swarming with them, and although not touched since, there is not a mite in one of the 40 drawers. The preparation is given in the *Insect Hunter's Companion*.—T. Baxter, St. Anne's-on-Sea. *Oct. 7th*, 1891.

Tæniocampa opima.—It may be of interest to note that I bred a fine series of *T. opima* (as far as the pupal state) from ova collected on the Lancashire coast, and believe I did not lose a single larva; they were fed on sallow, on the air-tight principle and were kept in the shade with just a little sunshine before 7 a.m., none afterwards. They have pupated in loose shallow trays which fit the bottom of my breeding cages, into which the larvæ were removed from the bell-glasses, about a fortnight before going down. I have over 150 pupæ, and, should they emerge all right next spring, I shall be pleased to give fuller particulars

of the system followed.—J. Mason, Clevedon Court Lodge, Somerset. *September 30th*, 1891.

Sphinx convolvuli in Wales.—A very large female *S. convolvuli* was given me on September 2nd. It was caught the day before by a brother, at rest in a hall of a house a few hundred yards from the sea. It either came to light or to a lily which was inside the hall. It measures $4\frac{3}{4}$ inches and is bigger by nearly half inch than either of the two specimens I had previously. Is it abnormally large?—R. B. Robertson, Sketty Park, Swansea. *September 25th*, 1891.

Sphinx convolvuli in Kent.—Next season I intend to plant a few plants of *Nicotiana affinis*, to attract *Sphinx convolvuli*, as they seem to be about here. Within the last four seasons, I have had three dilapidated specimens brought me, and this year I had one brought from Keston, on August 17th; but as the captor of it had it in a flower-pot all the week, it was quite shorn of its beauty, more like a Whitechapel than a West-ender. On September 27th, I had a splendid specimen brought by the road surveyor here, who found it crawling about on the middle of the road at Green St. Green, not the least damaged. He carried it in a paper bag. I have been told of different captures of it in this neighbourhood from time to time.—Hope Alderson, Farnboro', Kent. *October 5th*, 1891.

Foodplant of Chœrocampa porcellus.—In reply to the Editor's query, *re* the foodplant of *C. porcellus*, I beg to state that the larva was not *feeding* on the purple loose strife (*Lythrum salicaria*), but was found amongst the grass at a short distance from the plant, on which I presumed it had been feeding, as this is mentioned as one of its food-plants by the Rev. Seymour St. John. I must not, however, omit to say that in another part of the field there was some Lady's Bedstraw from which it is possible the larva may have wandered.—D. H. S. Steuart, North Leigh, Prestwich, Lancashire. *October 8th*, 1891.

Acherontia atropos in the Isle of Man.—On Saturday afternoon last, Mr. John Moughton from Laxey, sent to me a beautiful specimen of this insect, which had been captured by him in Laxey Glen on Thursday evening last, October 22nd. The insect is in splendid condition, and probably had not long emerged from the chrysalis before it was caught. These moths are very uncertain in the time and place of appearance in the Isle of Man.—H. Shortridge Clarke, 2, Osborne Terrace, Douglas, Isle of Man. *October 26th*, 1891.

Difficulty of setting the forelegs of Agriopis aprilina.—I remember reading (in the *Entomologist*) a short time ago about the difficulty of setting out the forelegs of *Agriopis aprilina*. I, however, set them out on the last I captured, but with some trouble. They seem gripped like a vice and as if fitted into a notch. It may be the joint stiffens, that I am unable to say. However, they can be separated by inserting a fine point between the thickest part and pulling at the same time with a pair of fine forceps.—Hope Alderson. *October 5th*, 1891.

Stauropus fagi and Cuspidia alni in the New Forest.—I beat a fine full-fed larva of the first mentioned species on beech in the New Forest, last September. Those of the latter species were comparatively common this year, though several were ichneumoned.—C. Edward Crane, Emery-Down, Arundel Road, Eastbourne.

PLUTELLA DALELLA ETC. IN DONEGAL.—I took *P. dalella* in Donegal, also *Helotropha leucostigma* and *Emmelesia affinitata*.—G. V. HART, 14, Lower Pembroke Street, Dublin.

ARCTIA CAJA.—Has any one met with the full-grown larva of this species later than the middle of August?—T. A. CHAPMAN, Firbank, Hereford.

INQUIRY CONCERNING MOTH TRAP.—In the *Lepidopterist's Guide*, Dr. Knaggs describes a moth trap, made by placing an inverted cone of perforated zinc in the top of a tin, in which is a piece of flannel soaked in sugar, under a false bottom (also of perforated zinc), by which the moths are attracted. Has any reader of the *Record* ever tried this trap? If so, I should be very thankful for any information as to its success.—J. H. D. BEALES, Beech Hurst, Poole.

URTICATION.—Would any reader of the *Record*, who has met with stinging larvæ, kindly answer the following questions? With regard to Question 3, I want a definite statement of the physical appearance of the rash, not a vague description, such as "like nettle rash" etc.; also if any one has done any work on this subject I shall be glad to hear from them:—

1. By what insect stung, whether larvæ or cocoon hairs?
2. Part of body affected, and to what degree?
3. Character of rash, if any was seen?
4. If perspiring when stung?
5. If skin be thin or sensitive?
6. Any other remarks.

All letters will be acknowledged.—RICHARD FREER, Rugeley, Staffs.

DIORYCTRIA SPLENDIDELLA AT WALLASEY.—My friend, Mr. H. B. Jones, captured a specimen of *Dioryctria splendidella* at Wallasey, about six weeks ago.—G. A. HARKER. *September 24th*, 1891.

DASYCAMPA RUBIGINEA AT POOLE.—I had the good fortune to capture two perfect specimens of this rare insect at ivy, on October 23rd. From their remarkably good condition, I should imagine that they had only recently emerged from the pupa. I believe that it is many years since *rubiginea* has been recorded from this neighbourhood.—J. H. D. BEALES, Beech Street, Poole. *November 1st*, 1891.

CLEORA LICHENARIA IN IRELAND.—With reference to Mr. Harker's sugges ion that he thought *C. lichenaria* new to Ireland (*Record*, *ante*, ii., p. 233), Mr. Russ reminds me that he long ago recorded it from Sligo, where it is rather common. I ought to have remembered the fact as I have a number of specimens which came from Mr. Russ.—J. W. TUTT. *November*, 1891.

AUTUMN EMERGENCE OF ENDROMIS VERSICOLOR.—I bred some specimens of *E. versicolor* this spring, but nearly one half of the pupæ did not emerge at the usual time. A fine ♀ came out on the evening of October 6th. The pupæ have been kept indoors since the spring.—H. ALDERSON, Farnboro', Kent.

ASSEMBLING WITH SESIA SPHEGIFORMIS.—I have had one or two interesting experiences this year. Mention is made by Mr. Tugwell in his notes on *Sesia sphegiformis*, that after one successful expedition, he took down two females on a fine day apparently exactly suited for assembling but met with no success, and he suggests that the cause may have been due to the condition of the atmosphere. Now, my first experience

was still more peculiar, for I took down two females on a suitable day, both having emerged on the same morning, with this result, that, while one female attracted a large number of males, the other only attracted two or three during the whole morning. I noticed that the attracting female was very restless, that she usually rested with her abdomen distended in a peculiar manner, and that on the approach of the male, when he began to buzz about the cage where she was confined, she became much excited. On the other hand, the unattractive female was perfectly quiet and apparently in a sleepy state. Not till the flight was nearly over did she show any signs of restlessness, or rest with her abdomen extended in the manner I have mentioned, and not till then did she attract a single male, but when this began, she attracted two at once. I gather, therefore, that in this species, the females are only attractive when they are in the humour for pairing. The pairing of these insects is most extraordinary. If you allow the male to enter the cage where the female is, he buzzes about for a moment, then he does not alight, but backing towards the female they pair, and the male almost instantaneously drops as if lifeless, suspended, of course, by the female. The contrast between the apparently lifeless body, thus hanging, and the insect that a moment before had been buzzing about, its wings moving with extraordinary rapidity, a simple mass of vitality, is something to be remembered. My next experience was a failure. I attempted to "semble" with *S. culiciformis*, when I quite expected to be successful. I went to get the pupæ but was too late, and only secured one, which emerged directly after I obtained it, and proved to be a fine female. The morning was bright and sunny, and she buzzed about freely, but not a single male came. I can only understand this by assuming that the males were over. I saw one or two which I think were females depositing, but it seems strange that all the males should have died so soon.—A. Robinson, 1, Mitre Court Buildings, Temple. *October*, 1891.

Double-broodedness of Cidaria silaceata.—I think Mr. Tutt is wrong in assuming this species to be double-brooded on such slight evidence. Numberless cases of autumn emergence of early summer species occur; but before we can conclude they are truly double-brooded, it will have to be shown that the ova are properly developed in the female, and that the larvæ would feed up and pupate. I never bred the insect till this year, and they have been emerging slowly ever since. My friend, Mr. Gardner, who has reared it frequently, tells me that his experience is the same, and that some of them always emerge in the autumn. I notice a specimen is out to-day.—John E. Robson, Hartlepool. *November 22nd*, 1891.

Under ordinary circumstances, perhaps it would be unwise to suppose that *Cidaria silaceata* is double-brooded, on the mere fact that I happened to capture a fair number of what was undoubtedly a second brood of this species in the Isle of Wight in August, 1889, but this personal knowledge is supplemented by the information of many correspondents and friends in the South of England who all treat it as a distinctly double-brooded species, and not only so, but speak of its strong tendency to seasonal dimorphism. The first brood in the south consists usually of fairly large specimens, with the central band well broken in a majority of specimens. The second brood consists of much

smaller specimens, the band almost always complete. The partial double-broodedness of this species, referred to by Messrs. Robson and Finlay (*ante*, p. 257), in a much more northern locality, is rather additional evidence of my statement, as it is well known that many species which are distinctly double-brooded in our southern counties, are only partially so, or otherwise distinctly single-brooded in more northern localities. The Isle of Wight offers a strange illustration of the complete double-broodedness of another species, *Acidalia emutaria*, which appears to be rarely so elsewhere, in the localities I have worked, where the species occurs rather commonly,—at Deal, Higham, Strood, Gravesend, etc. In the Isle of Wight, Mr. Hodges gets two distinct broods in June and August, whilst in the former localities, specimens appear continuously from the beginning of July to the first week in August, but there is no differentiation of the broods as in the Isle of Wight. I notice that Newman in his *British Moths*, treats *C. silaceata* as double-brooded, and there appears to be no doubt that the distinct double-broodedness noticeable in the south, is reduced to partial double-broodedness or even single-broodedness in more northern localities, not only in this, but in many other species.—J. W. Tutt.

The Eupitheciæ in County Sligo.—The *Eupithecia* I have taken this year, are as follows:—The earliest to appear was *E. abbreviata* at sallow blossoms, on March 27th. In April, I bred *E. exiguata* from larvæ collected the previous autumn, and obtained larvæ of *E. sobrinata* beaten from juniper whilst looking for *Thera simulata* larvæ. May produced *E. venosata*, *E. nanata*, *E. pumilata*, *E. coronata*, *E. dodoneata* (flying at dusk along hawthorn hedges, and, I believe, not previously recorded from Ireland), *E. vulgata* and *E. virgaureata*. In June, *E. satyrata* and its var. *callunaria* were abundant on moors, and *E. nanata* much more so than in the previous month. *E. pumilata* also appeared on the moors, earlier ones having been taken on the low lands. *E. isogrammata*, *E. exiguata*, *E. subumbrata* (occurs on lower slopes of the mountains, where scabious is plentiful), *E. lariciata*, *E. constrictata*, *E. pulchellata* (twelve specimens only, and very worn). In July, *E. debiliata* was abundant in woods where the undergrowth is bilberry. The place to search for this species is on the trunks of large holly trees growing amongst the bilberry. They are exceedingly difficult to see, being almost exactly the colour of the bark, on which they rest; but a tap with a stout stick disturbs them, and they are netted easily. The second brood of *E. pumilata* are smaller and darker than the first, *E. tenuiata*, the second brood of *E. coronata*, *E. minutata*, and *E. rectangulata*. In August, the only fresh species were, *E. absynthiata* and *E. centaureata*, which completed my list. *E. isogrammata* in the larval stage was exceedingly abundant on a large *Clematis vitalba*, growing along a high wall at a neighbour's house. It is the only plant of this species which I know of in the whole county, and was evidently planted there many years since. Does the larva of this species feed on anything else? I have taken the insect at a considerable distance from the plant. —P. H. Russ, Culleenamore, Sligo. *October*, 1891.

Agrotis trux.—Among some odds and ends forwarded me by Mr. Gregson unplaced in his cabinet, was a mutilated specimen of an *Agrotis*, found in a fruit warehouse at Liverpool. This turns out to be *A. trux*, a species once in our lists, but I think properly struck out as an accidental importation.—S. Webb, Dover.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—*December 2nd*, 1891.—The Rt. Hon. Lord Walsingham, M.A., LL.D., F.R.S., in the chair. Dr. D. Sharp exhibited and commented on a number of photographs of various species of *Lucanidæ* belonging to Mons. René Oberthür. Mr. C. G. Barrett exhibited a number of specimens of local forms and varieties of Lepidoptera, taken by Mr. Percy Russ near Sligo, including *Pieris napi* var. near *bryoniæ*; *Anthocharis cardamines* (male), with the orange blotch edged with yellow, and yellowish forms of the female of the same species; very blue forms of *Polyommatus alsus*; males of *P. alexis*, with the hind margin of the under wings spotted with black, and very handsome forms of the female; also varied series of *Agrotis cursoria*, *A. tritici*, *A. valligera*, *Hydræcia micacea*, *H. nictitans*, *Epunda lutulenta*, *Hadena protea*, *Odontoptera bidentata*, *Cidaria immanata*, *C. testata*, *C. pyraliata* and *Boarmia repandata*. The Rev. S. St. John exhibited two specimens of *Lycæna argiades*, taken in Somersetshire by Dr. Marsh in 1884; three specimens of *Deilephila euphorbiæ*, bred from larvæ found feeding on *Euphorbia paralias* on the Cornish coast in September, 1889; and a series of varied forms of *Anchocelis pistacina*, all taken in a garden at Arundel. Lord Walsingham, Mr. Barrett, and Mr. McLachlan took part in the discussion which ensued. Mr. Jenner Weir exhibited and made remarks on two dark specimens of *Zygæna minos* which had been caught by Mr. Blagg in Carnarvonshire. He remarked that the specimens were not representatives of complete melanism, and suggested that the word "phæism"—from φαιός, dusky—would be a correct word to apply to this and similar departures from the normal coloration of a species. Mr. C. J. Gahan exhibited specimens of the common "book-louse," *Atropos pulsatoria*, Fabr., which he had heard making a ticking noise similar to that made by the "death-watch" (*Anobium*). Mr. B. A. Bower exhibited the following rare species of Micro-Lepidoptera:—*Spilonota pauperana*, Fröl.; *Gelechia osseella*, Stn.; *Chrysoclysta bimaculella*, Haw.; and *Elachista cingilella*, Fisch. Lord Walsingham and Mr. Tutt made some remarks on the specimens. Mr. R. Adkin exhibited a variety of *Anthocharis cardamines*, and one specimen of *Sesia scoliæformis* bred from a larva found at Rannoch.

Mr. G. T. Baker read a paper entitled "Notes on *Lycæna* (recte *Thecla*), *rhymnus*, *tengstræmii*, and *pretiosa*." A discussion followed, in which Lord Walsingham, Capt. [illegible] part. Mr. F. Merrifield read a [illegible] temperature on the colo[illegible] of Lepidoptera." Th[illegible] of *Selenia*, *Platypte[illegible]* var. *callunæ*, and [illegible] stage, the lower [illegible] and darkness of [illegible] to the var. *polar[illegible]* which Mr. E. B[illegible] Mr. Jenner We[illegible] read a paper en[illegible]

Eriogaster lanestris and *Saturnia carpini*," and exhibited a large number of specimens in illustration of the paper. Lord Walsingham congratulated Mr. Bateson on his paper, and on the intelligent care and method shown in his experiments, and said that he was glad to see that at Cambridge there was an entomologist ready to enter this interesting field of investigation, and perhaps at some future day to contest the palm with Mr. Poulton as representing the sister University at Oxford. He had noticed that the larvæ of *S. carpini*, if left in a box with dead food, and probably starved, made a light-coloured cocoon; but that when the cocoon was made under natural conditions, on living foodplants on the moors, it was of a dark colour. Mr. Poulton, Prof. Meldola, Mr. Bateson, and others continued the discussion—H. Goss and W. W. Fowler, *Hon. Secs.*

City of London Entomological and Natural History Society. —*Thursday, November 19th*, 1891.—Exhibits:—Dr. Buckell, portions of an ash tree, from which he had obtained 27 specimens of *Zeuzera pyrina* (*æsculi*) in 1890. The recent gale had snapped the trunk about 7 feet from the ground. The portions shown abundantly illustrated the ravages made by the larvæ, and the consequent weakening of the tree. Mr. Tutt, varieties of *Noctua festiva* from Warrington and Clevedon; *Agrotis valligera* from Sligo, and *Agrotis corticea* from St. Anne's-on-Sea; *Coremia ferrugata* and *C. unidentaria* from Weymouth, illustrating the difference in width of the central band; a dark specimen of *Larentia didymata* from Liverpool; *Scopula decrepitalis* from Glasgow, and the empty pupa skin of *Apatura iris*, all belonging to members of the *Record* Exchange Club. Mr. Bellamy, a series of *Himera pennaria*, taken on lamps at Muswell Hill, one having the transverse lines very dark with distinct shades. Mr. Bayne, *Hydræcia micacea* from Tottenham, one of the specimens being var. *rosea*. Mr. Simes, *Acosmetia caliginosa* from the New Forest; *Hepialus velleda*, from Aberdeen; *Sesia apiformis* from Suffolk, and *Anticlea sinuata* from Box Hill. Mr. Prout, a series of *Hydræcia nictitans* and *H. paludis* from the Isle of Wight, the latter coming from the marshes, and the former from the higher land. Mr. Southey, a series of *Gortyna flavago* from Highgate Woods. Mr. Battley, *Gortyna flavago* from Clapton, together with the preserved larva, pupa, and cocoon. Mr. Clark, a fine confluent spotted specimen of *Agrotis saliæ* from Revendale [illegible] cies of [illegible] conflies [illegible] ens of various era:—

[illegible] d that [illegible] a, and [illegible] ivided [illegible] were [illegible] e sub- [illegible] lilated [illegible] onged [illegible] y pro- [illegible] er part [illegible] wings

unequal. In the fourth sub-family, the *Æschnidæ*, the eyes are completely contiguous and wings unequal, they also have an opaque triangular spot at the base of the hind wing. The second division contains two sub-families, the first of which, the *Calopterygidæ*, are distinguished by their wings being equal, eyes not contiguous, and head barrel-shaped and horizontal. The last sub-family, the *Agrionidæ*, are very similar to the *Calopterygidæ*, but much smaller. He then remarked on the life-history of dragonflies. The ova are deposited on aquatic plants, sometimes below the surface of the water. The larvæ feed on small animals, and for this purpose have the lower lip prolonged and ending in a claw, with which they capture their food. They breathe by inflating the intestine with water, when the tracheæ, with which the intestine is lined, absorb the air held in suspension by the water. The larva has the power of expelling this water with such force that it projects itself for some distance. Before emerging from the pupæ they crawl up some water plant and fasten themselves to it, the pupa-case then bursts and the insect appears. At first they are brownish in colour, their bright colours not being developed until they have been on the wing some days. Their food consists of various insects, which they capture on the wing. In doing this they are assisted by being able to fly in any direction without turning. The genital organs of the male are placed in the thorax, being thus different to all other insects.

Mr. Bellamy referred to the popular name (horse-stingers) given to these insects, and asked whether they would attack animals or men. Mr. Tutt stated that he had noticed *Æschna grandis* hawking for food at dusk, and asked whether this was usual. He also remarked on the development of the colours in the imagines some time after exclusion. Mr. Clark had also taken *Æ. grandis* at dusk, in the New Forest. Mr. Milton, in replying, stated that dragonflies had no sting, and that he did not think they ever attacked animals. With reference to *Æschna grandis*, he had never seen it on the wing at dusk, but he once took a specimen on a lamp, showing that they occasionally flew after dark, and were then attracted to a light. A vote of thanks was then accorded to Mr. Milton for his paper.

Mr. Battley stated that he had recently seen a hawthorn bush in blossom, this being the third time this year, it having bloomed previously in February and May. Mr. Elliman said that he had noticed an apple tree in flower in Hertfordshire.

The following gentlemen were then nominated as officers for the ensuing year: President and Treasurer, Mr. J. A. Clark, F.E.S.; Vice-President, Mr. J. W. Tutt, F.E.S.; Curators, Messrs. Smith and Heasler; Librarians, Messrs. Gurney and Cripps; Council, Dr. Buckell, Messrs. Boden, Phipos, Newbery and Hollis, F.E.S.; Secretaries, Messrs. Battley and Simes.

Thursday, December 3rd, 1891.—Exhibits:—Mr. Boden, a specimen of *Cateremna terebrella*, taken some years ago at Boxhill. He stated that he had repeatedly worked the same ground, but no more were taken. With reference to the species, Mr. Tutt stated that it had been taken in certain localities on or near the Breck sands, and several other localities near, and that the larvæ fed in the cones of the Scotch fir (*Abies douglasii*). Dr. Buckell, a bred series of *Oporabia dilutata* from Chingford and Hampshire. He pointed out that the distinctly banded

form was commoner among the latter, but the Chingford specimens and most of the London forms were chiefly unicolorous. Mr. Battley, *Cerastis spadicea*, *C. vaccinii*, and other autumnal species, taken on ivy and sugar at various localities to the north of London. Mr. Bayne, *Apamea gemina* from Epping Forest. Mr. Simes, *Amphidasys betularia* from Clapton, with more black markings than the usual form, melanic varieties of *Noctua xanthographa* and *Agrotis nigricans* from Scotland, and series of *A. cursoria*, including var. *sagitta* and *A. valligera*. Mr. Clark, a male specimen of *Fidonia atomaria* from Hayward's Heath, entirely dark sooty-brown in colour, also *Erebia cassiope* with a bleached mark on one wing. Mr. Bellamy, a series of *Heliophobus popularis* from Winchmore Hill. Mr. Southey, some fine specimens of *Hepialus sylvinus* from Hampstead Heath. He stated that he usually found these at rest on the undersides of the fronds of bracken.

Coleoptera :—Mr. Heasler, *Choleva nigricans*, taken under dead leaves at Highgate and Wimbledon. Mr. Riches, *Necrophorus ruspator*, *Dorcus parallelopipedus*, *Serica brunnea*, etc. Mr. Pearson, living larvæ of *Dermestes lardarius*.

The gentlemen who were nominated at the last meeting, as officers for 1892, were unanimously elected.

The Secretary read the report for 1891, in which he said that, notwithstanding several difficulties under which the Society had been working, the progress was good, this being especially the case with the exhibits and communications. Mr. Tutt proposed that this report be adopted, with a vote of thanks to the Secretaries. Mr. Huckett seconded the resolution, and it was carried.

The President then read his annual address. He said that, although diverse in many things, we all met here on a common footing, as students, and that all should be ready to learn. Although some were specialists, so closely were the various branches of Natural History connected, that it was almost impossible to devote one's attention to one order without knowing something of the others. He then spoke of the true recreative value of a pursuit such as the study of Natural History.

Dr. Buckell proposed that a vote of thanks be given to the President for his address, and also to all the officers for their services during the past year. Mr. Hodges seconded this, and it was carried.

Mr. Bellamy stated that he had seen a specimen of *Smerinthus tiliæ* on November 22nd, being evidently one of an autumn brood. Autumnal emergences were also noted of *Stauropus fagi* by Mr. Tutt, and *Abraxas ulmata* by Mr. Battley.

Erratum.—In the report for November 5th, *Ent. Rec.*, No. 11, p. 263, line 44, for "Mitcham" read "Eltham."

The South London Entomological Society.—*November 12th*, 1891.—Mr. J. A. Cooper exhibited a splendid banded variety of *Abraxas grossulariata* (*Ent. Record*, ii., p. 190); Mr. Auld, a hornet's nest from Ware, Herts; Mr. W. West, *Polia chi* from the Lake District; Mr. C. G. Barrett, a ♀ and ♂ specimen of *Lycæna argiades* captured at Bloxworth, a fine form of *Argynnis aglaia* captured in Norfolk, with deep black striations along the nervures towards the outer margin, also some splendid *Aplecta nebulosa* var. *robsoni*, bred by Mr. Collins of

Warrington. Mr. South remarked breeding one similar, from larvæ received from Rotherham (Yorks); Mr. Forrester, *Bombyx callunæ* from Perth, Mr. Barrett remarking that this form took two years to complete its metamorphoses, hybernating as a pupa in the second year. Mr. Barker remarked on taking larvæ at Folkestone which pupated this autumn, Mr. Tutt referring to a case in the *Ent. Record*, *ante*, ii., p. 186; Mr. Joy, *Epinephele hyperanthus* vars.; Mr. Oldham, vars. of *Orrhodia spadic a* and *Lycæna alexis*, also *Apamea ophiogramma* from Epping; Mr. Tugwell, a series of dark *Melanippe galiata* from Huddersfield, and paler ones from southern localities. He also made some most interesting remarks *re* pupæ being attacked by a fungus; Mr. S. Edwards exhibited *Morpho anascibia* and several *Papilios*. Mr. Adkin exhibited again his two specimens of *Tortrix* bred from pine, and Mr. C. G. Barrett, a typical specimen of *T. steineriana*. Mr. Tutt exhibited a series of specimens of *Tortrix steineriana* var. *dohrniana*, the ♂'s showing the usual unicolorous character of the ♂'s of this peculiar group, the ♀'s being very concave on the costa, and varying from almost unicolorous to a well-developed central band. He also exhibited specimens of *T. viburniana* (*viburnana*) from Darlington and Armagh, the ♂'s of the typical dark coloration, the ♀'s well banded; also specimens of typical *Tortrix paleana* both sexes, and males of the intermediate and provisionally-named *teucriana*. Specimens of the marsh species (?), probably the *asphodilana* of H.-S., which is supposed to be synonymous with *unicolorana*, Dup., were also exhibited. These specimens were from the Essex marshes. Mr. Tutt also remarked that Mr. Fenn and himself had devoted a great deal of time to *T. paleana* and *T. teucriana* at Folkestone in 1890, and that, distinct as were the ♀'s generally, the ♂'s showed every possible gradation between the yellowest *paleana* and the darkest *teucriana*, although nothing quite so dark as the moorland *viburniana* were observed. The females, however, were very distinct, and the characteristic concave costa was fairly well shown, and he suggested that *teucriana* was quite intermediate between *viburniana* and *paleana*. With regard to the pine-feeding species from Ireland, it was probable that in time all these forms might be telescoped into *viburniana*, but in the present condition of our knowledge and the excessively small amount of material London entomologists had to go on, too many names were better than too few, and that it would be quite time to sink the names when more of the different species were known, certainly it was unwise to sink the Irish species into *viburniana* in the present condition of our knowledge.

Thursday, November 26th, 1891.— Mr. Cooper exhibited five very fine varieties of *Arctia caia* var. *lutescens*, the hind wings having the normal red replaced by yellow; all the specimens were more or less asymmetrical in the markings and one had the fringe of the hind wings very dark. Mr. Carrington stated that he had lately examined the series of *A. caia* in the late Mr. Bond's collection, and of 40 specimens 6 had dark antennæ, 1 had buff, and the rest light; but, strange to say, the lightest specimen in the series had dark antennæ, whilst the darkest specimen had them light. Mr. South exhibited a series of *Liparis monacha* var. *eremita* from larvæ from the Forest of Fontainebleau. Mr. Fenn remarked that a well-known British lepidopterist had succeeded, by a careful selection of parents, in producing a race almost

entirely black, the original ♀ parent having been a dark specimen from the New Forest. Mr. Dobson said that dark specimens which he had obtained from the New Forest differed from those exhibited by Mr. South, inasmuch as the latter tended to buff, thus darkening the ground colour, whilst the darkening in the New Forest appeared to be due to an actual increase in the quantity of the black markings. Mr. Tutt remarked that certain years appeared to produce darker specimens than usual in the New Forest, and that a banded form was not uncommon. Mr. Adkin exhibited *Sesia scoliæformis* from Rannoch, where the larvæ are not rare in the thickest part of the trees: he stated that a fair number of larvæ were taken, although many were injured in getting them out of the trees, but many were immature and others much attacked by ichneumons; it was also undoubted that the larvæ took two or three years to come to maturity. Mr. Tugwell remarked that the Welsh *S. scoliæformis* were larger than that exhibited by Mr. Adkin, and Mr. Carrington remarked that the late Mr. Cooke used to take them by getting up at daybreak and watching them emerge, he also stated that they fly as soon as the wings are expanded. He saw one captured at Llangollen. Mr. Tugwell suggested "assembling" with a virgin ♀ to try to get the ♂'s in quantity. Mr. Adkin also exhibited a ♀ specimen of *Euchlöe cardamines* captured on Hayward's Heath, the specimen having a >-shaped mark under the discoidal spot. Messrs. Barrett, Fenn and Tugwell made some remarks relating to the >-shaped mark in the species of *Oporabia*. It was remarked that the >-mark in the specimen of *cardamines* exhibited was not on the nervures. Mr. Short exhibited *Cuspidia psi*, type and var. *suffusa*, *Melanippe fluctuata*, also some suffused specimens of *Spilosoma lubricipeda* all from London. Mr. Billups stated that the ichneumon from *Attacas cecropia* (*ante*, p., 189) was *Cryptus extrematis* which was figured (29) in *The Annual Report of the Fruit Growers' Association, Ontario*, 1890, p. 66, reviewed in the *Ent. Record*, ii., p. 48, where the species is said to be bred frequently from the cocoons of *Telea polyphemus*. Mr. Hawes exhibited a living imago (just emerged), also a living pupa of *Polyommatus phlæas*, the emergence having taken place about three months from the time the egg was laid; he also referred to the fact that he had obtained ova from *Pieris napi* and *Pararge megæra* by lamp-light. On one occasion, a ♀ of the former laid twelve eggs in a few minutes. Mr. Edwards exhibited some exotic *Papilios* and a very rare Hymenopteron—*Abia fasciata*—from Oxted. Mr. Adkin stated that he was at Eastbourne from August 10th till the 23rd, the weather being both wet and cold. The three species of *Pieris* were abundant, *napi* especially so; *Argynnis aglaia* was also common, one specimen had the left anterior wing very small; *Satyrus semele*, *Epinephele ianira* and other common species were more than usually abundant; *Lycæna corydon* was very common, and this species appeared to get low down into the roots for shelter in rough weather; a few specimens had the spots on the undersides more or less coalesced; *Lycæna icarus* and var. *icarinus*, no very blue females being observed except in one limited locality on the Parade. The Vanessidæ were rare except *urticæ*; *Macroglossa stellatarum* occurred, whilst the usual form of *Zygæna filipendulæ* had the central pair of spots united; one specimen was found with the pupa sheath adherent, looking like a third antenna. Sugared flower-heads were fairly attractive; *Abraxas grossu*

lariata abundant in blackthorn by the edge of the cliff; *Acidalia marginepunctata* (*promutata*) were generally pale, but a few dark specimens occurred; *Gnophos obscurata* was rare, and *Timandra amataria* occurred late in August. In the osiers, larvæ of *Halias chlorana* were not common, whilst *Pygæra bucephala* were stripping the plants in many places. With regard to butterflies hiding in wet and windy weather, and their general resting habits, Mr. Hawes made some remarks relating to *Hesperia actæon*, Mr. Carrington referred to *Melitæa athalia* and Mr. Frohawk, to the habits of the larger Fritillaries. Mr. Joy inquired about the resting habits of the imago of *Papilio machaon*, *in naturâ*, but no one could inform him. Information was also asked for relative to the specimens of *Polyommatus virgaureæ* recorded (*Ent. Record*, *ante*, p. 260), and Mr. Tutt stated that all the information he had was very meagre, and consisted essentially of what was already published in the *Record*.—Ed.

Birmingham Entomological Society.—*October 19th*, 1891.—Rev. C. F. Thornewill exhibited a number of insects taken on Cannock during a week spent there this year, including black *Cymatophora duplaris*; also a collection made in Buckinghamshire this year, including *Cleora lichenaria*, *Aventia flexula* etc. Mr. G. W. Wynn showed a series of *Geometra papilionaria* from Wyre Forest larvæ. Mr. P. W. Abbott showed nice series of *Setina irrorella*, *Agrotis lucernea* and *A. lunigera* from the Isle of Wight. Mr. R. C. Bradley showed *Acidia cognata* from Sutton, and *Acidia heraclei* from Moseley. Rev. C. F. Thornewill read a paper on the recent discovery by himself and Mr. R. Freer at Cannock Chase, of *Stilbia anomala*, hitherto not considered a Midland insect, it was so common that last year Mr. Freer obtained 150 specimens, and this year it was equally common.

November 2nd, 1891. — Mr. Bradley showed *Gonyglossum wiedemanni*, from Sutton. Mr. H. J. Sands showed *Calligenia miniata* from New Forest. Mr. W. Harrison showed a specimen of *Epione apiciaria* taken at Harborne so late as October 3rd. Mr. G. W. Wynn showed *Nudaria mundana* from Clewe Prior. Mr. C. J. Wainwright showed a number of insects bought at the sale of the Rev. G. H. Raynor's collection.

Nov. 16, 1891.—Rev. C. F. Thornewill showed a specimen of *Sphinx convolvuli* taken on Sept. 30th at Burton-on-Trent. Mr. G. T. Baker, *Callimorpha hera* from Jersey and the Continent; also *Nemeophila plantaginis.* var. *hospita* from various localities. Mr. P. W. Abbott, *Nonagria geminipuncta* and *Toxocampa pastinum*, series of each from the Isle of Wight. Mr. C. J. Wainwright, samples of the new steel pins made by Messrs. Kirby, Beard & Co. Mr. R. C. Bradley, a series of the genus *Calliphora*. Rev. C. F. Thornewill said that he had found in a cellar at Stretton 40 or 50 specimens of *Gonoptera libatrix*, also specimens of *Triphosa dubitata*. Rev. E. J. Nurse read a paper on "Wicken Fen and its Insects," being mainly an account of a holiday spent there in July this year, when most of the usual Fen insects were to be taken freely. The Rev. C. F. Thornewill and others spoke at the close.—Colbran J. Wainwright, *Hon. Sec.*

Lancashire and Cheshire Entomological Society.—*November 9th*, 1891. — Mr. Robert Newstead, F.E.S. read a paper entitled "General Notes on the scale insects Coccidæ." The author gave

a brief *resumé* of the work done by the earlier naturalists, and enumerated types of the principal genera (of which he had drawn large coloured diagrams in illustration). In the course of his remarks he described the distinctive characters, and exhibited drawings of the following new species:—*Lecanium assimilis* n. sp., on *Aster*, at Colwyn Bay; *L. minimum*, n. sp., on *Areca*, under glass, Cheshire; *Pulvinaria persicæ*, n. sp., on peach, Cheshire; *Pseudococcus associalis*, n. sp., on *Ribes*, Yorks; *Ripersia tomlinii*, n. sp., on grass roots in ants' nests, Guernsey; *R. pulveraria*, n. sp., under leaf sheaths of *Agrostis*, Cheshire. Mr. Newstead exhibited specimens of 172 species of Coccidæ, including nearly all the known British species. Mr. Gardiner exhibited *Coccus cacti* and *Carteria lacca*, the latter with their products. The secretary, *Aspidiotus personatus*, *Vinsonia pulchella* and *Lecanium oleæ*; the latter were much broken by some lepidopterous (?) larvæ which had formed silken tunnels under the scales. The President exhibited melanic and other forms of *Liparis monacha*. Mr. Gregson, varieties of *Dianthœcia conspersa*, which he divided as follows:—A variety, black and white, little, if any, ochreous-yellow, Port Patrick, South Scotland; var. *ochrea* all the usual white obscured with ochre, whole insect ochreous; var. *obscuræ* all light markings obscured with brown ochre colour, Forres, Moray; var. *obliteræ* whole insect dark olivaceous-brown, usual markings faint, sometimes quite obliterated, Shetland; also *Abraxas grossulariata* bred this year. Mr. Walker, water-colour drawings of *Deilephila galii*, and Mr. Stott a *Noctua* exhibited some time ago which has since been pronounced by Mr. Barrett to be a variety of *Epunda lichenea*.—F. N. Pierce, *Hon. Sec.*, 143, Smithdown Lane, Liverpool. *November 13th*, 1891.

NOTICES, REVIEWS, Etc.

Melanism and Melanochroism in British Lepidoptera, by J. W. Tutt, F.E.S.—These papers which have attracted very considerable attention, both at home and abroad, have, at the suggestion of some of our leading entomologists, been reprinted in book form to facilitate reference. As a contribution to our knowledge on this particular phase of variation, nothing so comprehensive has been attempted before, and all the important suggestions relating thereto have been collected and dealt with. In the Presidential Address to the Ent. Soc. of Lond., 1890, Lord Walsingham says:—"An especially interesting line of inquiry, 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 in British Lepidoptera" in the *Entomologist's Record*. The book is published by Swan, Sonnenschein and Co. Price *2s. 6d.* bound in cloth; or can be obtained by sending Postal Order for that amount to Mr. J. W. Tutt, Westcombe Hill, S.E., or to Mr. A. J. Hodges, 2, Highbury Place, N., with annual subscriptions for the *Ent. Record*.—Ed.

The Macro-lepidoptera of Winchester and the vicinity. By the Members of the Winchester College Natural History Society. Published by E. R. Cousans, Gazette Office, St. Benedict's Square, Lincoln. Price Sixpence.—Mr. A. W. S. Fisher is primarily respon-

sible for this welcome addition to our local lists of lepidoptera, and he acknowledges his indebtedness to our valuable correspondent, the Rev. G. M. A. Hewett, "to whom is due the credit of far the greater part of the work." The notes added to each species make the list much more valuable, and, whilst nothing very exceptional is to be noticed, it shows what good solid work the members of the College society are doing under Mr. Hewett's able guidance. I note that *Argynnis paphia* var. *valesina* "occurs at Ampfield occasionally," that *Melitæa artemis*, "formerly taken in many localities is now very rare, if not extinct;" whilst there are no records for *Pamphila paniscus*, *Grapta c-album* and *Argynnis lathonia* since 1871; four specimens of *Sphinx convolvuli* are recorded for 1891, and *Orgyia fascelina* has been found by the Rev. Mr. Hewett; a large percentage of the *Geometræ* occurs, amongst which *Acidalia rusticata* and *Anticlea sinuata* are the most noticeable, whilst *Phibalapteryx conjunctaria* has crept in by error for *P. lignata* (In the old edition of Newman these figures were, I believe, transposed, and hence many erroneous reports have occurred). *Dicranura bifida* "larvæ are fairly common on poplar," and *Stauropus fagi* occurs rarely at Ampfield. The occurrence of *Bryophila glandifera* "on walls in the town" is interesting (are they the *impar* form?); whilst of other Noctuæ, *Bisulcia ligustri*, *Cuspidia leporina*, *Agrotis cinerea*, *Noctua dahlii*, *Cucullia lychnitis* and *Heliothis dipsaceus* are perhaps some of the most interesting. But those who are interested in local fauna lists must buy it for themselves. I may add that a local list of birds is included in the same little work.—Ed.

Journal of the Institute of Jamaica, published by the Institute, Kingston, Jamaica.—The advent of Mr. T. D. A. Cockerell in Jamaica has soon been followed by the publication of a quarterly journal by the Institute. The scientific section appears to have been written entirely by Mr. Cockerell, and consists of "Notes of the transformations of some Jamaica Lepidoptera," "Additions to the Fauna and Flora of Jamaica" and "Additions to the Museum." With regard to *Leucania unipuncta*, Haw., Mr. Cockerell writes:—"A specimen of this species, referable to the form *asticta*, Tutt, is in the Museum collections. It was obtained in Jamaica by Mr. Bowrey. The larva of this insect is the celebrated army worm of the United States. Its occurrence in Jamaica is very interesting, as, although it is extremely widespread, Professor Riley, in the *Third Report of the United States Entomological Commission*, says (p. 91):—'The species has not been found, so far as we know, in the West Indies, though we certainly think that it exists there.' In the Northern United States, the damage done by this species to the cereal crops is enormous. Professor Riley writes (*l.c.* p. 92):—'Last year (1881), for instance, the amount of damage done to a single crop (oats) in Illinois and Indiana, was not far from three-quarters of a million dollars. The magnitude of the interests involved, causes even a slight percentage of loss to represent a very large sum. This is readily shown by the fact that in 1880 the value of those crops subject to the ravages of *Leucania*, amounted to over one billion seven hundred millions.' In the Southern States, although it occurs, it is not appreciably destructive, and probably we have little to fear from it in Jamaica. The variety *asticta* is distinguished from the type, by having no white spot at the base of the reniform stigma."—Ed.

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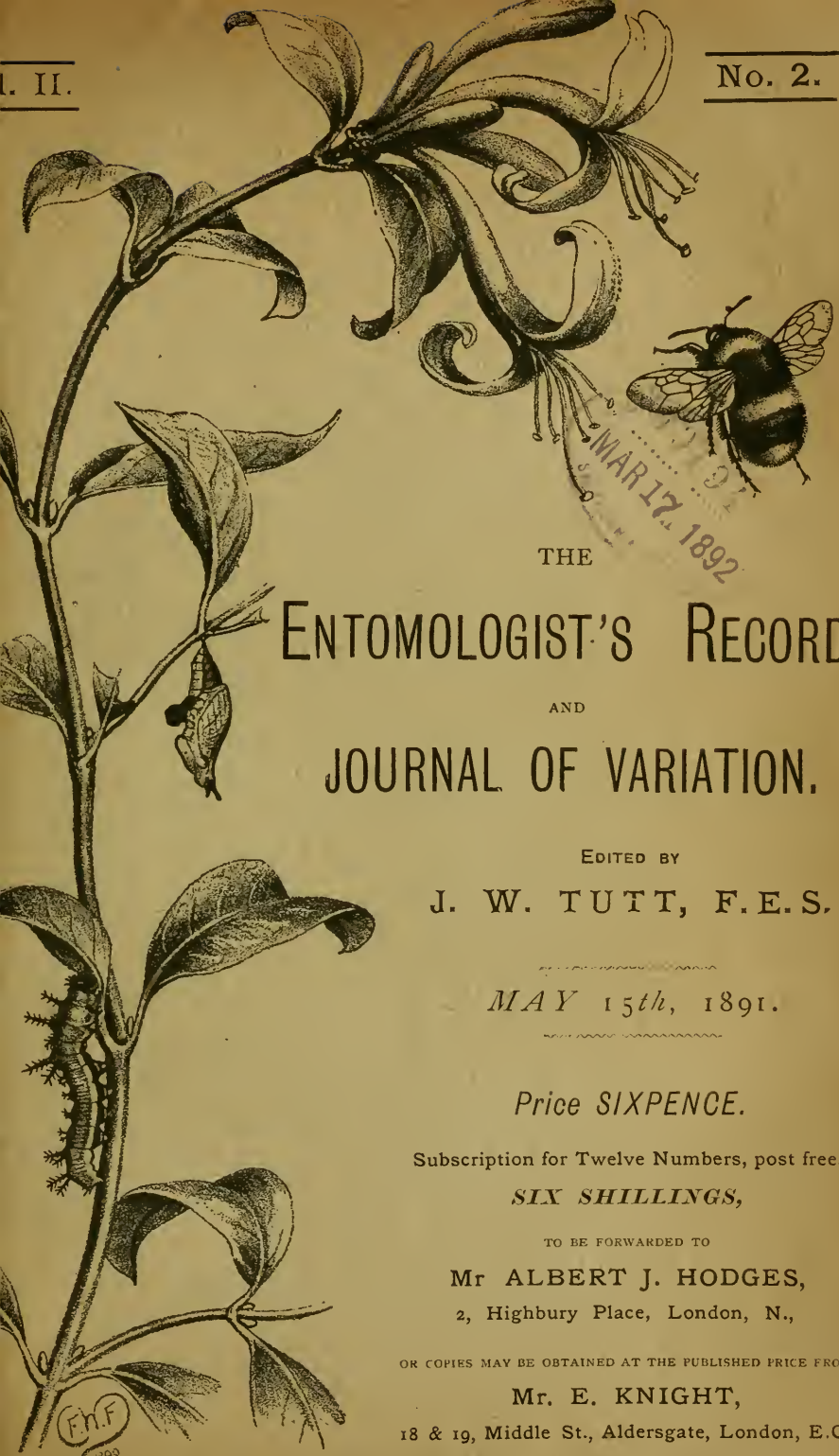

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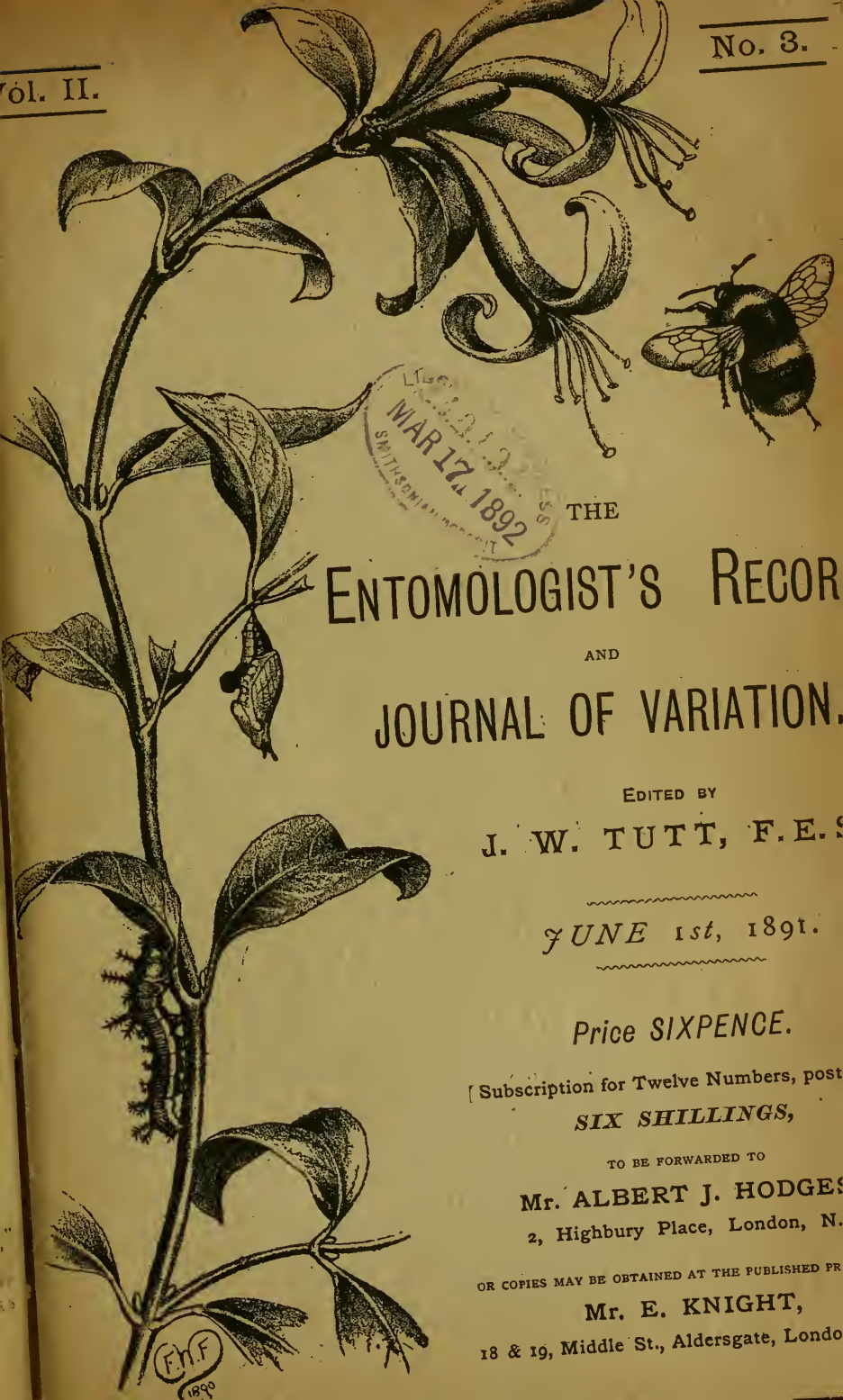

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Inquiry.—Can any gentleman give me particulars as to the best parts of Epping Forest to work in, etc.? If so, I should be greatly obliged.—*F. H. Wolley Dod, Collingham, near Newark.*

Wanted.—Dr. Staudinger and Wocke's *Catalogue of European Lepidoptera*, also vols. ii. and vi. of the *Entomologist*, or Nos. 1, 2, 3, 4 (1864); 13, 23, and 24 (1865). The *Intelligencer*, vol. i. State cash price.—*J. W. Tutt, Westcombe Hill, S.E.*

Appeal.—As I am proceeding as rapidly as possible with the second volume of *The British Noctuæ and their Varieties*, I should be glad of help from collectors in any part of the country, in the genera Agrotis, Noctua, Triphæna, Tæniocampa, etc. to the end of the family.—*J. W. Tutt, Westcombe Hill, S.E.*

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Mr. A. J. Hodges, 2, Highbury Place, London, N.; or to

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from whom single copies may be obtained.

NOTICE.—SPECIAL INDEX.—Will those gentlemen who have not yet acknowledged the receipt of the "Special Index" kindly do so at the earliest opportunity? to A. J. Hodges, 2, Highbury Place, N.

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[Notices of Exchange, which should consist only of the specific names of Duplicates and Desiderata are inserted without charge. Entomological Books wanted may also be inserted in this column.]

[The Editor wishes to state that the publication of Exchanges, Advertisements, etc., in this Magazine, is in no way to be taken as a guarantee of the authenticity, good condition, etc., of the specimens. This Notice is not intended to throw doubt upon the bona fides of Advertisers, etc., but to free the Editor from responsibility, should the privilege be abused.] *Marked* are bred.* Exchange Lists, addressed to J. W. Tutt, Westcombe Hill, S.E., must be received before the 8th for insertion in the current month

I much want fertile eggs of *Acronycta strigosa*, as I have not yet had the newly hatched larva of this species. I am willing to make any bargain, such as to return as pupæ all that I can get to that stage. Anyone who can capture a ♀ moth ought easily to get eggs. As I have wasted dozens of moths in the vain attempt to get the species to pair in captivity, it will be obvious that I am willing to make any possible return for a few fertile ova. Of *Atni* I want a specimen or two of a certain var. of the larva. I would rather get this from some one who is rearing the species than rear it again for myself, and shall be much obliged to anyone who rears it if he will communicate with me.—*T. A. Chapman, Firbank, Hereford. April 25th*, 1891.

Duplicates.—Adonis, Corydon, Ægon, Aglaia, Polychloros, Alniaria, Cucullatella, S. populi,* Ocellatus,* Ligustri,* Typhæ,* Festiva, Plecta, Flavago,* Iota,* Verbasci.* Pupæ Bembeciformis. *Desiderata.*—Pruni, Cinxia, Cassiope, B. rubi, Castrensis, Versicolora, Carmelita, Dictæoides, Dromedarius, Noctuæ very numerous.—*A. Forsyth*, 4, *Ranelagh Terrace, Weymouth.*

Duplicates.—Pupæ of C. absynthii. *Desiderata.*—Pupæ of local macros.—*Lieutenant Brown, West Kent Regiment, Shorncliffe.*

Duplicates.—A few each of Hirtaria, Baja, Leucophæaria, Triangulum, Augur, Nanata, Vinula, Festiva, Incerta, Corydon, Semele, Atomaria, Pronuba, Sambucata, Typica, Brassicæ, Oleracea, Repandata, Rhomboidaria, Sordidata, X. flavago, etc. To clear boxes. *Desiderata.*—Very numerous, many common.—*Henry J. Turner*, 13, *Drakefell Road, Hatcham, S.E.*

Duplicates.—Lucernea (a few), Cinxia (Channel Islands), Spilodactyla, Flavalis, Hirtaria, Galatea. Cardui, Semele, and many odd species. Lists exchanged. *Desiderata.*—Many common species, well-set to complete series.—*Albert J. Hodges*, 2, *Highbury Place, N.*

Duplicates.—Corydon, Bipunctaria, Antiqua, Chœrophyllata, Sobrinata, Lucipara, Oxyacanthæ, Pistacina. *Desiderata.*—Very numerous. Macro and Micro lepidoptera. —(*Miss*) *M. Kimber, Cope Hall, Newbury.*

Duplicates.—Lineolata and ova, Consonaria, Biundularia, Ferrugata,* Unidentata, Coryli (few), Illunaria, Leucophæaria, Punctulata. *Desiderata.*—Very numerous to renew series. Lists exchanged.—*Capt. Robertson, Sketty Park, Swansea.*

Duplicates.—Hispidus,* Croceago,* Elymi,* Isogrammata,* Absynthiata,* Nimbella,* Interjectaria, Coronata, Pumilata, Suspecta, Obscuraria, Puta, Biundularia, Lucernea. Lunigera, Lichenea, Albicolon, Albulata, Subnotata, Sobrinata, Pulchellata, Petasitis, Russata, Olivata, Logiana, and vars.* Consociella, Absynthii imagos and pupæ. *Desiderata.*—Pupæ or imagos on black pins. Lists exchanged.—*Colonel Partridge, Shorncliffe Camp.*

Duplicates.— Monacha, Dispar, B. quercus and neustria larvæ. *Desiderata.*— Numerous. Larvæ or pupæ.—*Mrs. Smith, Monmouth House, Monmouth Street, Topsham, S. Devon.*

Will any gentleman who has duplicate spare specimens, or can capture duplicate specimens during the coming season, set a few of any of the following, as the Curator of the City of London Entomological Society will be glad of any of them for the Society's cabinet? V. c-album, N. senex, mundana, B. callunæ, rubi, E. lanestris, P. syringaria, M. liturata, C. boreata, E. vulgata, H. ruberata, impluviata, C. unidentaria, C. sagittata, D. furcula, B. glandifera, A. aceris, menyanthidis, N. geminipuncta, H. micacea, M. abjecta, furva, M. fasciuncula, literosa, furuncula, A. lunigera, nigricans, N. umbrosa, H. croceago, E. fulvago, tincta, H. rectilinea, iota, interrogationis, S. anomala, A. corticea, E. lichenea, A. urticæ, C. vetusta, exoleta, T. opima, gracilis, populeti, miniosa, O. suspecta, M. anceps, M. albicolon, C. duplaris, C. or, A. myricæ, C. pyralíata, dotata, prunata, M. galiata, A. derivata, T. simulata, L. viretata.—*C. B. Smith*, 24, *Rectory Road, Stoke Newington, N.*

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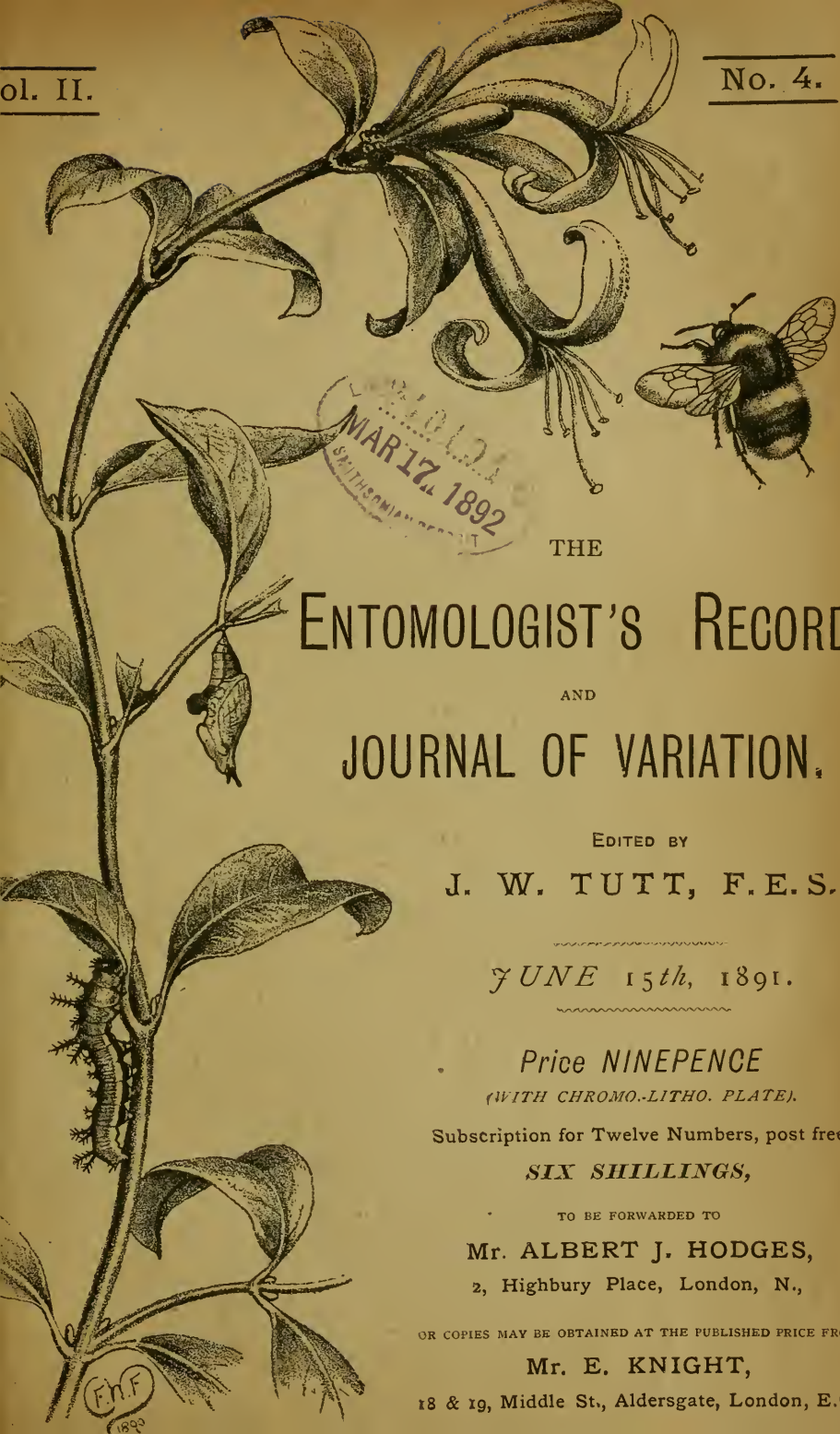

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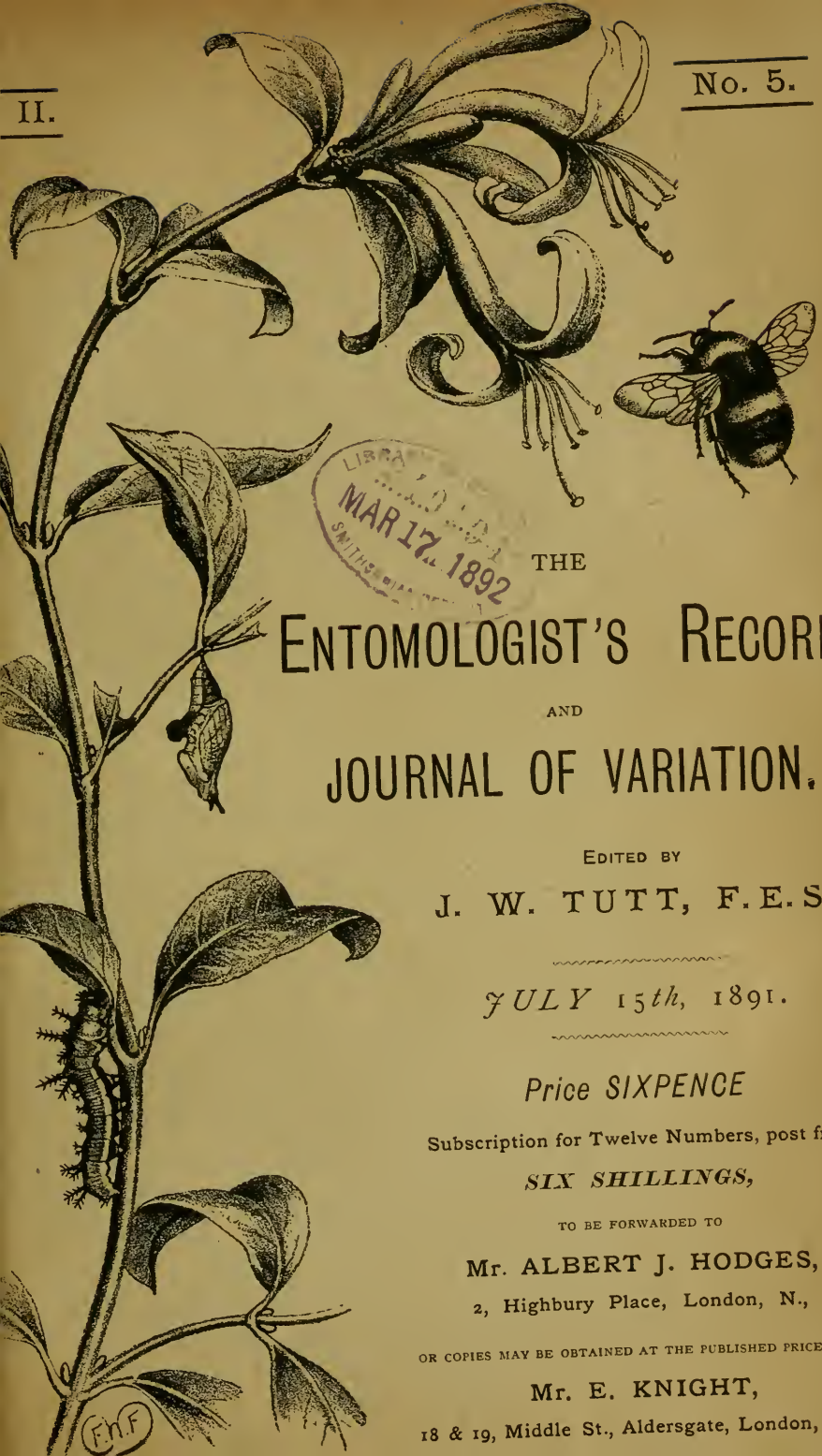

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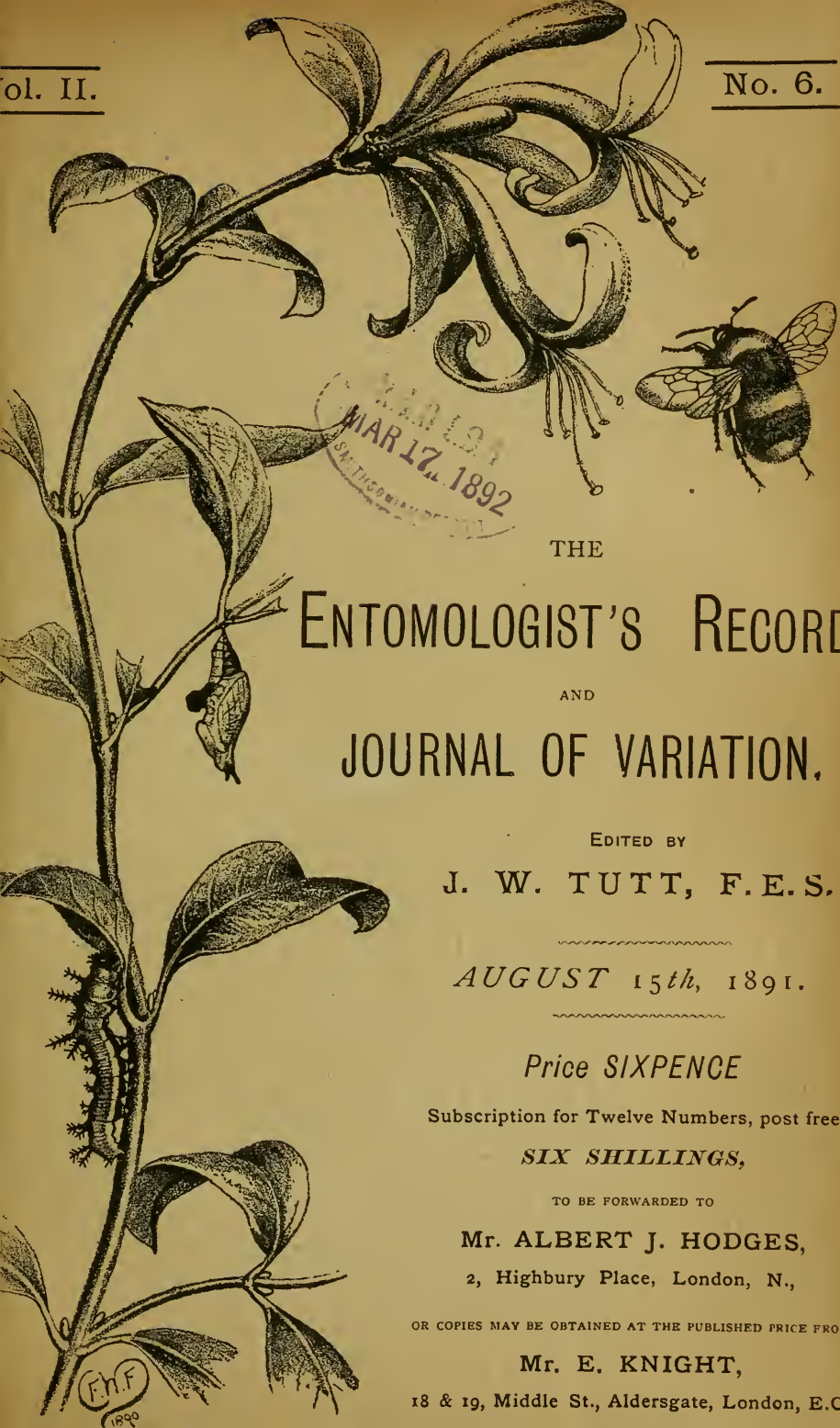

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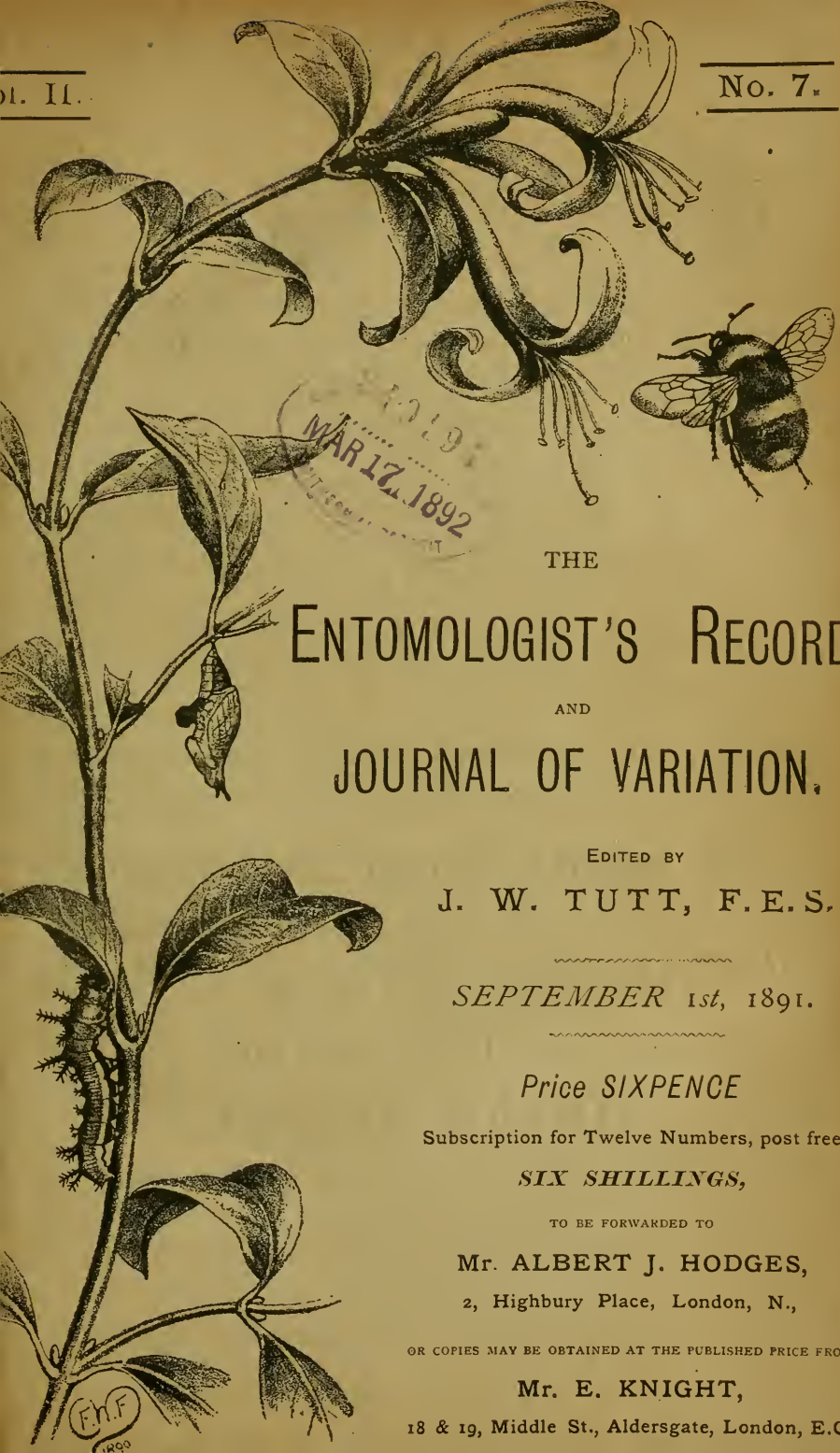

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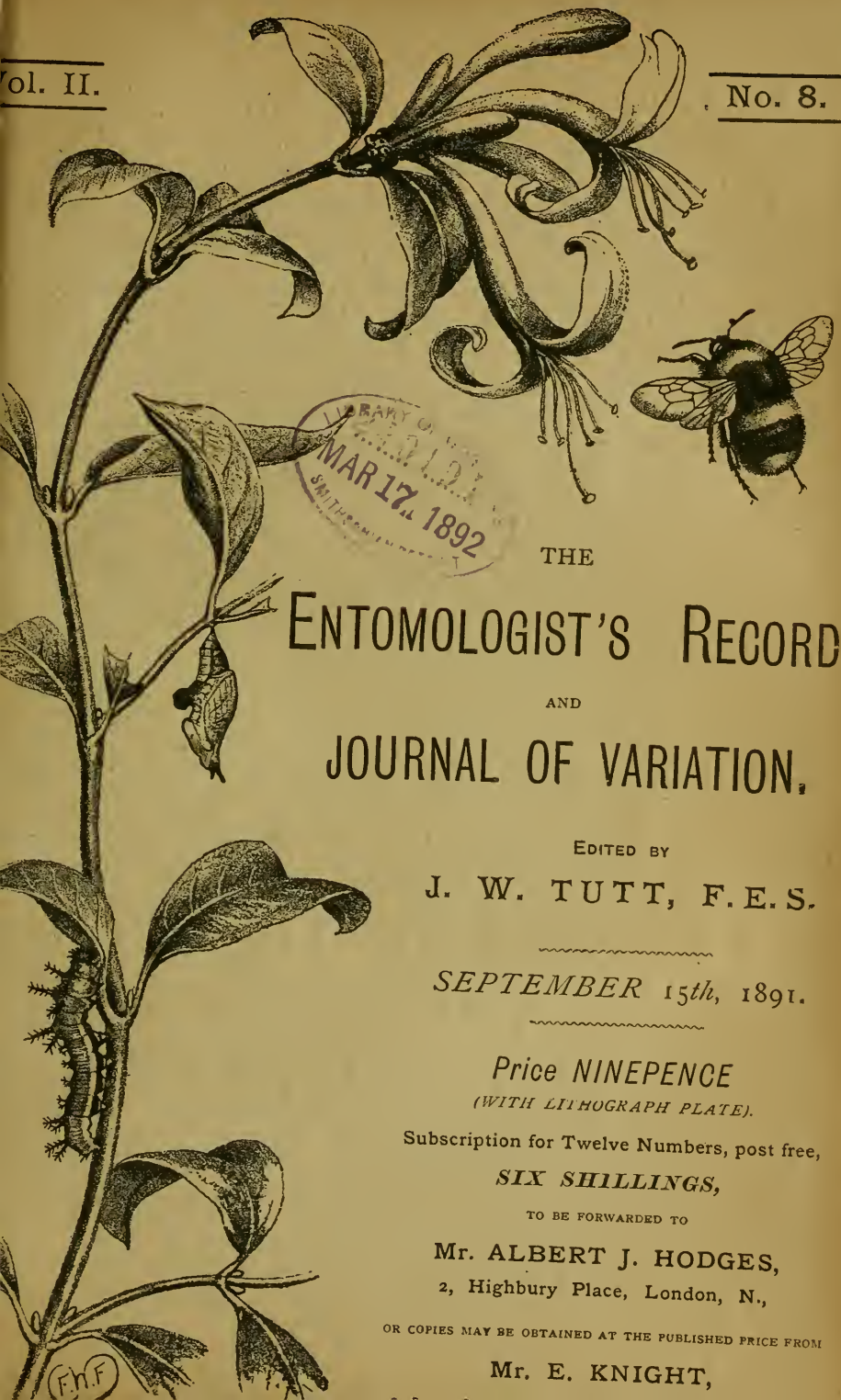

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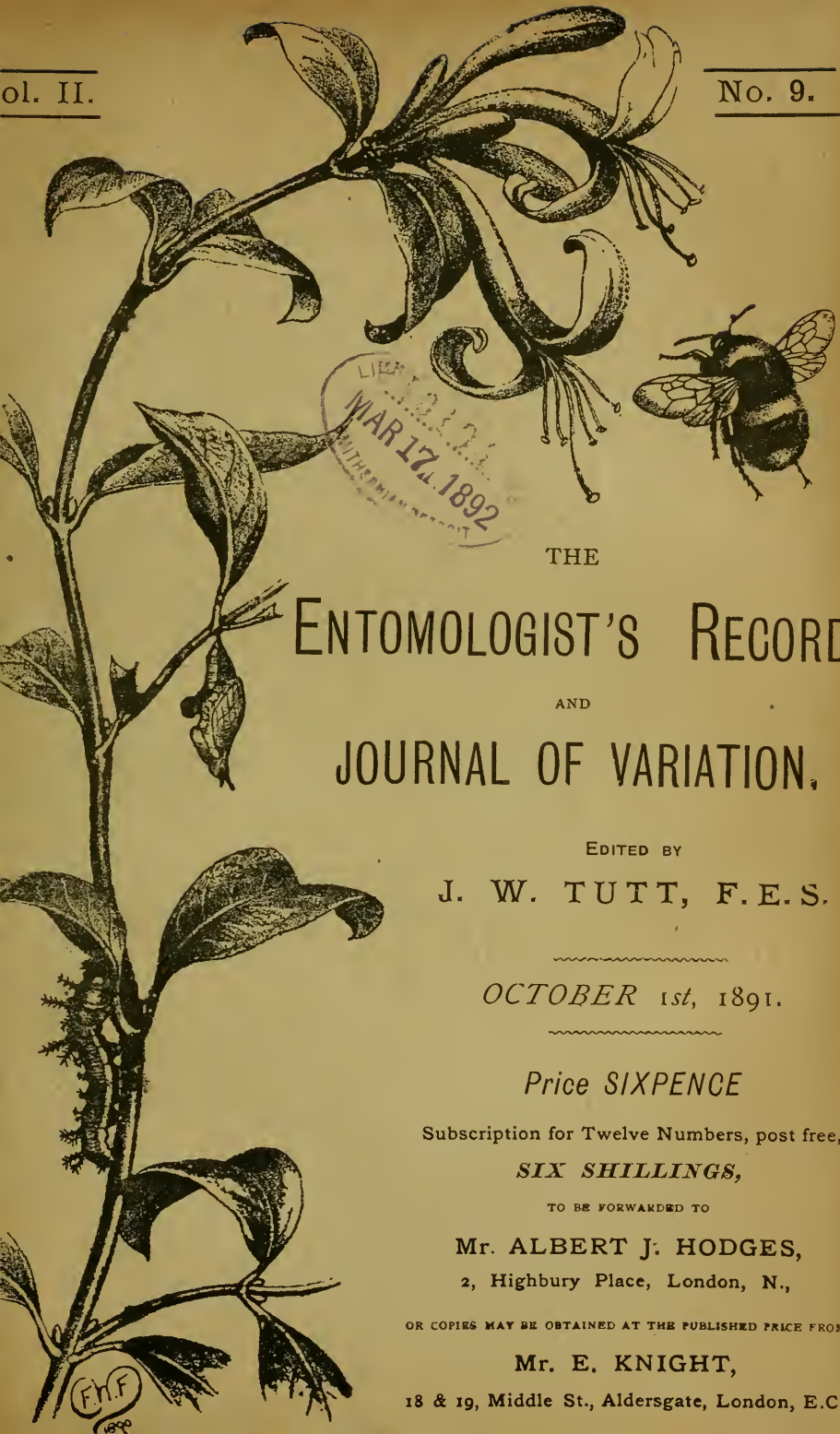

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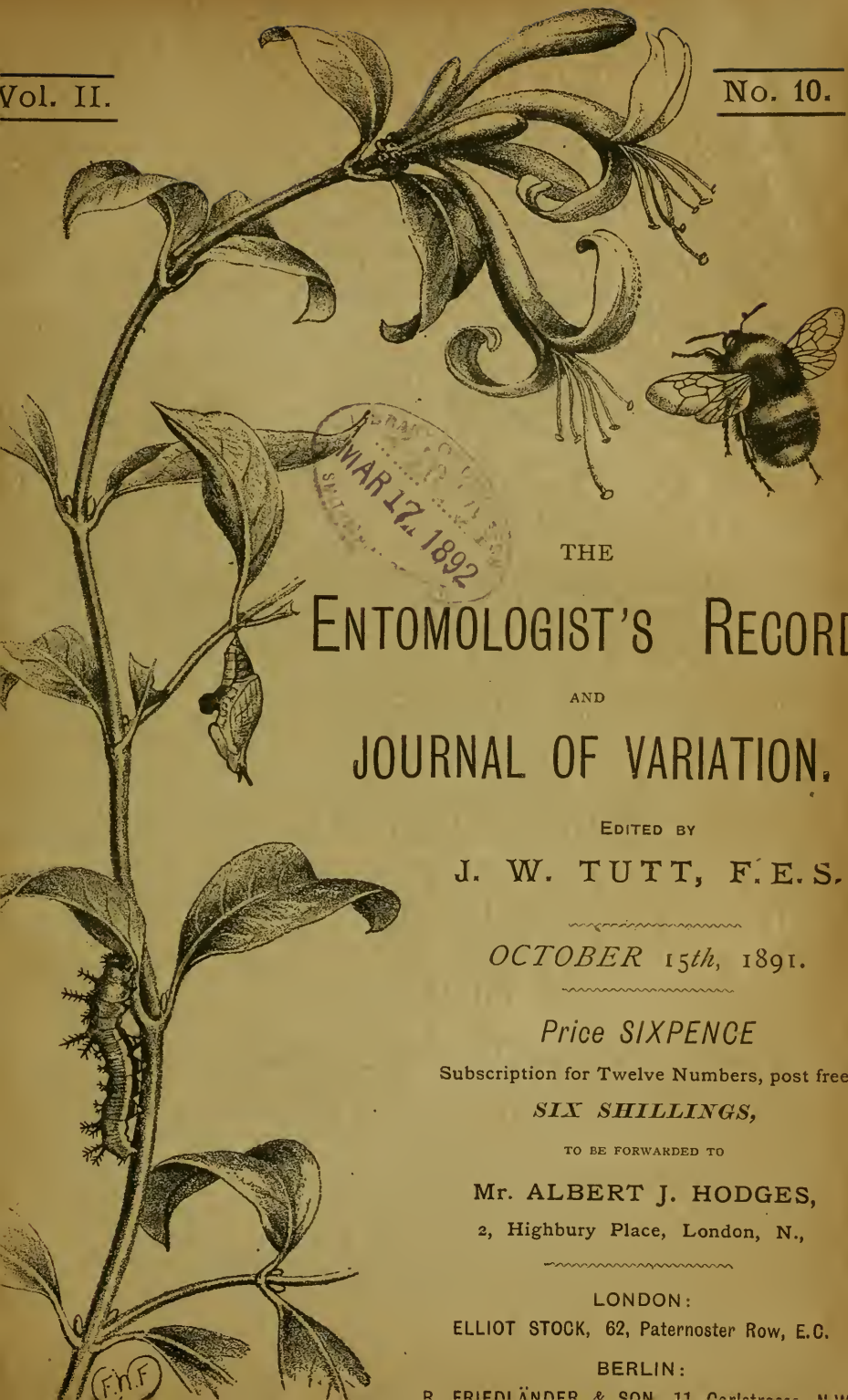

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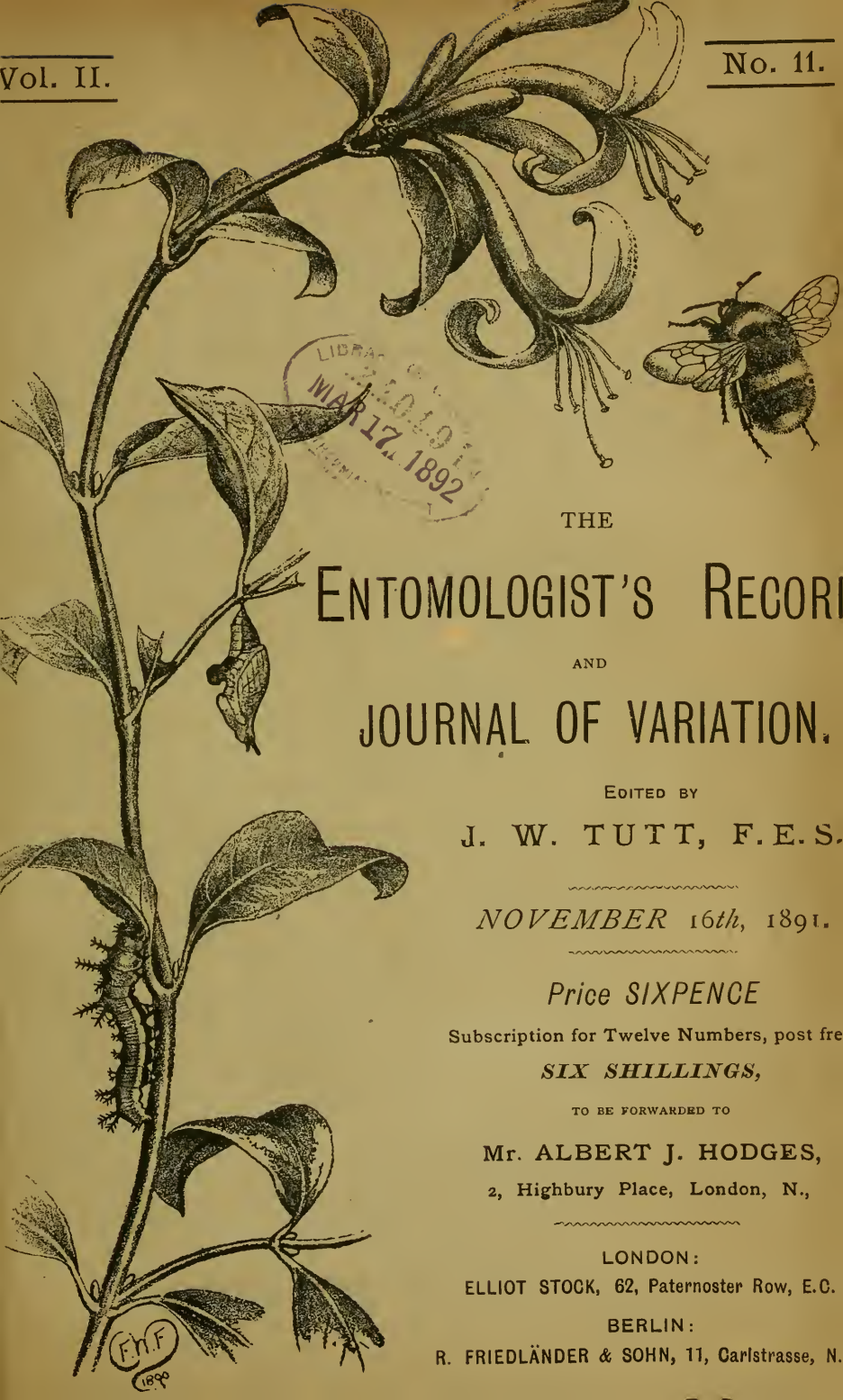

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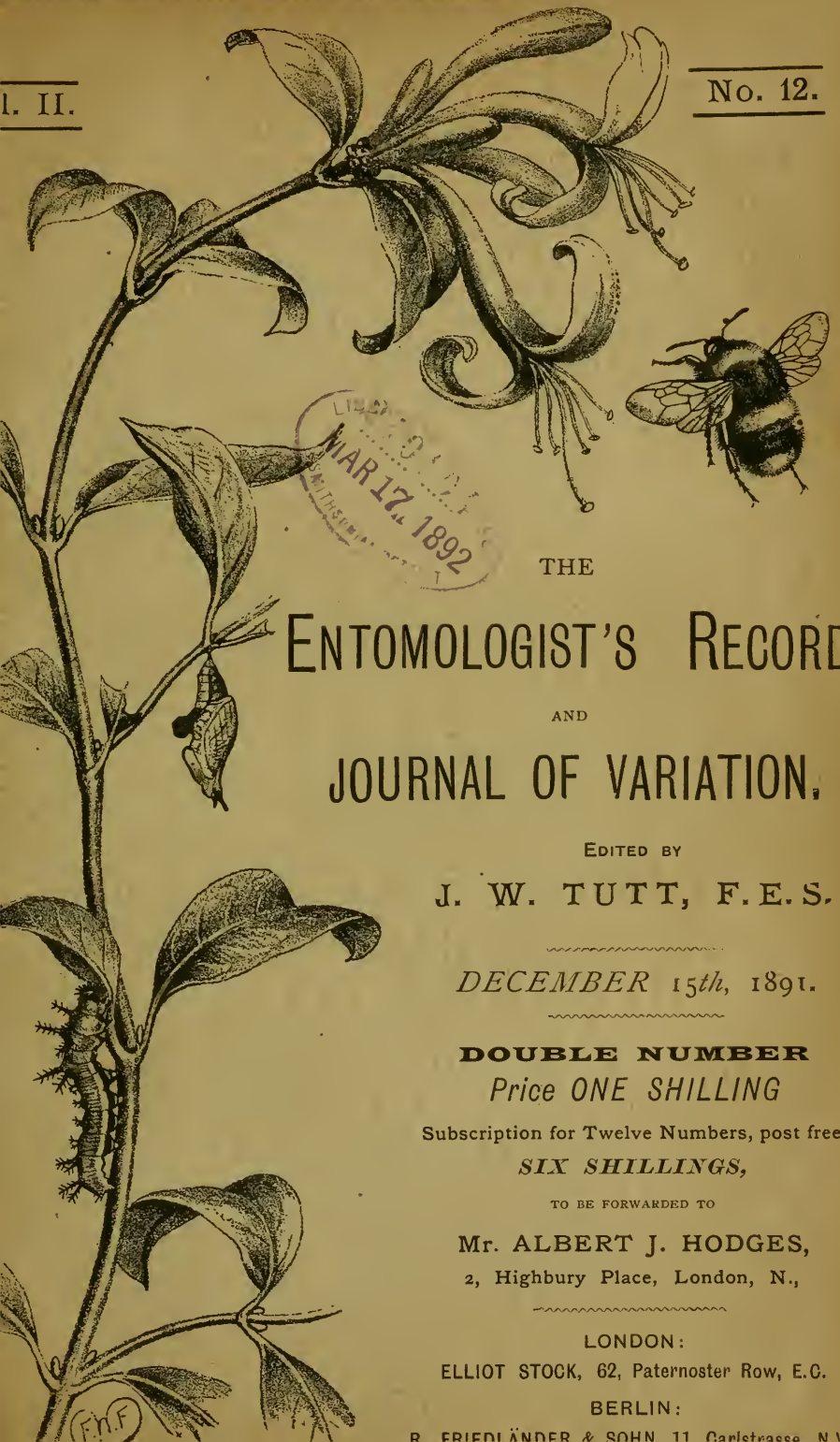

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Wanted.—As no one has offered me the desired vars. of Alni larva, I must try to rear it again myself. Will be pleased to hear from any one who can give me a pupa or pupæ from captured larvæ; will return imagines, ova if successful, or other desired exchange. —*T. A. Chapman*, *Firbank*, *Hereford.*

British Noctuæ Wanted.—Whilst thanking those gentlemen who have kindly sent me specimens of the Noctuid genera from time to time, I would state, that to the end of Tæniocampa is now in print, but that any local forms of the genera immediately following Tæniocampa would be just now especially useful.—*J. W. Tutt*, *Westcombe Hill.*

Coleoptera.—Will coleopterists kindly look through their duplicates to see whether they can spare any of the species mentioned in the Exchange Column of the *Record* during the current year, as required by the City of London Entomological Society for their Cabinet?—*H. Heasler*, 17, *Danby Road*, *Peckham*, *S.E.*

Duplicates.—Badiata, Petraria, Leucophæaria (vars.), Spartiata, Antiqua ♂'s and ♀'s, Galatea, Illunaria, Biundularia, Cerago, Proteus, D. pinastri, Lithoriza, Chrysitis, Thalassina, S. populi, Nupta, Anachoreta (from foreign ova), also a few each of Dictæa, Reclusa, Curtula, Ziczac, Camelina; pupæ of Anachoreta and Ziczac. *Desiderata.*—Numerous; many common local species wanted to complete series; insects in good condition only; lists exchanged.—*H. Alderson*, *Hilda Vale*, *Farnboro*, *Kent*, *R.S.O.*

Duplicates.—A large number of well set (carded) and correctly named British Coleoptera, including many rare and local species; also a few Hemiptera. *Desiderata.* —Lepidoptera, Coleoptera, and other orders.—*A. Ford*, *Claremont House*, *Upper Tower Road*, *St. Leonards-on-Sea.*

Duplicates.—Obelisca (few poor), Lunigera, Lucernea, Geminipuncta,* N. rubi, Puta, Gemina, Strigilis, Plecta, Corticea, Dentina, Pastinum (fair), Tragopogonis, C-nigrum, Janthina, Psi, Z. trifolii, Irrorella, Hectus, Rivata (all Isle of Wight), Cinxia, Statices, Flavicincta (Guernsey), Hirtaria. *Desiderata.*—Few fine bred Monacha, Pudibunda, to extend series; also Flavicinctata, Salicata, Affinitata, Simulata, Ruberata, Menyanthidis, Myricæ, Stellatarum, Umbra, Sulphuralis. Exchange of lists invited.—*Albert J. Hodges*, 2, *Highbury Place*, *N.*

Duplicates.—Numerous. *Desiderata.*—New series of Bajularia, Thymiaria, Subsericeata, Caliginosa, Niveus, Lancealis, Rubidata, Halterata, Coronata, Hippocastanaria, Affinis, Diffinis, Brunneata, Holosericeata, Straminata, Angularia (all to replace).—*J. B. Hodgkinson*, *Ashton-on-Ribble.*

Duplicates.—Suspecta, Leporina (few), Psi, Pudorina, Pisi, Loniceræ, N. rubi, Festiva, Emutaria, Senex, Sparsata, Lignata, Arcuosa, Brunnea, Pyraliata, Ulmata, Boreata, Orbona, Augur, Rurea, Gemina, Impura, Anceps, Fasciuncula, Lithoxylea, Xanthographa, Trapezina, Vespertaria (fair), etc. *Desiderata.*—Numerous, including A. latona, C-album, Artemis, Egeria, Epiphron, Pruni, Adonis, and Corydon.—*E. G. Potter*, 19, *Price Street*, *York.*

Duplicates.—Paphia, Selene, Rhamni, Sibylla, Galatea, Dominula, Monacha, Hirtaria, Pilosaria, Leucophæaria, Angularia,* Pyramidea, also a few Fuscantaria,* Hispidaria, Nupta;* and Valezina (fair). *Desiderata.*—Good specimens only; black pins preferred, C-album, Paniscus, Actæon, Porcellus, Ligniperda, Cribrum, P. populi, Quercifolia, Prunaria (♀'s), Illustraria (spring brood), Tiliaria, Consonaria, Blomeri, Undulata, Dictæoides, Curtula, Citrago, Croceago, Præcox, and many other Noctuas.—*Alfred T. Mitchell*, 5, *Clayton Terrace*, *Gunnersbury*, *W.*

Desiderata.—Myopæformis, Formicæformis, Scoliæformis, Bicuspis, Ilicifolia, Circellata, Helveticata, Lapidata, Exulis, Ophiogramma, Aurago, Barrettii, Occulta, Luctuosa, Interrogationis, and other rare insects. Will make good offers in local insects for any of the above.—*H. Murray*, *Lowbank Villas*, *Carnforth.*

Duplicates.—Fine Solidaginis, Viretata, Lunigera, Lucernea, Conigera, Irrorella, Neustria*, Chenopodii,* Typhæ, Blanda, Z. trifolii, Ziczac,* Semele, Pastinum (fair), Orbona,* Tritici (few), Flavalis, Impura, Carpinata, Dentina (fair). *Desiderata.*—Numerous.—*P. W. Abbott, Wylde Green, near Birmingham.*

Duplicates.—A. cratægi.* *Desiderata.*—Fine Piniperda, Rubricosa (Scotch, Irish, or Welsh preferred), Opima, Populeti, Munda, Suspecta, Lota, Macilenta, Rufina, Pistacina, Lunosa, Spadicea, Citrago, Cerago, Diffinis, Carpophaga, Cucubali, Flavicincta, Viminalis, Oxyacanthæ, Adusta, Protea, Pisi, Vetusta, Exoleta, Verbasci, Myrtilli, Iota, V-aureum, Duplaris, Diluta, Rumicis, Hepatica, Porphyrea, Fimbria, Triangulum (pale), Brunnea, Festiva (Scotch and Irish), Dahlii, Geryon, Globulariæ, Miniata, Mesomella, Tiliæ, Fuliginosa, Selene, Artemis, Blandina, Davus, Artaxerxes, Argiolus, Lucina, or offers.—*J. W. Tutt, Westcombe Hill. S.E.*

Duplicates.—Pupæ of S. populi, Carpini, Vinula, Bucephala, Menyanthidis, Myricæ, Pisi. Imagines :—Plantaginis, Caja, Fuliginosa, Glareosa, N. rubi, Xanthographa, Spartiata, Cerago, Silago, Ferruginea, Rubi, Adusta, Chi, Pulchrina, Gamma. *Desiderata.*—Very numerous. Ocellatus, Tiliæ, Atropos, Convolvuli, Ligustri, Porcellus, Elpenor, Stellatarum, Æsculi, Ligniperda, Dominula, Machaon, Sinapis, Cratægi, Rhamni, Edusa, Hyale, Iris, Io, Polychloros.—*Frances W. Buchan, Clenterty Cottage, Blackburn Kinaldie, Aberdeen.*

Duplicates.—Zonaria, mostly ♂, equal to bred. *Desiderata.*—Very numerous, in fine condition, or pupæ.—*Robert Kay*, 15, *Nasmyth Street, Horwich, near Bolton.*

Duplicates.—Rhamni, Davus, S. populi,* Bucephala,* Mundana,* Psi, Ypsilon,* Brassicæ,* Typica,* Gothica,* Oleracea,* Oxyacanthæ.* Trapezina,* Chi, Interrogationis, Perla,* Cerago,* Silago,* Flavago,* Porphyrea, Nanata, Pennaria,* Aurantiaria,* Cæsiata, Defoliaria,* Piniaria, Decolorata, Strigillaria, Pinguinalis,* Schulziana, Angelicella,* Aspersana,* Viburnana, Arenella,* Literella,* etc. *Desiderata.*—Iris, Acis, Galii, Clear-wings and offers.—*Thomas Baynes*, 14, *Briggs Street, Tyson Square, Ulverston, Lancashire.*

Duplicates.—Fuliginosa, Menyanthidis, Macilenta, Vaccinii, Satellitia, Ferruginea, Exoleta; also pupæ of Menyanthidis and Myricæ. *Desiderata.*—Numerous.—*A. E. Cannon, Mannsfield, near Aberdeen, N.B.*

Duplicates.—Punctaria, Temerata, Taminata, Rubiginata, Ænea, Carnella, Adornatella, Ornatella, Cespitana, Striana, Obtusana, Nana, Osseana, Cratægella, Ligulella, Tæniolella, Neuropterella, Festaliella, Albifrontella, and many others. *Desiderata.*—Numerous.—*W. D. Cansdale, London Road, Forest Hill, S.E.*

Duplicates.—Ova of Spartiata, pupæ of Carpini and Piniaria, imagines of S. populi, Vinula, Pronuba, Suffumata, Piniaria, Rubricosa, Spartiata, Subtristata, etc. *Desiderata.*—Very numerous.—*A. D. Connon, Woodend Brace, Aberdeen.*

Duplicates.—Blandina, Megæra, Ocellatus,* S. populi,* Semele, Velleda, Geryon, Loniceræ,* Salicis,* Potatoria,* Sambucata, Margaritata, Zonaria * ♀, Biundularia, Obscurata, Bisetata, Amataria, Atomaria, Boreata,* Cæsiata, Pimpinellata,* Dubitata, Immanata, Comitata,* Vinula,* Micacea, Graminis, Augur,* Triangulum, Brunnea, Baja, Gothica, Macilenta, Rufina, Litura, Vaccinii, Spadicea, Ferruginea, Chi,* Oxyacanthæ, Vetusta, Chrysitis, Iota, Pulchrina, Pyramidea, etc. *Desiderata.*—Artemis, Lucina, Alveolus, Comma, Tipuliformis, Culiciformis, Statices, Miniata, Rubricollis, Complanula, Betularia, Crepuscularia, Luteata, Sylvata, Rusticata, Interjectaria, Incanaria, Ornata, Promutata, Fumata, Emarginata, Liturata, Conspicuata, Euphorbiata, Filigrammaria, Ericetata, Blandiata, Unifasciata, Linariata, Pulchellata, Plumbeolata, Isogrammata, Impluviata, Unangulata, Certata, Undulata, Corylata, Bipunctaria, Obliquaria, any Ephyra, etc., etc. Well set, and on black pins.—*John Booth, Junr., Old Brewery, Ulverstone.*

Duplicates.—Paphia, Io, Atalanta, Cardui, Egeria, Megæra, Semele (Irish), Adonis (♂, 2), Cleopatra (2), Podalirius (2), Cratægi (numerous), Tages (2 Continental), Filipendulæ, Jacobææ, Mensuraria, Lithargyria, Micacea, Lithoxylea, Tenebrosa, Exclamationis, Lota, Pistacina, Ferruginea. *Desiderata.*—Numerous.—*L. H. Bonaparte-Wyse, Manor of St. John's, Waterford.*

Duplicates.—P. brassicæ,* Paphia (♂'s), Urticæ,* Sylvanus, Hyperanthus, Linea, Corydon, Galathea, Caja,* Dispar,* Neustria * (dark), Hirtaria,* M. brassicæ,* Stabilis, Xanthographa, Instabilis,* Chi,* Filipendulæ, Grossulariata, Vinula,* Jacobææ, Pudibunda,* Illunaria,* Ferruginea, Silago.* *Desiderata.*—Very numerous.—*F. J. Rasell*, 61, *St James's Road, Northampton.*

Duplicates.—Preserved larvæ of Brassicæ, Io, Urticæ, Populi, Loniceræ, Jacobææ, Caja, Lubricipeda, Auriflua, Salicis, Dispar, Antiqua, Lanestris, Rubi, Quercus, Carpini, Hirtaria, Amataria, Grossulariata, Æscularia, Didymata, Vinula, Bucephala, Cœruleocephala, Psi, Orbona, Augur, Xanthographa, Flavicincta. *Desiderata.*—Very numerous.—*C. Couldwell*, 1, *Park Avenue, Cane Street, Hull.*

Duplicates.—Pupæ of S. fagi (bred from captured female).—*H. S. Fremlin, Red House, Hadlow, Kent.*

Duplicates.—Chrysidiformis, Polycommata, Albimacula (pupæ). *Desiderata.*—Myricæ, Diffinis, Smaragdaria, etc.—*W. J. Austin, Radnor Street, Folkestone.*

Dr. Lucas of Queensland will be very pleased to exchange Australian Lepidoptera for English specimens. Anyone wishing to do so, can obtain particulars from me, I shall be pleased to answer any inquiry.—*A. Quail*, 15, *Stamford Hill, Stoke Newington, London.*

The Curator of the City of London Entomological Society will be glad of any of the following for the Society's cabinet:—V. c-album, N. senex, mundana, B. callunæ, rubi, E. lanestris, P. syringaria, M. liturata, C. boreata, E. vulgata, H. ruberata, impluviata, C. unidentaria, C. sagittata, D. furcula, B. glandifera, A. aceris, menyanthidis, N. geminipuncta, H. micacea, M. abjecta, furva, M. fasciuncula, literosa, furuncula, A. lunigera, nigricans, N. umbrosa, O. croceago, E. fulvago, A. tincta, H. rectilinea, P. iota, interrogationis, S. anomala, A. corticea, E. lichenea, A. urticæ, C. vetusta, exoleta, T. opima, gracilis, populeti, miniosa, O. suspecta, M. anceps, M. albicolon, C. duplaris, C. or, A. myricæ, C. pyraliata, dotata, prunata, M. galiata, A. derivata, T. simulata, L. viretata.—*C. B. Smith*, 24, *Rectory Road, Stoke Newington, N.*

To THE GENEROUS.—I am still in want of types of Unguicula, Curtula, Lunigera, Lota, Dentina, Megacephala, Flavicornis, Ridens, Spinula, Brunnea, Contigua, Genistæ, for the collection that I am attempting to finish for the local Natural History Society.—*J. Tyrer*, 14, *Bush Terrace, Chatham.* [Mr. Tyrer desires to thank those who have helped him. He is probably the oldest living collector in the British Isles, having almost completed fourscore years, and as the "old veteran" still delights in the pursuit of his youth, collectors are asked to help his work if they have anything that can be at all used.—ED.]

Wanted.—Multistrigaria, Lucernea, Ashworthii, and some common butterflies, or good Natural History books, in exchange for Continental types of rare British macro-lepidoptera.—*H. W. Marsden*, 21, *New Bond Street, Bath.*

Wanted.—British and European Lepidoptera, especially Noctuæ; will give in exchange fine North American species.—*Chas. S. Westcott, Merchantville, N.J., U.S.A. Box* 167, *Camden Co.*

Wanted.—Nos. 1, 3 (1864) of the *Entomologist.* The *Intelligencer*, vol. i. State cash price.—*J. W. Tutt, Westcombe Hill, S.E.*

Changes of Address.—R. Freer, to Rugeley, Staffordshire; Rev. C. D. Ash, from Queensland, to Saxby Rectory, Barton-on-Humber, Lincolnshire.

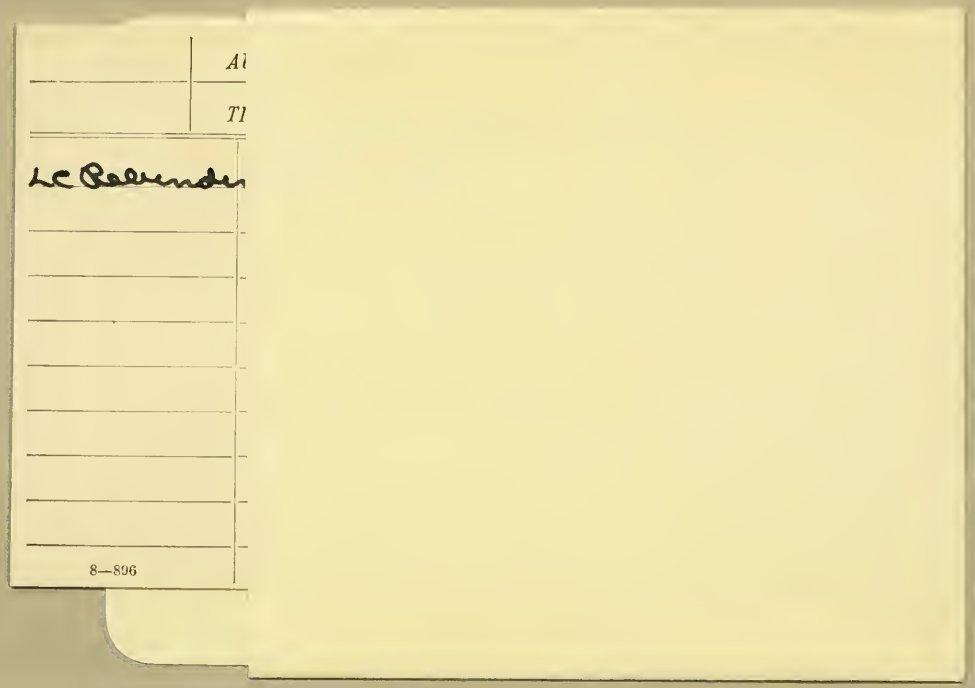
MEETINGS OF SOCIETIES.

Entomological Society of London, Chandos Street, Cavendish Square, W.—Wednesday, January 6th, at 7 p.m. Annual Meeting.

The City of London Entomological and Natural History Society, 33, Finsbury Square, E.C. Thursdays, at 8 p.m. December 17th, January 7th and 21st. All Entomologists cordially invited. (December 17th—Pocket Box Exhibition. January 7th—"Larvæ Preserving," by Mr. A. Quail. January 21st—"The Pterophorina," by Mr. J. W. Tutt.)

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Thursdays, at 8 p.m. January 14th.

F. KNIGHT, PRINTER, MIDDLE STREET, ALDERSGATE, E.C.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