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THE
BRITISH NOCTUÆ
AND
THEIR VARIETIES.
VOL IV.
—
TUTT.



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THE
BRITISH NOCTUÆ
AND
THEIR VARIETIES,

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

(Editor of *The Entomologist's Record and Journal of Variation*
and Vice-President of the City of London
Entomological Society).

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TO MY SUBSCRIBERS.

On the completion of the fourth and last volume of this work, I beg to sincerely thank the ladies and gentlemen who have so kindly subscribed to the work, and thus taken the whole of the monetary responsibility of production off my shoulders. To each and every of the following first list of subscribers, as also to those who have supported the production of the work through the publishers, I tender my heartiest thanks.

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INTRODUCTION TO VOL. IV.

In presenting the last volume of this work to my subscribers, it may be well to draw attention to a few further incidental facts to which the writing of the book has directed my attention.

In the Introduction to Vol. I. I dealt with some of the "Probable causes of variation," in that to Vol. II. with some thoughts on the "Genetic Sequence in the Colours of Lepidoptera," and in Vol. III. with those phases of variation connected with the sexes of Lepidoptera, generally known as "Secondary Sexual Characters." In the present volume I propose dealing with matters which need explanation, or have already had attention drawn to them, as well as a general idea of the classification of our NOCTUÆ and their relation to those of other countries.

VARIETIES AND ABERRATIONS.—Some entomologists lay great stress on the distinction between "aberrations" and "varieties" and I think very properly, although I have been unable to keep up so artificial a distinction in this work. According to the distinction as set up by Dr. Staudinger, "aberrations" are accidental forms, occurring occasionally with the typical form, whilst "varieties" are local races or modifications of the type, which they have supplanted in various localities. It is very evident, that in a work based on exact study rather than generalisations, the distinction to a great extent falls through, and almost all the "varieties" so-called, would be in reality "aberrations." But there is no real distinction in this direction. Even in our own country the "varieties" or local races of one district are "aberrations" in another and *vice versa*. Take for example *Cuspidia psi*. In London, the pale type of this species is very rare, and has been supplanted by a true variety or local race known as var. *suffusa*. A few miles from London, the pale type generally occurs, whilst a dark specimen of the variety *suffusa* is very rare. In such a locality, *suffusa* becomes purely an aberration in the Staudingerian sense, and therefore within a few miles area, this form may be a variety (local race) or an aberration (occasional form). Every entomologist could give other examples—*Cuspidia leporina* and its var. *bradyporina*, *Cymatophora* or and its var. *scotica*, *Thera juniperata* and its var. *scotica*, *Asphalia flavicornis* and its vars. *scotica* and *galbanus* and endless other species give parallel instances. It becomes clear, therefore, that such an arrangement is exceedingly artificial and indefinite, and altogether unworkable, when the variation of most of our species is closely and systematically worked out.

Perhaps in another sense, almost all our British specimens of a very large proportion of species are "varieties" in the Staudingerian sense, *i.e.*, if we compare them with the generally brighter and better marked typical forms obtained in Central and Southern Europe, for there are very few of our British species that do not differ from the usual Continental forms of the same species, and that do not bear a strong impress of the insular character of our fauna. In this way, therefore, our most ordinary forms are often local races, and our own

recognised local races are, in fact, forms very much intensified compared with the Continental race. Striking examples of this character are seen in British specimens of such species as *Viminia euphorbiæ* var. *myricæ*, *Dianthœcia luteago* var. *barrettii*, *Dianthœcia cœsia* var. *manani* and many others. These are, however, excellent illustrations of distinct local races or varieties, occurring quite independently of the type, and varying *inter se* as much as does the type in other localities.

Such absolute cases as these, however, are comparatively rare. Reference to the general remarks on such species as *Agrotis hyperborea*, *A. subrosea*, *Taniocampa instabilis* and *Pachnobia rubricosa* will show, however, that I have not neglected this part of the work. The first two of these species, although having intermediate forms, are strikingly developed as local races in Britain compared with the Continental form. The typical pale *hyperborea* of Scandinavia etc., is replaced by red forms in Britain and the Alps, whilst the ordinary Continental form of *subrosea* known as var. *subcœrulea*, is also pallid, the British form being very strongly tinged with rosy. *Pachnobia rubricosa* gives us local races that cross in various localities, although strongly differentiated in others, so also does *Taniocampa instabilis*. At any rate, the general notes on these and other species should be sufficient to direct the attention of future workers to the main facts as to whether, in certain localities, the forms should be considered principally as "varieties" or "aberrations," although I must own that I have not been able to see my way out of the mass of difficulty which must necessarily have occurred, had I attempted to adopt the Staudingerian arrangement, e.g., *Tapinostola fulva* ab. *fluxa* of Staudinger's 'Catalog' would become var. *fluxa* in many parts of Scotland, just as the *Cuspidia psi* var. *suffusa* in London, would become ab. *suffusa* a few miles out. *Leucania lithargyria* var. *argyritis*, as it is called in Staudinger's 'Catalog,' would become ab. *argyritis* in Britain, where this pale form, far from developing into a local race, is of the most rare occurrence, turning up as an aberration occasionally with the type. Again the *Grammesia trigrammica* var. *bilinea* of Staudinger would become ab. *bilinea*; *Cleoceris viminalis* var. *obscura*, would become ab. *obscura* in most localities, and so on almost *ad infinitum*.

Many of the forms with which I have had to deal, can scarcely be classed either as "varieties" or "aberrations." They have neither developed into "distinct local races which have supplanted the type" since they occur with the type, nor can they exactly be looked upon as accidental forms which occur occasionally with the type, as they are, on the contrary, frequently equally common with the type. The various forms of the species in *Leucania*, *Agrotis*, *Apamea* etc., will immediately occur to lepidopterists as illustrations of this view.

At the same time I am quite aware of the fact that although a "variety" and an "aberration" may be identical in the cabinet, yet in the hands of the field naturalist, the "variety" will probably breed true, a specimen of the type form only occurring occasionally as an "aberration," whilst the "aberration" may produce some "aberrations" but will in the main revert at once to the type. This appears to be the great difference between them, and the only reason for making any discrimination.

It becomes evident, therefore, that the division of forms which do

not agree with the type into "aberrations" and "varieties" is to a great extent artificial and arbitrary, and frequently incapable of application. At the same time, I do not wish to deny the comparative value of these terms when applied in a general way to local races or isolated accidental forms, as the case may be. But for the purpose of exact sub-division the terms are useless and cannot be scientifically applied.

USE OF THE TERM TYPE.—In the preceding paragraphs concerning "varieties" and "aberrations" I have frequently used the term "type." In entomology this has two very distinct meanings and its application in each instance from a scientific point of view can be readily justified and proved to be correct.

In the first place, the term "type" is used to designate the prevalent form of any species occurring in a given district or area. Thus var. *suffusa* is often referred to as the London type of *Cuspidia psi*; var. *myricæ* is referred to as the Scotch type of *Viminia euphorbiæ*; var. *meridionalis* as the Huddersfield type of *Polia flavicincta*; var. *viridicincta* as the Portland type of *Epunda lichenea* and so on. Every locality, with anything specially peculiar in its environment, will produce its own particular type, and hence, in this way, there will be almost as many types as localities.

Now let us first examine the usage of the term "type" in a more extended manner, and let us consider what in this sense is the true type of the species. As in the above examples, we restrict the term "type" to the prevalent form in a certain fixed area, generally a comparatively small one, so if we wish to obtain, in this sense, an idea of the true type or prevalent form of the species, we must find out what is the prevalent form throughout its whole area of distribution. But, as a matter of fact, we know very little of the different phases of the variation of most insects throughout their whole area of distribution, and hence it is, in the present state of our knowledge, almost impossible to fix on the prevalent form or type of even the best-known and commonest species. We know that every special locality, with any striking or marked peculiarity in its environment, will produce its own special form, and it would be necessary to compare all these different local types to get a general idea of the type of the species as a whole as used in this paragraph.

The use of the term "type," in this sense, can only be valuable, therefore, in a general way, and it contains no actual scientific value, since it does not convey a definite idea to the mind of the student.

But there is another use of the word "type" which is most valuable in scientific work. The term is applied to that particular form of a species which was first figured or described by an author under a particular name. For the purpose of comparison it is necessary to have a fixed form with which comparisons may be made, otherwise we should always be hopelessly muddled. It may be an arbitrary arrangement to refer to some particular form as the type, but it is certainly a most useful one. The type may, in this sense, be a very rare form, a very local form, or a common and well-distributed one, but for the purpose of comparison it matters little which of these it is. So long as we have something exact, fixed and unalterable, comparison is easy; without such, comparison is impossible. If our knowledge was sufficiently advanced to enable us to refer with ease to the most

widely-distributed form of each species as the type, it would be much preferable to the arbitrary arrangement we are obliged to adopt, but our knowledge in this direction is at present infinitesimal and our ignorance profound, and however satisfactory it would be to be able to use the term "type" as I have here pointed out, it is at present impossible.

I would only offer one gentle criticism concerning the use of descriptions and figures as types. Guenée and other authors have used as types the figures of authors not only without descriptions, but without names. The use of figures without descriptions but with names is perfectly legitimate and proper, and I consider a good figure with a name as valuable and useful (frequently more useful) for a reference, as the best description, but a figure without a name is useless, and it is ridiculous to refer a later author's name to the figure of an earlier author and look on the earlier author as the nomenclator of the species and delineator of the type. To illustrate my objection. Albin figured a moth without a name. Many years after it was figured by Hübner under the name of *impura* and yet Guenée refers to the species as *impura*, Albin. Albin never dreamed of the insect as *impura*, and it appears unscientific to attempt to tack his name on to the species as the nomenclator of the type. For myself, I have accepted the oldest recognisable named figure or description as the type.

Still another point relating to type descriptions. Hufnagel's, accepted by Staudinger, are wretched: and alone, should as a rule, and certainly would be rejected. But there is another side to the question. Contemporary (or almost so) with Hufnagel was Rottemburg, who knew Hufnagel's species (probably saw his types) and who re-described or extended Hufnagel's descriptions in an excellent manner, at the same time retaining Hufnagel's names. These latter, through Rottemburg's references, therefore, become quite intelligible, and I support Staudinger in retaining Hufnagel's names and utilising his descriptions for the types.

3. THE NOCTUÆ IN THE BRITISH MUSEUM COLLECTION.—Relating to this special group which we are now considering, I would refer to the National Collection in the British Museum, and also to a series of papers published by Mr. Butler, in the 'Trans. Ent. Soc. of London,' entitled "Notes on the synonymy of the Noctuites," which are based on the material in that collection. In accepting some of the references made in these papers without verification, I am afraid I led my readers into error in one or two instances in the *Agrotidæ*, but the errors have since been pointed out.

The necessity of seeing the type specimens of some species for the purpose of this work, led me to the British Museum to examine them, and at the same time to look over the collection. I was extremely sorry to find that the way in which certain species have been wrongly named, is a most serious matter, and presents dangers to those who may have to consult the collection, so that I feel it necessary to point out some of these instances. A British collector will understand the seriousness of the errors, when I say that in the series of *Hadena* (*Mamestra*) *thalassina*, there are eight specimens of *thalassina*, two of *H. adusta*, and four of *H. genistæ*; the last specimen in the series of *Noctua margaritacea*, is a typical specimen of *N. glareosa*; the two last

specimens under the name of *N. punicea* are specimens of *N. umbrosa*. Four specimens of *Agrotis nigricans* var. *carbonea* are placed in the series of *A. tritici*; whilst one of the most marvellous errors is in connection with *Agrotis hyperborea*. A very fine series of the typical grey form of this species (*vide, ante*, vol. ii., p. 85) is in the collection. Our British specimens are redder than the type, and, as is well known to most of our collectors, were called *carnica* for some years. There is an European species in *Pachnobia*, called *carnea*. Struck apparently by the similarity of the names *carnica* and *carnea*, the two red (type) specimens of *hyperborea* labelled *carnica*, have been placed in the midst of a series of *carnea*, in another genus, and to which they do not bear the slightest likeness. These errors, at any rate, will be sufficient to give workers of the NOCTUÆ some idea of the comparative worthlessness of the British Museum material of this group in its present condition, and the necessity of actual verification of everything published on the group; and if such errors as these occur in our own well-known species, what are the possible errors in those less well known? Nothing can show more, too, the danger attending the (to my mind, unnecessary) method of breaking up the collections on which our future work must be based. It is simply amazing to think that such collections as the Grote and Zeller collections, should be allowed to be broken up and distributed, especially when such errors as these already quoted, are made by those who make the distribution, and who thus criticise the work of entomologists,—work (which such errors lead us I think fairly to assume) is not understood.

With regard to hap-hazard criticism, the following is an example from the pen of Mr. Butler, who appears from his writings, to be somewhat if not entirely responsible for the present condition—both in naming and arrangement—of the national collection of NOCTUÆ. Referring to *Cerastis ligula* and *C. vaccinii*, he writes:—"The describers of Exotic lepidoptera frequently have to suffer from the bitter onslaught of men whose experience is limited to a study of the European, and sometimes to the British fauna, these men complaining that the student of tropical forms makes too many species. As a matter of fact, no men are greater "hair-splitters" than purely European workers. The above is only one out of many instances in which one variable species has been laboriously sorted out into three. Formerly, *N. ligula* was believed to be in all probability, a variety of *N. spadicea*, Schiff.; but *N. vaccinii* was regarded as a very distinct species. In Walker's 'Catalogue' (part x., p. 450), *N. ligula* stands as a recognised variety. Staudinger, on the other hand ('Cat.,' pp. 118-119), calls *spadicea* an aberration of *vaccinii*, but raises *ligula* to the rank of a species. Zeller, with his seventy specimens, showing every gradation between the three forms, was sadly bothered; so that he left a typical *N. ligula* amongst his examples of *G. vaccinii*, and divided the remainder somewhere in the middle, being evidently unable to find any constant character by which to distinguish them. Is it not a sense of their own short-comings which makes the describers of European lepidoptera so bitter against the students of Exotic species?" ('Transactions of Ent. Soc. of London,' 1890, pp. 682-683).

I think I can safely answer this query in the negative. European, and more especially British lepidopterists, are rather observers of lepidoptera and students of their earlier stages, than "describers" of their

fauna, as Mr. Butler so rightly names many of those who laboriously work at Exotic species. Of course, there are naturalists among those who interest themselves in Exotic species, but it is to the class "describers of Exotic lepidoptera" so graphically described by Mr. Butler, that I now refer.

The above-quoted remarks concerning *ligula* and *vaccinii*, show that the writer is not conversant with the condition of our knowledge of the NOCTUÆ at the present time. No writers have ever attempted to make three species of these. It has been conclusively proved by Dr. Chapman ('Ent. Mo. Mag.,' vol. xxvi., p. 86), that in Britain there are certainly two species, and it follows that the lumping process adopted above, is wrong in fact, and unscientific in principle. We can ignore Mr. Butler's reference to Mr. Walker's 'Catalogue' which might comfortably be burned, in fact, I am surprised at even Mr. Butler referring to it as an authority on such matters. Staudinger makes two species, as also does Guenée, and so also do most entomologists of the present day, but change in synonymy has altered the old order of things, and *spadicea* now equals *ligula*, *vaccinii* still remaining distinct (*ante*, vol. iii., pp. 1—6). I am not surprised that Mr. Butler cannot discriminate between *ligula* and *vaccinii*, when he makes such startling errors as I have previously pointed out.

It is surely strange of Mr. Butler to talk of purely European entomologists as "hair-splitters," when the British Museum collection contains a series of typical *hyperborea* in one drawer, and the red type of the same species in another, mixed up with another species and labelled *carnea*; when there is a typical series of *nigricans*, and then its var. *carbonea* is placed under the name of *tritici*. Truly such haphazard criticism as this is not very valuable, when there is scarcely a young entomologist in our London Societies who could not name such species with ease. I hope Mr. Butler will not think I "am not quite sensible of my own shortcomings," but I prefer to be an "European worker" to an Exotic muddler.

Mr. Butler is very unjust to Zeller, who was a naturalist, observant in the field, and a master in his generation. The statement that he divided "the remainder somewhere in the middle, being unable to find any constant character by which to distinguish them," follows out the general empirical style of Mr. Butler's criticisms. That Zeller "left a typical *N. ligula* amongst his examples of *G. vaccinii*" is well-nigh impossible. That Mr. Butler thought he had found one there does not surprise me.

One of the most remarkable instances of Mr. Butler's inability to see specific characters, or perhaps, I ought rather to say to distinguish allied species, occurs with regard to *Leucania pallens* and *L. straminea*. He says:—" *L. pallens* of the United States, agrees absolutely with the European *L. straminea*. The two forms have practically the same characters, and if received from any extra European locality, would never have been considered distinct; indeed, it is possible to find examples which cannot with certainty be referred to one form rather than the other. *L. straminea* differs chiefly in the generally more prominent pale longitudinal streak above the median vein of the primaries, and the better-defined black or dark markings. Not having bred both from the egg, I keep them separate in the collection" ('Trans. Ent. Soc. of London,' 1890, pp. 660-661). Reference to the

British Museum material on which the remark was based, show that of a whole row thus named, only seven specimens are *straminea* and not one of these came from America. I cannot imagine *straminea* and *pallens* being considered identical, and still less do I follow that the only reason for making them separate is that they do not "come from extra European localities" (What a condition the extra-European species must be in if they are named on these lines!), whilst we notice also that the only differences are stated to be "the generally more prominent pale longitudinal streak above the median vein of the primaries" and "the better-defined black markings," when, as a matter of fact, it is difficult to find a point of similarity, the thoracic crest in *straminea*, the differently shaped wings, the sexual variation in the hind wings, development of the pale nervures &c., all pointing to complete distinctness, and the final reason as given by Mr. Butler for keeping them distinct is the best of all: Mr. Butler "has not bred both from the egg." I wonder if he has bred either, or any other NOCTUA. And all this muddle about two species which swarm on the Plumstead marshes in the S.E. district of London, only a few miles as the crow flies from the Museum, and which have different larvæ feeding at different times in different ways on different food plants. Truly this is a strange paragraph.

Mr. Butler further writes:—"I cannot see any reason for distinguishing *Hydræcia** and *Helotropha* from this genus (*Celæna*). *Celæna* is very close to *Mamestra*, so much so that I find *M. stricta* (= *cinnabarina*) and *M. olivacea* (which looks like a black form of the same thing) undoubtedly belong to *Celæna* and are closely allied to *C. renigera*" etc.; and again "*Celæna* appears to be a fairly natural group, but the structural distinctions between it and *Mamestra* are not apparent on the surface" ('Trans. Ent. Soc. of London,' 1890, p. 676). I do not consider Mr. Butler's statement here as worth anything, as he owns to confounding *Miana strigilis* with the American *M. stricta*, but after allowing "*Celæna* to be a fairly natural group" and maintaining it as a distinct genus (l.c. p. 676) and referring a species of *Helotropha*—*leucostigma*—to *Celæna* (l.c. p. 677), it is rather strange to find that he refers his own *lævis* (Butler, 'Trans. Ent. Soc. London,' 1881, p. 181), which is a typical male *leucostigma*, to *Cerastis*; true (l.c. 1890, p. 677) he recognises his blunder, but like Professor Smith ('Entom.' xxv, p. 105) I should like to know on what characters Mr. Butler founds his genera, and why a species is *Cerastis* one time and *Celæna* another. It would also be interesting to know why the American *Helotropha reniformis*, Grote, a species either identical or so closely allied to our *leucostigma* that it is really indistinguishable, should be placed many drawers away from the typical series of the species in the cabinet in the British Museum, and labelled as a *Mamestra*. Truly such methods are quite beyond my comprehension.

The connection between *Gortyna*, *Celæna* and *Xanthia* is very forcibly put by Mr. Butler. He writes:—"Judging from the perfect insects only, this genus seems chiefly to differ from *Celæna* in the greater tendency of the species to become greasy, although many

* Not *Hydræcia* as we know it, but one of Mr. Butler's own imagination. He refers our *Hydræciæ*—*micææ* and *petasitis* to *Gortyna* (vide 'Trans. Ent. Soc. Lond.,' 1890, p. 678).

forms have a very distinct aspect, and are barely, if at all, separable from *Xanthia*; others, again (*G. illoba*, *necopina*, *micacea*, *stramentosa*, *petasitis* and *nitela*) are extremely like *C. leucostigma*, and allies. It is difficult to know what to do with groups of this kind, based, perhaps correctly, upon the mere clothing of the thorax or some such apparently trivial character; they appear to be natural genera, and therefore, I leave them as I find them" ('Trans. Ent. Soc. of London,' 1890, p. 678). Can anything be more strikingly illogical? Commencing with a statement "that the members of this genus seem chiefly to differ &c., by their greater tendency to become greasy," and that some of these same species have "a very distinct aspect, and are barely, if at all separable from *Xanthia*," Mr. Butler concludes by calling them "natural genera," and is satisfied "to leave them as he found them." That is, I suppose, they form a natural group, because they get "more greasy than one genus," and are "indistinguishable from another." Truly a scientific division, and one that perhaps illustrates Mr. Butler's characterisation of other genera.

Will Mr. Butler explain on what grounds he separates our *Plastenis retusa* from *P. subtusa*, placing the latter under another unearthed generic name of Hübner's, called *Ipimorpha*? We do not learn what Mr. Butler knows about *subtusa*, but he tells us what he knows about *retusa*, a not uncommon species within a few miles of the British Museum. In the 'Trans. Ent. Soc. of London,' 1886, p. 131, the specimens from Japan were named *Cosmia curvata*, i.e. when Mr. Butler thinks he has a new species, he finds its generic characters good enough for *Cosmia*. He then writes of them:—"These Japanese specimens are slightly larger and darker than most European examples: when I named *Cosmia curvata*, we had no European representative in the general collection" ('Trans. Ent. Soc. of London,' 1890, p. 681). In other words, Mr. Butler excuses his want of knowledge of a species fairly common just outside the London suburbs, because there was no "European representative in the general collection." This want was supplied, Mr. Butler states "by the acquisition of the Zeller collection," and then, I presume, the generic characters which led Mr. Butler to place the specimens from Japan in the genus *Cosmia*, vanished, and the species returned to its natural resting place in *Plastenis*, where we find it in the 'Trans. Ent. Soc. of London,' 1890, p. 681. But why has *subtusa* gone over to *Ipimorpha*? Perhaps Mr. Butler will tell us whether on such sterling characters as led *retusa* into *Cosmia* from 1886 to 1890, to be wafted back by a happy afterthought into *Plastenis*?

These are some of the points which struck me on the examination of the papers called 'Notes on the Synonymy of the genera of Noctuides,' published in the 'Trans. of the Ent. Soc. of London,' 1890, pp. 653-691.

I will only add with regard to this matter, that serious consideration should be given by the powers that be, that in future, any historical and valuable collections, like the Grote and Zeller collections, should be left in their entirety to illustrate what such masters at their work themselves intended, and not allow them to be distributed, and in the humble opinion of the writer, ruined by those who fail to understand them.

4. IDENTICAL AND REPRESENTATIVE SPECIES IN OTHER CONTI-

NENTS.—Among other subjects of interest to which my attention has been directed, is one which merits special attention. This refers to species found in other parts of the globe “representative” of our European species. I had a considerable correspondence with Mr. Grote, the great authority on American NOCTUÆ, relative to this question, and it must be owned that he showed a very comprehensive grasp of the subject, and taught me much. In dealing with the fauna of a new district, especially when there is anything strikingly peculiar in the environment etc., there are certain minor differences which lead us to surmise that we have new species. This has been the case with many of our own NOCTUÆ, of which the Continental (European) form of *Cuspidia euphorbiæ*, and our own peculiar dark form which was named by Guenée as a distinct species under the name of *myricæ*, is a striking example. All over their area of distribution, some species are so fixed in character and so constant, that it is impossible to surmise that they can be other than the species we know under certain names elsewhere. But there are other species which exhibit differences of colour or size, or which present some other unimportant difference which leaves room for honest doubt, and from want of knowledge, the species gets a new name. Nowhere, perhaps, is this so much the case, nor has this naming been carried out to such an extent as in North America. When a really intelligent European collector looks through a collection of American lepidoptera, he thinks he recognises a large number of species as identical, so far as he can determine, with European forms, but let that same collector look down an American list and he will be astonished how few names he recognises. The species he thought he recognised have different names, and he knows them no longer, they (the names) represent nothing to his intelligence. He loses touch altogether. Some American species are so positively identical with ours, that there is no longer any question, but these few will not account for the large number of species which have the facies and general appearance of European species.

IDENTICAL NORTH AMERICAN AND EUROPEAN SPECIES.—The species which are allowed to be identical in the American List of NOCTUÆ-GENUINÆ, and which are found in Britain, appear to be as follows:—*Noctua (Agrotis) conflua*, *N. baia*, *N. c-nigrum*, *N. plecta*, *Agrotis fenica*, *ypsilon* and var. *idonea*, *saucia* and var. *margaritosa*, *Aplecta (Agrotis) occulta* and *prasina*, *Hadena trifolii*, *H. exulis*, *Dipterygia scabriuscula*, *Euplexia lucipara*, *Hydræcia nictitans* with its vars. *erythrosthigma* and *lucens*, *Leucania pallens*, *L. unipuncta*, *Amphipyra tragopoginis*, *Tæniocampa incerta*, *Cosmia paleacea*, *Xanthia flaxago*, *Scoliopteryx libatrix*, *Plusia ni*, *Anarta cordigera*, *A. melanopa*, *Heliothis armigera*, *H. scutosa*, *H. dipsacea*, with a yellow variety, probably identical with the European var. *maritima*, and *Chariclea (Pyrrhia) umbra*. On the identity of European and American forms of these, and a few other species, all lepidopterists are practically agreed, except an individual here and there, who will scarcely allow that anything European can be American also, and *vice versa*.

It is not, however, in respect of these acknowledged identical species that our surprise is so much aroused, as at other species, between which and our own we are unable to see any, beyond perhaps the slightest difference in colour and size. *Viminia (Arsilonche) henrici* in America, appears to be quite identical with *V. albovenosa* in Europe. Mr. Grote

says "the moths he examined did not exactly correspond, and I keep provisionally the distinct name for the American form." I fail to find any distinction between *Xylophasia rurea* and *X. (Hadena) vultuosa*, *Mamestra atlantica* seems identical with our *Hadena dissimilis* and the *Hadena finitima* of the American list, appears to be most certainly a colour variety only of *Apamea basilinea*; whilst apart from size, *Graphiphora augur* appears to be identical with the American *Agrotis haruspica*, although Mr. Grote finds a difference in the genitalia, and is supported in his view by Professor Smith.

REPRESENTATIVE NORTH AMERICAN AND EUROPEAN SPECIES.— Apart from these identical and probably identical species, there are a vast number of species certainly distinct, which have the facies of our European species and replace them, often in somewhat similar localities in America. Thus our *Hyppa rectilinea*, *Brotolomia meticulosa*, *Amphipyra pyramidea* etc. have their representative species in *H. xylinoides*, *B. iris* and *A. pyramidoides*. Endless other examples are recognised in comparing the faunæ of the two countries.

Which are really identical and which representative species can scarcely be assumed now, much less determined, in the present state of our ignorance. Some of our own British species, well known to be distinct by the difference in the earlier (larval, pupal) stages, are so very similar in the imago state even when we are conversant with them, that we can only with the utmost difficulty separate them. The difficulty is, of course, greatly increased, where we are not intimate with such similar and allied species found elsewhere, and when the early stages of one at least is practically unknown.

With regard to a comparison of the Noctuidæ of Europe and North America, Mr. Grote writes:—"The study of the North American Noctuid fauna has shown its close relationship to the European. There is first, a comparatively small percentage of identical species to be considered. Then we must take into account that all the leading genera of European Noctuidæ are represented in North America, and show a larger number of species as a rule, and all with the European facies. The identical species are found almost without exception in the typical Noctuidæ, or Noctuinae. So far as these are ascertained at present they are as follows:—*Agrotis chardinyi*, *conflua*, *baja*, *c-nigrum*, *fennica*, *plecta*, *speciosa*, *rava*, *fusca*, *ypsilon* with its variety *idonea*, *saucia* with its variety *margaritosa*, *occulta* and *prasina*. Except as to *conflua*, the identity of American examples with these species of *Agrotis*, in *sensu* Lederer, does not admit of real doubt. Two species, determined as *conflua* and *perconflua*, the former from Anticosti, the latter from New York, are contained in the Grote collection in the British Museum. There is no doubt that the species determined as *perconflua* is distinct from the European, but it is not clear whether the Anticosti specimens represent a distinct species equivalent to Walker's *jucunda* and differing from the European. *Mamestra grandis*, *trifolii*, *Hadena lateritia*, *arctica*, *Dipterygia pimastris*, *Euplexia lucipara*, *Gortyna nictitans* with its forms *erythro stigma* and *lucens*, *Heliophila pallens*, *Pyrophila tragopoginis*, *Tæniocampa incerta*, *Pachnobia carnea*, *Cosmia paleacea*, *Xanthia flavago*, *Scoliopteryx libatrix*, *Plusia hoehenwarthi* and *devergens*, *Anarta cordigera* and several other species of this genus inhabiting northern or elevated Alpine regions, *Melaporphyria ononis*, *Heliothis armiger*, with an olive-coloured variety, *umbrosus*, apparently

not found in Europe, *H. scutosus* and *dipsaceus*, the latter with a yellow-winged variety, apparently the equivalent of the European *maritima*, *Pyrrhia umbra*. Besides these, several species occur in North America, the identity of which with certain European forms is a matter of present uncertainty. We may enumerate the North American *Hadena vultuosa*, which may turn out to be identical with the European *rurea*, *Caradrina miranda*, which may be *lepigone*; *C. civica*, which may be *quadripuncta*; *Lithophane pexata*, which may be *ingrica*; *Calocampa nuptera*, which may be *vetusta*; *Lithomia germana*, which may be *solidaginis*; *Calpe canadensis*, which may be *capucina*; *Arsilonche henrici*, which may be *albovenosa*. From this it will be seen, that the percentage of identical forms may be considered small, since the North American fauna is sufficiently well known as to prevent the idea that any large additions will be made in the future to the above list. The identical species, when finally fully compared and ascertained, will form a distinct and limited class by themselves. A less distinctly defined class of North American species, are those grouped as "representative." These grade through different distinguishing features, into the large class of perfectly differing species, still retaining the European facies, and then again into the generically peculiar forms only known as yet from North America, but with probably Asiatic and even African allies. There remains then a residue of structural forms peculiar to North America, together with those which intrude into the North American fauna from tropical America, and which, in part, are yearly immigrants over a large portion of the United States and Canada.

The characters by which the North American representative species are separated from their European allies are unequal in value, taken from different stages of the insect, and are often so slight that, did the European and American form occur together, there would be no question of their specific identity. The fact that these forms do not interbreed, that they do not produce each other, must be taken as the warrant for the assumption of a different specific title. Among the butterflies we have an instance in *Chrysophanus phleas* and the *C. americana* of D'Urban, or *hypophleas* of Boisduval. Instances of representative species occur also in the higher *Heterocera*, but we have to do here especially with their occurrence in the Owllet Moths. The least evident, but at the same time the best-marked character by which European and North American representative species may be distinguished, is the structure of the male genitalia. We may take as instances of this, the European *Agrotis augur* and the American *A. haruspica*, the European *Agrotis rubi* and the American *A. rubifera*. The peculiarities of size, form, external structure, colour, pattern of ornamentation of the European *augur* are reproduced in *haruspica*. The most that can be said of the moths is, that the American examples tend to an obsolescence of certain markings, and there may be a difference in the exact shade of colour; probably the latter, with the former character, will not hold good throughout extensive series. Yet the male genitalia show a difference in the details of their shape. The character may not be sufficiently founded, but what is published upon it may be accepted as evidence of the fact. Now there are, in North America, apparently co-existing genitalic species among the Skippers belonging to the genus *Nisoniades*. The question comes up: are modifications of the genitalia of specific value? That they are not to be

used as the sole basis of genera seems clear, from the fact that they differ very widely in co-existing species, in all other respects closely allied and generically identical. As to the case of *augur* and *haruspica*, the main distinguishing peculiarities of *augur* are all retained, as we have seen, in *haruspica*, except the structure of the genitalia. Since there can be no question that *augur* and *haruspica* are related genetically, that the differences, such as they are, are the result of a division of the original stock, of time and environment, we must come to the conclusion that a modification of the genitalic appendages is sooner effected than a change in color, pattern and form, and that therefore the character is morphologically of less importance, is less stable than other, apparently more superficial characters. The co-existing genitalic species of *Nisoniades* have been separated in the books, but no experiments have been made as to whether the insects produce always the genitalic type; the immature stages are not known, and this latter is also the case as to *haruspica* and *rubifera*, where, if known, they have not been properly compared with those of *augur* and *rubi*. We may consider the whole series of genitalic studies as being incomplete, as lacking confirmation and the basis of experiment, while we may be willing to admit, on the face of the matter, that they would be important if true. There are two or three aspects of the case which might be mentioned here. The first relates to the want of precision in the forms of the male appendages, owing to which, it is difficult to state what amount of modification is specific, what generic. It is clear here, as elsewhere in the moths, that specific and generic characters differ only in quantity, not in quality, that our categories are essentially artificial, and do not exist in nature. The second stands still clearly within a scientific or objective point of view. Some writers on genitalia have endeavoured to classify the whole Lepidoptera by their tails, much as Herrich-Schäffer took only cognizance of the wings and neuration. In one case, as in the other, the result must be failure. The last observation I would make leaves the theoretical domain of science. It refers to the overbearing language and assumption of certain recent authors who, on the strength of their studies as to the genitalia of a few species, allow themselves to speak disparagingly of the work of those who have not done the same, taking the ground, apparently, that the species are alone to be determined by their genitalia, whereas this is by no means the actual state of the case. In strongly differing species, the genitalia remain of the same pattern. While we may admit that the genitalia are a guide in difficult cases, the criterion for species remains, that the insects breed true to type; that in some, if not all stages, they may be distinguishable by experts, a difference in the genitalia being only one link in the chain by which we determine that we may have to do with a distinct cycle of reproducing existences. The reality of this fact must be finally assured by breeding.

Leaving the genitally founded representative species, inhabiting Europe and North America, we come to those which are separable chiefly by differences in the larval stage. Here we may cite the European *Triena psi* and the American *T. occidentalis*, the moths of which are much alike, while the caterpillars seem to be easily distinguished. Here also belong a number of instances deduced by Guenée from Abbot's drawings of American larvæ. The immature

stages of the North American NOCTUÆ are so incompletely known, that we may expect interesting additions to this class of species. A case, conversely, of resemblance between the larvæ and difference in the moths, is offered in this same group, viz: that of the European *Jocheœra alni* and the American *J. funeralis*.

The mass of representative species are separable on more obvious, though it may be still slight characters. Among such may be enumerated the European *Habrosyne derasa* and the American *H. scripta*. A third representative species of *Habrosyne* occurs in Japan. The Eastern American *Thyatira pudens* with its aberration *anticostiensis*, is less clearly a representative form; the differences, while the general pattern of ornamentation is retained, being somewhat great, while the Western American *T. lorata* departs still more, and shows a distinct approach to the species of *Bombycia*. The European *Diphthera orion* and the American *D. fallax*, show considerable resemblance, while *Acronicta leporina* and *A. vulpina*, may be held to represent each other. There are, however, a number of forms in America, belonging to *Acronycta* Ochs., which are as yet incompletely known. The North American *Agrotis normaniana* resembles the European *triangulum*; the American *A. obeliscoïdes*, the European *A. obelisca*; while the American *A. clandestina* is separable from the European *A. ravidata*, mainly by the peculiar structure of the female abdomen. There are not only here representative species as between Eastern North America and Europe, but also as between Eastern and Western North America, where, west of the Rocky Mountains, the Californian *A. havilæ* represents *A. clandestina* of the Atlantic district. The European Cabbage Owlet, *Copimamestra brassicæ*, is represented in America by *C. occidentis*. In the *Mamestra* are a number of American species representing, through various grades of resemblance, European forms. We may here compare together *nimbosa* with the European *nebulosa*, *purpurissata* with *tincta*, *atlantica* with *dissimilis*; while the American *Dianthœcia bella* and *glaciata*, much resemble the European *magnoliæ*.

The Russian *Oncocnemis confusa* is represented in California by *O. behrensi*, while the genus in America grows to an extent hardly foreshadowed by the few European species. The genus *Hadena* shows a number of representative species, and perhaps some identical species, not yet sufficiently worked out; among the latter, *H. lateritia* will probably be found. The European *Hyppa rectilinea* is represented in America by *H. xylinoides*, *Actinotia polyodon* and *A. ramosula* resemble each other, and *Trachea atriplicis* seems to be represented in America by *T. delicata*. *Brotolomia meticulosa* is represented in America by *B. iris*, while the European and American species of *Trigonophora* (*Habryntis*) differ strongly in colour. Certain European and American species retaining more or less a superficial resemblance, are found to differ structurally and therefore generically. As such may be cited *Cirrhœdia xerampelina* and *Eucirrhœdia pampina*. Instances of curious resemblances under this head remain to be noted (consult Grote, 'Revised Check List,' 43). The European *Pyrophila pyramidæa* is represented in America by *P. pyramidoides*, thus we have a representative and identical species of the same genus, *tragopoginis* being found in both the Old and New World. In the genus *Lithophane* (*Xylina*), *L. lambda* is represented by the American *L. thaxteri*, while *Scopelosoma satellitia* finds counterparts in America among no less than three species, *sidus*,

walkeri and *tristigmata*. This splitting up of the genus in America into several very nearly related species is a distinct phase of variation and merits particular attention. To separate the causes of variation, to eliminate the factors, and correlate them with the resultant effects, may bring us on the road to understand the reason for the diversity we find in the animal kingdom" (*in litt.* 1892).

IDENTICAL JAPANESE AND EUROPEAN SPECIES.—Many of the Japanese and East Asiatic species appear at first sight, to differ as much from our European specimens of the same species as do the American, but it is rarely now that they are known by any other name than that of their European types. Thus the normal condition of *Viminia rumicis* in Corea, Japan and China, is to be of a deep brown coloration closely approaching black, but the species is well recognised as *rumicis*. Referring to the 'Lepidoptera of Kiukiang,' we read *Moma orion* "agrees exactly with specimens from Europe"; *Clisiocampa neustria*, "identical with European examples"; *Agrotis ypsilon*, "includes most of the forms occurring in Europe"; *Graphiphora (Noctua) dahlii*, "several specimens showing considerable variation in tone of colour. Among them are examples identical with *canescens*, Butler;" *Dianthœcia compta*, "one example exactly like some European forms of this species," and many similar entries are made of other species (Leach, "Lepidoptera of Kiukiang" in the 'Transactions of the Entomological Society of London,' 1889, pp. 99-148).

CLASSIFICATION.—Another subject that has attracted my attention is that of classification. When I first commenced this work, in common I suppose with almost all field naturalists in Britain, I knew nothing of classification and cared to know less. A necessary alteration in synonymy appeared in the light of an innovation, and as such, most probably something to be resisted, but the study of variation soon dispels such ideas, and shows that there is some relationship between the various groups, some affinities more or less remote and some superficial characters, which at first sight appear to bear relationships to other similar forms, but which in fact have no such deep-seated origin, the superficial resemblance being essentially due to similar habits, developed by a similar environment, or by a common need for protection and thus due to "protective resemblance."

The naming of species is a minor matter, and the only purpose served by a specific name is to make the particular species named intelligible at once to all naturalists.

Generic names serve to a limited extent the same purpose, but the genera themselves are not only for this purpose but also serve a much deeper one. Each genus usually now serves, not only as a means of distinction of a group of certain species, but some relationship with those genera around it. And not only "some relationship" but that of the closest relationship is generally shown by allied genera. Beyond these, we find that one group of genera exhibits certain characters in connexion with another group, and yet, at the same time display considerable differences. We then call each group of genera a Family, and similarly by uniting allied families we get a series of sub-classes.

The whole of the sub-classes in the NOCTUÆ were united by Guenée into two great classes or groups, the larger called the NOCTUÆ-TRIFIDÆ, the smaller the NOCTUÆ-QUADRIFIDÆ. These respectively

represent in their general characters, the NOCTUÆ-NONFASCIATÆ of Borkhausen and the NOCTUÆ-FASCIATÆ of the same author.

It has always been the aim of those who have attempted to classify our species to form a linear arrangement of the lepidoptera, in which each species should be closely allied to the one above and to the one below it. Such a method must be of necessity impracticable. As our knowledge of the development of species increases, so such an idea as linear arrangement sinks into impossibility. Certain variations leading to specific developments are thrown off from a parent stock; they reach a certain limit which may be extensive or otherwise; and as they are found, owing to altered conditions (geological, climatic, &c.) to be suitable or unsuitable, naturally extend considerably or otherwise die out. That is to say, suitable environment will carry on the development once begun, and for a time, whilst such suitable conditions exist, a linear arrangement may to a certain extent be followed, to be again, however, broken up by outside circumstances, whenever they become unsuitable. Besides, the very origin of specific forms, by means of which branches from an original stock may develop into distinct species in different directions, is against a linear arrangement at the outset, and hence all attempts to form a linear arrangement have proved futile.

I do not propose to enter into the wide subject of classification in detail, for which indeed I have no knowledge, but to consider a few points in the classification of the NOCTUÆ, especially with regard to some aberrant species and genera. And here I may add that in my work I have adopted the system of Guenée generally, not because I believe in its infallibility, but because it was based on the study of the early stages as well as the imago, which, indeed, seems to be the only rational method of obtaining natural affinities, and it must be confessed partly also, because of my ignorance and inability at the time to suggest more natural lines and thus strike out a path for myself.

Guenée, as I have before remarked, divided the NOCTUÆ into the NOCTUÆ-TRIFIDÆ and NOCTUÆ-QUADRIFIDÆ, including in the former term all the families represented in Britain and mentioned in 'The British Noctua and their Varieties,' down to vol iv., p. 14, whilst the following portion of the work to vol. iv., p. 60 consists of the NOCTUÆ-QUADRIFIDÆ. The DELTOÏDES, dealt with from p. 60 to the end of this work, are treated by Guenée as a division equal in classificatory value to the whole of the NOCTUÆ.

Guenée places under the sub-class *Bombycifformes*, Gn., the three families *Cymatophoridae*, H.-S., which he himself calls *Noctuo-Bombycidae*, *Bryophilidae*, Gn. and *Bombycoideae*, Bdv. Staudinger, on the other hand, places the first family in the BOMBYCES, retaining the two last in the NOCTUÆ. This would appear, in a measure, to be the better method, as the species in *Noctuo-Bombycidae* have no very close affinities with *Bombycoideae*. It must be borne in mind though, that Staudinger classifies rather peculiarly, for whilst he sub-divides the BOMBYCES into no less than fourteen families of equal value—to wit—1. *Nycteoidae*, H.-S.; 2. *Lithosidae*, H.-S.; 3. *Arctiidae*, Stephs.; 4. *Hepialidae*, H.S.; 5. *Cossidae*, H.-S.; 6. *Cochliopodae*, Bdv.; 7. *Psychidae*, Bdv.; 8. *Liparidae*, Bdv.; 9. *Bombycidae*, Bdv.; 10. *Endromidae*, Bdv.; 11. *Saturnidae*, Bdv.; 12. *Drepanulidae*, Bdv.; 13. *Notodontidae*, Bdv.; 14. *Cyma-*

tophoridæ, H.-S.—he considers NOCTUÆ of equal value to BOMBYCES, but without giving a single division of equal value to these just mentioned in the BOMBYCES with the one exception of *Brephides*, consisting of the single genus *Brephos*. Not even the *Deltoides* which he includes in the NOCTUÆ have such a distinction. And there is something to be said for his view of the matter, for the NOCTUÆ are a compact group and as a whole are in no wise made up of such a mass of heterogeneous material as are the BOMBYCES. I think, however, the TRIFIDÆ and QUADRIFIDÆ of Guenée are valuable, and at any rate show marked structural characters, which vary considerably in the two groups. The removal of the *Cymatophoridæ*, H.-S., therefore, whilst only adding one more family or group to the already heterogeneous mass in the BOMBYCES, certainly leaves the NOCTUÆ still more compact and clearly defined.

Grote re-names the *Cymatophoridæ* of Herrich-Schäffer—*Thyatirinae*, treating it as a group of equal value with his *Noctuinae* which agrees almost entirely with Guenée's NOCTUÆ-TRIFIDÆ, exclusive of course of *Cymatophoridæ*. Of the *Thyatirinae* he writes:—"It contains a few genera of varying appearance united by the neuration: vein 5 of the primaries being equidistant between 4 and 6, but so it seems in *Nolaphana*, and vein 7 of secondaries springing from the anterior margin of the median cell. The caterpillars are naked, 16-footed, and resemble somewhat the *Notodontinae*. Of our *Thyatira pudens*, Mr. Dyar carefully describes the larva. The genus *Thyatira* (including *Habrosyne*) was formerly referred near *Plusia* and Hübner first associated it with *Bombycia*" ('Revised Check-List of the North American Noctuidæ,' p. 44). He further writes:—"The Bombyciform *Noctuidæ* or *Thyatirinae* differ in certain details of the neuration from the *Noctuinae* (*Noctuæ-nonfasciatae*), and the question comes up as to the value of this character for classification. In all other respects, this small assemblage of moths must be considered as belonging to the NOCTUÆ. The palpi, though short, have the Noctuid form. The eyes are sometimes naked, sometimes hairy. The legs, though somewhat short, are not unlike those of other owlet moths; the fore pair have a tibial epiphysis so far as known to me. The fore wings are subtriangular with pointed apices. The resemblance to the *Notodontinae* is seen in the neuration of the primaries where vein 5 is intermediate. This character of vein 5 of the fore wings is, perhaps, of more value than the variations of the secondary costal veins. The difference in the position of vein 7 of the hind wings is, perhaps, not so important when we see that in *Stilbia* and *Rivula*, vein 8 springs from 7, the upper margin of the median cell" ('Canadian Entomologist,' vol. xxii., p. 105). Grote seems to have overlooked, or not to have observed that the ova do not conform to the 'Noctuid type.' I would here also remark that Grote replaces the generic name *Cymatophora*, Tr., with that of *Bombycia*, Hübn.

Guenée and Grote, therefore, consider that the *Cymatophoridæ* are really NOCTUÆ. Staudinger on the other hand considers them as a group of the BOMBYCES. For myself, I do not think it matters much in which division they are placed. They are essentially a connecting group between two divisions in no way very clearly defined at their extremes, and whether we call the *Cymatophoridæ* a sub-class of BOMBYCES and place them at the end of this division, or a sub-class of

NOCTUÆ and place them at the head of that division matters but very little. The venation resembles that of the *Notodontidæ*, the ova are somewhat Geometrid, whilst the general appearance of the moths is Noctuid.

Almost everybody appears satisfied in allowing the sub-classes *Bryophilidæ* and *Bombycoidæ* to remain in the NOCTUÆ, and I think there can be no doubt that this is their true location. It has also occurred to most writers to place these near or classify them with the *Cymatophoridæ*. This appears to have been done without satisfactory reason, both in the case of the *Bombycoidæ* and *Bryophilidæ*, the latter especially having other affinities, and being probably closely related to some of the genera in *Orthosidæ*, and Dr. Chapman has shown that the *Acronyctidæ* in the development of an extra nervure between the median and first sub-median veins have some structural affinities in this direction with the *Orthosidæ* and the genus *Xylina*. At the same time, the *Acronyctidæ* show certain distant affinities with the *Liparidæ* and since the *Cymatophoridæ* show similar distant affinities with the *Notodontidæ*, the fact that both are in some way allied to the BOMBYCÆ has probably led to two very distinct and different families being placed next to each other. Mr. Butler seems to be the only writer who has ever suggested the genus *Acronycta* as an unnatural group in itself and that its members have no real affinity *inter se*, or proposed the location of its members elsewhere than with the NOCTUÆ.

The *Bryophilidæ* form a compact little group, certainly having no very strong affinities with either the *Cymatophoridæ* or *Bombycoidæ*, although usually classed with them, but the latter is less homogeneous, since Staudinger has added *Demas coryli*, *Moma orion* and *Diloba cæruleocephala* to this latter group. The early stages of the first and last are against their inclusion, whilst those of *orion* are in favour of its inclusion in the group, as it presents in its egg and larva many common characters with the genus *Acronycta* (taken as a whole), and there appears to be no doubt that *D. coryli* and *D. cæruleocephala* will both have to be transferred elsewhere. And here, too, it is necessary to refer to Mr. Butler's paper on the genus *Acronycta* in the 'Transactions of the Entomological Society of London,' 1879, pp. 313-317. This has been so repeatedly and adversely criticised that it would seem unnecessary to refer again to it, but it deals with the subject under consideration and is so sweeping in its erroneous conclusions that its fallacies cannot be too often pointed out. Shortly, Mr. Butler casually examined or looked at the blown larvæ of some British members of the genus *Acronycta*, and then in the same casual manner examined the neuration of the imago, finally transferring *A. (Viminia) rumicis* and *A. (V.) auricoma* to the *Arctidæ*, *A. (Cuspidia) leporina* and *A. (C.) aceris* to the *Liparidæ*, *A. (C.) megacephala*, *psi*, *tridens* and *strigosa* to the *Notodontidæ*, whilst *A. (C.) alni* and *A. (Bisulcia) ligustri* were left among the NOCTUÆ. Dr. Chapman in his work 'The genus *Acronycta* and its allies' has proved that these are all united in one generally well-defined whole, and capable of sub-division into three sections which he calls *Viminia*, *Cuspidia* and *Bisulcia* respectively, basing such divisions on the egg, larval and pupal peculiarities.

Grote unites under the title *Apatelini*, the *Bryophilidæ*, Gn. and the *Bombycoidæ*, Bdv., whilst he separates the genera *Arsilonche*, Led. and *Demas*, Stphs. into a tribe called the *Bombycoidi*. Dr. Chapman's

late researches have shown that *Arsilonche albovenosa* is congeneric with *Acronycta rumicis* and its allies, and this being so, *A. henrici*, which is supposed by many to be identical with *albovenosa*, will have to be removed from its location as determined by Grote. Our genus *Acronycta*, Och. is supplanted in Grote's 'Check List,' 1890, by *Apatela*, Hübn., and (I am sure I do not know what those who object to Dr. Chapman's division into three sub-genera will say to it) *Apatela* is divided into no less than ten sub-genera—to wit—*Triena*, Hübn. (including species resembling *psi*); *Acronicta*, Ochs.; *Megacronycta*, Grote; *Merolonche*, Grote; *Apatela*, Hübn.; *Jocheera*, Hübn. (including a species like *alvi*); *Lepitoreuma*, Grote; *Arctomyscis*, Hübn. (for a species named *sperata*), Mr. Butler* must have overlooked the latter fact when he suggested that Dr. Chapman should use *Arctomyscis* in place of *Bisulcia* for *ligustri*; *Mastiphanes*, Grote and *Eulonche*, Grt.

Guenée's GENUINÆ, with nine of its families represented in Britain, is a much more natural division, but his arrangement of the included families, and his distribution of the species in many of them is very seriously open to question. Staudinger takes them (without however using the terms) in the following order:—*Noctuidæ*, Gn.; *Apamidæ*, Gn. and *Hadenidæ*, Gn., combined; *Leucanidæ*, Gn.; *Caradrinidæ*, Bdv.; *Orthosidæ*, Gn. and *Cosmidæ*, Gn., combined; *Xylinidæ*, Gn.; *Heliothidæ*, Bdv. with however, *Amphipyridæ*, Gn. placed between the *Caradrinidæ* and *Orthosidæ*; the *Plusidæ*, Bdv. between the *Xylinidæ* and *Heliothidæ*, and the *Gonopteridæ*, Gn. between the combined *Orthosidæ* and *Cosmidæ* on the one hand and the *Xylinidæ* on the other. With most of these modifications I am inclined to agree. *Apamidæ* and *Hadenidæ* have no really differential characters, or at any rate none, such as would warrant us separating them into distinct families, and the *Orthosidæ* and *Cosmidæ* are much in the same condition. As I have before remarked, *ante*, vol. iv., p. 37, the position given to *Amphipyra* between *Caradrinidæ* and *Orthosidæ* is a not at all unnatural one, whilst *Nænia* and *Mania*, placed as they are by Staudinger in the *Hadenidæ*, would in my opinion find more natural affinities in the *Noctuidæ*, especially near *Graphiphora augur*. I disagree with the position of the *Plusidæ* in Staudinger's arrangement, the *Heliothidæ* being in my opinion more closely allied to the *Xylinidæ*; besides, the *Heliothidæ* belong to Guenée's great division NOCTUÆ-TRIFIDÆ, whilst the *Plusidæ* belong to the NOCTUÆ-QUADRIFIDÆ. The *Xylinidæ* comprise a strange assemblage, grouped apparently on a common facies due to their having adopted somewhat similar appearances for protection in the imago state. Some of them might possibly be referred to the *Orthosidæ*, whilst, on the other hand, it has been suggested from the study of its early stages, that *Scopelosoma satellitia* belongs probably to the *Xylinidæ*.

Grote divides Guenée's GENUINÆ into the following:—*Agrotini*, agreeing generally with *Noctuidæ*, Gn.; *Dicopini* †; *Hadenini*, agreeing generally with *Apamidæ*, Gn. and *Hadenidæ*, Gn. combined; *Arzamini* †; *Nonagriini*, agreeing with *Leucanidæ*, Gn.; *Scolecocampini*; *Nolaphanini* †; *Caradrini*, agreeing with the *Caradrinidæ*, Bdv.; *Orthosini*, agreeing with the *Orthosidæ*, Gn. and *Cosmidæ*, Gn. combined; *Calocampini*, comprising only the genus *Xylina* (called *Litho-*

* Vide 'Ent. Rec.' &c. vol. ii., p. 82 and pp. 104-106; also 'Entom.' 1891, pp. 111-112.

† These have no European representatives.

phane by Grote), *Lithomia*, *Calocampa* and *Xylomiges*; *Cleophanini**; *Cucullini*, containing only the genus *Cucullia*; *Eurhipini*; *Ingurini** (*Eutelini*); *Anomiini**; *Litoprosopini**; *Calpini*; *Stirini*; *Plusini* (thus following Staudinger in placing this group differently to Guenée), agreeing generally with *Plusidæ*, Bdv.; *Heliothini*, agreeing with *Heliothidæ*, Bdv. ('Revised Check List of North American Noctuidæ,' 1890, pp. 6-39, and 'Canadian Entomologist,' xxii., pp. 107-108). It is only right to add that Mr. Grote states in his preface that he published his 'Check List' in order to bring the classification of the North American NOCTUÆ into some accord with that of the European forms as displayed in the 'Catalog' of Staudinger, based on the system of Lederer, and thus, on this ground I presume, he gives the *Plusidæ* a place here. Of these families and their genera I would state my opinion that *Xylina* and *Calocampa* are not at all nearly related, and that Grote's sub-division of the *Xylinidæ* above, although getting rid of one of the difficulties of this heterogeneous group does not clear the matter much. I also believe that the *Nonagria* species are essentially *Apamid*, i.e., they are closely allied to the genera *Gortyna* and *Hydræcia*, whilst *Leucania* on the other hand belongs to the *Agrotidæ*. In both cases, there can be no doubt that the loss of colour and markings is due to a similarity of habit and habitat, the latter also producing a similar general facies, but this superficial similarity of the species does not imply a relationship of *Leucania* to *Nonagria* or *vice versa*.

There appears, therefore, to be only one essential point in which these authorities differ in their classification of the *Genuinæ* of Guenée, and that is in the position of the *Plusidæ*. For myself, too, I must own that I prefer Grote's sub-division of the *Xylinidæ* into the two groups *Calocampini* and *Cucullini*, although it is not carried out sufficiently to separate the distinct genera *Xylina* and *Calocampa*, but on the whole I think that such a sub-division is a more natural one, than leaving the whole grouped together, but the sub-division certainly has not been carried far enough.

With regard to matters of detail. Guenée follows the *Bombycoïdæ* with the *Leucanidæ*. On the other hand, Staudinger places the latter after the *Apamidæ* and *Hadenidæ* and in turn follows it with the *Caradrinidæ*.

Guenée's remaining sub-class of the NOCTUÆ-TRIFIDÆ, which he terms *Minores*, contains four families which have representatives in Britain, viz., *Acontidæ*, Bdv., *Erastridæ*, Gn., *Anthophilidæ*, Bdv. and *Phalenoïdæ*, Gn. (*Brephidæ*, H.-S.). The three former follow each other in Staudinger's arrangement, being in turn followed by the families in Guenée's sub-class *Serpentinæ*, one of the groups of NOCTUÆ-QUADRIFIDÆ. *Phalenoïdæ*, Gn., Staudinger relegates to the end of the NOCTUÆ, making it under this name, a distinct sub-class connecting the *Deltoïdæ* and the GEOMETRÆ, but whilst I think its anomalous characters certainly give it a title to be isolated as a separate sub-class, I have left it among the NOCTUÆ-TRIFIDÆ. Mr. Meyrick places *Brephidæ* in the GEOMETRÆ, although the larva certainly shows no characters in this direction (vide 'Trans. Ent. Soc. London,' 1892, and 'Ent. Record' etc., vol. iii., p. 110).

Grote finds the following four North American tribes in the *Minores*

* These have no European representatives.

of Guenée, viz., *Tarachini*, agreeing generally with *Acontidæ*, Bdv.; *Cerathosini*; *Eustrotini*, agreeing with *Erastridæ*, Gn. and *Anthophilidæ*, Bdv., combined; and *Hyblæini*.

Of the *Brephides*, H.-S. (*Phalenoïdæ*, Gn.), Grote writes:—"The *Brephincæ* are a small group with a Northern distribution, looking like small *Catocalæ*, but more hairy, differing from the *Noctuinæ* by the absence of simple eyes, and the accessory cell of the fore wings, while the costal vein of the secondaries springs free from the base of the wing" ('Check List of North American Noctuidæ,' 1890, p. 44).

Guenée's large sub-division NOCTUÆ-QUADRIFIDÆ is divided into eight sub-classes, of which, in Britain we have no representatives in the *Sericæ*, *Extensæ*, *Patulæ* and *Pseudo-Deltoïdæ*. Those in which we have representatives being *Variogatæ*, *Intrusæ*, *Limbataæ* and *Serpentinæ*. Grote calls the QUADRIFIDÆ "the geometriform *Noctuidæ* or the *Catocalinæ*." He then adds "Primarily this family falls at two groups, the *Catocalini* (agreeing with Guenée's *Limbataæ*) and the *Pheocymini*."

Of the sub-class *Variogatæ*, we have only members of one family in Britain viz., *Plusidæ*. Guenée, however, included *Gonopteridæ* as a doubtful family of this class, but it is well located elsewhere. Staudinger, as I have before pointed out, places *Plusidæ* before the *Heliothidæ* and is followed in this by Grote. The *Gonopteridæ* with its anomalous genus *Scoliopteryx* (*Gonoptera*), is placed by Staudinger between the *Orthosidæ* and *Xylimidæ* where I also have placed it. Grote retains the group, but calls it *Plusiini* and writes of its characters as follows:—"The thorax is rather short and square but globose above, and with hairy, somewhat silky covering, which forms posteriorly, an abrupt tuft. The eyes are naked, lashed in *Plusia* unlashd in *Telesilla*. The wings are somewhat pointed with full external margins. The tibiæ are unarmed. The ornamentation of *Plusia* is remarkable for the silvery or golden marks or sheeny patches. The American species are forty-two in number exceeding the European thirty-eight; but probably more remain to be described with us."....."Behrensia is a Californian type, allied to *Habrostola*; and *Deva*, an eastern and western genus, as closely allied to *Plusia*" ('Canadian Entomologist,' vol. xxii., pp. 70-71).

We now come to Guenée's *Limbataæ*, which should, in my opinion, have followed *Variogatæ*, instead of the *Intrusæ* doing so as arranged by Guenée. Of the five families into which it is divided by Guenée we have representatives of two in Britain, the *Catephidæ* and *Catocalidæ*, the whole group being placed by Staudinger between Guenée's *Serpentinæ* and the *Toxocampidæ*.

Grote neglects the consideration of the *Catephidæ*, but calls the *Catocalidæ* of Guenée—*Catocalini*, and adds that:—"The *Ophiderinæ* and *Toxocampinæ* of my 'Check List' are probably not to be separated from this tribe" ('Canadian Entomologist,' vol. xxii., p. 145). I am not quite certain whether the connection with the *Ophiderinæ* is not rather one of superficial than structural characters, and I certainly think the *Toxocampidæ* are nearer to the true *Deltoïdes* than to the normal *Catocalidæ*, in fact, there can be no doubt of the affinity of the larvæ of the *Toxocampidæ* with the *Deltoïdes*, which would also tend to make me give it a position very near the latter group. Grote's second division *Pheocymini* contains only two European genera,—*Pericyma*,

H.-S. and *Zethes*, Rbr., and as neither of these occur in Britain, being essentially Eastern genera, I do not know them except from the imagines. Staudinger places them with other non-British genera between the *Euclididæ* and *Ophiusidæ*. Grote connects the whole group very closely with the *Deltoides*.

Grote says the "NOCTUÆ-NONFASCIATÆ of Borkhausen pass almost insensibly into the *Catocalinæ*, Packard (= NOCTUÆ-FASCIATÆ of Borkhausen) in which the wings widen, the body is more thinly scaled, the antennæ more usually filiform, the ornamentation tends to become continuous over both wings and the resemblance to the GEOMETRIDÆ becomes obvious. In the concluding tribes of the NOCTUINÆ the larvæ are also half-loopers, and it may be said that there is an approach to the GEOMETRIDÆ in all stages" ('Revised Check List of North American Noctuidæ,' pp. 44-45). And yet Grote would include the *Toxocampidæ* in the *Catocalinæ*, Pack., although there is no doubt that the larvæ of the former are practically inseparable, structurally, from those of certain *Deltoides*. However, on the whole I quite agree with this author, and although it is impossible to join the GEOMETRÆ to the NOCTUÆ in a linear arrangement, and in fact the total impossibility of such an arrangement may readily be proved, yet the ease with which the NOCTUÆ lead through the *Deltoides* to the PYRALIDES shows a much nearer connection than with the Geometrid moths which are frequently attached to or follow them in a supposed natural sequence.

The sub-class *Intrusæ*, Gn. is divided into the three families *Amphipyridæ*, Gn., *Toxocampidæ*, Gn. and *Stilbidæ*, Gn., all of which have British representatives. It is in this group that there is most question about the natural affinities, and it is here we find great differences of opinion. Staudinger does not even keep the genera placed by Guenée in the *Amphipyridæ* together, for he places *Nœnia* and *Mania* next *Brotolomia meticulosa* in the *Hadenidæ*, *Amphipyra* between *Rusina* and *Teniocampa*, i.e., between the *Caradrinidæ* and *Orthosidæ*. I do not think that *Nœnia* and *Mania* belong to the typical *Hadenidæ* so much as to the *Noctuidæ*, although *Amphipyra* seems pretty well placed with the *Caradrinidæ*. But the *Toxocampidæ* is a family belonging essentially to this part of the NOCTUÆ (FASCIATÆ), and its nearness to, if not actual inclusion in the great division *Deltoides* is without question, and I agree with Staudinger who places it just in front of *Zanclognatha*, Led., although he sandwiches the anomalous species—*Aventia flexula* (larva *Catocalia*?) and *Boletobia fuliginaria* (an admitted Geometer) between them. But the family *Stilbidæ* is another difficult one. Staudinger places it with *Caradrina*, but I consider that it requires special treatment like *Brephides*, being very closely allied to no particular genus. However, I am inclined to disagree with Grote who would transfer the *Toxocampidæ* directly into his sub-class *Catocalinæ*.

Guenée's last sub-class *Serpentine* is divided into four families, of which we have representatives of three in Britain, viz. :—*Ophiusidæ*, Gn., *Euclididæ*, Gn. and *Poaphilidæ*, Gn. These are divided by Staudinger, the *Poaphilidæ* being placed between the *Erastridæ* and *Agrophila sulphuralis*, which is separated from the rest of the *Acontidæ*. The *Euclididæ* follow this species (*sulphuralis*), to be followed again by several non-British genera, and these in turn by the *Ophiusidæ*.

The *Deltoides* were kept essentially distinct as a group equal in value to the whole of the NOCTUÆ by Guenée, but I agree with those who classify them as a group of the NOCTUÆ. Their relations in the

larval stage are strongly evident, and in the imago stage also they show strong affinities with the *Toxocampidæ* and other groups. Grote calls them "Pyralidiform *Noctuidæ*," a rather happy term as relating to them. The same author names the group *Deltoidinæ*, and suggests Herrich-Schäffer as the first author who classed these with the *NOCTUÆ*. He writes:—"Herrich-Schäffer showed that in their essential characters they conform to the Noctuid type; they are Pyralidiform *NOCTUÆ*" ('Canadian Entomologist,' vol. xxii., p. 146). However this may be, it is clear that Staudinger, adopting Lederer's method, put the idea into practical shape in his 'Catalog' of 1871, leaving out, however, any reference to their deserving any special mention under their old name (*Deltoides*), which he dropped altogether. He however retained Guenée's main divisions *Platydidæ*, *Herminidæ* and *Hypenidæ*, in his arrangement of the species. The first is not British, but Grote uses the two latter divisions, calling them, however, *Herminini* and *Hypenini*, and I must say the divisions seem very natural and hence very satisfactory.

Grote writes of these:—"The third sub-family *Deltoidinæ*, Latr. is remarkable for the resemblance to the *PYRALIDÆ*: in fact, Packard, in his excellent paper on the *Noctuidæ* in the 'Proceedings of the Portland Soc. Nat. Hist.,' excluded them as did some older authors preceding him, and considered them as *PYRALIDÆ*. But Herrich-Schäffer showed that they were true *NOCTUIDÆ*, and that the three groups did not differ importantly in their structure. There can be no doubt of the correctness of this view" ('Revised Check List of North American Noctuidæ,' p. 45).

But although we can accept Herrich-Schäffer's general principle, he certainly did some unaccountable things in his detailed work, and the removal of *Schranckia* (*Tholmiges*) *turfosalis* and *Rivula sericealis* into the *Nycteolidæ* with *Sarrothripa undulans*, *Halias chlorana* and *H. prasinana*, and that of *Sophronia emortualis* into the *Leptosidæ* with *Aventia flexula* and *Phytometra cænea* (*viridaria*), are altogether inexplicable, and quite deserving of the criticism passed on them by Guenée. Herrich-Schäffer's work moreover, had another good effect, in so far as it caused Guenée to permanently differentiate and separate the *DELTOIDES* from the *PYRALIDES*.

Briefly summarising then, I would draw the special attention of future workers in this group to the following suggestions:—(1) That *Demas* and *Diloba* are not *NOCTUÆ*. (2) That the *Bryophilidæ* have no close affinities with the *Bombycoidæ*. (3) That the *Leucanidæ* is an unnatural group, the genus *Leucania* belonging to the *Noctuidæ*, and the *Nonagrie* to the *Apamidæ*. (4) That the *Hadenidæ* is essentially identical with the *Apamidæ*. (5) That the *Xylidæ* must be so divided as to show the want of relationship between the genera *Xylina* and *Calocampa*. (6) That the *Amphipyridæ* should be subdivided, that the genera *Nonia* and *Mania* have affinities with the genera *Triphena* and *Graphiphora*, whilst *Amphipyra* has affinities with the *Caradrinidæ*. (7) That the *Plusidæ* are less closely allied to the *Xylidæ* than are the *Heliothidæ*. (8) That the affinities of the *Toxocampidæ* are rather with the *Deltoides* than with the *Catocalidæ*. (9) That the *Deltoides* are in all essential characters, *NOCTUÆ*.

These are, of course, only generalisations for consideration. To work the matter out fully would be beyond the scope of the present paper.

THE BRITISH NOCTUÆ AND THEIR VARIETIES.

Class :—NOCTUÆ, Linn.

III. Sub-class :—MINORES, Gn.

1. Family :—*Acontidæ*, Bdv.

This is the last Sub-class included in Guenée's NOCTUÆ TRIFIDÆ and contains five families, of which one—*Hæmerosidæ*—is unrepresented in Britain. Guenée writes :—" All the little species, which have at first sight the appearance of *Geometers*, *Pyrales* or *Tortrices* are comprised in this sub-class. This appearance is not otherwise contradicted by the earlier stages, which approach, in fact, these different divisions of Lepidoptera. A certain amount of practice is also necessary to recognise these Noctuelles " ('Noctuelles,' vol. vi., p. 199). The species included in the MINORES are generally, as Guenée remarks, very much like *Pyrales* and *Tortrices* with which indeed, many have been classed by various authors. The *Acontidæ*, in part, resemble in the perfect state some of the *Heliothidæ*, and have somewhat similar habits. Of this family Guenée writes :—" If one only examined European species, it would be difficult to understand why *Agrophila* and *Acontia* are placed in the same family. One finds, however, that they are closely connected, and that the succession of genera—*Agrophila*, *Anthophila*, *Eugraphia* and *Xanthodes* is natural. On this account, this last genus has hitherto been confounded with the true *Acontidæ*. Otherwise, the characters of the family are, as we see it, numerous and well-marked " ('Noctuelles,' vol. vi., p. 203).

Agrophila, Bdv., *trabealis*, Sc. (*sulphuralis*, Linn.).

As might be expected from the peculiar character of the markings of this species there is considerable variation. Normally, there is a subterminal row of black dots, a complete angulated line formed of united dots, a longitudinal line along the inner margin and another parallel to it; three dots on the costa, and two dots between these and the second longitudinal line. We frequently find the subterminal dots united into a line, the costal dots uniting to form streaks (1) with each other, (2) with the dots below; whilst these dots again frequently unite with the angulated or upper longitudinal line forming streaks in other directions; sometimes the costal dot is continued so as to unite with the angulated line, etc. Guenée describes a var. **A** of which he writes :—" The black spreads over the superior wings, leaving only some yellow spots (Engr. 598e) " ('Noctuelles,' vol. vi., p. 206). Of this species Humphrey and Westwood write :—" This pretty species is rather less than 1 inch in the expanse of the fore

wings, which are sulphur-coloured, with nine black spots and two thick bars of white, of which three spots are upon the costa, two on the disc, preceding the bar, the latter running from the base parallel to the hind margin, which is also black, extending nearly to the anal angle, when it is bent into an oblique bar, which runs nearly to the apex of the costa; the apical margin has four black spots; these are sometimes confluent, forming an irregular subapical bar; the strigæ and the other spots are also sometimes more or less confluent together; the oblique part of the black bar is silvery in fine specimens" ('British Moths,' p. 242). Newman in his 'British Moths,' p. 442, figures a specimen in which the black spots exhibit a tendency to unite. The type is thus described by Scopoli:—"Lon. lin. 4½. Alæ anticæ paleacæ; fasciis binis, trabe longitudinali maculisque (5) nigris." "Margo alæ super. niger, fasciæ in limbo positæ subundulatæ, trabs margini inferiori parallela, maculæ tres superiori margini adnatæ, palpi breves, alæ anticæ subtus fuscæ: margine paleaceo; posticæ supra fuscæ; subtus pallidiores: litura transversa punctoque medio fuscis" ('Entom. Carniolica,' pp. 240-241).

Acontia, Och., *luctuosa*, Esp.

Some specimens of this species are slightly greyer in the ground colour than others. The large white spot which occupies the reniform area in this species is sometimes continued to the costa, and although normally white in colour, is occasionally distinctly ochreous. In the hind wings, the band is distinctly narrower in some specimens than in others. Guenée notices some variation in this species which I have not seen. He writes:—"The white band of the inferior wings is sometimes continuous and sometimes spotted, the spot on the superior wings is white or pale rosy, but these differences are not found united in the same specimens in such a manner as to form a constant variety" ('Noctuelles,' vol. vi., p. 223). Esper's diagnosis of the type is as follows:—"Alis superioribus fuscis characteribus atris, macula trapeziformi, inferioribus fascia albis" ('Die Schmet in Abbild.' p. 71; Pl. 88, fig. 4). Newman in his 'British Moths,' figures a variety from Mr. Vaughan's collection with the characteristic spot in the fore wing reduced almost to a lunule, and the transverse band on the hind wings much reduced.

a. var. ochracea, mihi.—Like the type, but with the large characteristic pale spot in the fore wings ochreous instead of white.

Acontia, Och., *lucida*, Hufn. (*solaris*, Esp.).

There seems very little to lead us to suppose that this species now occurs in Britain. Of *solaris*, Guenée writes:—"Superior wings having the white base marked with a black basal spot, an abbreviated basal line and some clouds, leaden-coloured, the remainder of the wing of a dull brown mixed with grey, with a large quadrilateral costal spot; the lower half of the outer margin and that of the fringes white. A terminal series of irregular spots of a leaden-grey. Reniform very fine, whitish, formed like an 8. Inferior wings having the base white, with three or four blackish rays and an uniformly broad black border. Fringes white, with the first half spotted with black at the base" ('Noctuelles,' vol. vi., p. 221). Esper's diagnosis is:—"Alis

superioribus fusciscentibus, basi maculaque ad apicem quadrata albis, caractere in medio numeri 8 referente; inferioribus albis limbo fusco" ('Die Schmet. in Abbild.' etc., p. 69). Of this species Humphrey and Westwood write:—"This species measures about $1\frac{1}{3}$ inches in the expanse of the fore wings, which are white at the base with a black dot towards the costa, and terminated before the middle of the wing by a rather broad deeply angulated bar, followed on the costa by a large whitish patch, and a slender waved streak on the opposite side of the inner margin; the anal angle white, with several ashy-grey clouds or spots; the apex rather of a leaden-grey, with a row of minute black dots; the reniform stigma somewhat like the figure 8; cilia brown, that portion next the anal angle white, hind wings white with a broad brown margin, cilia white. Several specimens taken near Dover and London, about 20 years ago, in June. The caterpillar feeds on trefoil, dandelion &c. The moth is common near Paris appearing in May and August. It flies in the hottest part of the day in the dry places where *Eryngium campestre* grows" ('British Moths,' p. 239); whilst Mr. Dale writes:—"Acontia solaris var. lucida. This species was taken by Mr. Stone at Dover, in June, 1825; three others were likewise taken there, one of which I believe to be Mr. Burney's" ('Ent. Mo. Mag.,' vol. xxv., p. 247). I cannot quite understand Mr. Dale's synonymy above, as *lucida*, Hufn. = *solaris*, Esp. The variety captured in Britain has always, so far, been var. *albicollis*. Of the occurrence of *Acontia solaris* var. *albicollis* in Britain, Mr. Stainton writes:—"The capture of a specimen of this insect by Mr. Percy Andrews is recorded in the 'Intelligencer,' vol. vi., p. 187. 'I took it in a clover field at Brighton on August 25th, flying in the sunshine like others of the genus.' Mr. Andrews announced it under the name of *albicollis* on the authority of Mr. Doubleday. *A. solaris* is a variable insect, and pale specimens have been reported distinct under the name of *albicollis*. Guenée observes:—"This *Acontia* is, in my opinion, a perfectly distinct species from *solaris*, of which all modern authors have considered it a variety, and I have no doubt the larva, which is at present unfortunately unknown, will confirm its distinctness. No doubt it occurs in the same localities as *solaris*; however, it becomes commoner as we advance southwards, whilst the contrary is the case with its congener.' In singular antithesis to the last sentence, *the pale var. and that only* has occurred in Britain. Stephens remarks:—"A single specimen of this insect was in the late Mr. Marsham's collection but of the locality I am not aware; two examples were taken within the metropolitan range about ten years ago and four others near Dover about six years since; all but the first were rescued from oblivion by the zeal of Mr. Stone.' Herrich-Schäffer observes of *solaris* 'less generally diffused than *luctuosa* but occurring further North'" ('Ent. Ann.,' 1860).

a. var. albicollis, Fab.—Of this Staudinger writes:—"Al. ant. basi thoraceque totis albis" ('Catalog,' p. 131), whilst Guenée writes:—"This *Acontia* constitutes, in my opinion, a species perfectly distinct from *solaris*, of which it has been considered a variety by all modern authors, and I do not doubt that its caterpillar, which is unhappily yet unknown, would help to confirm its validity. It inhabits, doubt-

less, the same localities as *solaris*. It has been remarked, however, that this species becomes more common as one gets south, whilst the opposite is the case with its congener (*solaris*)” (‘Noctuelles,’ vol. vi., p. 220). I have before mentioned Mr. Stainton’s remark, that it is strange that all the specimens which have at present been taken in England, have been var. *albicollis*. Fabricius’ diagnosis is:—“*Noctua lævis alis deflexis basi albis apice fuscis: litura duplici alba*” (‘Mantissa,’ p. 144). It is figured in Newman’s ‘British Moths,’ p. 443.

β. var. insolatrix, Hb.—Guenée treats this as a variety of *albicollis*, Fab. and writes:—“The black spots have disappeared in a great measure from the disc in the upper wings and have left those areas which the black spots usually occupy of an ochreous colour: the black, however, remains at the apex where it forms a large spot which extends on the fringe and to the inner angle before the subterminal. The remainder consists only of more or less numerous small spots, of which two on the costa indicate the origin of the lines. The border of the inferior wings is narrower, although I have never seen it so reduced as in Hübner’s figure, and there is no trace whatever of black on the disc” (‘Noctuelles,’ vol. vi., pp. 220-221), to which Guenée adds:—“It is chiefly in southern countries that this variety is found, which presents all the essential characters of the type, and which cannot form a separate species” (*l. c.*, pp. 221). Staudinger’s diagnosis is:—“*Al. ant. fascia media subnulla flavescens*” (‘Catalog,’ p. 131). Of Hübner’s figure I made the following description:—“Anterior wings white, with the space between the complete basal and elbowed lines yellow; the complete basal and elbowed lines with fuscous streaks on the costa and inner margin. The orbicular indistinct, reniform reddish with a white margin, the claviform reddish-fuscous; the subterminal greyish, edged with fuscous; a fuscous apical patch. Hind wings white, ochreous on margin with the outer edges of nervures fuscous” (‘Sammlung europ. Schmet.’ figs. 684-5).

2. Family:—*Erastridæ*, Gn.

Of this family Guenée writes:—“The *Erastrides*, in the perfect state, are small moths which very much resemble *Geometers*, but which have no less the general facies and all the characters of *Noctuelles*. The stigmata and the ordinary transverse lines are generally very well marked, the abdomen carries almost always well-developed crests. Lastly, the shape of the wings in repose, is that of all *Noctuelles*, except that the upper wings, in completely covering the lower wings, only form a very flattened roof. These small lepidoptera remain clinging to the trunks of trees, or they are found resting under the leaves, from whence they fly when the bushes are shaken. They are found in almost every part of the world, and the greater part of the European species is well known” (‘Noctuelles,’ vol. vi., pp. 224-225). We have only three British species in this family. It is very much restricted also on the Continent of Europe.

Erastria, Och., *venustula*, Hb.

In this beautiful species I fail to trace any noticeable variation beyond the fact that the blotch on the inner margin is larger, darker,

and apparently better developed in some specimens than others. Some specimens also appear to show a development of cuneiform streaks parallel to the hind margin; three seem to be the greatest number of spots developed, but most specimens are without them. The description I made of Hübner's type figure is:—"The anterior wings slaty-grey marbled with darker, with a distinct white apical mark, at the end of which a longitudinal red line runs to the base, the dark patch on the inner margin is distinct, the outer margin also darker with a pale subterminal running through it" ('Sammlung europ. Schmet.,' fig. 294). The arrangement of the markings in Hübner's figure is as in Newman's figure, p. 445, but the colour is not rosy as in our British specimens. Of the early occurrences of this species in Britain, Mr. Stainton writes:—"The following notices of the capture of this insect have appeared. 'Though professedly a micro-lepidopterist, I do not hesitate to take any rarity that falls in my way; therefore, being at Loughton on the 16th June, and falling in with a few specimens of *Erastria venustula*, I thought it no sin to box them. One of them, a male specimen, is a perfect gem, being clouded about the base of the wing with the most delicate pink imaginable. Like other *Noctuidæ*, it flies for a short time before dark, and has a habit of dropping when alarmed. One of my specimens served me thus, and, getting amongst the short herbage, defied all my attempts to discover it. However, I carefully noted the spot where it disappeared, and, lighting my pipe, 'blew a cloud' into the grass &c., and in a minute had the satisfaction of observing it issue from its retreat in the very place where I had been searching' (C. Miller, 'Int.' viii., p. 99). 'Having visited Loughton in search of this insect, I was so fortunate as to capture a few' (Thomas Eedle, 'Int.' viii., p. 99). 'On the 14th June, I had the pleasure of capturing a female of this species; it has fortunately laid me some eggs, which have since hatched. Since then I have taken several more' (J. Bryant, 'Int.' viii., p. 107). 'Then at half-past eight, *venustula* made its appearance, flying in pairs, one after the other' ('Int.' viii., p. 143). 'This beautiful little *Tortrix*-like *Noctua* has again appeared in Epping Forest. At first, either damaged or retarded by excessive wet, it occurred only sparingly, but the numbers gradually increased until the 24th June, when they appear to have reached their zenith, one collector alone having taken about a hundred' (Edward Newman, 'Zoologist,' 7108)" ('Ent. Ann.,' 1861, pp. 98-99).

Erastria, Och., *fasciana*, Linn.

I fail to trace anything in the way of actual variation in a long series of this species although some specimens look blacker than others. The characteristic white spot at the anal angle is much more restricted in some specimens, owing to a dark grey shade following the inner edge of the white subterminal to the anal angle, and thus suffusing the outer and lower portion. In some, this white spot absorbs the subterminal and ends well-up on the outer margin towards the apex. The Linnæan description of the type is:—"Tortrix fasciana alis fusco cinerascentibus: fascia alba. Media. Alæ superiores obscure cinerascentes margine exteriori albo nigroque maculato; fascia lata, albida, recurvata. Inferiores alæ nigricantes; margine ciliari albido" ('Fauna Suecicæ,' p. 342).

a. var albilinea, Haw.—Humphrey and Westwood write of this variety under the name of *albidilinea*. This species measures 1 inch in expanse and is very closely allied to the preceding insect, of which it is regarded as a probable variety by Curtis and Stephens, with the markings suffused, the pale patch at the anal angle of the fore wings being obliterated, and the subapical pale flexuous striga very rudimental. It is captured in company with the preceding species, according to Mr. Stephens, but very rarely" ('British Moths,' p. 241). This is not the *albidilinea* of Haworth to which Humphrey and Westwood refer it, for the latter is a variety of *Mamestra brassicæ*, but it is the *Phytometra albilinea* of that author which he describes as follows:—"Phytometra alis fusco nigro alboque varie cinereis, striga flexuosa alba pone stigmata, posticis fuscis." "Præcedenti (*fusca*) simillima, et vix differt, nisi in absentia maculæ albæ anguli ani, et in striga flexuosa juxta marginem posticum fere omnino obliterata" ('Lepidop. Brit.,' p. 261).

β. var. guenei, Fallou.—This variety illustrates one of those strange facts that are being repeatedly met with, *viz.*, that when an odd variety of a species is captured alone and not with other specimens which give a clue to its actual identity, it is often located far away from the species to which it actually belongs. When this variety of *fasciana* was first described by Fallou, he placed it in *Bryophila* and compared it with *B. algæ*. He wrote:—"This belongs to the *algæ* group, although it differs from that species very much in colour, and it should be placed between *receptricula* and *algæ*. It has the size and shape of the latter, but all its wings are proportionally larger, or, if one prefers it, shorter, and the inferior wings, in place of having the well-marked sinus which is seen opposite the cellule in all *Bryophilæ*, are only a little less rounded in this part. The superior wings are of a clear wood-coloured brown, or of the tint of fresh nuts, mixed with darker brown, principally in the median space. In this darker area, the three ordinary stigmata, very pale and almost white in colour, stand out conspicuously. The reniform is of average size, regular, and with a well-marked outline; the orbicular small and less clearly marked and almost touching the transverse line. The two median lines are placed somewhat similarly to those in *algæ*, and the elbowed line is followed on the inner margin by a broad clear space, in which the subterminal line which is indistinct, is absorbed. The fringe, which is alternately light and dark, is preceded by a series of well-marked blackish dots, of which the fifth is the larger. The inferior wings are uniformly pale brown (which is remarkable in this genus* where the wings are always paler towards the base), with the fringe slightly speckled. Their undersides are of a very pale grey, tinted with reddish on the costa and inner angle, with the cellular lunule and a fine undulated line, darker. The thorax is varied with nut-brown and blackish, and the abdomen is grey-brown with the crests darker. I took two exactly similar examples of this Noctuelle, in the park of the Château de Pau (Basses-Pyrénées), on the 24th July, 1859. I regret not having sufficiently noticed the species when I found it, for it is probable that these two specimens were not the only ones in this locality" ('Ann. Soc. Ent. France,' 1864, p. 27). Some time after, M.

*It must be remembered that Fallou placed this in *Bryophila*.

Fallou found out his error in considering this a distinct species and wrote:—"When, in December 1863, I communicated to the Society the description of a new Noctuelle which I could not refer to any known species and which I named *Bryophila guenei*, I asked my colleagues in the locality to continue the search, and attempt to obtain a better result than could be arrived at with my two specimens. My expectation was not of long duration, and I received, on the 9th November 1864, from our excellent colleague M. Lafaury, communications which have convinced me that this species is only a southern variety of *Erastria fuscula*. Twelve specimens of the latter, taken at Dax by our colleague, connect the type with my *guenei*, both in the shape of the wings and in markings. I hasten, therefore, to correct the note published in our "Annales," and to no longer allow this error to exist. As this variety is curious and appears constant, I consider it should continue to figure in our catalogues as *Erastria fuscula* var. *guenei*" ('Ann. Ent. Soc. Fr.,' 1864, p. 688).

Bankia, Gn., *argentula*, Hb.

In this species, the variation of some specimens is rather marked, and in these we get a distinct change of ground colour, the green in some specimens becoming red. The stigmata are strangely developed, the reniform existing as a white blotch on the white line which passes from the centre of the wing to the anal angle, the orbicular and claviform as two spots, one towards the top, the other towards the bottom of the other oblique line which occupies the position of the ordinary basal line. The origin of these spots is obscured in many specimens, but a specimen now and then shows their structure beyond doubt. In some specimens there are no spots to show the position of one or more of the stigmata, and there is every possible gradation in the form and size. There is a great difference in the width of the white lines. In two of my specimens they are so narrow as to become partly obsolete, the reniform existing independently of the line as a white encircled stigma, the orbicular and reniform showing up their origin most distinctly in these specimens. Hübner's description of the type is as follows:—"This species is of the size of *sulphurea* and much like it in shape. The head is white and olive-green, the palpi are entirely olive, the antennæ brown. The fore wings on the upper surface olive-green with silvery stripes. The latter consist of one short one near the base and two larger ones in the centre, the outer with two teeth, and the second with a round spot near the centre. The two lines run from the costa to the inner margin. Towards the apex is a short line and close to the outer margin is another line, between which and the margin the ground colour is quite pale. The fringes are grey. It is taken rarely near Augsburg" ('Beiträge zur Geschichte' etc., vol. i., pt. 2, p. 9).

a. var. *rufescens*, mihi.—Under this name I would include all those specimens which have the normal green ground colour of the type changed into a reddish-brown. Such varieties are rare. They are marked in the same manner as the type.

β. var. *obsoleta*, mihi.—The ground colour as in the type, but the two transverse white lines reduced in width, becoming very narrow and almost linear. My specimens were taken with the type at Chippenham Fen.

3. Family:—*Anthophilidæ*, Bdv.

Of this family Guenée writes:—"The imagines of this family are all of the smallest size, and in this family a species of the average size of a NOCTUA of our country would appear gigantic. Their bodies are generally slender in proportion to their wings, so that the old authors have mistaken them for Pyrales or for Geometers; but the number and the form of their palpi, the thickness of their wings, their markings and appearance, the strength and shortness of their fore legs etc., quite prove them true Noctuelles. They fly in broad daylight, sometimes amongst the plants in marshy districts, but more often on dry hillsides exposed to the sun. Instead of extending their wings in the manner of other species which have, like them, a slender body, they carry them, on the contrary, inclined roofwise." "The old authors knew only a small number of the *Anthophilidæ* however, and some may still be found among their Phalenidæ and Tortrices, where we have found many. The greater part has been recently discovered. They inhabit almost all the countries in the world, and their number must necessarily be augmented considerably, as their small size has caused them as yet to be neglected" ('Noctuelles,' vi., pp. 233-234). In Britain, we know very little of the species in this family, only *Hydrelia uncula* being at all common. The remaining species are most rare in Britain.

Hydrelia, Gn., *uncula*, Cl.

In the ground colour, some specimens of this species are rather redder than others, but it is in the hook or unca, which takes the place of the reniform, that the greatest variation exists. This varies in shape, size, and slightly in direction. In one specimen I have, it almost, but not quite, reaches the pale subterminal line. The orbicular exists as a longitudinal dilatation on the lower part of the pale costal mark, and a striking form of variation occurs when the central nervure becomes pale and joins this pale orbicular dilatation with the reniform unca-mark, thus cutting off, as it were, a triangular portion of the dark central area. The inner margin is generally clouded, the darker central area merging into it, but I have some specimens in which the pale area is continued broadly and distinctly all round the fore wing. The description I made of Clerck's type was:—"Anterior wings dark fuscous-brown, with a white longitudinal line parallel to the costa, continued from the base to the subterminal line, and containing a white prolongation in the place of the reniform; the subterminal also white; a white line along the median nervure almost joins the lower part of the costal longitudinal line with the white reniform mark. Posterior wings fuscous" ('Icones' &c., Pl. iii., fig. 7).

Thalpochares, Ld., *ostrina*, Hb.

I have two old specimens of this species taken very many years ago by Mr. Tyrer in Kent, and which he sent to me not long since as vars. of *Miana furuncula* (*bicoloria*) with actual specimens of that species. One has the ground colour pale ochreous but is slightly darker between the subterminal and augulated lines which become visible owing to this darker tint; the costal area between these lines is represented by a pale lunule; the second specimen is much darker, has a distinct longi-

tudinal basal line under the median nervure; a pale subterminal line, a dark area bordering the subterminal line internally and a dark central shade with fine black longitudinal lines (cuneiform spots?) joining these shades. These specimens are very differently coloured to the figure in Humphrey and Westwood's 'British Moths,' pl. liii., fig. 21, although the markings are identical in both. Of the occurrence of this species in Britain and its capture by Dr. Battersby (*vide, Thalpocharis parva*) Mr. Stainton writes:—"That *Micra ostrina*, not taken here since 1826, should occur simultaneously in different parts of the country, is certainly startling, though from all accounts the habit of the insect is so retired that it seems but natural, even if the insect were about, that it should escape observation" ('Ent. Ann.,' 1859, p. 145). In Newman's 'British Moths,' we find:—"The moth appears on the wing in June, and has been taken in one English and one Welsh county only, Devonshire and Glamorganshire. Mr. Reading records the capture of a specimen at Torquay, by Miss Battersby, and Mr. Stainton says one specimen was taken at Bideford, in June, 1825" ('British Moths,' p. 447). The Welsh locality is thus recorded by Mr. Llewelyn:—"It was in the month of July, a few years since, that I captured, on the sand hills at Pembrey, South Wales, a pretty little insect whose identity I have, until lately, been utterly unable to establish. The spot at which I secured it was rather barren and sandy, in a sheltered situation; an abundance of dwarf willow grew in the vicinity, and also, as far as I remember, thistles, bed-straw, wild thyme, and a short kind of grass, from which latter I expect that I disturbed it; at any rate, the insect was flying low over the barren sand when I caught it. The day was showery, with occasional gleams of sunshine, during which *Hipparchia semele* and other butterflies were on the wing, and during one of these gleams I took the insect, and, seeing that it was something I did not know, boxed and pinned it at once. The recollection of the capture is very fresh in my mind, owing to the pleasure of the expedition and the difficulty I have had in getting the insect named" ('Ent. Mo. Mag.,' vol. i., p. 282). The most recent captures are recorded in the 'Entomologist,' vol. xiii., p. 242 and 'Ent. Mo. Mag.,' vol. xvii., p. 135, by Dr. Battershell Gill at Dover on September 8th, 1880; and from the Dorset coast 'Ent.,' xiii., 282, by Mr. Dale. The description I made of Hübner's type is as follows:—"Anterior wings of a beautiful rosy colour, with a central shade made of blackish dots; reniform small and black; subterminal pale grey, with a transverse series of black longitudinal, wedge-shaped spots (comparatively large) on inner edge of subterminal. Hind wings grey, base paler" ('Sammlung europ. Schmet.,' fig. 399).

a. var. æstivalis, Gn.—Guenée's description of this variety is:—"A little smaller. The rosy colour has entirely disappeared and is replaced by a yellowish straw colour or reddish. All the markings are partly obliterated, and the black colour remains only at the apex and in the orbicular stigma. The inferior wings are white, with the border barely yellowish" ('Noctuelles,' vol. vi., p. 247). Staudinger's diagnosis is:—"Pallidior absque colore roseo" ('Catalog,' p. 133).

β. var. carthami, H.-S.—Staudinger's diagnosis of this variety is:—"Al. ant. unicolor. stramineis, apice infuscato" ('Catalog,' p. 133).

Herrich-Schäffer himself writes:—"I take *carthami* for a var. of *ostrina*, in which the ground colour is pale sulphur and the markings absent. The brown spot near the tip as well as the adjoining black dot and the black dot in the centre, quite agree with those in *ostrina*. A smaller and still paler specimen was captured by Lederer near Ronda, and was sent to me as *undalis*" ('System. Bearbeitung' etc., p. 438). This would appear to be the form which I have in my collection.

γ. var. *porphyrina*, Fr.—Staudinger's diagnosis of this variety is:—"Al. ant. albicantibus [exterius roseis], fasciis media et postica obscuris" ('Catalog,' p. 133). Guenée writes of it:—"Larger. Basal space, concolorous with the rest of the wing, which is of a rosy-white or yellowish; a straight median band, uniformly brown but passing gradually into the ground colour on its edges, interrupted at the median and sub-median nervures, and contiguous with the little cellular dot. Costal streaks and apical nervures not marked in rosy" ('Noctuelles,' vol. vi., p. 247). He then adds:—"This large variety appears at first sight, wholly different from the type" (*l. c.*). Freyer's own note on this variety is as follows:—"Mr. Kindermann sent me this pretty species as a var. of Hübner's *ostrina*, with the remark that M. Rambur of Paris had determined it as a distinct species under the above name. I do not know Hübner's *ostrina*, but judging from the figure, M. Rambur appears to be right. It is somewhat larger than the preceding. The thorax and fore wings are yellowish-white. The latter have a light brown band running through the middle, which divides into two branches on the costa under which is a black dot. At the base is also a faint trace of a brown band. The tip is coffee-brown in colour, and behind it, a zig-zag band runs to the inner margin, twice curved towards the outside, and edged with dark brown on its inner margin. The fringes are brownish, with the body and hind wings greyish-white, the latter with pure white fringes. It flies in the Ural" ('Neuere Beiträge' etc., pp. 93-94).

Thalpochares, Ld., *parva*, Hb.

This is a very rare species in Britain, and probably much overlooked. Guenée writes:—"It is not rare (in France), but its very small size causes it to be overlooked" ('Noctuelles,' vi., p. 246). The description I made of Hübner's type is as follows:—"Anterior wings reddish-grey, with a pale transverse line near the centre of the wing internally edged with darker; a semilunar costal mark near the apex; a small dark dot above the anal angle. The base of the wing and the apical mark much darker red than the rest of the wing. Posterior wings grey with a dark marginal and another dark median shade" ('Sammlung europ. Schmet.,' fig. 356). It will be seen that this figure differs somewhat from the figure in Newman's 'British Moths,' p. 447, which appears to agree rather with Guenée's var. A. Of *Micra parva*, Mr. Stainton writes:—"Of this insect, execrably figured by Hübner, a passable likeness is given by Duponchel (under the name of *minuta*); his description, however, is far more satisfactory than his figure. Several years ago, Mr. Doubleday saw a specimen which had been taken at Teignmouth, by Mr. Jordan, but it was so mutilated as to be unrecognisable. In the past summer, Dr. Battersby of Torquay

has been fortunate in obtaining two specimens, of which he has, at my request, sent the following notice" ('Ent. Ann.' 1859, pp. 147-148). In the 'Entomologist's Annual' for 1859, Dr. Battersby writes:—"My daughter having found a specimen of *Micra ostrina* in June, I was induced to go with my children the two following mornings and make a close search along the coast wherever the cliffs are accessible, and having a good many little eyes at work, we were fortunate enough to meet with five more; they occurred at three places in an extent of about three miles, and were met with half way down the cliffs to the water's edge. We found *Micra parva* only in one place, and saw but two specimens, both of which, were captured; they, as well as *ostrina*, lay very close among the grass and brambles, and when disturbed did not fly more than a yard or two, *ostrina* settling on the ground, and *parva* on plants: this was the only difference I observed in their habits; indeed, until I was able to examine both carefully at home, I considered that I had merely taken two sexes of *ostrina*. We searched the cliffs with great care for nearly a week afterwards, but without seeing a trace of more." Mr. Newman adds:—"From the figure which accompanies the notice of the 'Annual,' I should have supposed this insect to be the female of *ostrina*. I observe that M. Guenée regards *Micra parva* as a distinct species, but whether Dr. Battersby's insect belongs to that species or not, we have no evidence" ('British Moths,' p. 448). Of *parva* Treitschke writes:—" *Erastria alis anticis ex flavo ferrugineis, fascia angusta alba; posticis fusciscentibus.*" "*Parva* is the best known of the genus and is of the same size as the two preceding species (*minuta* and *paula*), varying chiefly from light to dark ground colour. The head, collar and thorax are white, mixed with reddish brown; body yellow-grey, ringed with darker; the pectinated antennæ are rust-coloured, legs yellow-white; the fore wings are of two colours, yellowish-white or light reddish-brown. The basal area is quite plain; then follows a deep brown, edged with a white, zigzag line; the central area is white, mottled sometimes with ferruginous-grey, in which the discoidals are more or less indicated by one or several small black dots; the outer area is brown towards its inner part and whitish near the outer margin; towards the tip there are some small black dots; fringes reddish-grey." "Italy and still more Dalmatia which is rich in the smaller insects, are its home. It occurs in some parts of Southern Germany, but is rare. It flies in June in the daytime and resorts to thistles and fragrant flowers" ('Die Schmet. von Europa,' vol. v., pt. 3, pp. 269-270).

a. var. pallida, mihi.—Guenée describes his var. **A** as having "The red median band quite straight instead of being wavy. The colours generally paler and the inferior wings whiter" ('Noctuelles,' vi., p. 246). This description was made from a specimen "in Guenée's collection taken in the Iles d'Hyères" (*l.c.*).

β. var. rubefacta, Mab.—Staudinger simply says of this:—"Obscurior, rubescens" ('Catalog,' p. 133). Mabelle writes:—"There is no trace of yellowish or of dirty white in the upper wings. The base and outer margin of the wing is of a deep brown sometimes rosy; the median line very well-marked throughout its length, with a blackish shade. Inferior wings very dark. For a long time I believed that this species was distinct from *parva* which did not vary

when reared on *Centaurea calcitrapa* and *Phagnalon*, and which is common in Corsica. But the larvæ of my variety *rubefacta* not appearing to differ I have reunited the two insects provisionally. *Rubefacta* lives in flowers of *Inula viscosa* in October and November; I have found it commonly but have neglected to rear it" ('Ann. Ent. Soc. France,' 1869, p. 56).

Thalpochares, Ld., *paula*, Hb.

I am very doubtful as to the right of this to be considered a British species. Guenée writes of it:—"It is the commonest of the genus" ('Noctuelles,' vi., p. 245); whilst Treitschke writes:—"Paula, as already mentioned, has long been mistaken for *minuta*, Hübn., although the colour and markings are very different. The head, collar and thorax are white with scarcely perceptible darker borders; the body is ash-grey with the segments darker; the antennæ are pale rust-brown and slightly pectinated, the legs also brown. It is of the size of the preceding (*minuta*). The ground colour of the fore wings differs from that of *minuta*. The white is not pure but yellowish, dusted with ash-grey, sometimes the colour is yellowish-brown. The basal area is bordered by a brown band edged with a white line; the middle area is dusted with brownish; the angulated line is white bordered with brown, almost straight with a slight arch (bow) in the middle but not with a decided angle. All the markings are quite different in *minuta*. More similar are the subterminal line and the following row of brownish dashes or dots which extend to the white fringes. We have received the moth, the life history of which has not been discovered, from Dalmatia and Italy. It has often been taken there on thistles in June in company with *parva* and *ostrina*. It also occurs in Hungary but much more rarely" ('Die. Schmet.' etc., vol. v., pt. 3, pp. 268-269).

IV. Sub-class:—PHALENOIDÆ, Gn. (BREPHEDES, H.-S.).

Of this sub-class Guenée writes:—"Everything is abnormal in this family which is composed of a single genus, and if only the organs of the insects were studied, one would soon be entirely puzzled. The palpi are scarcely worthy of the name, all the joints being reduced to a minimum, disclosing only the tufts which are situated there; the wing-roots and the collar, which are almost in the same condition; the spines on the fore-legs which are aborted, and which are noticed with difficulty, all seem to suggest an insect very little understood. The antennæ and the wings are perfectly developed, although bearing also, as one would expect from the other characters, some traces of an abnormal nature. One notices also the anal flaps of the ♂ and the disposition of the terminal tufts which have, like the other characters, their trace of originality" ('Noctuelles,' vol. vi., pp. 263-264). Meyrick considers the species in this family true Geometers and places them next to *Anisopteryx ascularia*, vide, 'Ent. Record' etc., vol. iii., p. 111. Knowledge of the larvæ would have prevented such an erroneous suggestion.

Brepheos, Och., *notha*, Hb.

The chief characteristic of this species is the distinct pectination of the antennæ of the males. Guenée writes:—"This species is easily

distinguished from the preceding (*parthenias*), independently of its shape and other characters, by the antennæ of the male, which are furnished with spathulate pubescent pectinations, whilst the joints are simply thick and velvety in *parthenias*” (‘Noctuelles,’ vol. vi., p. 265). The British specimens of this species are generally greyer (more slaty) than in *parthenias*, and a conspicuous, broad oblique band runs transversely from the costa, between the basal line and the centre of the wing, to the inner margin. This is much more defined, narrower, and with straighter edges than in *parthenias*. The description I made of Hübner’s type is as follows:—“Anterior wings brown (very slightly reddish), with the base dark brown, slaty basal line, externally edged with black, then a broad, oblique, brown, transverse band reaching almost to the centre of the wing; the band shaded externally and broadly (throughout its length) with white scales, the orbicular absent, the reniform surrounded with black; the elbowed line black with an external whitish costal mark; the sub-terminal slaty with a dark apical patch. Hind wings reddish-orange; the blackish-brown basal area solidly marked; black outer margin” (‘Sammlung europ. Schmet.’ figs. 343-344). Of this species Treitschke writes:—“*Notha* has for a long time been confounded with *parthenias*. The points of distinction, however, are very marked. It varies in the clearness of the markings and vivacity of colour, hardly less than *parthenias*, nor is the time of appearance different from that of *parthenias*. But it is smaller than *puella*, the fore wings are not so long, and there is generally less white on them, whilst the dark band in the central area, like the angulated line, is straighter and more uniform. The angulated line has, below the reniform and towards the inner margin, a dentate mark, otherwise it is almost straight, whilst in *parthenias* it is zigzag. The fringes are almost unicolorous brown-grey, with very little white. Hind wings pale orange colour especially in the ♀. The black discoidal which joins the triangular basal spot is slenderly elongated, and, excepting an elevation on the outside, is of equal width. The underside is like that of *parthenias*, but there is no white to be seen with the exception of a spot adjoining the brown tip of the fore wings. In many collections, *notha* is found under the name of *parthenioides*, but there is no reason for altering Hübner’s name” (‘Die Schmet.’ etc., vol. v., pt. iii., pp. 383-384). I have before mentioned that the pectination of the antennæ and the width and direction of the oblique band between the basal line and centre of the wing are very characteristic in this species, and there is some essential difference in colour. In the fore wings of *parthenias* there is generally a strong tinge of reddish-brown, and the paler mottlings, when present, generally have a tendency to ochreous. In *notha*, there is rarely even a suspicion of reddish-brown, the colour being blackish-grey, whilst the paler markings are decidedly paler grey, almost white or with a slight slaty tint. The females, at any rate so far as my series is concerned, are more decidedly and strongly marked than the males, which have fewer paler marblings, sometimes none at all, the presence of these pale marblings in the female, in fact, giving the markings of the female their distinctness. In the hind wings, *notha* is of a more uniform orange-red, and rarely, if ever, of a bright reddish hue like some of the males of *parthenias*.

Brephos, Och., *parthenias*, Linn.

The fore wings of this species exhibit some variation (to a great extent sexual) in the amount of mottling which they undergo, and the tint of the hind wings varies considerably, from orange with the very slightest red tint in it, to a shade almost entirely red. The Linnæan description of the type is as follows:—" *Phalœna Noctua parthenias* spirilinguis, alis deflexis fusco alboque variis; inferioribus luteis punctis duobus nigris." "Media. Alæ superiores supra fuscæ, albo nebulosæ. Inferiores luteæ punctis nigris, duobus, magnis, quorum alter in centro cohærens cum nigredine baseos; alter ad angulum ani. Subtus omnes alæ luteæ: fascia in medio nigra" ('Fauna Suecicæ,' pp. 308-309). It is noticeable that Linnæus calls the hind wings "yellow." Generally they are red or at least orange-red, with a distinct yellow spot towards the anal angle. Some specimens, however, are of a decidedly orange tint with a minimum of red, others are red with a minimum of orange. The central spot, agreeing with the lunule, is variable in size and shape and is sometimes double, the lines which join this to the black basal mark also varying in intensity. Mr. Dale's var. *nigra*, mentioned below, is the only melanic specimen of which I have ever heard. Guenée describes the sexes of this species separately, and says of the female:—"Female larger, 40 mm. (♂, 35 mm.), more powdered with white, the median shade and lines more distinct, the fringes more netted; the inferior wings tinged here and there with clearer yellow" ('Noctuelles,' vol. vi., p. 264). Both sexes in this species are very liable to variation in the quantity of paler markings on the fore wings, the Scotch specimens being particularly variegated and beautiful.

a. var. nigra, Tutt.—The original notice of this variety, for which I proposed the name *nigra*, is from Mr. Dale, who writes:—"I have a specimen of *B. parthenias*, which was obtained from the late Mr. Ross, which is entirely black without any trace of white or yellow about it. It is one of the best melanic specimens I have ever seen" ('Ent. Record' &c., vol. i., p. 34).

V. Sub-class:—VARIEGATÆ, Gn.

1. Family:—*Plusidæ*, Bdv.

So far we have been dealing with Guenée's great division TRIFIDÆ, we now have to consider the sub-classes in his other great division QUADRIFIDÆ. The first of these is *Variogatae*. This large sub-class which Guenée divides into eight families, has no British representatives in any of the families except in *Plusidæ* and *Gonopteridæ*, the latter of which has been transferred elsewhere (*ante*, vol. iii., pp. 96-97). The *Plusidæ*, however, considering our limited fauna, is well represented. Of the latter family Guenée writes:—"This family is one of the most natural, and a trained eye recognises immediately the insects which it comprises. I should observe that the last genera (*Plusiadonta* &c.) approach the family *Calpidæ* insensibly, with which, indeed, they form a transition, more natural than is to be obtained by a rigorous method" ('Noctuelles,' vi., p. 319). To which he adds:—"The imagines are recognised as quickly as their larvæ by their brilliant superior wings, sharp, and always provided in some place with satiny, brilliant, metallic

marks, or signs of gold or silver, often equalling the best polished metal. They have nothing particular in their manners, and fly in the evening with the greatest swiftness; but I have noticed in my 'Essai' the singular hardness of their abdomen which is more sonorous and more hollow, so to speak, than that of other NOCTUÆ. I do not know whether anatomists will one day be able to explain, by an actual difference in the tissue, this exceptional organisation, or whether it will be necessary to class it with unexplained illusions" (*l. c.* pp. 319-320). Guenée also adds:—"The *Plusidæ* are found in all parts of the world, and their beauty has attracted the attention of authors, so that a certain number of these species is known even among the exotics" (*l. c.* p. 320). Our British species are included in the two genera *Abrostola* and *Plusia*, and are, in most instances, very beautiful, although not exhibiting any striking variation in any of the species, except in the peculiar forms taken by the metallic sign in *Plusia interrogationis*, which appears to vary endlessly, whilst minor forms of variation in the same markings occur in *Plusia iota* and *pulchrina*. *Plusia aurifera* and *illustris* find places as British in our old text-books. The widely-distributed *bimaculata* (*verticillata* as it was long called) is also considered a British species. *P. ni* is supposed to have been accidentally imported, and *moneta* has recently been added to the British fauna, a considerable number of specimens having been taken during the last two or three years. Altogether this is a most interesting family, and a general favourite among lepidopterists. Of the *Plusini*, Grote writes:—"The thorax is rather short and square, but globose above, with hairy, somewhat silky covering, which forms, posteriorly, an abrupt tuft. The eyes are naked, lashed in *Plusia*, unlashed in *Telesilla*. The wings are somewhat pointed with full external margins. The tibiæ are unarmed. The ornamentation of *Plusia* is remarkable for the silvery or golden middle marks, or sheeny patches. The American species are forty-two in number, exceeding the European thirty-eight; but, probably, more remain to be described with us. We have representative species, *e.g.* *putnami*, allied to the European *festuæ*, while *parilis* is found in Lapland and Labrador. The question whether *ni* can be separated from our *brassicæ*, I have been inclined to answer negatively. The peculiar abdominal tufts speak for the identity of the forms. Among American forms are a greater number of grey and brown species, allied to *gutta*, *interrogationis*, *chalcytes*, &c., and are perhaps, on the whole, less showy. Nevertheless, a resemblance may be traced between many species, as between *v-argenteum* and *mappa*, *zosimi* and *balluca*, etc. The resemblance is further shown in the species of *Habrostola*, which have the caterpillar 16-footed and the moths without metallic marks, while the species of *Plusia* have 12-footed larvæ. But the most remarkable among the American species of *Plusia* are the three mimetic forms:—*thyatiroides* which resembles a *Thyatira*, *formosa* which resembles a *Leptina*, and *striatella* which resembles a *Heliophila* (*Leucania*). *Behrensia* is a Californian type, allied to *Habrostola*; and *Deva*, an eastern and western genus, is closely allied to *Plusia*" ('Canadian Entomologist,' vol. xxii., pp. 70-71).

Abrostola, (rect. *Habrostola*), Gn.

Structurally, the larvæ of *Abrostola* connect the *Plusidæ* with the

other NOCTUÆ, the larvæ having the number of feet normal in the other groups, although the imagines are decidedly *Plusia* in appearance etc. They (the imagines) are much less brilliantly marked than the true *Plusiæ*, although retaining all the characteristics of the family. There is a little variation in the amount of pale marbling in *tripartita* (*urticæ*), otherwise there appears to be nothing particularly noticeable. Guenée writes:—"The perfect insects are exceptional in this family, in that their wings are altogether without metallic spots or lines; as compensation, the ordinary stigmata are well marked and surrounded by small upright scales which make them stand out still more clearly. They vary little or not at all, although the larva of each species has two well marked varieties, but this does not influence the colour of the imagines" ('Noctuelles,' vol. vi., p. 320). Our two British species are very different in general appearance, although it is almost impossible to find a good structural point of distinction between them.

Abrostola, Och., *triplasia*, Linn.

This species is very closely allied to the next (*tripartita*), and apart from colour, it is very difficult to get a distinct point of difference between them; the basal line is, perhaps, more regularly curved, and the elbowed line also more curved near where it meets the inner margin in this species, but neither of these points is infallible; the spot between the stigmata is generally darker in *tripartita*; the small longitudinal marks near the apex; the pale stigmal mark which looks like an extension of the orbicular (so characteristic in some of the *Hadena*); the raised scales on either side of this mark and those round the basal line appear to be identical in both species and show their very near relationship. I can find no points of variation in this species except the slight sexual differences in the antennæ and abdomen. The type of this species is thus described by Linnæus:—"Noctua spirilinguis, alis deflexis: superioribus arcu duplici contrario maculisque tribus glaucis intermediis. Crista thoracis reflexa, alta, pallida." "Alæ superiores griseo-cinereæ arcu ferrugineo in ala antica et postica. Maculæ tres interjectæ glaucæ, quarum duæ versus marginem lateralem" ('Syst. Naturæ,' xth., 517; 'Fauna Suec.,' 318). Of *triplasia* Guenée writes:—"The description of Linné is not at all satisfactory, but the citation of Roesel's figure and the species which still exists in his (Linnæus') collection remove all doubt" ('Noctuelles,' vol. vi., p. 323). The glaucous coloration mentioned in the Linnæan description is highly suggestive of *tripartita*.

Abrostola, Och., *tripartita*, Hufn., Rott.

Distinct as is this species from the former in general appearance, and easily as they can be separated, I fail to find a single point of difference, apart from colour and general appearance, between them. Unlike the former, this species varies considerably in ground colour although it is always of some shade of purplish-red, sometimes very pale, at others almost black. But the pale parts of the fore wings are those which vary most. In Britain, these paler parts which are of a greyish-ochreous coloration, generally extend as a more or less distinct transverse band between the subterminal and angulated lines, and also form a somewhat oval patch in the lower part of the basal area. In

some specimens, however, these pale areas are practically absent, and Mr. Finlay of Morpeth has sent me a specimen with the pale markings entirely obsolete, exactly copying *triplasia*, although the specimen is certainly *tripartita*. Rottemburg thus describes the type:—"This moth very much resembles the ordinary *Phalæna triplasia*. The only differences between them are, that the ground colour at the base and on the margin of the fore wings is entirely white, and they are also dusted and powdered with white in other parts. In shape and markings the species resemble each other. Although Hufnagel considers this a distinct species and seems to have observed a variation in the larvæ, I shall still be inclined to consider it as a mere var. of *triplasia* until I shall have had an opportunity of breeding it from the larva. This may alter my opinion, as I do not know the larva, all those I have bred having produced the ordinary *triplasia*" ('Der Naturforscher,' ix., pp. 139-140). Hübner's *triplasia* fig. 269 is this species with the normally pale markings clearly shown. The same author's *urticeæ* fig. 625 is also this species but represents that form in which the whitish or ochreous markings are absent as in the Morpeth specimen to which I have previously referred. There is, however, apart from entire absence, considerable variation in the quantity of pale markings; those with the greater amount of pale markings were known to our old British authors as *urticeæ*, those with a less quantity were known as *asclepiadis*. The latter is therefore a form intermediate between typical *tripartita* and the obsoletely-marked form *urticeæ*, Hb.

a. var. urticae, Hb.—This name is applied to that form of *tripartita* which has the normal pale markings obsolete and thus bears a superficial resemblance to *triplasia*. I have a specimen without a trace of pale markings from Morpeth, and other specimens in my collection tend in the same direction. Hübner's figure may be described as:—"Anterior wings of a dark greyish colour, with black marblings at the base; a reddish complete basal line, but neither so reddish nor curved as in *triplasia*; the orbicular paler, joined with another oblique (turned from the base) stigmal marking, which united form a long 8-like mark; the reniform surrounded with black; the elbowed line straighter than in *triplasia*, reddish, edged externally with black; the subterminal pale and wavy; a black apical mark" ('Sammlung europ. Schmet.,' fig. 625). Altogether this is a most unicolorous form.

Plusia, Och.

This genus contains some of the most beautiful of our British moths, the metallic patches and signs or letters which characterise them being very remarkable, and rendering them quite brilliant. Some of the species have the metallic markings on the fore wings in the form of patches, others in the form of transverse bands, whilst others again have them in the form of letters, the Greek γ and i being the most frequent forms. This sign or letter has really no connection with the stigmata, being an entirely independent mark, although the upper portion is situated just below the orbicular. The markings of *P. festucae* are intermediate between those of the species with patches and those with letters, the two central metallic patches of this species corresponding with the v and $.$ of *jota*, *pulchra* etc. Another im-

portant character is the elongation of the anal angle into a sort of hook, the inner margin being rounded towards this point so as to give it this particular character and appearance. Guenée writes:—"The perfect insects are, without exception, extremely beautiful. Some are noticeable only for their satiny, bronzy, or reddish-brown decorations, of which the most noticeable precedes the outer margin and reaches, on becoming narrower, the median space behind the extra-basal (complete basal) line; but the greater part of the species, besides these decorations, which are found to exist in almost all of them, carry a particular or special ornament. This consists of one or two spots placed under the cellule, quite peculiar to this genus, and agreeing with neither of the three ordinary stigmata. These spots which I shall name in my descriptions "signes subcellulaires" are coloured with a substance resembling polished gold or silver in colour and brilliancy. They are slightly raised on their edges, as if some drops of these rich colours had fallen on the wing and had sunk in the middle in drying. But they are not the less composed, like the remainder of the wing, of imbricated scales, of which the exterior ones form a kind of pleat or raised margin with a rounded contour, instead of being arranged transversely, as are the other scales of the wing, even those which form metallic spots, often as brilliant as these particular signs. But it is not only for their brilliancy that these signs are remarkable, but also for their form which is not less essential, and which enables us readily to distinguish the species. Sometimes they are simple rounded decorations, sometimes they are two contiguous points, generally the posterior sign only has the form of an oval dot, whilst the anterior is shaped more or less like a rounded hook resembling a Y or U or a note of interrogation, deprived always of its dot below; lastly, the two marks sometimes join, and then the posterior takes the form of a drop and the whole resembles roughly a *gamma* or *lambda* reversed, of which the buckle would always be blocked (filled in). All these names of letters have been used to designate the species of *Plusia*, although the resemblance to these alphabetical symbols is not always very striking. There is yet a character that should not be omitted when speaking of the genus *Plusia*. It is a tooth formed at the anal angle of the fore wings which varies in size according to the species. I call it the "anal tooth." Some *Plusiæ* have scarcely a trace of it, as the species *egenda* and *illustrata*; in others it is very much developed, and the inner margin takes the form of a deep sinus, so as to meet this prolongation at the anal angle. This is seen in *P. signata*, *ærea* etc., but that in which it is most pronounced is the curious species which I have named *thyatyroides*. Lastly, another character which is presented in a certain number of the species of *Plusia* is two tufts or plumes of scales which are found on the sides of the abdomen, and which are pressed against the segments following, sometimes following the sides, sometimes almost joining at their extremities over the back. I have not referred to the plumes on the thorax, which are, however, very remarkable in this beautiful genus, but all entomologists have noticed these on the specimens in our collections" ('Noctuelles,' vol. vi., pp. 325-326). This is a remarkably good account of the principal characters of the imagines of this most interesting genus.

Plusia, Och., *aurifera*, Hb.

This species is mentioned as British by many of our old authors, although there appears no reason to suppose that it is at present a British species. Humphrey and Westwood write of it:—"This species measures $1\frac{1}{3}$ -inch in the expanse of the fore wings, which are of a pale brown colour with the stigmata and two basal strigæ slightly indicated; a greenish-gold patch in the middle of the fore wings, somewhat lozenge-shaped, and dilated beyond the middle into a broad bar extending from the costa almost to the anal angle; this is followed by a slender yellowish subapical striga. Very rare, if indeed the true *P. aurifera* be really indigenous; as the specimen in the British Museum, taken near Dover by the Rev. G. Lyon, has been considered as a singular variety of *P. chrysitis*. *P. aurifera* has been described as a native of Spain, Portugal, the South of France, Teneriffe etc. Another specimen, supposed to have been taken near London, was formerly in Mr. Ingpen's collection" ('British Moths,' p. 233). Of what he supposed to be the specimen of *Plusia aurifera* just referred to as from Mr. Ingpen's collection, Mr. C. G. Barrett writes:—"I have recently had the opportunity of examining some insects which, from their great age and their associations, seem to me to be of almost antiquarian, and quite *historic*, interest. They are in the collection of the Rev. Henry Burney, and were obtained many years ago by his father, in some cases through Mr. Charles Dale, from older collections. Mr. Burney, sen. was contemporary with—and corresponded with—Haworth, Samouelle, Capt. Blomer, Leach, Curtis, Dr. Abbott and other entomologists of a former generation, and many of their insects ultimately fell into his hands. Although he, unfortunately, did not label them very carefully, he preserved the specimens so well that they are but little faded, and still quite presentable, although from sixty to one hundred years old. Some of them seem to me deserving of a special notice. One is a very beautiful *Plusia*, obtained sixty years ago from Mr. Charles Dale, who had it from the collection of Dr. Abbott, a rather noted collector at the end of the last century; it is, therefore, from ninety to one hundred years old, and is set in the rather drooping manner which seems to have been favoured by our early predecessors—with the costal margin of the fore wings hardly so forward as the head. This specimen is *Plusia aurifera*, Hb.; it is figured very accurately by Noel Humphreys, as a British species (Westwood and Humphrey's 'Brit. Moths,' p. 233, plate 52, fig. 5) on the following grounds:—"Supposed to have been taken near London, in Mr. Ingpen's collection," with the mention of 'one in the British Museum, taken near Dover by Rev. G. Lyon, considered as a singular variety of *Pl. chrysitis*.' There is nothing to indicate whether the present specimen is the same as was formerly in Mr. Ingpen's collection, or another; its name even had not been preserved; its main interest lies in the fact that it is an ancient representative of a species formerly supposed to be British, and which may actually have been so, and have become extinct. Some colour is given to this supposition by the statement of Westwood that it was, at the date of his work (1840), 'a native of Spain, Portugal, the South of France, and Teneriffe,' while Staudinger now only gives as a locality the 'Canaries,' as though it were gradually retreating southwards" ('Ent. Mo. Mag.,' vol. xxv.,

p. 223). Referring to Mr. Barrett's communication Mr. Dale writes:—"Mr. Barrett in the 'Ent. Mo. Mag.,' xxv., p. 223, in recording some old insects in the collection of the Rev. Henry Burney, has apparently fallen into some mistakes, which I will try to rectify, and also furnish some additional information. "One is a very beautiful *Plusia*, obtained sixty years ago from Mr. Charles Dale, who had it from the collection of Dr. Abbott a rather noted collector at the end of the last century." "This specimen is *Plusia aurifera*, Hb." "There is nothing to indicate whether the present specimen is the same as was formerly in Mr. Ingpen's collection, or another." My father, who is above referred to, purchased the collection of Dr. Abbott, after his death in 1817. The Doctor's diary commenced in 1798, and concluded in 1801; Abel Ingpen was born in 1796, and died in 1854. If the specimen came from Dr. Abbott's collection, it is therefore a foreign one, and consequently, was not valued by my father; had it been a British one, he would not have parted with it, and it would have been recorded both in Dr. Abbott's manuscripts and also in my father's. Perhaps the following passage from Stephens' "Illustrations," *Haustellata*, vol. iii., p. 105, may throw some light on the subject:—"One was taken near Dover by the late Rev. J. Lyon, and is now in the British Museum; the other was, I believe, found in the vicinity of the metropolis, and at present forms a prominent ornament of a collection at Manchester, having been rescued from oblivion by Mr. Ingpen." The specimen is not in the sale catalogue of Mr. Ingpen's collection in 1855 ("Ent. Mo. Mag.,' vol. xxv., p. 246). This little appears to be all that is known of *aurifera* as a British species, and this little is unsatisfactory enough. Hübner's description of the type is as follows:—"Anterior wings bright red with three yellowish costal streaks near the base, the orbicular surrounded with white, the reniform with fuscous; a large yellow patch from apex extends down the sub-terminal area almost to the anal angle, then turns at an obtuse angle parallel to the base under the reniform and orbicular, stopping where the complete basal line is usually situated. Hind wings dark grey, base paler" ('*Sammlung europ. Schmet.*,' fig. 463). Guenée, after describing this species, writes:—"It is said that this species inhabits Southern Spain, and that it has also been taken in the neighbourhood of Rochefort. I cannot confirm this statement, but I suspect all the specimens I have seen have been exotic. Almost all come from different parts of Africa" ('*Noctuelles*,' vol. vi., p. 335). Guenée then describes a var. **A** of which he writes:—"Of a pale testaceous-grey. The gilded band as in the type but of a pale and greenish gold. Thorax almost unicolorous. The lower part of the inferior wings has a broad, darker, terminal band. Java, Bourbon" (*l.c.*, p. 336).

Plusia, Och., *moneta*, Fab.

This species, quite recently added to the British fauna, is characterised by a strong central transverse fascia, and a golden ear-shaped mark, made up of the orbicular, and the pale mark under it which becomes conspicuous as a metallic blotch in *P. bractea*, and *festucae*, but which is, in this species, of a pale golden colour surrounded with an U-shaped mark of brighter tint. This compound mark is quiet

reniform in appearance and very conspicuous, although, of course, it has nothing to do with the reniform stigma. *Moneta* is very distinct from any other British species, and in a considerable number of foreign specimens I notice no variation. Mr. Dobrée however writes:—"Of *P. moneta* there is a not uncommon variety of the imago in Amurland (Siberia), in which the fore wings are of a shining silvery-white, instead of the golden-grey colour of the type. I have specimens of both" ('Entom.,' xxiii., p. 344). Guenée says of this species:—"It is the most common of this beautiful group," and adds that "M. Boisduval has bred it in numbers in Normandy" ('Noctuelles,' vol. vi., p. 332).

Of the appearance of this species in Britain Mr. C. G. Barrett writes:—"It is a rather curious fact but one well established, that those seasons which are remarkable for unfavourable weather and consequent scarcity of insects, are noticeable for the occurrence of unexpected novelties or rarities. Possibly the wretched weather (which is not usually confined to these Islands), induces restlessness on the part of insects and a desire to "better their position" by migration, and so influx of strangers comes about. This season the interesting visitor appears to be *Plusia moneta*, Fab., of which a specimen has already been recorded this year in another magazine. The first specimen noticed was taken hovering over a *Delphinium* blossom in a garden at Dover, by a schoolboy, on June 25th. It was brought to Mr. Sydney Webb, in whose collection it is now. Another was taken by Mr. W. Holland, flying about a gas lamp at a railway station near Reading, on the night of July 2nd, and is now before me. It is a beautiful specimen, but paler than Mr. Webb's and not quite so large, the latter being of the largest size usually obtained by species. This is a most lovely species, as large as *P. orichalcea*, almost the whole of the fore wings being of a pale yellowish-brown or yellowish-grey, suffused with pale golden, with a narrow, darker golden-brown central band or irregular fascia. The greater part of the hinder margin is broadly tinged with violet. The orbicular stigma is nearly round, bright golden, and beneath it is a similar spot of the same colour, the two forming a sort of 8-mark, or two tiny yellow *coins*, hence the name. The hind wings are pale grey with darker nervures; the palpi are long and somewhat recurved. *Plusia moneta* is widely distributed in Europe, and is said by Kirby chiefly to frequent mountainous districts. It occurs in the East and South of France, and much interest would attach to any information attainable, as to whether it has this year been noticed in the northern and western portions of that country. It is a most welcome addition to our fauna, and as its food-plant, the monkshood (*Aconitum*), grows in every cottage garden, there seems no especial reason why it should not become a permanent resident" ('Ent. Mo. Mag.,' vol. xxvi., p. 255). The Editors of the 'Ent. Mo. Mag.' further write:—"At a meeting of the French Entomological Society on December 10th, 1890, the veteran lepidopterist, Mons. J. Fallou announced ('Bull. Soc. Ent. Fr.,' pp. cxxi.), that he had captured a specimen of this insect at Champrosay (Seine-et-Oise), not far from Paris, in June, 1890, for the first time during the twenty years he has resided there. He also gave some general notes on its occurrence in France, commencing with Duponchel (vol. vii., 2, p. 63, 1829), who

stated that it had only then been found in Normandy. Subsequently it had been noticed at Mont Doré (Auvergne), in 1879; in Alsace, and, according to M. Jaidrheulle, at Troyes (Aube), in 1887 and 1888. M. Fallou does not allude to the 'France méridionale' given by Guené in his 'Noctuérites' (ii., p. 332, 1852). We call attention to Duponchel's statement as to its occurrence in Normandy previous to 1829, as of especial interest at the present time. Duponchel says that a brother of M. Boisduval, found it regularly at Falaise every year, that it was double-brooded, and that the larvæ fed on a variety of plants, including sunflower and Jerusalem artichoke, burdock and cucumber. Guéné (*l.c.*) briefly alludes to the same subject. According to this statement, made by eminent lepidopterists, its first appearance in the North of France is by no means recent, and, in fact, its first recorded occurrence in the country was in the north. Does it still occur in Normandy?" ('Ent. Mo. Mag.,' vol. xxvii., p. 74).

Herr A. Hoffmann then wrote a most interesting note on the geographical distribution of this species. He says:—"With great interest I have read the announcement of the occurrence of *Plusia moneta* in Great Britain (Barrett, 'Ent. Mo. Mag.,' 1890, p. 255); this species being a very good example of the great changes which may take place in the geographical distribution of an insect. The tendency of moving in the direction from east to west, which we find, or suspect, in so many other European insects is expressed clearly in this species, and has been noticed for some years by Continental entomologists. *Plusia moneta* was known to be a common insect in the South and South-East of Germany, but until the year, 1875, was not recorded from the North-West of our country, nor from the Netherlands. In the year 1875 began the invasion of the species into the above-named districts, and in the course of a few years it was recorded from different places. Rhoden, Aralson (Speyer), Hanover (Wacquand), Mecklenburg, Stralsund (Schmidt), Hamburg (Græser). In the year 1882, it was found near Arnheim, and in 1887, near Breda, in Holland (Snellen). The tendency of the species to gain new ground was so intense, that even the rough climate of our Hartz Mountains was not able to keep it back, for I found *moneta* in the moorland districts of the Brocken, at a height of about 800 metres; I noticed the larva there during three years from 1870 on the *Aconitum* plants, in a small garden belonging to a forester's house. The species was single-brooded there, whilst it is double-brooded in more favourable climates. Now, the species having crossed the Channel, it will probably spread rapidly over England as it has done over the North-West of Germany, and over Holland. The larva may be easily noticed, when young, in May, on the aconite, spinning the young shoots of the plant together, like the larvæ of several *Depressariæ*. Later, the large yellow cocoon is easily visible hanging on the underside of a leaf of aconite. The most interesting question is, whether *Plusia moneta* will keep the newly-gained ground, or whether it will lose it again in the course of years" ('Ent. Mo. Mag.,' vol. xxvii., pp. 21-22). The species was again recorded in 1891, so that *moneta* appears to have come to settle with us.

The type is thus described by Fabricius:—"Noctua cristata, alis deflexis aureis: strigis undatis annuloque geminato argenteo." "Mag-

nitudo *N. festuceæ*. Thorax cristatus griseus punctis nigris. Alæ anticæ auræ strigis atomisque fuscis, apice obscuriores. In medio annulus duplicatus argenteus quadro fusco notatus. Posticæ cinereæ" ('Mantissa,' p. 162). I have before referred to a form recorded by Mr. Dobrée, very different from the European form and the above type description.

a. var. *esmeralda*, Oberthür.—The variety referred to by Mr. Dobrée was described by Mons. Oberthür as follows:—"Differs from the Swiss and Normandy form by the yellowish-white tint, which in *esmeralda* replaces the fauve tint on the upper side of the superior wings in *moneta*; this difference of colour gives var. *esmeralda* a very distinct facies, and at first sight it does not appear to resemble typical *moneta* at all, of which, however, it has exactly the same markings, except so far as concerns the bent extrabasal line below the median nervure of the superior wing. This line is double in *moneta*, simple in *esmeralda*" ('Études d'entomologie,' v., pt. 1, p. 85). This is described in a work dealing with the 'Lepidopterous Fauna of the Isle of Askold,' where the type specimens of the variety were obtained.

Plusia, Och., *illustris*, Fab.

Of this species as an inhabitant of Britain Guenée writes:—"Messrs. Stephens and Haworth maintain that this species has been taken in England, but it would appear that this is due to erroneous determinations" ('Noctuelles,' vol. vi., p. 330). He also adds:—"It varies moderately, above all in the depth of the green and red" (*l.c.*). The type is thus described by Fabricius:—"Noctua cristata alis deflexis integris viridi cinereoque nitidulis: maculis tribus ferrugineis distinctis." "Alæ anticæ cinereo, viridi carneoque variegatæ, nitidæ et ad marginem posticum maculæ tres distinctæ ferrugineæ, strigis duabus pallidis inclusis. Posticæ cinereæ" ('Mantissa,' p. 164). Of this species Humphrey and Westwood write:—"Although figured by Mr. Curtis in illustration of the genus *Plusia*, the present insect is a very aberrant species from the true gold-spangled type of the genus. It measures rather more than $1\frac{1}{2}$ inch in the expanse of the fore wings, which are of a greenish-brown, and very glossy, with an oblique pale line, edged externally with black, extending from the inner margin near the base to the anterior stigma, which is oblique and elliptic, divided by a slender pale line into two parts; the outer stigma is succeeded by a rosy patch; beyond the stigmata is a flexuous striga, rosy externally, and pale inwardly; the subapical striga nearly straight and pale, as well as the margin itself; the hind wings are brown, rather darker along the margin, and with a short fascia near the middle. The caterpillar is green, with a dark dorsal and pale lateral lines, and black setigerous tubercles. It feeds on *Aconitum lycoctonum* and *Thalictrum aquilegifolium* in May and June, when it forms a delicate cocoon and the moth appears in June and July. Formerly taken in some numbers on Salisbury Plain, and since, in South Wales, by Mr. Donovan" ('British Moths,' pp. 230-231). Mr. C. G. Barrett writes:—"Another of the specimens in the Rev. Henry Burney's collection is *Plusia illustris* which also came from an old British collection, but without label or name. It is in fair preservation, but ill-set, obviously very old, and entirely without a history.

Haworth described this species as British, although he had himself seen none but German specimens; he says:—"Mr. Donovan informs me that he took it in Wales." It was figured by Curtis, and also by Noel Humphreys; Professor Westwood stating ('British Moths,' p. 231) that 'it was formerly taken in some numbers on Salisbury Plain.' For the same reason it was described by Mr. Stainton in the 'Manual'; but it was placed by Mr. Doubleday in his last list among the reputed British species. Probably Mr. Burney's is one of the original specimens, wherever they were obtained from: we have no recent record of its occurrence in this country, except a statement in the 'Entomologist' for February, 1889, that a specimen occurred in Ireland in 1887" ('Ent. Mo. Mag.,' vol. xxv., pp. 223-224). Referring to Mr. Barrett's communication, Mr. Dale writes:—"Mr. Barrett goes on to say:—"Another of the specimens in question is a *Plusia illustris*, which also came from an old British collection.' I possess a couple which were given to my father by Dr. Leach, who informed him they were taken on Salisbury Plain by a Mr. Spratt in 1810. Mr. Burney's specimen probably also came from Dr. Leach" ('Ent. Mo. Mag.,' vol. xxv., p. 246).

Of the recent occurrence of *Plusia illustris* in Ireland, Mr. G. H. Carpenter writes:—"Among a number of moths taken by Miss Alice Hull, near Castle Kevin, in County Wicklow, in August, 1887, and lately given by her to me for identification, I was greatly surprised to find a specimen of *Plusia illustris*. The moth is figured in Curtis's 'British Entomology,' vol. xvi., p. 731, published in 1839, and is there recorded as having been taken on Salisbury Plain and in South Wales. Mr. H. T. Stainton has most courteously informed me, that these captures took place before 1810, and that the insect has never since been in Britain. Both he and Mr. de V. Kane agree that it is quite new to Ireland. The insect is admitted by Humphreys and Westwood into the 'British Moths' (1843). It is to be found among the reputed British species in the 'Doubleday list,' but in Mr. South's 'List' it is refused a place even among these. Its reappearance in our Islands, after so many years, is therefore a noteworthy fact. It seems very strange that, if Miss Hull's specimen is a migrant from the Continent, no individuals have been taken in Great Britain. On the other hand, it is equally strange if the insect has been breeding among us unnoticed over seventy years. The ordinary food-plants of the caterpillar, *Thalictrum aquilegifolium* and *Aconitum lycoctonum*, are both confined to the Continent. *T. minus*, however, occurs sparingly on the Wicklow Coast, and species of both genera may very possibly be cultivated in the locality" ('Entom.,' vol. xxii., p. 46).

Plusia, Och., *chrysitis*, Linn.

This species varies in the tint and arrangement of the metallic markings. In some the tint is yellow, in others green, and the paler colour does not appear to betoken any wearing or to be a result of exposure. The glossy appearance also, is quite superficial and almost entirely independent of the pigment underlying it, for if the colour in this species become bleached, the gloss remains. In arrangement, the "burnished brass" colour forms two bands, usually united at their centres, but occasionally the bands are distinct owing to the develop-

ment and subsequent union of the brown patches on the costa and inner margin in the centre of the wing. The stigmata in this species are in the brown central costal patch but are very indistinct. Guenée writes:—"It varies very much in size, and also in the colour of the golden band, which is sometimes greenish and pale, and more rarely of a rich golden yellow. It often happens that the two metallic bands are more or less united, but this last variety hardly constitutes a distinct race, as it is allied to those in which the bands are isolated by a crowd of intermediate forms" ('Noctuelles,' vol. vi., p. 335). The type is thus described by Linnæus:—"Noctua spirilinguis cristata, alis deflexis: superioribus orichalceis fascia grisea" ('Systema Naturæ,' xth., 513), to which he adds:—"Alæ superiores nebulosæ, versus marginem posticum cinereo-obsolutæ; dein fascia pallido-aurata; tum nebulosæ sunt alæ cum tinctura aurea, quæ quasi alteram fasciam auream constituit; demum nebuloso cinerascens ad basin alæ. Alæ inferiores supra fuscæ" ('Fauna Suecicæ,' p. 311). The form with two distinct metallic bands is, therefore, the type; that in which they are united being the variety.

a. var. *juncta*, mihi.—The two metallic bands on the fore wing joined in their centres by a transverse band, instead of being separated throughout their length. This form appears to be much commoner in England than the type.

Plusia, Och., *chryson*, Esp.

The tint of the metallic portion of the wing in this species varies somewhat similarly to that in *chrysis*, some specimens having this part quite golden, others tending to green. There appears to be, however, no other point of variation except that the size of this blotch varies slightly. The elbowed line is very distinct and sometimes forms a small metallic lunule at its termination on the inner margin. The stigmata are traceable but are very inconspicuous. The type of this species is thus described by Esper:—"The ground colour of the fore wings is a mixture of dark or rather brownish-violet, which merges into red-brown. Through the middle area of the wing run black interrupted lines, but fresh specimens have a reddish-yellow uninterrupted line near the outer margin. Over the upper half of the outer margin spreads a golden yellow spot, through which passes a brownish line. The inner margin is broadly bordered with red-brown. On the costa stands a dark spot which is absent in some specimens. The hind wings have an uniform ground colour with a broad brownish border, in which is a somewhat paler transverse line" ('Die Schmet. in Abbildungen,' p. 447). In sinking Fabricius' name *orichalcea*, Staudinger says:—"It appears certain to me, that the *orichalcea* of Fabricius is another species, not only from the description but from the locality"* ('Catalog,' p. 126); I do not quite agree with this latter remark. This species was, until a few years ago, very rare in England. A few specimens were recorded some forty or fifty years ago from that part of the Kent coast near St. Margaret's Bay, between Deal and Dover, but now washed away by the sea, and odd specimens had occasionally occurred in one or two other localities. The "Fen" workers at last turned up the species and found the larvæ in great numbers at Chippenham. Since then Mr. Farren and others

* Mons. Oberthür records it from the Isle of Askold.

have supplied our cabinets with long series of this species. The latest addition to our British localities has been the neighbourhood of Swansea, where it was discovered by Captain Robertson.

Plusia, Och., *bractea*, Fab.

This species and the following show in their metallic blotches all the characters of the γ moths—*jota*, *pulchrina*, *gamma* and *interrogationis*, although the marks are developed as solid blotches in this species and *festuæ* and have not merely the outlines of a golden colour as in *jota* and the allied species. Consequently, we find very considerable variation in the size and shape of the spot, sometimes it is lengthened out with every appearance of a letter γ but with the upper part quite solid; generally, however, this γ appearance is lost in a blotch of irregular form which is scarcely identical in any two specimens in my rather long series. The stigmata are only traceable in two or three of my specimens. The type is thus described by Fabricius:—"Noctua cristata alis deflexis variegatis: macula magna media aurea nitida." "Caput et thorax obscure ferruginea. Alæ anticæ cinereo, fusco, ferrugineoque variæ. In medio macula magna, angulata, nitida aurea. Posticæ cineræ" ('Mantissa,' p. 161). This is the rarest of those species ordinarily obtainable in Britain (*i.e.* excluding *aurifera*, *moneta*, *illustris*, *bimaculata* and *ni*) and appears to be confined more especially to the North of England, the South of Scotland and various parts of Ireland. I am particularly indebted to Messrs. Russ of Sligo and Finlay of Morpeth for some very fine specimens.

Plusia, Och., *festuæ*, Linn.

This species, to my mind the most beautiful in the genus, has the arrangement of the metallic blotches somewhat in the manner of *bractea* and *moneta* combined. In the metallic blotches in the centre of the wing it shows the intermediate stage between the solid Y-like blotch in *bractea* and the distinct γ mark in *iota*, *pulchrina* &c. On the other hand, the basal and apical marks on the costa are almost exact reproductions of the similar marks in *moneta* and the tendency to inner marginal patches also occurs in both species. I have no specimen in which the two central patches are actually united, although in some specimens they approach one another very nearly indeed. There is but little variation in the ground colour, although some specimens are rather paler than others. The golden blotches at the base of the costa, at the apex, and two in the centre of the wing are always present, although the apical spot is sometimes more or less restricted owing to the spread of the ground colour. There are some oblique patches on the inner margin, passing towards the central spots, also an anal patch running up the subterminal area and parallel to the outer margin. Both the inner marginal and anal patches vary, sometimes, forming conspicuous metallic blotches of considerable size, sometimes being altogether absent and replaced by the ground colour. I fail to find the stigmata in this species. Guenée writes:—"I have seen a specimen from North America which in no way differs from ours" ('Noctuelles,' vol. vi., p. 337). The Linnæan description of the type is as follows:—"Noctua spirilinguis cristata, alis deflexis: superiori-

bus flavo ferrugineoque variis: maculis tribus argenteis" ('Systema Naturæ,' xth., p. 513).

Plusia, Och., *jota*, Linn.

There is, in different specimens of this species, some little difference in the tint of the dark central shade directly under the almost obsolete stigmata, in which the γ or *i* mark is situated. In some specimens, this patch is strikingly dark compared with the costal area; in others, the two approach somewhat towards uniformity, owing to the redder character of the patch, and hence give such specimens a less marbled appearance. The characteristic golden letter or mark is usually composed of two separate parts, a ν -shaped part nearer the base, and a dot near the point of the ν . Sometimes this dot is linear, and it then occasionally become united to the ν , thus forming a complete γ -like mark = var. *percontationis*. I have a specimen in which both parts of this mark are very small indeed, although the characteristic shape and appearance of both parts are preserved. For this, I am indebted to Mr. Finlay of Morpeth. Of this species, which was confounded with *pulchrina* by Continental entomologists, long after it had been bred from a distinct larva in England, Guenée writes:—"We appear really to have two distinct species in our collection under the name of *jota*. Mr. Doubleday and one of his friends have assured themselves on several occasions that they (the species) were not bred from the same larvæ and that they appeared at different times of the year. I give, therefore, the description of typical *jota* as it exists in the Linnæan collection, and will then describe the other species under the name of *v-aureum*, by comparing it with the former" ('Noctuelles,' vol. vi., p. 338). The Linnæan description of the type is as follows:—"Noctua spirilinguis cristata, alis deflexis: superioribus ferrugineo griseis *i* respinato aureo inscriptis." "Alæ superiores griseo fuscoque variæ; in medio versus marginem tenuiorem magis luteæ; in centro alæ *jota* græcum s. signum interrogationis aureum, a præcedentis (*interrogationis*) speciei diversissimum" ('Systema Naturæ,' xth., p. 513). The two species (*jota* and *pulchrina*) are now well understood on the Continent, and thoroughly differentiated. The variation in the γ or *i* mark is parallel in both species. The essential differences between *jota* and *pulchrina* would appear to be, that in the former, there is a distinct rosy tinge, whilst the latter is distinctly rich purplish in colour; in *pulchrina* the stigmata are more distinct, and both these and the transverse lines are edged with metallic scales. The more rosy colour of *jota*, however, frequently finds a parallel variation in the brighter and more rosy tint in *pulchrina* and *vice versa*, and the brighter outlines to the transverse lines and the stigmata more generally characteristic of *pulchrina* are also occasionally reproduced, as a parallel form of variation of course, in *jota*. Certainly the two species are very closely allied.

u. var. *percontationis*, Tr.—Of this Staudinger writes:—"Signo argenteo confluenta in litteram γ " ('Catalog,' p. 126). This is Haworth's var. β of which he writes:—"Alis brunneo griseo ferrugineoque variis, gamma aurea perfecta in medio" ('Lep. Britannica,' p. 256). Treitschke's original description of the type is as follows:—"After long and careful observation, I cannot agree with my late friend Ochsen-

heimer, who divided the specimens of *jota* he had into two species, and called the rarer yellow-brown form *percontationis*. An examination of many specimens does not furnish any fixed mark of distinction. There appears to be no difference between the larvæ of *jota* and *percontationis*, and Esper, as well as Borkhausen, only separated the darker from the lighter specimens, because, in them they considered they had discovered Linnæus' *interrogationis*, which, however, is now generally known to be another species. My collection contains a pair of Ochsenheimer's *percontationis*, which resemble exactly the figures in the 'Naturforscher' and 'Pap. d'Europe,' and which I consider to be *jota*. Esper's figs. 3-4, which Ochsenheimer also classed among his *percontationis* are too badly done to have any weight." Treitschke then further adds:—"As already mentioned, the colour of the var. *percontationis* is paler yellow or flesh-coloured brown. The moth is stated to be larger than *iota*, but I have several *iota* before me, which are larger than *percontationis*. The mark of interrogation, should in the latter join below with the spot, but I find in my collection, males of this variety with the mark suffused on the left wing, whilst I possess several *iota* with similar markings. The hind wings are more yellow than those of *iota*. The discoidals are sometimes absent as in the allied species *interrogationis* and *gamma*" ('Die Schmet.' &c., vol. v., 3rd pt., p. 184). I have British specimens of this variety, with a complete γ from Warrington, Clevedon, Grantham, Morpeth, Mansfield and Aberdeen.

β . var. *inscripta*, Esp.—Of this Guenée writes:—"The golden marks altogether absent" ('Noctuelles,' vi., p. 339), whilst Staudinger says:—"Signo argent. nullo" ('Catalog,' p. 126). Esper's diagnosis of this variety is:—"Pl. *Noctua spirilinguis cristata alis deflexis, superioribus ferrugineo-griseis, disco nigricante-fusco, nullo caractere [ut in prioribus (iota)] notato*" ('Die Schmet. in Abbil.' &c., p. 229). The figure (Pl. 113, fig. 5) to which this description refers, has no gamma mark. I have seen no British specimen with this mark obsolete, although it is quite probable that such exist.

γ . var. *ancora*, Frr.—Staudinger writes of this:—"Ab. pallidior" ('Catalog,' p. 126), whilst Guenée writes:—"I have not seen it in nature. Its colour should be generally paler; the elbowed line should have no sinus in its lower part; the metallic markings should be of a dull silver colour; the hind wings with a less distinct border" etc. ('Noctuelles,' vol. vi., p. 339). Freyer's figure ('Neure Beiträge,' Pl. 47, fig. 1) has the anterior wings of a very pale tint, with a dark patch just below the stigmal area in which the almost obsolete γ -mark is placed. It is not a very striking form, except for its more than usually pale ground colour.

Plusia, Och., *pulchrina*, Haw.

This is a very beautiful species and closely allied to *jota*; although they appear very different when series of each species are examined side by side. The rich purplish tint which makes this species so beautiful, is almost entirely wanting in that species, and the darker colour in this shows up conspicuously the paler transverse lines, making it look more variegated than its congener. The ground colour of some specimens is redder (approaching *jota*), and in others, the markings in the central area and following the subterminal are conspicuously darker

and inclining to black. I have one or two specimens so devoid of variegation, that they resemble *jota* very closely. The two parts of the characteristic γ mark are as in *jota*, but I believe more rarely united, although they undergo the same minor variations in size and position as in the latter species. There appears to be rather more sexual difference in the hind wings in this species than in *jota*, although the character of a pale central transverse band is maintained in both. Haworth's description of the type is as follows:—"Alis brunneo griseo ferrugineoque variis, gamma aurea fracta, stigmatibus divaricatis remotis aureo cinctis." Haworth then adds:—"Very similar to the last var. (= *percontationis*, Tr.), but much more beautiful. It may be known at first sight by the wings being more variegated, and by the more strongly marked and distinct stigmata, which are beautifully surrounded with golden colour. The cilia are reddish with fuscous spots" ('Lepidoptera Britannica,' p. 256). Humphrey and Westwood describe *pulchrina* under the name of *iota*, whilst *iota* is described as *percontationis*, in their 'British Moths,' p. 231. Of this species Newman writes:—"Contrasted with the preceding species, *pulchrina* is more decidedly variegated than *iota*; the boundaries of the shades being more sharply defined" ('British Moths,' p. 454). Guenée writes:—"This species is extremely near to *iota*. It appears, however, to be distinct. Its larva resembles, I understand, that of *gamma*. It is of a pale green, without any longitudinal line; the head is green with a black line on each side. I have before me a very good drawing of it; but I dare hardly say that it has not been taken from an example ready to undergo pupation, and that it may have lost its markings, as then happens to all NOCTUÆ, especially the species in *Plusia*. However, I am assured that the larva differs constantly from that of *iota*, and as the latter is common in England, I must concur with the observations of English entomologists. The following are the slight differences which separate the perfect insects:—*Pulchrina* is only 38 mm. in expanse. The superior wings of a less intense rosy red, which approaches carnation colour more than does *iota*, with the brown areas more numerous, thus making it appear more variegated. The elbowed line always strongly angulated, the subterminal more pronounced and more decidedly resembling an M in the middle. The reniform more visible, greatly constricted in the middle, encircled with golden colour at the bottom, and with very distinct black interior shading. The golden marks are thicker; the first resembling an U rather than a Y, the second forming an oval point generally larger. Fringe always broken up with black. Inferior wings having the lines and border more distinct above. The female the same as the male, although a trifle darker. *Pulchrina* is found in the same countries as *iota*, but is always rarer. English entomologists maintain that Hübner's figure 282 refers to this and not to *iota*; this is a difficult matter to decide with this figure which is far from being one of the best in Hübner's work" ('Noctuelles,' vol. vi., pp. 339-340).

a. var. juncta, mihi.—This is a parallel variety to *iota* var. *percontationis*, and has the two parts of the metallic mark united to form a gamma as in that variety. Mr. Finlay writes:—"I have captured and bred some hundreds of this species, but specimens having the gold marks united are very rare indeed" (*in litt.*). I have specimens from

Morpeth, Wicken, Dundee and Clevedon. This may be var. *monogramma*, Alph. (1887).

Plusia, Och., *bimaculata*, Stphs. (*verticillata*, Gn.).

Guenée describes this species under the name of *verticillata* as follows:—"Extremely near to *chalcites*, Esp., and *rogationis*, Gn., but it is a little smaller, generally paler, of a grey colour barely shaded with reddish, with the metallic parts of a greenish-grey colour instead of being golden; the complete basal line distinctly formed of three lunules; the silvery markings clearer; the subterminal more strongly marked and twining round as a black streak at the first inferior nervule. Inferior wings unicolorous, even on their undersides, or, at least, without appreciable markings etc." ('Noctuelles,' vol. vi., p. 344). The species is said by Guenée to inhabit "Java, the East Indies, Pondicherry etc." Stephens' original description of the type is as follows:—"Alis anticis fusco-brunneo ferrugineoque variis maculis duabus aureis (Exp. alar. 1 unc. 8 lin.)" "Head, thorax and abdomen as in the last described (*percontationis*): anterior wings varied with fuscous-brown and ferruginous, with a biundulated golden striga at the base, enclosing a black spot; then another, similarly coloured, before the stigmata, much angulated at its origin on the costa, and waved interiorly, followed, behind the stigmata, by an obscure crenulated bent one, without metallic ornament; stigmata very obsolete, without golden edges: on the disc are two large bright golden spots, the anterior emarginated towards the base and rounded posteriorly; the hinder triangular-ovate; between the anterior and the costa is a faint golden lunule as in *Plusia iota*; cilia rufescent, immaculate; posterior wings reddish-ash, with a central lunule, an oblique striga, the hinder margin and the nervures dusky. A single example of this beautiful and remarkably distinct species—which is not the *inscripta* of Esper—was obtained by me from the Marshamian collection where it was placed as the opposite sex of *Pl. iota*. Of its locality I am ignorant" ('Illustrations,' iii., p. 102). Humphrey and Westwood after quoting this original description of Stephens write:—"A single specimen of this species is in the unrivalled collection of J. F. Stephens, Esq. (whose description we have quoted above) but its locality is unknown. Mr. Curtis regarded it as a probable variety of *Plusia iota*, whilst Mr. H. Doubleday has omitted it from the list of British NOCTUÆ, considering it, as he informs me, as an apparently North American species" ('British Moths,' p. 232).

Of the correct nomenclature of this species Dr. Mason writes:—"In the collection of the late Mr. Edwin Brown I found an insect with the printed label, "*bimaculata*," and a reference to its reception from Carter of Manchester. This had been placed under *P. iota*, and I have never closely examined it until the other day, when I received a specimen of *P. verticillata*, Gn. from Dr. Staudinger. This reminded me of the old specimen, and on comparing them, I found them to be examples of the same species. On reading Stephens' description of *P. bimaculata*, there is no doubt that it is a good and sufficient description of the species named *verticillata* by Guenée. To make sure of the correctness of the identification, Messrs. Kirby and Warren kindly examined the Stephensian collection, and

discovered that the type specimen was not there, and Mr. Kirby told me that they did not possess a great many of the reputed British specimens of this collection, and suggested that my specimen might possibly be the type. Can any one put on record the fate of these reputed British specimens? The box or drawer containing them did not go to the British Museum with Stephen's British collection. Stephens' type specimen came from the Marsham collection, and was without locality. Now, there is one record of the capture of *P. verticillata*, Gn. (*acuta*, Walker) in England, viz., that by Mr. H. P. Robinson, of Tunbridge Wells, in May, 1870. The synonymy of the species must, therefore, be corrected as follows:—*Plusia bimaculata*, Steph. 'Ill. Brit. Ent.,' vol. iii., p. 102., *P. verticillata*, Guenée, "Sp. Gen. Noctuel.,' vol. vi., p. 344, No. 1168, 1852; Knaggs, 'Ent. Annual,' 1871, p. 79. *P. acuta*, Walker, 'B. M. Cat. of Noctuae,' p. 992, 1857; Robinson, 'Ent. Mo. Mag.,' vii., p. 138. This species seems, like others of the genus, to have a very wide distribution, and there are specimens in the British Museum from many parts of Asia, from Africa, and from Australia" ('Ent. Mo. Mag.,' vol. xxvii., p. 163).

The whereabouts of the type was soon detected for we read on p. 207 of the same volume of this magazine, the following from the pen of Mr. H. T. Stainton:—"The Stephensian specimen of this insect is now in the British Museum. When the Stephensian library was removed here in 1853, along with the books came one solitary book-box, containing a number of Continental specimens of reputed British insects—such as *Aglia tau*, *Gluphisia crenata*, &c. I had never looked on the box as containing anything of value, till I read Mr. Mason's note on *Plusia bimaculata* at p. 163 of this volume. I then referred to this box, and there, sure enough, was the missing specimen, along with several other apparently British specimens of curious *Plusiæ*. I lost no time in communicating my discovery to Dr. Günther, F.R.S., and hearing from him that the Museum would be glad to receive this box of insects, I took it there and handed it to him on the 22nd June. It had been an inmate of this house for 38 years" ('Ent. Mo. Mag.,' vol. xxvii., pp. 207-208).

Plusia, Och., *gamma*, Linn.

In this species, the γ mark is almost always (as far as my long series is concerned, always) in one piece, and the red coloration is usually confined to a ferruginous patch, sometimes strongly marked, in contact with the lower part of the angulated line, and extending under the γ mark. Some specimens also have the extreme outer margin outside the subterminal, very pale, and also the costal patch just outside the reniform. The stigmata are as distinctly marked as in *pulchrina*. The hind wings of some of the males have the basal area pale, the darker outer margin having then quite the appearance of a marginal band; the pale central transverse band (conspicuous in the hind wings of *jota* and *pulchrina*), becomes merged or extended into a broad paler basal area. Guenée says:—"The imago figured by Sepp, is a veritable masterpiece. It is impossible to find a figure which unites to the same extent so many excellent points" ('Noctuelles,' vol. vi., p. 349). He also adds:—"In the second edition of Schäffer, this species is coloured in rose, so that it might be mistaken for *Plusia iota*" (*l.c.*); and again:—

“Engramelle figures another variety (594, *c.d.*), which is of a reddish tint. I have never seen it” (*l.c.*). The type is thus described by Linnaeus:—“*Noctua spirilinguis cristata, alis deflexis: superioribus fuscis λ aureo inscriptis*” (‘*Systema Naturæ*,’ xth., p. 513). A variety with very dark ground colour was exhibited at the meeting of the South London Entomological Society, held Aug. 23rd, 1888, where we read:—“Mr. R. South exhibited a melanic example of *Plusia gamma*, and called attention to a curiously serrated line on the hind margin of the primaries, which formed a distinct metallic W” (‘*Proc. Sth. Lond. Ent. Soc.*,’ 1888, p. 61).

a. var. pallida, mihi.—This is Guenée’s var. A, which he describes as follows:—“Of a very pale whitish-grey colour. This form is sometimes bred from the larva, but only rarely” (‘*Noctuelles*,’ vol. vi., p. 349).

β. var. rufescens, mihi.—Mr. Freer was good enough to send me a series of this species captured on Cannock Chase, in which the red was much more pronounced and occupied more space than usual, at any rate much more so than in the other specimens in my series. This form appears to be Haworth’s *gamma* var. *β* of which he writes:—“*Alis saturatioribus, minus argenteis, rubedine magis mixtis, gamma græcorum absolute aurea, nec argentea. Stigmatibus ordinariis exacte ut in iota var. γ, atque similiter tenuissime aureo circumcinctis*” (‘*Lepidoptera Britannica*,’ p. 257).

Plusia, Och., *ni*, Hb.

Guenée writes of this:—“The North American specimens are a little darker, and the designs more mixed up with the ground colour, but they do not appear sufficiently different to make a distinct species. I have also seen the remains of a specimen from Senegal, which does not appear to differ from the others. It is to be observed that in this species the abdomina of the males is terminated by a tuft of fawn-coloured scales, with which are united two lateral fascicles of the same colour, which originate on the fifth segment” (‘*Noctuelles*,’ vol. vi., p. 349-350). I should not be at all surprised if Guenée’s remarks on the North American specimens, referred actually to what is now considered *Plusia brassicæ*, Riley. The following is the description I made of Hübner’s type:—“Smaller than any other of our British *Plusiæ*, approaching more nearly to *interrogationis*. Anterior wings of a glaucous tint with the abbreviated and complete basal line ochreous; the orbicular and reniform slightly brownish; the *γ* mark complete, placed under the orbicular; a small dark patch under the reniform; the elbowed line pale: the subterminal consisting of a single black wavy line; outer area beyond subterminal brownish. Hind wings dark grey, base pale, distinct lunule” (‘*Sammlung europ. Schmet.*,’ fig. 284 (*non* 286). Mr. Newman writes:—“The palpi are porrected, but scarcely ascending, the second joint is scaly, but not densely so; the terminal joint slender and pointed; the antennæ are simple; the costal margin of the fore wings is straight nearly to the tip, when it is slightly bent and somewhat pointed; their colour is grey, mottled and marbled with sepia-brown; this darker colour occupying the median area of the wing, and containing a dull silvery mark supposed to bear a resemblance to the Greek *γ* or English *y*: the hind wings

are grey-brown, rather paler at the base, where they have darker wing-rays: the head, thorax and body are grey-brown, the latter with long reddish scales at the sides near the tip. The moth is an inhabitant of North America, Italy, Sicily and the South of France; it appears on the wing in June and August. A single specimen is said to have been taken at Alphington, near Exeter, by Mr. D'Orville, on the 13th of August, 1868, flying over the flowers of red valerian. I made use of the qualified term 'is said,' because the details given by Dr. Knaggs, in the 'Entomologist's Monthly Magazine,' vol. v., p. 127, and in the 'Annual' for 1868, p. 125, do not agree with the authentic examples of this species from the Continent of Europe kindly given me by Mr. Doubleday and described above" ('British Moths,' pp. 455-456).

The moth was first recorded as British in the 'Ent. Mo. Mag.,' vol. v., p. 107 where we read that the Rev. J. Hellins sent a specimen captured by Mr. D'Orville to the editors of that magazine. The note by Mr. Knaggs (just previously referred to) and which was written on receipt of this specimen is as follows:—" *Plusia ni*, Hb. (first noticed by Engramelle under the name of *L'ajoutée*) is closely allied to our common *P. gamma*, for a variety of which it might easily at first sight be passed over. It also presents some slight points of resemblance to *P. interrogationis*, and between these two species it will have to be placed in our lists and cabinets. As it can only be confounded with *gamma*—and then, mind, only at first sight—I have thought it advisable to lay before our readers some of the more striking points wherein it differs from that species, which I hope may call attention to its peculiarities, and perhaps lead to the detection of other examples in our collections. The alar expanse is less than that of *gamma*, the forewings are less acute at their apices, and lack the smooth, burnished, bronzy lustre of *gamma*; or, to put it the other way, the contrast between the ground colour, which is blackish, and the markings, which are, say, rosy-ferruginous, give *ni* a duller and more mottled appearance; the letter-mark in the specimen before me is shaped somewhat as in *v-aureum*—thus \sphericalangle . or $\cdot V$, but I find, on examining a series that though this character is usually pretty constant, it is by no means invariably so. The hind wings are much as in *gamma*, but blacker in hue: the palpi are smaller, the antennæ finer, and in the abdomen of the ♂ we find still better characters; here the dorsal tuft is of a yellow ochreous colour, the tufts of ochreous scales fringe the sides of the last segments, terminating underneath the anal segments in an ochreous patch" ('Ent. Mo. Mag.,' vol. v., p. 127).

The most important contribution to our knowledge of the species, however, came from Prof. Zeller translated from the 'Isis,' 1847, p. 449, where he writes:—"As Treitschke correctly observes, *Plusia ni*, when on the wing, has a great resemblance to *P. gamma*, and it requires very sharp powers of observation to recognise the buzzing NOCTUA, by its grey colour, as *Plusia ni*. Near Syracuse, on the 30th May, I took a wasted male in a fallow field, where, when started up, it settled again to sleep on a vine leaf, instead of buzzing at flowers, as is usual. *Gamma* sometimes settles again in the same way, and, indeed, I had almost passed this specimen for *gamma*. In the neighbourhood of Catania I found specimens of the second brood, on the

3rd July, in a moist meadow overgrown with rushes; they flew in the forenoon, and when I revisited the meadow a second time, I found them flying readily towards evening, and settling deep in the tufts of rushes, with the head downwards. At Messina I again observed this species, in the second half of August, where they were flying in the grass, and amongst *Nepeta calamintha*, on the heights of Castellaccio. One beautiful specimen I took from a small *Asilus* which had already killed it. *Plusia ni* was, however, most plentiful on the border of a road near Naples, on the 20th of August; they were on this day particularly shy, more like *gamma*, and whenever I approached them they went over a wall into a vineyard. I also noticed this species in the Campagna to the South of Rome, on the 28th August. This species, at any rate, seems no rarity in the southern part of Italy. Its most characteristic markings are furnished by the subterminal line of the anterior wings and the central markings; the former shows between the second and third branches of the median vein, and between the last branches of the sub-dorsal vein two acute angles, which are open towards the base, and filled with black-brown, and it always bears on its anterior edge, in the interval between the branches of the sub-costal vein and between the first and second branches of the median vein, short black-brown longitudinal streaks. The central marking is not silvery, but simply white with a faint gloss, and at the part which hangs on to the median nervure it is filled up with pale grey; the free part is oval, and more or less distinctly separated. It is very remarkable, but, in three male specimens, this part is quite distinctly separated on the left wing, but not on the right, on the other hand, in one female the contrary takes place, and in no one specimen is there this separation on both wings. The male is distinguished from every other species of *Plusia*, except *circumscripta*, by the abdomen. On each side of the fifth segment is a long, almost straight, pale reddish tuft of hairs, which projects but little from the abdomen, but strikes the eye very readily, so that one cannot help wondering how it was not mentioned by Treitschke: below this tuft on the 6th segment is a longer and thinner tuft, of which the tips of the hairs are black; usually these black tufts are concealed in the anal tuft, but may be easily fished out with the setting-needle. As I had not observed these appendages, the object of which I am at a loss to conceive, in the fresh specimens, I am not confident that they are really attached to the above named segments. Probably other species possess this character in the male sex, and it might furnish a clue to a more natural grouping of the species. *Plusia daubei*, with which I am not personally acquainted, comes very near to *P. ni* according to Freyer's figure ('N. Beit,' iii., p. 90; Tab. 256, fig. 1); on the anterior wings it shews the same markings of the subterminal line, but it wants the lower oval part of the *Plusia*-mark, and, on the other hand, has the peculiar reniform stigma as in *P. gamma*. Boisduval says of *P. daubei* ('Index,' p. 159), that it is smaller than *ni*; but according to Freyer, it is almost larger than *gamma*" ('Ent. Mo. Mag.,' vol. vi., pp. 12-13).

Of the recent capture of *Plusia ni* in Britain, Mr. C. G. Barrett writes:—"I have recently had the pleasure of examining a very rare British moth, a genuine specimen of *Plusia ni*, Hb. I found it among some NOCTUÆ sent for examination by Major Partridge, of The Castle,

Portland. He says:—"One night in September I had been sugaring, and while passing down the terrace in my garden, which is within a few yards of the sea, an insect flew down to my light and fell to the ground. On examining it, I at once saw that I had got something out of the common way. It looked uncommonly like *P. ni*, but I feared it was too good to be true." The specimen is a very perfect *Plusia ni*, and a most satisfactory confirmation of the title of the species to be included in the British list. As *Plusia ni* must now be fully admitted to rank as a British species, a few words upon the characters which distinguish it from the closely allied species may be useful. It is most nearly related to *P. gamma*, but smaller, hardly so large as *P. interrogationis*. It is a somewhat paler, greyer insect than either; the γ -mark is *entire** and straighter than in *gamma*, that is, not so curved upwards, and the subterminal line is much indented and rather indistinct, but has several black wedge-shaped streaks springing from it, and pointing towards the base of the wing. The small tufts of scales at the sides of the abdomen are *yellowish*" ('Ent. Mo. Mag.', vol. xxv., p. 160). Whilst Mr. Nevinson writes:—"With reference to the capture of *Plusia ni* recorded in your last number, it may interest Mr. Barrett and others of your readers to hear that my brother netted an excellent specimen of the above-mentioned insect in the vicinity of Swanage, Dorset, in August, 1885. Unfortunately, the net being damp, the thorax is somewhat rubbed, otherwise the insect is in first-rate condition. Although the species is readily to be distinguished from its allies, to make assurance doubly sure, I showed the specimen to Messrs. Butler, Waterhouse and other entomologists, who all unhesitatingly pronounced it to be an indubitable *P. ni*" ('Ent. Mo. Mag.', vol. xxv., p. 184). At the Entom. Soc. of London meeting on July 2nd, 1890, Mr. Stevens said that when at Exeter he visited the Museum, and was pleased to see the original specimen of *Plusia ni* in the late Mr. H. D'Orville's collection, taken at Aliphington, near Exeter, in August, 1868.

Of *Plusia ni*, Mr. T. D. A. Cockerell writes:—"The recent records of *Plusia ni* in the South of England, suggest an enquiry as to what is exactly meant by our (British) *Plusia ni*. *P. ni*, a South European species, is represented in America by a form called *P. brassicæ*, Riley, which is abundant and injurious to cabbages in the United States. Now, as is not unusual in *Plusia*, we have in *brassicæ* a species so near to *ni* as to be very frequently confounded with it, and constant enough in its characters to be regarded as distinct. For this reason, a specimen now believed to be *brassicæ*, found in England years ago, was recorded as *ni*, and is still supposed to be such by many British entomologists. The question therefore naturally arises, are these recent captures really *ni*, Hb., or *brassicæ*, Riley? If they are *brassicæ*, the natural inference is that they are somehow imported from America, in the same way as *H. albifusa*† must certainly have been. I need not go any further into this matter, but hope that a re-examination will be made of the English examples of "*ni*" to see what they really are"

* I hardly understand why Mr. Barrett emphasises the fact that the γ -mark in *P. ni* is entire. I never knew it otherwise in *P. gamma*, so that in this respect they would appear to be similar, except that Professor Zeller records the mark as broken in *P. ni* (*vide extract ante p. 34*).

† *Vide remarks re Hadena trifolii var. albifusa, ante vol. iii., pp. 84-85.*

(‘Entom.’ xxii., p. 74). Mr. Cockerell also notes that *Plusia brassicæ*, Riley, is by some regarded as a form of *P. ni*, Hb. (‘Ent. Mo. Mag.’, vol. xxv., p. 324).

Plusia, Och., *interrogationis*, Linn.

The great character in this species is the endless variation which the central silvery mark or character undergoes. Truly no two are alike, and to look down a long series of *interrogationis* at this mark, is something like looking at a series of Chinese characters. Some are like the normal mark in *iota* and *pulchrina*, composed of a ν and dot; others have them united as in *gamma*; others, again, are like the Greek ϵ ; one forms a tiny solid blotch as in *bractea*, and so on. As is so frequently the case in species having the peculiar glaucous tint possessed by this, and which seems so characteristic of moorland species, especially in northern latitudes, some of the specimens have a delicate rosy tint, otherwise there appears to be but little variation in the method and arrangement of the markings. The pale band in the centre of the hind wings is rather like those of *iota* and *pulchrina*, and does not spread to the base as in *gamma*. Guenée says:—“I dare not cite Haworth’s reference, as he says that the colour is very much mixed with rosy” (‘Noctuelles,’ vol. vi., p. 354). Our British specimens are, as I have previously mentioned, often strongly tinted with rose-colour, so that Guenée was evidently unacquainted with British specimens. The type is thus described by Linnæus:—“*Noctua spirilinguis cristata, alis deflexis superioribus cinereis signo? albo inscriptis*” (‘Systema Naturæ,’ xth., p. 513). The variation in the characteristic mark of *interrogationis*, was remarked by Zetterstedt who wrote:—“*Variat sæpe signo argenteo inscripto, punctisque ejusdem coloris subscriptis 2 aut parvis discretis, aut majoribus in unum confluentibus*” (‘Insecta Lapponica,’ p. 948). Mons. Oberthür records this species from Caunterets (Pyrenees) as follows:—“An obscure form, conforming to the general rule of the coloration of the Noctuæ in the Hautes-Pyrénées” (‘Études d’entomologie,’ viii., p. 51).

a. var. rosea, mihi.—Some of our British specimens are beautifully tinted with rose-colour. This is the form described by Haworth who writes:—“*Phytometra alis cinereo fusco roseoque variis, in medio littera v punctoque contiguo argenteis.*” “*Præcedentibus (gamma) differt statura minore, alis anticis roseo cinereo fuscoque perpulchre variegatis, et potissimum characterere argenteo. Cilia rosea fusco maculata*” (‘Lepidoptera Britannica,’ p. 257), to which he adds:—“This species was known to Harris as above cited, where he remarks it ‘is a different species from the *Phalena interrogationis* of Linnæus.’ In this, however, he was probably mistaken, as there are hardly any doubts about this being the *N. interrogationis* of the ‘Fauna Sueciæ,’ although Linnæus makes no kind of mention of its beautiful purple tints. It is not the *interrogationis* of Hübner, nor does it exactly accord with his *Noctua ni*: although very closely allied to both” (‘Lepidoptera Britannica,’ p. 257). It will be seen, therefore, that whilst Guenée was undecided as to our British specimens being *interrogationis* because of their rosy tints, Haworth specially notices that Linnæus makes no mention of them.

VI. Sub-class :—INTRUSÆ, Gn.

1. Family :—*Amphipyridæ*, Gn.

This group has been variously placed by different authors. Guenée places it with the *Toxocampidæ* and *Stilbidæ*, whilst Staudinger sub-divides it, putting *Nenia* and *Mania* next *Brotolomia reticulosa*, and *Amphipyra pyramidea* and *tragopoginis* between *Rusina* and *Tenio-campa*, at the end of the *Caradrinidæ*, a not at all unnatural position it appears to me, for this latter genus. I consider that *Nenia* and *Mania* belong essentially to the *Noctuidæ* and have no relationship whatever with *Amphipyra* as united by Guenée, nor with the *Toxocampidæ* following. *Typica* and *maura* should not be too far from *Graphiphora augur* or *Triphaena pronuba*, whilst it has been suggested to me that the larva of *pyramidea* suggests *Petasia* as a possible relationship. Guenée writes of the family :—“The insects are recognised easily by their flattened form. When at rest, they carry their wings parallel to the plane in which they rest, and crossed over the back in such a way that they partly cover themselves. This depressed form allows them to glide into the narrowest crevices. It is in such places that *A. tragopoginis* is often found, in the frames of doors and of shutters where it appears at first as if they must be inevitably crushed. The imago of *pyramidea* often hides in the empty galleries made by the larvæ of *Cossus ligniperda* in the trunks of trees. I have often seen them in these retreats with their heads turned towards the entry, and plunged into complete darkness with which the reddish phosphorescent light of their eyes strongly contrasts” (*Noctuelles*, vol. vi., p. 412). The two British species in *Amphipyra* appear to be rather closely allied.

Amphipyra, Och., *pyramidea*, Linn.

This species in Britain is not what may be termed a variable one, but occasionally very beautiful varieties of this species are met with here, in which the whole of the central area between the basal and elbowed lines (which are very pale) is formed into a distinct dark transverse band. The outer half of this area is frequently banded in this species, in fact, it is rarely that it is not so, but it is very unusual for the whole area to become dark. The reniform is generally indistinct, and in many specimens there is a longitudinal line passing from the elbowed line through the reniform and often extending beyond the orbicular to the basal line. This generally absorbs the reniform, leaving the orbicular distinct, although occasionally this also becomes absorbed and obsolete. The outer area beyond the sub-terminal line varies considerably in depth of colour and there is some variation in the number of cuneiform spots developed. A second longitudinal black mark often reaches from the claviform to the angulated line.

The Linnæan description of the type is as follows :—“*Noctua spirilinguis cristata*, alis fuscis : superioribus strigis tribus flavescens repandis” (*Systema Naturæ*, xth., p. 518). In the xiiith edition “fuscis” becomes “cinerascentibus,” whilst “undatis” precedes “flavescentibus” and “maculaque fusca” comes after “repandis.” The exhibition of “a slate coloured specimen of *Amphipyra pyramidea*

by Mr. J. H. Carpenter" is recorded without comment in the 'Proc. Sth. Lond. Ent. Soc.,' 1888, p. 67.

a. var. virgata, mihi.—The anterior wings with the central area (between the basal and angulated lines) filled in with darker colour, thus making a dark band, bounded by the paler transverse lines; the outer area on each side of the subterminal line strongly shaded with black. The finest specimen of this form that I have seen was in the collection of the Rev. G. H. Raynor, and I have a specimen, given to me by the same gentleman, and captured at Brentwood, somewhat similar; whilst another approaching it, came from Mr. Alderson of Farnboro' (Kent). This variety seems to approach very nearly to, if not to be identical with the North American *A. pyramidoides* of Guenée, described in the 'Noctuelles,' vol. vi., p. 413.

β. var. obscura, Oberthür.—The type of this variety was first described in a paper on the 'Lepidopterous Fauna of the Isle of Askold' by Mons. Oberthür, who writes:—"Differs from the type by its constantly darker colour, which even extends to the inferior wings, in which the reddish is sometimes entirely brown. 10 ♂, 4 ♀" ('Études d'entomologie,' v., pt. 1, p. 85).

(?) *γ. monolitha, Gn.*—The *monolitha* of Guenée is by some considered only a form of *pyramidea*, whilst by others it is considered as a "representative species" replacing *pyramidea* in the East Indies and on the East Coast of Asia and not being identical with it. Mr. Leach combines the two, together with *magna*, Walk. and var. *obscura*, Oberth., and writes:—"In a long and variable series of this species (*pyramidea*), taken by myself in Japan, there are specimens which agree with *monolitha*, Guen., others with *magna*, and one or two examples with Oberthür's variety. These forms are connected one with the other and with *pyramidea* by intermediates"; whilst he adds:—"From the neighbourhood of Kiukiang, I received two specimens only, one of which is the var. *obscura* and the other *magna*, Walk." ('Trans. Ent. Soc. Lond.,' 1889, p. 135). When we consider how closely allied some of our undoubtedly distinct British species are, e.g., *Cuspidia tridens* and *C. psi*, *Agrotis tritici* and *A. cursoria* etc., we must take such general lumping as this with a certain amount of reservation. Not, that *monolitha* might not be specifically identical with *pyramidea*, probably it is, but the capture or receipt of a long series of specimens of a species which we do not know intimately, and which appear to run without break into the normal form of a species which we do know, should hardly be held conclusive proof of the specific identity of the two forms, as the keenest entomologists often fail to distinguish the allied British species mentioned above, and, until the earlier stages are known, "representative species" should not be too generously lumped, as they are certainly far better separated than united when there is any doubt about them. Guenée writes of *monolitha*:—"This is also very near to *pyramidea* but much more distinct than the preceding (*pyramidoides*, Gn. from North America). The superior wings little indented, of a deep violet-brown, velvety, unicolorous and not clouded as in our *pyramidea*, with the same lines marked in shiny grey, and also shaded interiorly. The orbicular stigma forming a very distinct grey dot, but not ocellated. The subterminal line barely distinct, with the dark streaks which pre-

cede it, partly lost in the ground colour. Fringe concolorous, uniform. Inferior wings of a coppery-red, paler and duller, with the fringe of an uniform grey like the costa. The four wings are equally more uniform below. The thorax of an uniform brown. The conspicuous palpi very slightly grey, their third joint still sharper and longer than in *pyramidoides*." "One ♂ from Silhet." "This appears to replace our *pyramidea* in the East Indies" ('Noctuelles,' vol. vi., p. 414).

Amphipyra, Och., *tragopoginis*, Linn.

There is practically no variation in this species, although some have a little more brown in the ground colour than others. The reniform, which is usually composed of two distinct dots, sometimes, but very rarely, has them joined, whilst at other times one is obsolete. The orbicular sometimes forms a small linear mark, and there is occasionally a trace of the subterminal line. The slightly darker forms were called *tetra* by Haworth and Stephens, who probably believed them to be the Continental species of that name. The Linnæan description of the type is:—" *Phalœna Noctua tragopoginis spirilinguis subcristata, alis superioribus fuscis: punctis nigris tribus approximatis; inferioribus lividis.*" " *Rustica media, inelegans, fusca. Alæ superiores supra in medio punctis tribus minimis remotis, quorum 1 anterius, 2 posteriora. Inferiores alæ lividæ*" ('Fauna Suecicæ,' p. 316).

a. var. tetra, Haw.—Humphrey and Westwood write of this variety:—"This species is described as larger than the preceding (17 lines broad); the fore wings dark brown, with three dark spots placed as in *tragopoginis*, and with several small white dots on the costa near the apex, and the hind wings darker livid brown with the margin brown. Mr. H. Doubleday ('Entomologist,' i., p. 262) considers this and the preceding species identical. As, however, the two species are given distinct by all the Continental authors, I have retained it, considering it probable, however, that as *tetra* is described as a more southern species, it is doubtful whether the insects so called in England may not be dark varieties of *tragopoginis*. The moth appears in July and August" ('British Moths,' p. 151), whilst Haworth's diagnosis is:—" *Noctua* ('The Mahogany') *alis perfuscis, medio punctis tribus obsoletis nigris quatuorque costalibus albis.*" "Caput, thorax et alæ perfusca, fere nigra, atque quasi oleosa. In medio alarum puncta tria contigua obsoletissima nigra, triangulatim posita. Costa fere ad apicem punctis quatuor albis etiam obsoletissimis. Alæ posticæ livido-fuscescentes fimbriâ fuscâ" ('Lepidoptera Britannica,' p. 164; and Guenée very truly observes:—"The *tetra* of Haworth and Stephens is only an insignificant variety, in which the inferior wings have a very light coppery appearance" ('Noctuelles,' vol. vi., p. 416). As mentioned by Humphrey and Westwood, Doubleday long ago considered the British specimens called *tetra* and *tragopoginis* to be the same species for he wrote:—"I think that there is but one species in this genus, at any rate, I can perceive nothing in the specimens called *tetra* and *tragopoginis*, to induce me to consider them distinct species" ('Entomologist,' vol. i., p. 262).

Mania, Tr., *maura*, Linn.

The strangest character in the markings of this species is the peculiar shape of the angulated line, which, although somewhat of the shape of that of *Amphipyra pyramidea*, is very different to that of most other NOCTUÆ. The space under the stigmata is sometimes unicolorous with the rest of the ground colour; sometimes it is crossed transversely with two dark fasciæ, one, a part of the central shade, the other, parallel with the basal line; at other times this area is much darker than the rest of the wing, when it gets a banded character. The central band is never complete transversely to the costa, although the lower area just mentioned as sometimes being much darker, is occasionally continued up to the costa, (1) between the orbicular and basal line, (2) between the stigmata and (3) between the reniform and angulated line, thus almost completing it in some specimens. On the outer margin of the hind wings some specimens are paler, but others are almost uniform with the ground colour. The Linnæan description of the type is as follows:—" *Noctua spirilinguis cristata*, alis depressis dentatis fasciis duobus nigris; inferioribus nigris fascia alba " (' *Systema Naturæ*, xth., p. 512). The form with the median space darker is described by Guenée. The more unicolorous Linnæan type is figured in Newman's ' *British Moths*, ' p. 459 as a variety. The striated variety is figured by Newman on the next page (*l.c.*) as the type.

The forms we get appear to be as follows:—

- 1.—Almost unicolorous = *maura*, Linn.
- 2.—With central area banded = var. *virgata*.
- 3.—With pale (whitish) transverse and longitudinal lines = var. *striata*.
- 4.—Tinted with rosy or violet = var. *rosea*.

a. var. virgata, mihi.—This form with a more or less complete dark central band is described by Guenée as the type. Rare as the two following varieties appear to be in Britain, specimens with the central area forming a more or less complete band, especially in the lower part towards the central area, are not at all uncommon.

β. var. rosea, mihi.—This is Guenée's var. **A** of which he writes:—" A rosy or violet tint on all the pale parts." He also adds:—" Some examples of this variety are always obtained in rearing a number from larvæ " (' *Noctuelles*, ' vol vi., p. 418). I have noticed no specimens with this peculiar tint.

γ. var. striata, mihi.—The anterior wings with a distinct whitish central nervure, which bifurcates under the reniform, a pale inner margin and angulated line, pale nervures between the angulated and subterminal lines, which are also pale, the nervures pale also on the outer margin. It is figured in Newman's ' *British Moths*, ' p. 460.

Nania, St., *typica*, Linn.

A long series of bred specimens of this species sent to me by Capt. Robertson from Swansea disclosed to me the fact that there were two distinct forms of it. I was quite conversant with the dark fuscous-grey form, and knew that there was more or less indistinctness about the longitudinal markings in some of the specimens. It was quite a revelation to me, however, to find among bred specimens a form with

the ground colour strongly ochreous-brown, the markings being paler ochreous rather than white, thus giving such a more unicolorous appearance. I found, however, odd specimens of this form afterwards, which had come from Strood and other localities. The Linnæan description of the type is:—" *Noctua spirilinguis cristata, alis deflexis fusciscentibus: macula reniformi strigis pallidis reticulatis* " (' *Systema Naturæ*, xth., p. 518). To this he adds:—" *Alæ superiores cinereæ maculis ordinariis margine albo, et strigis tribus albidis, postice in strias excurrentibus, unde ala quasi reticulata* " (' *Fauna Suecicæ*, p. 317). The fuscous-grey specimens with distinct whitish reticulations would, therefore, appear to represent the type.

a. var. *brunnea*, mihi.—The ground colour of a deep ochreous-brown, with rather paler ochreous longitudinal nervures, thus making the specimens of a more generally unicolorous appearance owing to the near approach of the ground colour to that of the longitudinal lines. I have some very fine examples from Capt. Robertson, which were bred from larvæ taken at Swansea. The form probably occurs in other localities with the type.

2. Family:—*Toxocampidæ*, Gn.

This family comprises a distinct and closely allied group of species which certainly very much resemble DELTOIDES and strongly help the idea that the latter should be entirely united to the NOCTUÆ. We have only two British species, one of which, *cracce*, is almost restricted to North Devon, whilst the other, *pastinum*, is fairly-well distributed in our South-eastern counties of England, extending as far North as Cambridgeshire. Comparing the family *Toxocampidæ* with the heterogenous material that makes up the *Amphipyridæ*, Guenée says:—" There is certainly a great relationship between the preceding family (*Amphipyridæ*) and the present one, which is divisible into two sections " (' *Noctuelles*, vol. vi., p. 419). Of the genus *Toxocampa* he writes:—" The imagines are to be recognised at first sight, by their collar and the upper part of the frontal tuft, which show up conspicuously in brown or black against the grey of the thorax, and by the reniform spot of the same coloration, and which is partly obliterated, but of which there are always some remnants. The orbicular is reduced to a single dot, often even, entirely absent. The ordinary transverse lines are usually indistinct and reduced to the faintest traces of them. All the surface of the wing, of which the ground colour is grey and silky, is seamed with small vertical striations, which at first sight appear to be formed of darker atoms, but which, in reality, are only little furrows resulting from the break in the continuity of the scales in certain directions. There is nothing similar on the hind wings, which are generally unicolorous grey, or with the outer margin blacker." " The males are distinguished from the females by the form of the antennæ and of the abdomen. Amongst many of the latter (females) the abdomen bears on the penultimate and antepenultimate segments, two small lateral prominences formed by reclining tufts, of a more yellow colour, and the presence of which is not more explicable in the present state of our knowledge than many other anomalies " (*l.c.* p. 424).

Toxocampa, Gn., *cræcæ*, Fab.

This species is comparatively rare in Britain, although taken and bred in some numbers in North Devon by Mr. South when collecting professionally some eight to ten years ago. It is very distinct from *pastinum*, its pale longitudinal nervures at once distinguishing it. There appears to be some slight sexual variation, the males I have are rather browner than the females, and the abdomina of the latter are very large. The type is thus described by Fabricius:—"Noctua cristata, alis striatis cinereis: puncto albido, lunula punctata thoraceque antice atris." "Statura præcedentis (*lusoria*) at paullo minor. Thorax cinereus antice ater. Alæ anticæ venis striatæ cinereæ puncto parvo albo ante medium. In medio lunula e punctis aliquot atris. Postice fascia obsoleta obscurior. Costa punctis quatuor fuscis" ('Mantissa,' p. 154).

Toxocampa, Gn., *pastinum*, Tr.

This is the commonest of the British species in the genus and offers a slight amount of variation in the ground colour, which, in some specimens, is certainly whiter than in others. The area beyond the elbowed line to the outer margin is frequently much tinged with brown, sometimes the brown is restricted to a narrow band between the elbowed and subterminal lines, whilst at other times, it is still more restricted forming only a small costal patch, and very rarely it is quite absent. The reniform stigma is sometimes L-shaped with a dot, sometimes lunular, sometimes it forms an irregular blotch. The orbicular is usually represented by a dot, but is occasionally absent.

The species was first described by Treitschke as follows:—"Ophiusa alis anticis glaucescentibus, obsolete fusco fasciatis, macula reniformi punctisque nigris;" to which he adds:—"Pastinum was first discovered in 1819 by M. Dahl in two different places near Vienna. In shape and general markings it is like the last two species (*cræcæ* and *ludicra*), but in size and certain particular markings, it differs from them considerably. The head is whitish, the collar black-brown. The thorax, which has a small crest, is whitish-grey sprinkled with brown dots. The body and feet are ashy-grey, the antennæ light rust colour with whitish scales, those of the male slightly pectinated. The forewings, up to the mottled band, are bluish-grey, with many brown dots and dashes. The first transverse line sometimes takes the appearance of an indistinctly shaded band. The reniform is black-brown, whilst behind it stand one or two black dots, through which runs a faint transverse line. The mottled band (outer margin) is brownish up to the fringes, darker on the costa and inner margin, sprinkled throughout with minute dark brown dots. Before the light brown fringes stands a row of small dark brown dots. Hind wings and fringes brownish-grey, near the middle there are faint traces of a paler band" ('Die Schmet. von Europa' &c., vol. v., pt. 3, p. 297). The *lusoria* of Haworth is the type whilst his *ludicra* would appear to be a rather dark variety. Humphrey and Westwood describe *pastinum* under the name of *lusoria*, and say:—"There is much difference in the tint of different specimens" ('British Moths,' p. 246).

a. var. *ludicra*, Haw.—Haworth's diagnosis is:—"Phylometra alis fuscis puncto lituræ medio nigris, strigisque duabus obsoletis apicem

versus." "Valde affinis *N. lusoricæ* (= *pastinum*), ab distincta. Alæ anticæ fuscæ strigis duabus apicem versus vix conspicuis. Posticæ itidem fuscæ" ('Lepidoptera Britannica,' p. 259). Guenée writes:—"The *ludicra* of Messrs. Haworth and Stephens appears to me to be only a variety of *pastinum*. At any rate, the true *ludicra* is not found in England" ('Noctuelles,' vol. vi., p. 427). This certainly was only a rather darker form of *pastinum* which our older British authors probably considered to be the *ludicra* of the Continent. It seems hardly worth distinguishing, but would appear to refer to those specimens which have the outer margin strongly brown.

β. var. *pallida*, mihi.—Anterior wings of a whiter-grey than the type; the transverse bands or fasciæ obsolete, especially the brown area between the subterminal and angulated lines; the dark scales which give the type a more mottled appearance, very few in number. Altogether this is a much paler form. I have occasionally taken a few specimens with the type in Kent.

3. Family:—*Stilbide*, Gn.

This is another aberrant family and has been variously placed by different authors. Staudinger, following Treitschke, has placed it with the *Caradrinide*, with which its larva is altogether wanting in affinities, the latter tending to point to a position close to its present location as assigned by Guenée. The only species in the family is confined more particularly to Western Europe (Great Britain, France and Western Germany), and shows strong sexual dimorphism, the female being smaller, darker, shorter winged, and with an altogether different facies to the male. Guenée writes:—"This is certainly a most abnormal genus, on which a knowledge of the earlier stages, now well known, thanks to Mr. Graslin, has not thrown the light that had been expected." "The imago is very curious: its palpi and its thorax short; its feet long and slender; its inferior wings, which fold up and are covered by the superior and pressed close to the body, large; the neuration of the inferior wings justifies what I have said above, that it has, in reality, no affinity whatever with any family, and that everybody who has attempted to locate it, has found a difficulty in doing so. It appears to have, at first, some marked resemblance to the *Leucanide*, to the *Caradrinide*, to the *Orthoside*, and to the *Erastride*, but one is obliged to separate it from each of these when all its characters are taken into account. It is, perhaps, not better placed here, and constitutes, I repeat, like *Brephos*, one of those absolutely isolated types, which can be introduced nowhere in the series of species in a manner satisfactory to one's mind" ('Noctuelles,' vol. vi., pp. 433-434).

Stilbia, St., *anomala*, Haw.

This species exhibits a considerable amount of sexual variation, the female being much smaller and almost uniformly blackish-brown in colour, with the markings obsolete. The male is a very distinct-looking insect and rather strikingly marked. Until quite recently this species was not at all common in Britain, but during the last few years it has been taken abundantly on Cannock Chase by Mr. Freer, at Sligo by Mr. Russ, and in Aberdeenshire. The Sligo specimens appear to be larger, brighter and better marked, than the Cannock

Chase examples, and to agree with Treitschke's *stagnicola*. This species is the *hybridata* of Hübner and Guenée, the *stagnicola* of Treitschke etc., and the *anomalata* of Stephens. Guenée writes of the female :—"Smaller, with the superior wings narrower, darker, almost black, partly absorbing the transverse lines and even the reniform; the orbicular narrower and linear" ('Noctuelles,' vol. vi., p. 434). Of a dark variety of *Stilbia anomala* taken at Rannoch Mr. Wheeler writes :—"One fine var., smoky black without markings" ('Ent. Mo. Mag.,' vol. xiii., p. 141). Probably this was a female. Haworth's description of the type, which appears to agree more particularly with the form captured in the Midland Counties of England, is as follows :—"Phytometra anomala. Alis pallidissime fusciscentibus nigro subnebulosis, stigmatibus ordinariis pallidis divaricatis obsolete pupillatis" ('Trans. Ent. Soc. Lond.,' 1812, p. 336).

a. var. *stagnicola*, Tr.—This is the brighter form of the species, with a distinct slaty tinge. I have previously referred to the Sligo specimens as being very strongly coloured, and Treitschke in his diagnosis refers to the tint as of a "leaden blue." He writes :—"Caradrina alis anticis cæruleo plumbeis, maculis duabus dilutioribus, orbiculari solito majore obliqua; posticis albidis fusco adpersis" ('Die Schmet. von Europa,' vol. v., pt. 2, p. 258).

β. var. *philopalis*, Grasl.—This is a small pale variety of the male which is described by Grasl as follows :—"Similis forma *Stilbia stagnicolæ*, sed minor. Alis anticis cineraceis, ad basim rufulis; ad extremum tribus lineis nigris; duabus lineis, transversis nigris, in medio extrinsecus denticulatis; maculis solitis magnis, similibus *stagnicolæ*. Posticis subcineraceis" ('Ann. Ent. Soc. France,' 1852, p. 413). Of the figure illustrating this description I wrote :—"Very pale and small; the reniform whitish; the elbowed and subterminal lines whitish; the basal line edged with darker; the claviform pale almost whitish" (*l.c.* Pl. 8, fig. 3). The type of this variety came from Marseilles. Staudinger's diagnosis of the variety is as follows :—"Minor, pallidior, distinctius signata" ('Catalog,' p. 110).

VII. Sub-class :—LIMBATÆ, Gn.

1. Family :—*Catephidæ*, Gn.

This sub-class is divided by Guenée into five families, of which we have representatives in Britain of only two, *viz.*, the *Catephidæ* and *Catocalidæ*, and of these, the number of species amounts to only one in the former and four in the latter. The species are very characteristic and the underwings of some of the *Catocalidæ* very beautiful, their bright colours, however, are hidden in repose, by the grey and brown tints of the upper wings, which respond sometimes most perfectly to the environment of the particular species. Of the *Catephidæ*, Guenée writes :—"The imagines have all a rather pronounced family appearance, but still the species are very variable *inter se*. The abdomen is sometimes simply smooth as in the genus *Cocytodes* and certain species in *Catephia*, sometimes strongly crested as in other species of the latter genus and in *Anophia*, and lastly, some are provided with a single very small and very inconspicuous crest as in *Stictophera*. Their inferior wings are not less variable. They never

take the designs of the upper wings, but ordinarily have the base white or glossy, at other times, they are marked with blue or white bands; lastly, some are entirely unicolorous. The females differ very little from the males in this family, in which the antennæ are never decidedly ciliated, and the abdomen is either crested or smooth in both sexes" ('Noctuelles,' vol. vii., pp. 40-41).

Catephia, Och., *alchymista*, Schiff.

This species is referred to Schiffermüller and Denis, as the nomenclators by Staudinger. In the 'Sys. Verz. Wien.' &c., pp. 150-151, we read:—"Here we must observe, in order to escape the suspicion of an error, that this species which differs from the *leucomelas* of Linnæus, was named *alchymista* by Geoffroi, although these authors refer to each other. The former, as he found his *NOCTUA* chiefly white and black, thought perhaps that the want of white spots on the fore wings might be a freak of nature, or an abnormal form, as he left out, on reference to the Linnæan description, the following words:—"Macula alba." Linnæus, however, must have referred Geoffroi's *alchymista* to *Ph. leucomelas* without reading an exhaustive description, or he would then have observed, not only that the insect was twice as large, but also the absence of the white spot, and the lighter brown transverse lines spreading towards the inner margin, which are never seen in *leucomelas*, but are always seen in our species, and in the figures of the specimens from Saxony, where the larva is said to feed on oak." On p. 89 we read further:—"Alchymista. Schwarze-braunlichtgerandete Eule." In a way, this quotation from the 'Sys. Verz.' etc., may be, perhaps, sufficient to define the species as *alchymista*, but for completeness the description of Fabricius is appended. He writes:—"Noctua cristata alis deflexis dentatis nigris atro undatis apice cinerascens, posticis basi maculisque duabus marginalibus albis." "Affinis *N. leucomelas* at paullo major. Corpus atrum dorso cristato. Alæ nigræ strigis quatuor undatis atris apice striga cinerascens, quæ versus angulum ani maculam format. Posticæ nigræ macula magna baseos duabusque minoribus marginalibus albis. Subtus omnes nigræ posticis basi albis puncto nigro" ('Mantissa,' p. 171).

Treitschke writes:—"From *leucomelas*, *alchymista* is now generally differentiated by the characters of the fore wings, which are likewise blackish-brown, but have not the large semicircular whitish or rust-coloured disc. Several black lines, which are partly united by longitudinal lines, run transversely across the fore wings. The orbicular is traceable as a darker area, but the reniform is more distinct. The latter often appears like two rings lying side by side. The elbowed line is zigzag in shape with a large curve under the reniform. The pale outer area shades off into rust-yellow before the fringes" ('Die Schmet.' etc., vol. v., pt. 3, p. 325); whilst Guenée, writing of the true *Anophia leucomelas*, says of this matter:—"Whatever Treitschke and Laspeyres may say of it, this Noctuelle (the French *Anophia leucomelas*, which is not a British species) is certainly the *leucomelas* of Linnæus, his description leaves no doubt, and besides the actual specimen still exists in his collection as I am informed by Mr. Doubleday. It is certainly surprising that

he cites the figures of Clerck, which represents *ramburii*, and Geoffroy, who has really described (although badly enough) *alchymista*; but these two contradictions only show how little importance should be attached to these references. Linnæus has only seen specimens with the base of the inferior wings white, and as NOCTUÆ, of this pattern were but little known in his time, he concluded that all those which showed this character in other authors, referred to the same species" ('Noctuelles,' vol. vii., p. 47).

Of the first appearance of *Catephia alchymista* in Britain, Mr. Stainton writes:—"Of this most conspicuous and striking species, of which we hope to give a figure next year, a single specimen was taken in September this year at sugar, by Dr. Wallace in the Isle of Wight. The larva feeds on oak in July and August, the perfect insect appearing naturally in June of the following year; hence its capture in September must be considered exceptional. This is not the *leucomelas* of Haworth of which he says:—"Mr. Francillon possesses an English specimen;" the Francillonian specimen may still be seen amongst the doubtful British species in the possession of Mr. Shepherd" ('Ent. Ann.,' 1859, p. 148). The more recent records are one at Sussex ('Entom.,' viii., p. 164), one at Colchester ('Entom.,' viii., p. 185), one at Dover ('Entom.,' xv., p. 162). Other references in our British magazines to this species are 'Ent. Mo. Mag.,' vol. xxv., pp. 65 and 91; 'Entom. vol. xx., p. 239 (this record is very doubtful); 'Entom.,' vol. xx., p. 325; 'Ent. Mo. Mag.,' vol. xxv., p. 65.

2. Family:—*Catocalidæ*, Bdv.

There is a great break between the *Catephidæ* and *Catocalidæ*, there being no representative species in Britain of the families *Bolinidæ* and *Hypocalidæ*. This family is a very characteristic one; the imagines usually having richly-coloured underwings, which are covered when at rest by the fore wings, the latter being ornamented with greys of different shades and responding very distinctly to their environment. In Britain, we have no species like *epione* etc. with the hind wings black, and only *fraxini* in which the coloration is other than red. Besides the genus *Parthenos* (which contains only one species, *nubilis*, Hb.), the family consists entirely of the genus *Catocala*. Guenée writes:—"The facies of the insects in their three states is so positive, that it forms without doubt a very distinct group, but, on account of this very fact, it is without very decided affinities with the neighbouring families. Further, it has more resemblance in colour and markings, than in common characters, with the *Opheridæ* which follows it. It is in much the same position with regard to the *Hypocalidæ* which precedes it. However, the genus *Parthenos* (which otherwise has a slightly ambiguous appearance) has some very marked affinities with the *Catocalidæ* and *Bolinidæ*" ('Noctuelles,' vol. vii., p. 79).

Of the *Catocalinæ* as a sub-class Grote writes:—"The earliest recognition of this group which I find in literature is that of Borkhausen, who calls this *Noctuæ fasciatæ*, in contradistinction to the *Noctuince*, or *Noctuæ nonfasciatæ*. These terms are clumsy and had better give way to those of Packard ('Proc. P.S.N.H.,' vol. i., p. 153, et seq.). The wings are broad; primaries triangulate; secondaries full, tending

to be marked by continuous bands. The eyes are naked; antennæ generally simple; body usually untufted; abdomen smooth and tapering; the dorsal surface rarely crested; the tibiæ not unfrequently armed. Packard says that the epicranium is longer than in the *Noctuineæ*. The basis of this sub-family is comparative form. No single structural feature holds the genera together, and Lederer does not recognize its existence. Nevertheless, the moths and larvæ seem to me more or less readily distinguishable, and that we may retain the sub-family term. Dr. Packard says (*l.c.*) that these two sub-families 'agree in the main with the *Trifidæ* and *Quadrifidæ* of Guenée, though the use which he makes of the venation seems to us to lead to artificial distinctions. The very constant venation of this family does not admit of any variation in the grouping of these veins and their branches, and hence they offer characters of secondary importance.' With this statement my experience fully agrees. I do not think that the venation alone should decide family position. There are already too many exceptions known to the system of Herrich-Schäffer, which is, in some cases, considered the test of family character by Lederer. Primarily this sub-family falls into two groups:—First, the tribe *Catocalini*, in which the secondaries, though often gaily coloured, are covered by and subordinated to the primaries. The European genera belong chiefly to this tribe. Secondly, the *Pheocymini* (*Pheocyma*, *Homoptera*, *Erebus*, etc.) in which the secondaries are partially exposed and marked like the fore wings, decidedly geometriform moths. The larva thus first becomes geometriform as we recede from the higher *Noctuidæ*, and then the perfect insect follows suit" ('Canadian Entomologist,' vol. xxii., p. 109). He further writes:—"Some idea of the preponderance of *Catocalinæ* in North America may be given by the statement that in Europe there are about fifty-six species belonging to about sixteen genera, while in North America there are about two hundred and fifty species belonging to about fifty-six genera. These latter figures may be changed by new observations with us, but hardly diminished. In the *Deltoidinæ* the proportions are more in conformity with the numerical relations in the typical group, the *Noctuineæ*. The reason I have given for this preponderance of the *Catocalinæ*, lies in the physical geography of the Continent, the prevailing atmospheric and ocean currents, all of which favour the introduction of southern or tropical lepidopterous forms; and we must consider the *Catocalinæ* as tropical in general character in the same way as we consider the other groups of the *Noctuidæ* as belonging to temperate regions of the earth's surface" ('Canadian Entomologist,' vol. xxii., p. 148).

Of the *Catocalini* as a tribe of the *Catocalinæ* Grote further writes:—"In this tribe the secondaries are oftenest gaily coloured (mostly yellow) and banded, still subordinated to the primaries which show, more or less adequately, the usual Noctuidous ornamentation. The abdomen is rarely tufted. On account of the shape of the primaries, the form of the abdomen, the abdominal tuftings, the pattern of the wings beneath, the approach to *Ophideres*, I regard the genus and species, *Euparthenos nubilis*, 'Ann. N. Y. Lyc. Nat. Hist.,' as entirely distinct from *Catocala* sp. The most important genus is *Catocala*, in Europe with 22, in North America with upwards of 100 species. A division of this genus on the peculiarities of tibial armature (as I have suggested in *Agrotis*)

was stated to me as possible several years ago by Mr. Smith, and has more recently been attempted by Mr. Hulst. I must add that his observations need verifying, judging from his published opinions on the value of the forms of *Catocala*, which I have shown to be in a number of instances incorrect. The *Ophiderince* and *Toxocampince* of my 'Check List' are probably not to be separated from this tribe, in which the anterior ventral feet of the larvæ are more or less incomplete. The genera become gradually broader winged and concolorous as we approach the next tribe" ('Canadian Entomologist,' vol. xxii., p. 145).

Catocala, Och.

The characters of this genus are very marked, and the upper wings, the colour and markings of which are such as to respond most distinctly to their environment, are, as might be expected, subject to considerable variation. One of the most remarkable points in the markings of this genus, is the absence of the orbicular and the development of another stigmal marking directly below the reniform, known as the "sub-reniform." The space between the reniform and the position which would be occupied by the orbicular if it were present, is filled in by a pale blotch in contact with the reniform, giving it a double appearance. There is no claviform, although the pale "subreniform" has a superficial appearance to a claviform, and is likely to be mistaken for one on superficial examination, especially in *C. sponsa*, where it sometimes reaches well back to the complete basal line, but its complete isolation in *fraxini*, *nupta* and *promissa* makes an error almost impossible. Attention must be drawn to the black basal area in the hind wings of *fraxini*. If a specimen of this species be looked at in the cabinet it will appear that the hind wings consist of a black outer margin, a bluish band, and a black basal area. If, however, a specimen be held up to the light, the black basal area subdivides, the part nearest the blue band absorbing the light and forming an intensely black band as in *nupta*, *promissa*, etc., the extreme basal part allowing the light to be freely transmitted, so that the difference between the hind wings of *fraxini* and *nupta* is apparent only, each having really 4 distinct areas. Guenée writes of this genus:—"The superior wings of the species in *Catocala* are invariably grey, powdered with paler and darker scales, and clouded here and there with black and white. A series of pale brown spots edged with white, immediately precedes the outer edge in the smallest species, but at a certain distance in the large, these are followed by the subterminal line, rarely well marked, always indented and paler than the ground colour. The two following lines, on the contrary, are always distinct, and sufficiently separated from each other; the complete basal line being made up of lunules or irregular arcs; the elbowed line, of more or less pointed teeth, of which the upper ones are almost always more prominent. Of the two stigmata, the reniform is the only visible one. It is, however, often very dusky or inconspicuous, but we here find a third placed directly underneath, generally paler than the ground colour, surrounded with black, and to which I apply the name subreniforme. The inferior wings are generally dentate, with a border always black, but rather broken in continuity at about three-quarters of its course, reappearing only at the anal angle, where

it then forms a black spot. The fringe, which is always clear, generally abuts on this band at the external angle, and leaves there a more or less extended clear spot. Independently of this border, another dark band is seen, narrower, commencing in the middle of the wing and undergoing inflexions which vary according to the species. Sometimes the band is absolutely wanting; at other times, it is united with the colour of the base and leaves in the middle of the wing only a small yellow or blue band; lastly, it sometimes happens that the entire wing is of a unicolorous black velvety colour. In the remaining cases the ground colour is blue, red, fawn-yellow or orange. Our European *Catocalæ* have been divided into groups according as they exhibit these three colours, and, as this division is convenient, I have adhered to it as much as possible. I confess, however, that it is not very natural and that there is no actual difference in shape, size, appearance and food between our *Catocala sponsa* and *promissa*, whose inferior wings are of a beautiful red, and *neogama*, *paleogama* etc., of North America, which are of the same yellow colour as our *conversa*, nor *epione*, *vidua* etc., in which they are entirely black. The underside of all the wings of *Catocala* are always of a pale colour, with black bands, even in those which are quite black above. But, at times, the pale colour is the same as that on the upper part of the inferior wings; at others, its place is taken by white, which is then more or less tinted with red or with yellow in the third part or the internal half of the inferior wing. The *Catocalæ* vary but little even in the intensity or the shade of the grey. The females are generally a little more clouded than the males, and the brown or red band which follows the elbowed line is more distinct in the former. But there is another organ which varies in this species in regard to colour. This is the abdomen, which, in some species, is accidentally covered with a beautiful delicate red tint. It is often so in the case of *C. optata*, and I have seen a *C. promissa* which had the same peculiarity. I am convinced that *electa*, and generally all the species of that section called *Lampronia*, are sometimes similarly affected, without mentioning *pacta* in which this tint is normal" ('Noctuelles,' vol. vii., pp. 82-83).

Catocala, Schrk., *fraxini*, Linn.

This species is generally rare in Britain, occasional specimens being captured. The double black band characteristic of most of the *Catocalæ* would appear to be absent in this species, but by holding a specimen up to a strong light it can be seen that the dark basal area is divisible into two parts, one, representing the normal band and very opaque, the second allowing the light to be readily transmitted. There appears to be but little variation in tint in the specimens I have seen and Guené writes:—"I have received specimens from North America, where the species does not differ from our European examples" ('Noctuelles,' vol. vii., p. 83). Treitschke, however, writes:—"There are to be found varieties in which the fore wings are strongly tinged with yellow, and others, where the band of the hind wings is suffused with violet." "It is the largest moth of this genus, in fact, one of the most imposing of the European species, but now well known everywhere. The head, collar and thorax are white-grey mixed with grey and yellowish hairs, the collar bordered by two

darker lines. The body is dark ash-grey with white rings, and has, on the foremost joints, raised crests. The chest and underside of the body are snowy white, also the legs, which are ringed with grey on the lowest joint, and covered strongly with down above. The antennæ are brown-grey with white projections, which are long in the male and sharply pectinated. The fore wings are of a whitish-grey ground colour which is more or less dusted with minute brown and yellow dots. Through the surface run white transverse lines bordered with brown; close to the base is an interrupted line; a little further on a complete one, consisting of many scallops. Then follows the middle area in which only the reniform is visible as a confused darker mark, whilst below, towards the inner margin, stands a kind of flame-shaped quadrangular mark which is sometimes light yellow, but the colour nearer the base is lighter. Some distance from the reniform is seen an elbowed, dentate, white line, but bordered with yellow-brown; then follows a whitish band, after which, behind a faint scalloped brown-grey subterminal line, the ground colour becomes bluish-grey. The fringes are long and scalloped, spotted with white and grey and often mixed with yellow and surrounded by interrupted lunular marks towards the inside" ('Die Schmet.' etc., vol. v., pt. 3, pp. 330-331). The Linnæan description of the type is as follows:—" *Noctua spirilinguis cristata alis deflexis cinereo nebulosis, inferioribus supra nigris fascia cærulescente*" ('Systema Naturæ,' xth., p. 612).

Catocala, Schrk., *nupta*, Linn.

There is a very considerable difference in the shade of the ground colour of the fore wings of this species. Some are pure grey without a tinge of ochreous (the type), but these appear to be very rare, whilst in others the grey is so strongly suffused with ochreous [var. *obscurata*, (?)] that it appears to lose its grey character altogether. In some specimens, the transverse lines and outlines to the stigmata are strikingly pale, and are, in turn, edged with very dark brownish lines which throw up the markings and lines most distinctly. The centre of the reniform and a dark lunule in contact with the inner edge of the reniform are usually the darkest parts of the wing. In a few of my specimens, both the pale lines and dark margins are merged into the ground colour, such specimens being particularly unicolorous. The hind wings have two distinct shades of red, one being much brighter than the other. I have also a specimen which came out of Mr. Coverdale's collection, the fore wings of a clear pale grey, and the hind wings of a pale yellowish almost white, a most perfectly pigmentless example, although perfectly scaled. The shape and direction of the central black band on the hind wings vary a little, and there is a tendency for the long red scales at the base to cover the lower portion of this band. The type is described by Linnæus as follows:—" *Phalena Noctua spirilinguis cristata, alis cinerascensibus; inferioribus rubris: fasciis nigris, abdomine cano subtus albo.*" " *Simillima sponsæ, sed abdomen dilutius subtus album. Alæ superiores supra cano fuscoque undulato-nebulosæ. Subtus nigræ fasciis 2 albis; cilia marginalia cana: stria nigra in medio cujusvis dentis. Inferiores supra dilute rubræ: fasciæ 2 nigræ flexuosæ; margo ciliaris niveus. Subtus concolores; fasciæ*

arcuatæ, sed antèrîus albidæ. Margo ciliaris niveus" ('Systema Naturæ,' xiith., p. 841). Humphrey and Westwood figure the form with bright red hind wings as *nupta* (Pl. lv., fig. 5), whilst a figure with duller red hind wings is called *elocata* (fig. 6), but they state that their figure is made from a Continental specimen of the real *elocata*. There is no doubt, however, apart from this figure that the so-called *elocata* taken in Britain were only forms of *nupta* with the hind wings of a duller red colour, a not unfrequent variety in most British localities, and representing the type according to Guenée.

Treitschke writes of *nupta*:—"As already remarked under *elocata*, that, and the present species (*nupta*) were in former years treated as the same species, with which the authors of the 'Vienna Verz.' etc. agreed. It is difficult to tell which of the older entomologists were of that opinion: but Borkhausen and Esper's good descriptions may be considered the best guide. It has also been proved by breeding, that Hübner's *concupina*, fig. 329, is nothing more than a var. of *nupta*. *Nupta* is smaller than *elocata*: the head, collar, and the thinly tufted thorax are light grey, dusted with yellowish and brown scales, the collar has several darker cross lines; the body is ash-grey, likewise the anal tuft of the male, which, however, has white hairs on both sides and on the point. The chest and body below are light whitish; the fore wings have a light grey ground colour with distinct but variable markings. The surface, with the exception of a light band in the central area of the wing, is dusted with brown, and minute yellowish dots, which are, however, more separated than in *elocata*, and, therefore, do not give it so coarse an appearance. The incomplete and complete transverse basal lines are the same as in *elocata*, broad and whitish, bordered with yellowish-brown. Then comes the already mentioned light band, in which a special white dot indicates the orbicular. Then comes the reniform, which is distinctly half-moon shaped and zigzag towards the outer margin. It is of a brown colour mixed with yellowish. This (the reniform) is joined as in *fraxini* towards the inside by a yellowish flame-shaped mark. The angulated line is very clear and passes in a wide circuit round the reniform forming a kind of M, and then continues very irregularly dentate towards the inner margin; this line is yellowish but edged with brown. Lastly, the ground colour of the fringes is pale ash-grey, much scalloped and edged by two dark lines, and a row of isolated dots" ('Die Schmet. von Europa,' vol. v., pt. 3, pp. 338-339).

a. var. *cærulescens*, Ckll.—Mr. Cockerell ('Entom.' xxii., p. 127) writes:—"A noteworthy form of dichroism, which must surely belong to the first division*, is a change from blue to red or crimson, and *vice versa*. This occurs in *Catocala*, e.g. in *C. nupta* var. *cærulescens* with blue secondaries, as recorded in the 'Entomologist,' p. 51. Reference to p. 51, shows us that at the meeting of the Sth. Lond. Ent. Soc., Jan. 10th, 1889, "Mr. White exhibited a coloured drawing of a variety of *Catocala nupta* having the red of the inferior wings replaced by blue, the specimen having been taken by Dr. Laver at

*This "division" refers to Mr. Cockerell's divisions of the probable changes which pigments undergo.

Colchester,"—Mr. Weir remarking at the same time "that the colour was the same as that which was normal in *C. fraxini*."

β. var. concubina, Bork.—The form of *nupta* with the less bright red hind wings is considered as the type, and that with the brighter red hind wings as *var. concubina*. Sepp first figured this bright form and it was afterwards copied by Esper in his 'Die Schmet. in Abbildungen' etc., Pl. 97, figs. 1-2, who placed it by the side of the figure of a typical *nupta* with less bright red hind wings, and then wrote that the second (brighter coloured) figure was copied from the works of Sepp. Borkhausen also referred to Sepp's figure, but he considered it distinct from *nupta* and called it *concubina*, writing of it as follows:—"Sepp ('Nederland. Ins.,' vol. iv., p. 33, fig. 7). Should this moth which Sepp has figured and Esper copied be considered a species distinct from *nupta*? I will give my opinions respecting this, but will first of all describe the insect more minutely and leave the final decision to more experienced entomologists; meanwhile I call it *concubina*." He then describes it as:—"Phalæna Noctua *concubina*. It is of the same size as *nupta*, whilst at the same time it is very near *elocata* and often of the same size as the latter. The fore wings are of an ashy-grey ground colour, much suffused and darkened by numerous black dots. Towards the base, the wings are somewhat brownish, with a bluish tint which is only seen in perfect specimens. The transverse lines have very irregular teeth, strongly turned towards the outside; the reniform and a round spot below are suffused with a shiny bluish tint, whilst a similar tint is noticeable towards the hind margin. The hind wings are of a brighter red than that of *nupta*, and the middle band is especially different, losing itself entirely in the hind margin. In other respects it is like *nupta*" ('Naturgeschichte' etc., vol. iv., p. 21). Borkhausen then supports the probability of their distinctness as species. Of *concubina*, Bork., Guenée writes:—"Superior wings of a pure ashy colour not yellowish, the inferior wings of a brighter red, with the median band more marked towards the abdominal margin." Guenée also says:—"It is found almost as often as the type, particularly in the female sex. However, Borkhausen says that he had found both sexes and even described the larva, but he owned that he had obtained both species from intermediate larvæ" ('Noctuelles,' vol. vii., pp. 85-86).

γ. var. obscurata, Oberthür.—This is described by Oberthür in his 'Lepidopterous Fauna of the Isle of Askold' as follows:—"Very much darker in the superior wings than the *nupta* of France. M. l'abbé David has taken in the North of China a similar example to that from Askold" ('Études d'entomologie,' v., p. 86).

Catocala, Schrk., *sponsa*, Linn.

In the ground colour of the fore wings of this grand species there is a tendency in some specimens to ashy, in others to ochreous, in others to rich brown and occasionally to blackish-grey. The central area varies very much in tint. In some specimens there is a tendency to a pale band, whilst in others, this area is uniform with the outer and basal areas of the wing, the area around the orbicular persisting pale the longest. There is a pale spot, variable in size and shape, directly under the reniform and orbicular, which at first sight

looks like the claviform but which is the "subreniform" of Guenée. In fact, the whole arrangement of the stigmata in this species and its allies is very remarkable, the reniform being situated in contact with an almost obsolete orbicular; the "subreniform," peculiar to this group, situated well forward and directly under the reniform, the claviform being practically obsolete. There is also in some specimens a tendency to the formation of a transverse series of yellow-ochreous spots, between the angulated and subterminal lines. Very little difference is to be observed in the tint of the hind wings in the various specimens, and but slight variation in the width of the central black band in these wings. Guenée writes:—"The imago is easily distinguished by its larger size, its superior grey-brown wings being mixed with yellow and not with white, the inferior wings of a brighter red, the band which precedes the border narrower, with rounded angles" etc. ('Noctuelles,' vol. vii., p. 91). Of the stigmata of *sponsa*, Humphrey and Westwood write:—"The anterior stigma is represented by a J-like mark, and the outer one by a G, very plainly delineated, behind which is a distinct spot, varying in colour, and edged with black" ('British Moths,' p. 250).

Treitschke writes:—"In *sponsa* the fore wings have a dull appearance, yet the following markings are clearly perceptible. At the base stands an incomplete, further on a complete, transverse line. The broken one is brown and yellow, the complete one forms irregular arches and is yellow with a blackish border on both sides. The middle area of the wing is the lightest, and is chiefly of a whitish-grey colour mixed with yellowish. In it is found the ochreous reniform, which, on the outside, is surrounded with whitish teeth but bordered with black; below it stands a flame-shaped spot, thinly scaled and which appears transparent when held against the light; the second line and the zigzag line are special characters in *sponsa* and distinguish it from *dilecta*. The elbowed line turns towards the inner margin in many small black arches. At the end towards the inside, is an arrow-shaped whitish streak. It is black, and a second line which runs parallel is dusky and indistinct. In *dilecta* the second line consists of two strongly-marked dark streaks, which, after having formed a comparatively larger M, runs with a gentle arched curve towards the white arrow. The watered band (outer margin) is more striking in *sponsa*, likewise the zigzag subterminal line, and this latter takes a different course, as it turns from the costa in a more slanting direction, and has a clearer border. The nervures are marked throughout by longitudinal lines and they terminate in a row of dark dots which is situated directly before the dentate, white-spotted fringes" ('Die Schmet.' etc., vol. v., pt. 3, pp. 344-345).

The Linnæan description of the type is as follows:—"Phalœna. *Noctua spirilinguis cristata, alis griseis; inferioribus sanguineis; fasciis duabus nigris, abdomine undique cinereo.*" "Facies *Ph. pactæ*. Abdomen undique cinereum. Alæ superiores supra fusco griseo undulato-nebulosæ. Punctum pallens juxta maculam lunarem. Subtus nigricantes ciliis marginalibus fuscis inter dentes albos. Inferiores supra saturatissime rubræ; fasciæ 2 atræ undulatæ. Margo ciliaris cinereus. Subtus sanguineæ fasciis 2 nigris, quorum anterior arcuata in orbem. Margo ciliaris albo punctatus" ('Systema Naturæ,'

xiith., p. 841). From this it will be seen that Linnæus had a suffused brown form before him when he described the species.

a. var. *rejecta*, Fischer.—Fischer de Waldheim in the 'Entomographie de la Russie' etc., i., p. 197, describes and figures a specimen with black hind wings, which Staudinger refers, as a probable aberration, to this species, simply noting:—"Alis posterioribus nigricantibus" ('Catalog,' p. 137). Guenée also treats this as a variety of *sponsa* and writes:—"It differs according to Fischer de Waldheim (for I have not seen it in nature) by the inferior wings being entirely black, with a clear rosy line situated behind the place of the median band. The anus is rosy. The superior wings have a more bluish and more unicolorous appearance, and the white spot which precedes the ordinary stigma is paler and larger. I look on this as an accidental variety" ('Noctuelles,' vol. vii., p. 91).

Catocala, Schrk., *promissa*, Esp.

This species loses to a great extent the ochreous tint characteristic of the fore wings in *sponsa*, and the ground colour is essentially either lighter or darker grey, whilst the central band is in this species, much more persistent and marked, it being the rule for it to be fairly complete, especially where it is in contact with the basal line. The angulated line is very much curved under the stigmata and meets the inner margin quite close to the basal line, in fact, in some specimens, they appear to meet. Guenée writes:—"Engramelle represents (fig. 569 g) an accidental pale variety, and in 569 i k, on the contrary, a variety with the inferior wings of a red colour almost black, obtained from the collection of Gerning. Care must be taken not to confound with this species, fig. 3 of Roesel, and 569 h of Engramelle which represent *sponsa*" ('Noctuelles,' vol. vii., p. 90). Esper's diagnosis of the type is as follows:—"Noctua spirilinguis cristata alis cinereis nigro alboque nebulosis: inferioribus sanguineis fasciis duobus nigris, prima tenuissima, angulata; abdomine cinereo" ('Die Schmet. in Abbild.,' p. 116). Treitschke writes:—"Promissa is, in size, much like *sponsa*, but often smaller. The ground colour is whitish-grey mixed with yellow-brown and having black hairs and coarse scales. The thorax and collar of the same colour, the latter darkly bordered and tinged with yellow; the shoulder blades have a blackish border; the body above yellowish ash-grey, below whitish-grey; chest yellowish-white; the antennæ brown-grey; legs black with white rings. The whitish-grey fore wings are clouded with yellowish and black shades. The basal area has two very distinct transverse lines, both black, which form a band filled out with yellow or grey. In the middle of the wing stands on a light streak, the reniform, and below, an irregular round spot surrounded with black, peculiar to the species of this genus. The elbowed and subterminal lines are bordered by rust-coloured bands; the former is shaped like an M at the reniform, and is more indistinct than the light (white), brown-bordered subterminal line, which runs quite straight, the fringes are brown and black, spotted with white and black streaks (dashes) towards the inside and are crossed by dark lines." Of its variation he further writes:—"Promissa, like its congeners, is subject to considerable variation in colour and size. Like *sponsa*, its colour varies from black-brown to yellow;

in size, it is almost as large as that species; but we have specimens of scarcely half its size—like *hymenæa*. No doubt Hübner's var. *mneste*, to which he has added, also, a rarer, but well-known brown var. of the larva, belongs to this species. This is already mentioned in 'Pap. d' Europe,' vol. viii., p. 86" ('Die Schmet. von Europa,' vol. v., pt. 3, pp. 349-351). There is, as remarked by Treitschke, very considerable variation in the size, in the amount of mottling on the anterior wings, and in other minor characters. On the hind wings, the central black band is generally more or less complete to the anal angle, but occasionally does not quite reach it, thus forming what is known as the var. *mneste* of Hübner, a form so insignificant, that it is scarcely worthy of special notice.

a. var. mneste, Hb.—Guenée writes of this as follows:—"This supposed species appears to me entirely imaginary. It is founded particularly on the fact that the median band of the inferior wings does not quite reach the anal angle, for if one attempts to apply the other differences, Hübner and Esper do not agree. It is simply on an exaggeration of the band in his *promissa* (fig. 657) and the white parts of the superior wings, that he has been led to make two species" ('Noctuelles,' vol. vii., p. 90). Hübner's fig. 569 which he names *mneste* is not of quite so deep a red, and the pale parts of the fore wings rather incline to reddish-ochreous. Compared with Hübner's own *promissa* ('Sammlung europ. Schmet.,' fig. 334) there is no distinction, as Guenée would suggest in the quotation above, that in *promissa* the black band on the hind wing reaches the inner margin whilst in *mneste* it does not do so, as in neither fig. 334 (*promissa*) nor in fig. 569 (*mneste*) does the black band reach this margin. However, as some specimens vary in this way it may be convenient to retain Hübner's name for the form. This variety in which the black band on the hind wings does not reach the anal angle is figured by Humphrey and Westwood, Pl. lvi., fig. 4, as *conjuncta*. Of this they write:—"This species is very closely allied to the two preceding, (*sponsa* and *promissa*) measuring about $2\frac{1}{4}$ inches, or somewhat less, in the expanse of the fore wings, which are ashy-brown, varied with darker clouds and dentate strigæ, and a rather pale patch in the whitish central fascia; the hind wings coccineous, with a nearly straight, black, central fascia abbreviated towards the anal angle, and a broad black margin, of which the inner edge is rather more sinuated than the preceding striga, and having a whitish patch on the margin, near the tip of the wing; abdomen ashy-brown. Mr. Stephens states that a specimen has been taken near Dulwich; two other specimens were in ancient British collections of which the localities are unknown" ('British Moths,' p. 250).

β. var. rosea, mihi.—Guenée describes a variety (var. A) of which he says:—"Abdomen entirely of a rose colour" ('Noctuelles,' vol. vii., p. 90). I do not know whether such occur among our British specimens.

VIII. Sub-class:—SERPENTINÆ, Gn.

1. Family:—*Ophiüsidae*, Gn.

Guenée divides the *Serpentine* into four families, of three of which we have representatives in Britain, but only four species are distributed

among the three families, and one of these, *Ophiodes lunaris*, is very rare. Guenée writes of the first of these families, the *Ophiüsidae*, as follows:—"This family is the most numerous of all the NOCTUÆ-QUADRIFIDÆ. One meets here and there some European species, all classified together formerly by Ochsenheimer in his genus *Ophiusa*, but of which each has now become so to speak the type of a separate genus." "The imagines rarely quit the woods or places where the larvæ have fed. They hide during the day in the brushwood, and sometimes come out in the middle of the day to take a violent flight, which is, however, of short duration. They are usually abundant in collections, probably because of their diurnal habits, which allow collectors to capture them at the only time when their excursions would make it practicable" ('Noctuelles,' vol. vii., p. 220).

Ophiodes, Gn., *lunaris*, Schiff.

This species is common in the greater part of Europe during May, but very little is known of it as a British species, very few specimens having been captured. Schiffermüller's description is little beyond a catalogue reference. He writes:—"With a blackish imperfect lunar-shaped spot on the fore wings" ('Sys. Verz.' etc., p. 94).

Of the first occurrence of this species in Britain Mr. Stainton writes:—" *Ophiodes lunaris* ; first enumerated as British in Doubleday's 'Catalogue,' p. ii ; a single specimen was taken by Captain Chawner in Hampshire. Of this species Guenée says, 'common in dry woods throughout Europe in May.' 'The larvæ feed in July on oak'" ('Ent. Ann.,' 1855, p. 16). Of the capture of the second British specimen of this species Mr. Stainton writes:—"A fine specimen of *Ophiodes lunaris* was taken at sugar at West Wickham Wood, May 27th, by Mr. Smith of Walworth ('Int.,' viii., p. 91 ; 'Zoologist,' 7108). This is only the second specimen that has occurred in Britain ; the insect is not rare in oak woods in Belgium, and will probably soon be turned up in greater numbers in some parts of the South of England ; a figure of the insect will be seen on our frontispiece (fig. 4)" ('Ent. Ann.,' 1861, p. 99, fig. 4). Besides these Newman gives "two specimens captured at Killarney, in Ireland, by the late Peter Bouchard" ('British Moths,' p. 468). The most recent records are the capture of one specimen at Brighton by Mr. Trangmar in 1874, *vide* 'Entom.,' vii., p. 164 ; and a specimen in Sussex recorded by Mr. Tugwell, 'Entom.,' viii., p. 164. The last recorded British specimen was captured by Mr. Austin, at Folkestone, in May of the present year, and was reported in the 'Entomologist's Record' etc., vol. iii., p. 132.

2. Family:—*Euclididae*, Gn.

This family is much less extensive than the *Ophiüsidae*, and in Britain we have only two species, both of which are in the genus *Euclidia*. These two species are very common and fly in the sun, and, although so different in colour and markings, their habits are very similar. Guenée writes of the *Euclididae*:—"They are easily recognised in all their states. The imagines are recognised by their appearance which is slightly Phalæniform or Pyraliform, by their slender and almost smooth abdomina, by their very long feet, very slender and scarcely furnished with scales, by their short and closely grouped palpi,

of which the first joint is short and much less distinct from the second than in the preceding family (*Ophiuoidæ*)” etc. (*Noctuelles*, vol. vii., p. 280). Of the genus *Euclidia* the same author writes:—“The imagines inhabit northern countries by preference. They are very lively and fly in the bright sunlight, but this flight is not of long duration, and they soon settle on the neighbouring flowers to those they have just left, until a new caprice or the steps of pedestrians disturbing the grass at some distance, compel them to repeat such manœuvres. Nearly all the *Euclididæ* have been known to authors, but as those of Southern Russia are very rare they have sometimes been twice described. The most common of all is *glyphica* which is found here in great abundance” (*l.c.* p. 291).

Euclidia, Och., *mi*, Clerck.

The markings on the fore wings of this species almost defy description, but, looked at sideways, the most striking of them bear a rough resemblance to a Punch's face, the orbicular being the eye, the linear reniform the mouth. The wings are usually fuscous with ochreous markings which show up distinctly. Sometimes, however, the markings are not distinctly paler, but blend with the ground colour, the specimens then becoming decidedly more unicolorous. Scotch specimens from Perth in my collection, have the pale parts of the wing whitish-grey, and the dark parts greyer than is usual in our South of England examples. They are also much smaller. In the hind wings, the base sometimes contains three clearly distinct ochreous or whitish spots, at other times there is only one spot. The central transverse line sometimes forms a complete ochreous or whitish band, at other times it is in the form of spots, the divisions of the spots being formed by the dark nervures.

Clerck's type of this species may be thus described:—“Anterior wings greyish-brown with two white transverse basal lines, followed by another just below the orbicular. Through the reniform area another white much curved line reaches the one before the orbicular, and is followed by another bent one which joins the last about half-way down its length. The subterminal is also white. The orbicular is white enclosing a black dot. There is no reniform. Hind wings with a central white band, also two white dots near the base and a row of marginal dots” (*Icones*, pl. 9, fig. 5). This type figure has a very different character in the markings to most of our specimens. Instead of the bent line through the reniform area, we get a white mark resembling the letter **┌** (placed sideways), and then the next (which equals the elbowed line) is continued under the stigmatal areas to join the basal line nearest the orbicular. In the hind wings, too, the centre of the wing generally has a transverse row of dots and not a complete white line. The markings on the fore wings, as may be gathered from the above, are subject to a considerable amount of variation, and run into each other almost indefinitely in a long series. Those on the hind wings vary in the same way both in number and size. The ground colour varies considerably from a blackish-grey to black and sometimes brownish. The pale markings of the wing are either white or ochreous, the white form being Clerck's type, although Staudinger appears to have considered the form with yellow markings the type,

for his diagnosis of Cyrilli's *litterata* is:—"Alis albo non flavo pictis" ('Catalog,' p.135); the form with the wings with white markings is, however, really the type, and not that with yellow markings as apparently assumed by Staudinger. Hübner's figure 346, has the pale markings of the fore wings of a faint slaty tinge, those on the hind wings being ochreous; the markings are however, normal, with the T well developed. Treitschke also, as well as Staudinger, refers to Cyrilli's *litterata* as the variety. As I have just previously mentioned, the white form is Clerck's type, the ochreous, and by far the more common form, being the variety. Of Cyrilli's *litterata*, Treitschke writes:—"There are varieties which are very white on the upper surface and in which the normal yellow on the hind wings is almost white. These are the *Ph. litterata* of Cyrilli. There are, on the other hand, other specimens very dark, almost reddish-brown, dusted strongly with black on the hind wings; the former (pale specimens) are mostly males, the latter females" ('Schmet. von Europa,' vol. v., p. 397). Comparison with the description of Clerck's figure, will at once show that it and *litterata* are identical.

a. var. ochrea, mihi.—Both the anterior and posterior wings with the ordinary pale markings ochreous instead of white. This is by far the commoner form in Britain and probably on the Continent, and is erroneously treated as the type by Treitschke and Staudinger. The yellow form is the var. A of Guené who writes:—"The spots on the inferior wings of a yellow-ochreous tint. Southern France and Catalonia" ('Noctuelles,' vol. vii., p. 292).

Euclidia, Och., *glyphica*, Linn.

The Linnæan description of *glyphica* always suggests to me the markings of its congener *mi*, which certainly resemble "hieroglyphics" more than do those of this species. In some specimens, the ground colour is darker than in others, whilst a few have a decidedly greyish tint. There is also considerable difference in the intensity of the transverse lines, and in the darker specimens the basal line is merged in the ground colour. A dark transverse fascia is frequently formed by the darkening of the ground colour between the elbowed line and the central shade; sometimes this dark band has conspicuously paler edges, at others, only the central fascia and angulated line are darker, the space between being paler. The dark costal spot near the apex also varies in size, sometimes being quadrangular in shape, at others triangular, and occasionally it forms only a simple lunule. In the hind wings the yellow is paler in some specimens than others, and this is generally so with those that have paler fore wings. The dark transverse line parallel to the outer margin is sometimes complete. The dark basal patch is sometimes continued on its upper and outer edge so as to form a solid block, whilst it is frequently continued to the transverse line just mentioned. The nervures black, sometimes much shaded and encroaching on the ground colour, giving such specimens a very dark appearance and reducing the yellow to a minimum.

The Linnæan description of the type is as follows:—"Noctua seticornis lævis, alis patulis fusciscentibus maculis hieroglyphicis nigris; subtus fascia nigra." "Geometra similis; aë characteribus

anomalis fuscis, luteo marginatis cum puncto nigro ("Systema Naturæ," xth., p. 510). Treitschke writes:—"The female is usually larger than the male and generally has the fore wings browner and the hind wings dusted more with black" ("Die Schmet. von Europa," vol. v., p. 392).

a. var. dentata, Led.—Lederer's *dentata* is described by Staudinger simply as:—"Multo pallidior major" ("Catalog," p. 135).

3. Family:—*Poaphilidæ*, Gn.

This family is particularly abundant in North America, but with very few European species and only one of these British—*Phytometra* (*Prothymia*) *viridaria*. Guenée writes:—"In the perfect state the *Poaphilidæ* have the same habits as the *Euclididæ*, to which they are otherwise related in their organisation, that is to say they fly by day amongst low plants, on which they frequently rest. The species appear to be very numerous and near to each other, and judging from the number which are sent to us from North America, they are not rare in the clearings of the forests. It is only most astonishing that almost all are undescribed, and that authors, who have figured so great a number of species from Guiana (America), a country where they should probably be found, have not given us a single species" ("Noctuelles," vol. vii., p. 295).

Prothymia, Hb., *viridaria*, Cl.

This species exhibits a considerable amount of variation, some of the specimens being of an uniform dull olive-grey, others of a bright green banded with purple. This variation is not sexual, although the males are more frequently of the former, and the females of the latter coloration. Other specimens again have the normally green parts, brown. There are other minor variations, but the forms just mentioned are those principally taken by the species in Britain.

The following is the description I made of Clerck's type:—"The anterior wings with the basal area green; two parallel red bands in the reniform area pass from the costa to the inner margin; the extreme outer marginal area beyond the subterminal, blackish. Hind wings green with three red lines" ("Icones," pl. 9, fig. 12).

Hübner's *ænea* (fig. 350) has the fore wings olive-grey, rather than green, otherwise the red bands &c. are quite typical. Treitschke writes of this species:—"Ænea is of the size of *latruncula*. The ground colour of the whole body and the fore wings is generally a bright metallic green, but in some specimens the colour is brownish-grey with no metallic lustre, like Hübner's fig. 634. Without reason this var. has for some time been called *N. cineta*. The latter coloured specimens are most frequently females, which are also larger than the males. The antennæ are thread-like and rust-brown, legs grey with black dots on the joints. The palpi are, in comparison with the head, large, and turned upwards. The fore wings have a purple line alongside the costa on an olive-greenish ground merging into brown-grey. In the middle stands a pale spot, and immediately behind it a purple transverse band which is lost towards the outer margin in the ground colour. On the costa, behind the fringes, is seen behind the light green zigzag line a second red band, broader than the first. in

which stand seven small grey dots, which, however, are rarely distinct. The fringes are red but white towards the tip (apex). In many specimens the greater half of the wings is red and only two fine transverse lines are seen. The half of the wings nearest the body is green dusted with red scales. The first red band is sometimes divided by a thin green line. In the grey var., either all the markings are absent or the bands are darker with paler borders. The hind wings are generally metallic green in the middle with a dull red band, then a line, and a second red band against the fringes, which have white tips. In other varieties these markings are suffused, or the whole surface is brown-grey" ('Die Schmet.' etc., vol. v., pt. 3, p. 274).

The following appear to be the forms already described :—

- 1.—Green, with 2 parallel red bands = *viridaria*, Cl.
- 2.—Fuscous, with 2 purple bands = var. *ænea*, Haw.
- 3.—Blackish-fuscous, with darker outer margin = var. *suffusa*.
- 4.—Unicolorous brownish or fuscous = var. *fusca*.

a. var. ænea, Haw.—Of Haworth's *ænea*, that author writes :—" *Phytometra tota fusca, alis anticis fascia obliqua pone medium margineque postice late purpureis.*" " *Alæ omnes subfuscæ seu fusco-piceæ, vel subinde cinerascens, fascia anticarum pone medium subundulata saturatiore, et subinde obsolete purpurascens, utraque marginata colore pallidiore. Palpi recurvi mediocres*" ('Lepidoptera Britannica,' p. 266). The form in which the ground colour is fuscous rather than green, but in which the red or purplish bands are well developed appears to be in Kent commoner than the type.

β. var. suffusa, mihi.—This is Haworth's *ænea* var. *β* of which he writes :—" *Alis fusco-piceis fascia postica subundulata saturatiore*" ('Lepidoptera Britannica,' p. 266). It is very rarely that blackish-fuscous specimens occur in Britain.

γ. var. fusca, mihi.—This is Haworth's *ænea* var. *γ* of which he writes :—" *Tota fusca absque fascia, vel purpureo*" ('Lepidoptera Britannica,' p. 266). It is a most common form, the wings being of a dull brownish or dull olive-brown without any fasciæ or purple bands. It occurs frequently in all our South British localities for the species. Newman writes :—" All the wings in some specimens are dingy olive-brown" ('British Moths,' p. 469). This form is the var. *A* of Guenée who writes :—" The purple colour has disappeared and is replaced by a brown shade differing slightly from the ground colour" ('Noctuelles,' vol. vii., p. 298).

IX. Sub-class :—*Deltoïdes*, Lat.

The *Deltoïdes* are so closely allied to the NOCTUÆ that it is not surprising that Dr. Staudinger included them in the latter class, and there is no doubt that they are more closely allied to the NOCTUÆ-GENUINÆ than are some of the latter Sub-classes and families dealt with. Their ova are of the usual NOCTUA shape, and their larvæ resemble those of the same family. The sub-class *Deltoïdes* consists of three families, the *Platydidæ*, the *Hypenidæ* and *Herminidæ*, of which the first has no representative in Britain, the second contains eight British species, whilst the last contains only seven, and of these some are very rare. The most remarkable character is the presence of a "fan-foot" in most of the

species of *Herminide*. Grote writes of this sub-class:—"This sub-family was formerly regarded as belonging to the PYRALIDÆ. In the vernacular the *Deltoides* are called "Snout Moths," from their long labial palpi. But Herrich-Schäffer showed that in their essential characters they conform to the Noctuid type, *i.e.*, they are *Pyralidi-form-Noctuidæ*. The wings are usually pointed at the tips, the colours are grey and dusky, and the usual Noctuid ornamentation is hardly to be discerned. The eyes are naked. They fall into two principal tribes. The character of this sub-family becomes again largely European. As the name "Snout Moths" refers to this sub-family, I have called the PYRALIDÆ by the name of 'Sparkler Moths' " ('Canadian Entomologist,' vol. xxii., p. 146).

Guenée divides the *Deltoides* into the three families just mentioned, *viz.*, the *Platydidæ*, *Hypenidæ* and *Herminidæ*. He, however, maintains their distinction as a family separate from the NOCTUÆ and criticises at length Herrich-Schäffer's arrangement. This latter author certainly makes some unaccountable changes, and, although one understands his reasons for removing *Herminia* and *Hypena* into the NOCTUÆ; the removal of *Schranckia* (*Tholmiges*) *turfosalis* and *Rivula sericealis* into the *Nycteolidæ* with *Sarrothripa undulans* (*revayana*), *Halias chlorana* and *H. prasinana*; and that of *Sophronia emortalis* into the *Leptosidæ* with *Aventia flexula*, *Phytometra cenea* (*viridaria*) etc., are quite inexplicable. At the same time, Guenée saw that the group had nothing in common with the true PYRALIDÆ, for he wrote:—"It is impossible, certainly to leave the species included in the *Deltoides* with the true PYRALITES, of which the larvæ, habits, neuration and other characters are so different; and, without uniting them altogether with the NOCTUÆ from which they are isolated by their early stages, by their palpi, by their slender bodies, by their habits etc., one is able to make, like Latreille did, a separate division which will connect the true NOCTUÆ with the PYRALES properly so called" ('Histoire naturelle des Lep.,' vol. viii., p. 4). He then adds:—"The organs of the perfect insects are much more curious than their early stages. In this respect, this division is perhaps the most interesting of the nocturnal Lepidoptera. It is that in which Nature has more frequently broken the general rules which she has laid down and made exceptions, the reason for which almost always escape us, and which on that account, we dogmatically call caprice, accustomed as we are to measure its inexhaustible fecundity from our own standpoint and knowledge, resigning ourselves to admire only, that which we cannot understand. Perhaps if we could see further, these apparent chances would appear to us as full of motive and as necessary as those organs, the ingenious simplicity of which we so much admire" (*l.c.* p. 5). Guenée then describes the various organs at length. Of the feet he writes:—"The feet yield in no way to the antennæ for the exceptional appendages which have their origin on the first pair. It frequently happens that the latter is swollen, as we have already noticed in some NOCTUÆ, into a kind of sheath which contains the joint itself, and further into a brush of silky hairs which the insect expands at will. At other times, instead of a sheath, the leg carries a sort of broad tuft of reclining hairs, whilst lastly, a second tuft is sometimes found at the upper extremity. There are some species in which

these two or three appendages are united; others carry simple, genicular fasciæ which spread out like a fan. In some cases, the first joint of the tarsus is itself covered with hairs, and we experience great difficulty in distinguishing the following joints beneath this hairy covering. Lastly, a great number have simply the tibiæ furnished with a thick covering of scales which widen towards the extremity as in many NOCTUÆ. The leg and the thigh of the same fore feet vary also in length" ('Histoire naturelle' etc. (Deltoïdes) pp. 4-7).

1. Family:—*Hyppenide*, H.-S.

This family consists of eight British species, of which *Madopa salicalis* and *Hyppena obsitalis* are rare with us, and *Hyppenodes albistrigatis* exceedingly local, the other species being, however, fairly common. Only one species *Hyppena rostralis* shows any tendency to vary largely, but this exhibits a fairly wide range of variation. The raised tufts of scales on the fore wings of the latter species are very marked.

Of the *Hyppenide*, Guenée writes:—"Intermediate between the two other families of this division, the *Hyppenide* are almost, so to speak, the type of the *Deltoïdes*, for whilst the *Platydidæ* incline more to the NOCTUÆ, the *Herminidæ* incline more to the PYRALES. The *Hyppenide* have, on the contrary, a distinct facies, and if one could find a distant resemblance to another group of the lepidoptera, one would be inclined to turn to the GEOMETRÆ as was done by the old authors. The points which give some show of reason for this are—the large and slender wings, the similar Phalæniform flight, the larvæ also slender and somewhat pointed at the extremities. But we must be careful not to carry out the parallel too far, and return to the exact characters of this family." He further adds:—"The larvæ have only fourteen feet, and this character alone if it subsequently confirmed itself would isolate them strikingly from *Herminidæ*. The imagines have the inferior wings generally more developed and pleated; their colour is almost always unicolorous and without markings. The species which have an areole are still in the majority here. The palpi are always similar in the two sexes, nearly always straight and broad, at times slightly arched, but rarely so much bent as a scythe and never turned backwards. The antennæ are always without knots or tufts of scales, and the fore legs have not presented hitherto tufts of hairs" ('Histoire naturelle' etc. (Deltoïdes), vol. viii., p. 17).

Madopa, Stphs., *salicalis*, Schiff.

This is a rare species in Britain, although occasionally captured in our southern British counties, especially Kent and Surrey. The specimens I have seen have exhibited no marked variation. The species is described and figured by Schiffermüller and Denis who write:—"Alis cinereis: anticis strigis tribus obliquis fulvis, antennis pubescentibus," which are exactly the words of the description of Fabricius in the 'Mantissa,' p. 219, to which, however, Fabricius afterwards added:—"Statura obtusa fere Pyralidis. Strigæ alarum e flavo fulvoque compositæ" ('Entom. System.' etc., p. 227). This rare species is readily recognised by its slaty (bluish) tint, and three distinct red transverse lines margined internally with yellow. It is

remarkable that it is not more frequently found among sallows in our southern counties.

Hypena, Tr.

This genus contains the two most common species of the *Hypenide*, viz., *proboscidalis* and *rostralis*. The rare *obsitalis* is probably overlooked, owing to its similarity to the common *rostralis* which varies considerably. It is in this latter species, too, that the tufts of raised scales on the disc are best developed. These occupy the stigmatal areas, and often the median line. Guenée writes of the genus:—"The imagines have a Phalæniform aspect and may be easily recognised by their straight, extended palpi, sometimes three or four times as long as the head. These palpi are ornamented with very coarse scales on all their joints; the second, generally, only varies in length, but in the third, the form is very different in the various species. In the majority of cases it is sécuriforme, elbowed with the preceding and ending in a fine little point. But this form, which is usual in many of our European species, is far from being general. Thus in *H. scabralis* and *H. erectalis* the point is entirely suppressed and the joint has an almost rectangular form; in *namaqualis*, it equals the second in breadth and its form is almost oval; in *secularis* it is the second itself which broadens more than usual etc." ('Histoire naturelle' etc., (Deltoides), vol. viii., p. 26).

Grote writes:—"The type of this tribe (*Hypenini*) is the European *Hypena proboscidalis*. The hind wings are unicolorous and subordinate to the primaries, which show the usual Noctuid markings more or less distinctly. The body is sometimes tufted, the brush-like antennæ are simple. In *Bomolocha* the eyes are lashed, but this character has nothing to do with the hairiness or nakedness of the eye itself, which, in the *Deltoidina*, so far as I know, is always naked. This nakedness is a general characteristic of the lower moths. I know of only one Geometrid with hairy eyes. The genera in my 'Check List,' down to *Hypenula*, referred to this tribe, should probably be included in the preceding" ('Canadian Entomologist,' vol. xxii., p. 147).

Hypena, Tr., *proboscidalis*, Linn.

This is a very common species, but unlike *rostralis* does not appear to vary to any appreciable extent. The Linnæan description of the type is as follows:—"Pyrælis palpis porrectis approximatis thorace longioribus, alis cinereo-griseis: strigis ferrugineis" ('Systema Naturæ,' xth., p. 533), which he afterwards altered to:—"Pyrælis palpis porrectis approximatis thorace longioribus, antennis pectinatis, alis grisescentibus strigis ferrugineis" ('Systema Naturæ,' xiith., 881). This is hardly a description which commends itself as applying to our British specimens, which are hardly "greyish with ferruginous strigæ." Guenée says:—"It varies very much, above all in the colour and the distinctness of the lines. Linné appears to have made his description from very well marked specimens" ('Histoire naturelle' etc. (Deltoides), vol. viii., p. 31). Unless the Scandinavian specimens are very much greyer than ours, I am scarcely able to apply the description to the species, as we know it in Britain, at all. Our British specimens are almost entirely brown, but of two distinct shades. One of a dark fuscous

hue, which is certainly sometimes slightly dusted with grey, the other of a much brighter tint. Fabricius in the 'Mantissa,' p. 217, also describes the colour as "griseis," whilst Guenée says they are "of a grey, more or less yellowish, finely marked with darker, with three transverse lines well-marked in reddish-brown" etc. ('Histoire naturelle' etc. (Deltoïdes), vol. viii., pp. 30-31). I am inclined to think the type is a very extreme condition of our darker form and that the brighter tinted specimens are confined rather to the more southern localities for the species. Guenée evidently refers to our more ochreous form in the extract quoted above, where he says, "more or less yellowish," and hence appears to assume that our darker specimens are the grey type which he also terms grey. This being so, the brighter form is described as the variety.

a. var. brunnea, mihi.—As I have just explained, I have treated the darker as the typical form, and would refer the brighter and more ochreous-tinted specimens to this variety. Both the darker and brighter specimens occur in both sexes, the dimorphism in our British specimens being in no way sexual.

Hypena, Tr., *rostralis*, Linn.

This is the most variable and probably most common member of the family. The ground colour varies from a bright ochreous to a dingy blackish, and the markings, in some specimens very clear and distinct, are in others almost obsolete. The Linnæan description of the type is as follows:—"Pyralis palpis porrectis thorace longioribus, alis subgriseis punctis duobus muricatis striga interjecta nigra." "Alæ posteriores pallidiores; in area anteriore linea nigra utraque extremitate terminata puncto eminente. Palpi approximati" ('Systema Naturæ,' xth., p. 533). Guenée writes:—"This species varies very much. I consider as the type those specimens of a testaceous-grey colour with clear markings, but with the band concolorous which follows the median line" ('Histoire naturelle' etc. (Deltoïdes), vol. viii., p. 32). The characteristic markings consist of a distinct central transverse line (agreeing almost with the ordinary elbowed line) situated just outside the reniform; a blackish line from the reniform to the orbicular, both stigmata being indicated by raised tufts of scales; the orbicular by a pale round tuft, the reniform (and claviform also) by a dark round tuft. This is in the well-marked specimens. In those less well marked the wings become unicolorous. The following is an attempt to classify the various forms:—

- 1.—Ochreous or greyish-ochreous, with distinct markings (as described above) = *var. ochrea-variegata*.
- 1a.—Ochreous or greyish-ochreous, unicolorous = *var. ochrea*.
- 2.—Dark grey-brown, with distinct markings = *var. variegata*.
- 2a.—Dark-grey or grey-brown, with ochreous costa = *var. radiatalis*, Hb.
- 2b.—Dark-grey or grey-brown, unicolorous = *var. palpalis*, Fab.
- 3.—Pale greyish, with distinct markings = *rostralis*, Linn.
- 3a.—Pale greyish, with pale costa = *var. vittatus*, Haw.
- 3b.—Pale greyish, unicolorous = *var. unicolor*.

a. var. ochrea-variegata, mihi.—Anterior wings of a pale ochreous or greyish-ochreous colour, with the normal dark markings in the

centre of the wing and also the central transverse line. Taken, but not very commonly, with the darker forms in the South of England.

β. var. ochrea, mihi.—Of the same ground colour as the former, but with the characteristic darker markings quite or almost obsolete. This pale unicolorous form is comparatively rare.

γ. var. variegata, mihi.—This is Guenée's var. **A** of which he writes:—"The ground colour of the fore wings more marbled; the band which follows the median, white, divided by a brown line. This is found principally in southern countries. It has also its sub-variety with a pale costa" ('Histoire naturelle' etc. (Deltoïdes), vol. viii., p. 32). The ground colour is of a dark grey tint, marbled with rich brown transversely, and with distinct and characteristic markings. It is not at all an uncommon form in the South of England. This is a parallel variety to the type which is also a well-marked form, this being darker, however, and more richly variegated with brown transverse fasciæ which are frequently intersected by paler lines.

δ. var. radiatalis, Hb.—Of Hübner's type I made the following description:—"Anterior wings brownish-grey, with a somewhat reddish-ochreous patch running longitudinally along the costa from the base to the apex, narrow at both extremities and somewhat broader in the centre; a central black spot surrounded with whitish; the nervures dark and showing very distinctly. Hind wings grey, with the base paler, and a small dark lunular spot" ('Sammlung europ. Schmet.', fig. 134). Of this variety Staudinger writes:—"Alis anterioribus nigricantibus, regione costali lutescente" ('Catalog,' p. 142). This does not agree with the type of the variety, as Hübner's figure certainly cannot be said to be "alis anterioribus nigricantibus." Guenée writes:—"All modern authors refer *radiatalis*, Hb. here, which Hübner himself would have subsequently recognised as a simple variety, and of which Treitschke affirms having seen the original in the Radda collection. The latter author even affirms that this form has been bred from the larva of *rostralis*. The variety should be reddish, with the costa clearer and with no other markings than those of the nervures which are black. But that which naturally causes much doubt is the fact that the four wings are completely rounded. It can only be considered at all events an accidental variety" ('Histoire naturelle' etc. (Deltoïdes), vol. viii., p. 32). This form with the pale costa is not uncommon in the Southern counties of England. It is a parallel variety to the var. *vittatus* of Haworth.

ε. var. palpalis, Fab.—Guenée describes a variety which he refers to the *palpalis* of Fabricius as:—"Entirely of a very dark brown, sometimes absolutely without markings, often with the trace of the ordinary lines, but not distinct. The apical streak and the cellular points remain in all specimens." He then adds:—"This variety appears to me to refer to the *palpalis* of Fabricius, which is not, at any rate, the species known by that name by modern authors. The description of his *Geometra hispidata* appears to me to belong also to the same variety. As to the *palpalis* of English authors, it would appear to be the American species, *H. scabratis*" ('Histoire naturelle' etc. (Deltoïdes), vol. viii., p. 32). Fabricius describes *palpalis* as:—"Pyralis palpilis porrectis thorace longioribus, alis griseis; posticis margine crassiori albo" ('Mantissa,' p. 217). This is one of the com-

monest varieties of the species in England, a very large percentage of our specimens being of a dark fuscous colour with the characteristic markings almost, and sometimes perfectly, obsolete.

♂. var. *vittatus*, Haw.—Of this variety Guenée writes:—"The costa, paler throughout its length. This is the only difference which Haworth himself suggests, who recognised, otherwise, that it might be only a simple variety" ('Histoire naturelle' etc. (Deltoïdes), vol. viii., p. 32). This is a parallel variety to var. *radiatalis*, Hb., but has the ground colour somewhat paler. It is not at all an uncommon form in various localities in the South of England. Haworth's description of *vittatus* is as follows;—"C. (The cream-edged Snout) alis acutis subretusis griseo-pallidis, fusco subnebulosis, stria lata seu vitta recta costali flavicante." "Expansio alarum 1 unc. 2 lin. Costæ anticarum vittâ flavicante priore (*rostralis*) solat discrepat. Forte mera ejus varietas" ('Lepidoptera Britannica,' p. 367).

η. var. *unicolor*, mihi.—This is one of the commonest forms of the species in Britain, a large percentage of our specimens being of a pale greyish-fuscous colour without distinct markings. It is a parallel form to var. *palpalis*, Fab., but is paler in colour, both being almost equally common.

Hypena, Tr., *obsitalis*, Hb.

This rare species was first recorded as British by the Rev. O. Pickard Cambridge, who wrote:—"On the 21st of September last, I captured a moth unknown to me, at rest on a door jamb in my flower garden. It was evidently a *Hypena*, but quite distinct from either of our known British species. My old friend, Mr. F. Bond, has kindly compared it with specimens in the British Museum collections, and determined it to be *Hypena obsitalis*, Hüb., not before recorded as British" ('Entomologist,' xvii., p. 265). This notice was accompanied by a woodcut of the species, and a footnote from Mr. Carrington, the Editor of the 'Entomologist,' who wrote:—"From *Hypena rostralis*, which is our nearest allied species, *H. obsitalis* differs considerably in having somewhat longer anterior wings, which are pointed and more mottled with black than in *H. rostralis*. The best character for identification is the angular or elbowed line across each anterior wing. In *H. obsitalis* these wings are brown, and, in addition to the black markings already mentioned, are some of an obscure pale yellow colour. In our collections this addition to our fauna will follow *H. rostralis*. The figure above is taken from a Continental example of *Hypena obsitalis*, formerly in the possession of the late Mr. Henry Doubleday, and closely resembles the specimen recently captured by the Rev. O. Pickard Cambridge" ('Entomologist,' vol. xvii., pp. 265-266).

Of Hübner's types I made the following description:—"Fig. 164, ♀ (?). Anterior wings pale grey, very slightly ochreous, much mottled with fine black longitudinal markings, with a broken black basal line; the elbowed line slightly marked, with a faint costal patch towards the apex. The hind wings dark grey." "Fig. 165, ♂. Anterior wings brownish with greyish inner margin, two round black dots in the centre of the position of the basal line. The orbicular black, with another dot below it near the inner margin. A series of short blackish-brown longitudinal dots takes the place of the

elbowed line, and three longer longitudinal blackish streaks run from the outer margin just below the apex. Hind wings dark grey" ('Sammlung europ. Schmet.,' figs. 164-165).

Mr. South describes the type as "brown, with numerous fine transverse darker lines; beyond the middle, a thick dark angulated line edged externally with pale brown etc.; the stigmata black, but hardly well defined," whilst he describes a variety from Mogador as:—"Var. *a*. Expanse, 1 in. 5 lines. Fore wings pale reddish-brown, without fine transverse lines; the angulated line is preceded by a broad triangular blackish patch enclosing the stigmata; a smaller blackish patch on the outer margin below apex" ('Entom.,' xxiii., p. 270). I am totally unable to understand Mr. South's description above of what he calls the type, as Hübner's type certainly shows no fine transverse darker lines, these finer lines being longitudinal, nor does it show a thick dark angulated line, which is, in Hübner's figure, restricted to a series of dots. Possibly, Mr. South, simply described the commonest form in the collection under his care, and called it the type without knowing what the real type form was like. Guenée writes:—"The species varies as much as *rostralis*, but it is not very easy to classify its varieties as races, as they pass insensibly the one into the other" ('Histoire naturelle' etc., vol. viii., p. 29). Probably with a sufficiently long series it would be found that this species really passes through as many gradations of colour and markings as its congener, *rostralis*.

The following appear to be the principal forms:—

- 1.—Pale grey almost whitish, with transverse lines broken or indicated by dots = *obsitalis*, Hb.
- 2.—Greyish-fuscous or brownish, with transverse lines obsolete or indicated by dots = var. *unicolor*.
- 3.—Greyish-fuscous or brownish with distinct transverse lines = var. *transversa*.
- 4.—Greyish-fuscous or brownish with dark patch on centre of the costa = var. *costipuncta*.

a. var. *unicolor*, mihi.—This is Guenée's var. **A** of which he writes:—"The superior wings almost entirely brown, and the markings obliterated except the ochreous apical spot" ('Histoire naturelle' etc. (Deltoides), vol. viii., p. 29). This more unicolorous form is, I believe, not at all uncommon on the Continent.

β. var. *transversa*, mihi.—This would apply to those specimens which have the transverse lines distinctly marked, especially the angulated line. It would appear to be also equally common with the preceding and succeeding varieties. It would also appear to be the form previously referred to and described by Mr. South as the type.

γ. var. *costipuncta*, mihi.—This is a very distinctly marked and variegated form, and has, in addition to the normal apical patch and well-developed transverse lines of var. *transversa*, a dark costal patch, situated in the centre of the costal margin, and extending below and enclosing the stigmata. This would appear to refer to the Mogador specimen previously mentioned, and described by Mr. South under the name of var. *a*.

Bomolocha, Hb., *fontis*, Thnb.

There are two very distinct forms of this species, one, with the outer and inner marginal areas of the wing, distinctly whitish; the other with these same parts ashy, and sometimes much shaded with fuscous, specimens of the latter form looking very dark when placed side by side with the former. Besides these, some specimens have the dark costal patch outlined with bright ochreous or brownish, whilst occasional specimens have the dark costal patch extended to the inner margin, absorbing the normally pale area found there and also the somewhat extended pale inner marginal basal blotch. There is also a second line of variation, *viz.*, in the colour of the dark costal patch. In some specimens, this is of a dark chocolate-brown, almost black, in others, it inclines strongly to red. Altogether, therefore, this species offers considerable variation, and it is not surprising that the old authors with their slender material found different names for the various forms.

The darkest form is the type for Thunburg writes:—"Alis deflexis nigris, anticis margine postico cinereis punctis lineaque apicis nigris. Habitat in Hallandia D. Osbeck, in Wermelandia Med. Cand. Holmer" ('Museum Naturalium' etc., p. 72). Guenée's var. **A** would appear to be the type for he writes:—"All the pale parts of the wing of a dark ash-colour, in which the white subterminal dots are conspicuous. The base is powdered with brown and hardly distinguishable from the dark costal blotch which is followed by a very distinct, parallel brown line. The inferior wings very dark. The thorax almost black" ('Histoire naturelle' etc. (Deltoides), vol. viii., p. 34). One readily understands that Guenée would treat this as a variety, the majority of French specimens being of the paler coloration; in fact, Guenée refers Hübner's *achatalis*, fig. 12 (a pale form), to the type. Hübner's fig. 172 is a very extreme form of the darker variety, the whole of the inner marginal and basal areas, and the space between the position of the elbowed and subterminal lines being encroached on and filled up by the dark costal patch. Hübner's *terricularis* is a still more extreme form, with the wings almost entirely blackish-brown. The following is an attempt to classify the principal forms of this species:—

- 1.—Outer and inner marginal areas whitish, costal patch dark brown = var. *achatalis*, Hb. (fig. 12).
- 1a.—Outer and inner marginal areas whitish, costal patch reddish = var. *rufescens*.
- 2.—Outer and inner marginal areas ashy-grey, costal patch dark brown = *fontis*, Thnb.
- 2a.—Outer and inner marginal areas ashy-grey, costal patch reddish = var. *crassalis*, Fab.
- 2b.—The dark costal patch extending completely to the inner margin = *achatalis* (fig. 172), Hb. = var. *suffusa*.
- 2c.—Almost entirely blackish-brown = var. *terricularis*, Hb.

a. var. *achatalis*, Hb.—This is the palest form of the species, with the basal part of the inner margin and the outer margin beyond the angulated line white, the dark costal area extending from the base to the angulated line, of a dark chocolate-brown colour. The description I made of Hübner's *achatalis* is as follows:—"Fore wings with a dark

chocolate-brown costal patch, and with a whitish-ochreous basal patch on the inner margin; the inner margin itself, leading from this basal patch to a whitish-ochreous elbowed line, narrowly whitish; the elbowed line edged on each side with white; the subterminal line wavy and slaty in colour, with a brownish apical streak. Hind wings grey with a darker transverse band and lunule" ('Sammlung europ. Schmet.' (Pyrales), fig. 12). This pale form is not at all uncommon in the South of England.

β. var. rufescens, mihi.—The outer margin to the elbowed line, also the inner margin and basal patch whitish, with the dark costal patch extending from the base to the elbowed line, of a brighter reddish colour than in the former variety. This is also a moderately abundant form in the South of England.

γ. var. crassalis, Fab.—This is the red-brown form of the species with darker grey or ashy outer and marginal areas, which Fabricius thus describes:—" *Pyralis alis anticis fusciscentibus apice cinereis: punctis ocellaribus nigris.*" " *Alæ anticæ fuscae margine tenuiore albo maculato. Margo posticus imprimis interne cinerascens punctis aliquot obsolete, ocellaribus, fuscis. Posticæ fuscae*" ('Entomologia systematica' etc., p. 222).

δ. var. suffusa, mihi.—I take the *achatalis* (fig. 172) of Hübner as my type of this variety as I have never seen one in nature. As he calls another form also *achatalis*, I name this *suffusa*. It has the dark costal patch extending to the inner margin, and filling up completely the normally pale inner marginal and basal areas with dark, whilst at the same time, the dark colour absorbs the elbowed line and reaches the subterminal area, being limited by the pale dots there. The description I made of Hübner's figure is as follows:—"Anterior wings entirely chocolate brown to beyond the elbowed line which is white; the dark apical streak also with a white edging; the outer margin paler. There is no pale basal patch nor any pale mottling as in Hübner's fig. 12. This is Guenée's var. **C** of which he writes:—"Hb. fig. 172. It is a sub-variety of **A***" (which appears to be the same as Thunberg's *fontis*) "from which it differs by the extension of the brown part which completely absorbs the paler part of the inner margin and even the elbowed line also, the dark area being limited only by the series of white dots, which form in this, a continuous dentate line. Besides this, the two apical spots are united into one large blotch, semilunar in shape and edged with white" ('Histoire naturelle' etc. (Deltoïdes), vol. viii., p. 34). Guenée then adds:—"I have not seen this beautiful variety in nature" (*l.c.*). This form is intermediate between the type and Hübner's extreme variety, *terricularis*.

ε. var. terricularis, Hb.—Of this variety Staudinger writes:—"Al. ant. fere totis nigris, exterius albo lineolatis" ('Catalog,' p. 141), whilst Guenée writes:—"I have not seen in nature this *Hypena* which Treitschke refers here as a variety. After the figure of Hübner the shape should be different, the superior wings should be entirely of a dark blackish-brown, with a line on the inner margin, and another median one yellow-ochreous, the latter followed by a

* *Vide* description of this variety in the general notes on this species, *ante* p. 68.

series of large black spots exteriorly edged with white lunules" ('Histoire naturelle' etc. (Deltoïdes), vol. viii., p. 34). The description I made of Hübner's figure is as follows:—"Anterior wings dark chocolate-brown, almost blackish-brown, with a black basal longitudinal streak and a transverse black basal costal streak (part of the basal line); reniform black; a black patch in the centre of the wing below the reniform; the elbowed line paler, brownish at the costa, the lower part lost in the ground colour; the subterminal made of white lunules. The hind wings dark grey with a blackish lunule" ('Sammlung europ. Schmet.' etc. (Pyrales), fig. 163). This is a most extreme form, of which I have seen no representative.

Hypenodes, Gn.

This genus contains only two species—*albistrigalis* and *costæstrigalis*—both of which are British. Stephens included these in his *Cledeobia*, but as he had previously used the latter name in a much more extended form in his 'Catalogue,' the present genus was formed by Guenée and the name *Cledeobia* retained for the principal genus of the family *Cledeobidæ*. Guenée writes of this genus:—"The *Hypenodes* are very delicate little species which fly in the damp and shady parts of woods and which are very rarely met with fresh, the markings of the second species (*costæstrigalis*) especially, being almost always partly effaced. As to its characters, they are very distinct from the other *Hypenidæ* on account of the absence of the stemmætes and by the neuration" ('Histoire naturelle' etc. (Deltoïdes), vol. viii., p. 41).

Our two British species are of much the same size and general appearance, but *costæstrigalis* is to be distinguished by the dark costal blotch before the elbowed line, whilst *albistrigalis* has no dark costal blotch before the elbowed line, the latter being very conspicuously edged with white.

Hypenodes, Gn., *costæstrigalis*, St.

This species appears to be much commoner than its congener in Britain and also on the Continent of Europe. It frequents marshy places and damp woods, in which localities I have occasionally captured it. The type was described by Stephens as follows:—"Alis fusco-cinereis anticis maculâ subtriangulari versus apicem costæ fuscâ, lineolâque obliquâ apicis alba, posticis albidis. (Exp. alar. 10 lin.)." "Wings ashy-brown; the anterior, with a somewhat triangular fuscous patch towards the apex of the costa, bounded by an oblique white streak, which terminates in a pale whitish-ash blotch; the hinder margin is brownish, with a faint waved whitish streak; and on the external edge is a row of detached black lunular dots; posterior wings whitish, with the apex fuscous: cilia of all the wings, fuscous. A rare insect; the only locality I am aware of being in the vicinity of Whittlesea Mere, and near Swaffham in Norfolk, where it was taken by the late Mr. Haworth" ('Illustrations' etc., vol. iv., p. 21). Guenée describes this species and then writes:—"Herrich-Schäffer has confounded this species with *albistrigalis*, in fact his figure represents neither species very exactly. Altogether the elbow of the median line and the pale colour of the inferior wings make me think he had this species before him" ('Histoire naturelle' etc. (Deltoïdes), vol. viii., p. 43).

Hypenodes, Gn., *albistrigatis*, Haw. (*albistrigatus*, St.).

The type of this species is thus described by Haworth:—" *C. alis subfuscis*, fascia lata saturatiore nigro, albo obsolete terminata." "Palpi præcedentium. Alæ anticæ puncto obsolete ordinario post medium fasciæ anticarum" ('Lepidoptera Britannica,' p. 368). Guenée writes:—"The superior wings of a shiny, wainscot-brown, with two fine, black, dentate, parallel lines, not reaching the costa; the second edged with whitish-yellow behind, with the ground colour paler beyond it. Very near to this line, in the cellule, is a small black x. A series of large dots before the fringe, which is alternately marked with yellowish. The inferior wings of a dark ashy-grey, unicolorous, with the fringe faintly marked transversely. The female similar and only slightly darker" ('Histoire naturelle' etc. (*Deltoides*), vol. viii., p. 42).

Stephens writes of this species:—" *Albistrigatus*, Haw.; *Cl. albistrigatus*, Stphs. 'Catalogue', ii., 159, No. 6769. Wings pale fuscous; the anterior with a broad central darker band, terminated near the base by a slender zigzag black streak and beyond the middle by a broader slightly flexuous one; adjoining to which on the inner margin is a whitish space, gradually changing into a dark fuscous. On the hinder margin itself is a row of black dots; a spot of the same colour is in the middle of the disc; posterior wings immaculate. A scarce insect found occasionally within the Metropolitan district, in the vicinity of Darenth village, and also in Norfolk and Devonshire" ('Illustrations of British Entomology,' p. 20).

Tholmiges, Ld. (*Schranckia*, H.-S.), *turfosalis*, Wk., H.-S.

This species was described and figured almost simultaneously by Doubleday, Wocke and Herrich-Schäffer. The description of the latter is as follows:—"Smaller than *Cledeobia acuminalis*. The palpi turned up, sickle-shaped and bare. The middle nervure, towards the base and apex, finer. The colour of the fore wings somewhat reddish and uniform. The first transverse line very indistinct, the next rises exactly at the centre of the inner margin, runs obliquely under the central spot where it turns towards the fringes, and then turns again, continuing as a straight line towards the costa. The curved line runs from the apex to the inner margin (anal angle) turning gradually from the outer margin but meeting it again at the anal angle. The hind wings more reddish-grey than in *acuminalis*, the base paler" ('Systematische Bearbeitung' etc., vol. ii., p. 448).

This species was first recorded as British by Mr. Doubleday, and described by him as *Hypenodes humidalis* in the 'Zoologist' for 1850, App. cv., where he reports it to have been "captured in the bogs of Ireland, in 1848, by Mr. Weaver, and discovered in abundance in 1850, by Messrs. N. Cooke and Greening of Warrington." I have specimens captured in the latter locality by Mr. Collins last summer (1891). Since then it has been taken plentifully by many collectors in various parts of the country. About the same time as the species was described by Doubleday, Wocke described it as *turfosalis*. Concerning this, Guenée writes:—"Very similar in appearance to the preceding (*Hypenodes*), this genus cannot be united with the latter owing

to considerable differences found in the palpi and antennæ. The unique species in the genus was discovered almost simultaneously in Germany and in England some years ago, and published by Doubleday under the name of *humidalis*, and by Wocke under that of *turfosalis*. Of these names it is difficult to choose, but the last having been published in the body of (Herrich-Schäffer's) work, appears to be preferable" ('Histoire naturelle' etc. (Deltoides), vol. viii., p. 43).

This is the smallest and most delicate species in the family, and likely to be passed over at first sight as belonging to a different group. It has a somewhat superficial appearance to *Scoparia pallida*. In neuration it appears to be closely allied to *Hypenodes*. Altogether it may be looked upon as forming a link between the *Hypenidæ* and *Herminidæ*.

2. Family:—*Herminidæ*, Dup.

The strangest structural character of this family is the presence on the fore legs of the males, of a large tuft or brush of hair which has obtained for the members of the genus *Herminia* the popular name of "fan-feet." With the exception of the rare *Sophronia emortualis*, all the other members of this family are fairly common, indeed, frequently abundant.

Guenée writes of the *Herminidæ*:—"We now reach the most varied and most interesting family of the *Deltoides*, that in which anomalies abound, and in which the organs differ infinitely. As I have already spoken of them in detail in the general notes I have written on the *Deltoides*, I will only here indicate some differences and the manners of the insects." "The imagines compared with the *Hypenidæ* have the palpi more arched or hooked, like a beak, (some females alone being exceptions to this rule), they offer generally much more variety and difference; such often following the sexes. The antennæ are subject to a crowd of modifications not seen in the *Hypenidæ*. The frontal crest is absent or almost so, instead of forming a sharp prominence between the eyes. The wings are thicker, the inferior wings less developed and always partaking, at any rate towards the anal angle, of the designs of the superior wings. The *Herminidæ* have not altogether the same habits as the *Hypenidæ*. They prefer the shady and even humid parts of woods, although some are found in dry localities. Their flight is short but rapid, and during the day they never leave one hiding place but to seek another. The species of *Herminia* rest under leaves like *GEOMETRÆ*, those of *Helia* settle on tree-trunks like *NOCTUÆ*, whilst *Rivula* frequents marshy fields" ('Histoire naturelle' etc. (Deltoides), vol. viii., p. 45). One recognises the anomalous character of many of the structures in this family, but, besides a certain degree of sexual dimorphism, the British species do not exhibit that great amount of general variation which, as Guenée suggests, characterizes the family as a whole. Of this family which he calls *Herminiini*, Grote writes:—"The type of this tribe is the European *Herminia tentacularis*, to which our North American *Philometra* is related. The wings are concolorous, marked with continuous lines, reminding us of the *Pheocymini* and the *Geometridæ*. The antennæ are often furnished with sexual nodosities. The species fly in grass upon which the larvæ generally feed. One of the most variable *Noctuidæ* known to me belongs to this tribe, *Zanclognatha*

levigata. Our species resemble generally the European, but are much more numerous" ('Canadian Entomologist,' vol. xxii., pp. 146-147).

Rivula, Gn., *sericealis*, Sc.

This species, abundantly distinguished from the remaining *Herminidae* by its bright straw-coloured fore wings, was placed in a separate genus by Guenée, who wrote concerning it:—"This genus, created by me, and adopted by all entomologists, offers numerous striking characters. One sees some connection between its neurulation and that of the genera *Hypenodes* and *Schranckia*, to which it also bears some resemblance in shape: but it is, above all, on the early stages that I would insist here; for, so common as are the larvæ in damp fields, it had not been observed before I noticed it, and what is more, has not been observed since" ('Histoire naturelle' etc. (Deltoides), vol. viii., p. 48). Guenée then describes the larva in detail, remarking on a slight similarity to those of *Pterophorus* and in another direction to those of certain *Tenthredine*,—and also notes that the pupa forms a transition between the chrysalides attached by a simple thread like the *Diurni* and the species of the Geometrid genus *Ephyra*, and those which are placed in a complete cocoon. There has been considerable difficulty connected with the specific nomenclature of *sericealis*, Haworth and Herrich-Schäffer both considering this species the *Phalena limbata* of Linnæus, described in the 'Systema Naturæ,' but it is now pretty well agreed that Linnæus' *limbata* refers to *Ebulea prætectalis*.

There is some slight variation in the colour and shading of our British specimens. Some are much yellower than others, and whilst some specimens are very considerably shaded with dark fuscous on the outer margin, others show little, or no trace of such shading. The reniform is always dark; in some specimens I have, there is a shade running from it obliquely towards the base. This shade is very faintly marked in other specimens. The hind wings of some are entirely pale, in others entirely fuscous, whilst some have the basal area pale with the outer margin fuscous. This would appear to contradict Guenée's idea that this species could not be the *P. limbata* of Linnæus because the latter writes positively of his species "posticæ luteæ, limbo postico fusco," Guenée remarking that this description "applies in no way to this species, this character and the description as a whole being more applicable to *Ebulea prætectalis*." It will be seen, however, that the character emphasised, *viz.*, that the outer margin is shaded with dark fuscous, and which Guenée says does not apply, does really occasionally occur in this species.

The type of this species is thus described by Scopoli:—"Long. lin. 4. Tota subossea sed serici in modum nitens; alis anticis macula obsoleta fuscescente" ('Entomologia Carniolica' etc., p. 242).

Sophronia, Gn., *emortualis*, Schiff.

This exceedingly rare British species, is of an ochreous or ochreous-grey colour, and sometimes has a slight olive tint, with three yellow transverse lines, which do not appear to be always equally distinct or well developed. Guenée very truly observes:—"I agree with Treitschke that the *Geom. olivaria* of Borkhausen

represents this species, however, the latter mentions a subterminal shade which I have not found in any example" ('Histoire naturelle' etc. (Deltoïdes), vol. viii., p. 51). This appears to be unimportant in the group, one of the lines of variation peculiar to this family being the development of transverse shades following the transverse lines. The same author also observes:—"The *emortualis* of the early English authors is only a variety of *derivalis*" (*l.c.*). In Guenée's time the species was not supposed to be British, but since then specimens have been observed which leads one to suppose that probably Stephens' references really belong to the species, and there is but slight probability that Haworth's are erroneous.

The species was considered British by Stephens in his 'Illus. Brit. Ent.,' who refers to "a specimen in the cabinet of Mr. W. Swainson," and one in his own possession captured in Devonshire. Two other specimens were recorded, one in 1858, and another in 1859.

It must be confessed, however, that it would hardly be reasonable to suppose that Haworth's species was wrongly named as he referred it to Hübner's fig. 1, which represents *emortualis*, and at the same time compares it with *derivalis* to which species some writers (among others Guenée) have referred Haworth's description. He certainly puts to his reference to Hübner's figure a mark of doubt, but Haworth knew *derivalis*. Hübner also figures it, so that an actual error was not very probable. Haworth's description is:—"C. (the olive crescent) alis fusco-flavescentibus, strigis duabus lunulaque medio flavescentibus." "Expansio alarum 1 unc." "Statura et magnitudo atque colore C. *derivati*" ('Lepidoptera Britannica,' p. 369). He also adds:—"The above description was taken several years since from Mr. Swainson's collection of English insects" (*l.c.*).

Stephens writes as follows:—"Emortualis, Hb.; *Polypogon emortualis*, Stphs. 'Catalogue', ii., 158, No. 6766. Brown or olive, with a yellowish tinge; the anterior wings with an incurved paler streak towards the middle, a short lunate one in the middle, and a waved one behind; posterior wings with a single pale streak nearly on the hinder margin; cilia yellowish, immaculate" ('Illustrations of British Entomology,' p. 18). He also adds:—"This appears to be a very rare species; a specimen is in the cabinet of W. Swainson, Esq., and I possess one captured in Devonshire" (*l.c.*)

Two later records of this species as British occur. One was made by Mr. H. Cooke of Brighton, who wrote as follows:—"A specimen of this insect (new * to Britain) was captured in this town, on the 18th June, 1858, by Mr. Pocock. Unfortunately the specimen is not in good condition, and it would therefore be difficult to describe it, but a few characters may be given, by which it may be readily distinguished from any other of our *Deltoïdes*. In size it approaches *tarsipennalis*, and when perfect, the colour may perhaps agree with that species, but in the specimen recently captured there is a distinct yellowish tinge; the first line arises on the costa, and descends almost perpendicularly to the inner margin, in this nearly approaching *grisealis*; this line is but

*Stephens' records appear to have been altogether overlooked, unless, as is just possible, these were considered vars. of *derivalis* as mentioned by Guenée. This is probable, as the species is not mentioned in the 'Manual,' by Stainton.

slight and indistinctly represented on the underwing; the second line rises on the costa beyond the middle, and by a slight but uniform curve passes across the wing to the inner margin, and is continued quite through to the inner margin of the under wing: this line does not arise on the costa and then extend towards the outer margin, as in *derivatis*, but the point which actually crosses the costal nerve, is the most distant from the base of the wing; both these lines are well-defined, and appear of a pale yellowish or cream colour, margined with darker on the inner side; the character of the second line would be best understood by a reference to *Ephyra punctaria*, but it is much more boldly defined than in that species. The posterior margin of the reniform stigma is faintly outlined with pale yellow or cream colour. The state of the specimen precludes further remarks" ('Intelligencer,' vol. v., p. 123).

The second capture is recorded as follows:—"About the 12th of July last, I took a fine female specimen of this insect. It has a predilection for sweets, for I took it in company with other sugar-loving *Deltoides* and PYRALIDES. Mr. H. Cooke's description ('Intel.,' vol. v., p. 123) of this new Deltoid, though for the most part correct, was evidently made from a very indifferent specimen, and consequently is imperfect in some particulars. Its colour is a light yellowish olive, dusted with numerous small black spots. A figure of this insect in Wood's 'Index Entomologicus' (first edition, pl. 27, fig. 168) will give a tolerable idea of its colour, though of little else.* The first line seems not to be continued on the under wing. There is a crescent-shaped yellowish marking on the underwing about half way between the base and the tip of the wing, but it does not appear to rise on the costa, and it distinctly ceases before it reaches the middle of the wing; and, if continued to the inner margin, it would strike the second line. I have examined, by the aid of a common magnifying-glass, what seems to be 'the posterior margin of the marking of the reniform stigma,' of which Mr. Cooke speaks, but I cannot trace the rest of the marking of the stigma; and there only appears a yellowish crescent shaped marking, which corresponds exactly with that on the under wing" ('Ent. Weekly Intelligencer,' vol. ix., p. 28). Since then very few examples appear to have been captured, or if captured recorded. I have two specimens which came into my possession with Mr. Coverdale's collection having a "Surrey" label on one of them, otherwise I know nothing of their capture or precise locality.

The 'Systematisches Verzeichniss' reference is little more than a catalogue name, for it only states:—"Grünlichgrauer Zunsler mit zwei gelben Querstrichen." The first really good figure bearing this name is that of Hübner. The description I made of it is as follows:—"Anterior wings dark olive-green with a yellow basal line; yellow inner edge to the reniform; a yellow line nearly straight, replacing the elbowed line; yellow subterminal line. The hind wings of the same colour as the fore wings, with a yellow margin, yellow central transverse line and yellow lunule" ('Sammlung europ. Schmet.' etc., (Pyrales), fig. 1).

* Wood's figure is now generally supposed to represent a variety of *derivatis*.

Herminia, Latr.

This genus is used in its most comprehensive form by Guenée, and includes no less than eighteen species of which the British ones are:—*Derivalis*, *barbalis*, *tarsipennalis*, *grisealis*, and *cribrumalis* (*cribralis*). The genus is subdivided by Staudinger, and he places the British species in the subdivisions as follows:—In *Herminia*—*cribrumalis* and *derivalis*; in *Zanclognatha*—*grisealis*, *tarsipennalis* and *emortalis*; in *Pechipogon*—*barbalis*. Guenée himself recognised the great difference in some of the species, but as other species showed transitional forms, he preferred to keep them united. He writes:—"Since this genus was created by Latreille, it has appeared a natural one to all entomologists, and has been adopted by all authors; however, it is very far from presenting very homogeneous characters, and almost every organ which appears, if one or two species only be consulted, to carry some striking characters, is modified by degrees as we advance. Thus the antennæ, furnished in all with reclining ciliations, are sometimes simply pubescent, sometimes strongly ciliated, sometimes altogether pectinated, and, lastly, are sometimes laden towards the lower part, about a third of the way up, with a fascicle of scales, which forms a swelling or knot on the upper part of the face. The palpi, of which the second joint is regularly arcuated and turned towards the head, and which are simply flattened scales in most species, have sometimes this same joint absolutely straight and ascending obliquely as in *barbalis*, *crimalis* etc., and sometimes furnished above with long upright hairs, as in *cribralis* and *barbalis*. The third joint of the palpi is often similarly constituted as in *crimalis*, and often it varies both in form and direction, since it is sometimes simply elbowed at 45 degrees to the preceding point, sometimes regularly arcuated, and sometimes returning as far as the collar (as in *fractalis*). The feet, which in many species present no peculiarity, have, in other species, the anterior tibiæ enlarged, very velvety, and enclosing some tufts of silky hairs, which under certain conditions are spread out like a fan. Lastly, the wings themselves, and this has escaped every entomologist, offer very important differences, since the areole, of variable form without doubt, but usually well marked and well closed, is completely absent in *barbalis*, in which species the second superior vein gives rise at once to the third and to the last two costal branches. In *crimalis* where the areole exists, the same arrangement of the nervures is to be observed. In the hind wings there is another anomaly, the independent nervure, well isolated in almost all the species, and grafted on the disco-cellular nervure very far from the two following, approaches to them, notably in the case of *derivalis*" ('Histoire naturelle' etc. (Deltoïdes), vol. viii., pp. 53-54). Guenée then criticises their separation into distinct genera as carried out by the English authors and Duponchel, and, on the other hand, the method of Herrich-Schäffer, who includes too many species. He then goes on to say:—"The genus *Herminia*, reduced to the limits I have indicated, are Phalæniform insects of a testaceous or yellowish-grey coloration, which fly in the shady parts of woods and rest under the leaves like *GEOMETRÆ*, but their flight is generally quicker and more irregular than that of the latter. Their larvæ are only imperfectly known. *Barbalis*, which I know

best, has a very characteristic form, and at first sight, one might not look on it as belonging to a species of the lepidoptera. Its flattened form, its drawn-in narrow neck, and its distinctly marked (square-cut) segments, give it a very strange appearance" (*l.c.*). The characters indicated by Guenée as existing in the imago state, have been found to be coupled with similar differences in the early stages, so that the species are now generally subdivided and distributed over the three genera—*Herminia*, *Zanclonatha* and *Pechipogon*.

Herminia, Latr., *cribrumalis* (*cribralis*), Hb.

This white marsh-frequenting species cannot possibly be mistaken for any other. Hübner figured and described it under two names—*cribrumalis* and *cribralis*. His fig. 2 in the 'Sammlung europ. Schmet.' (Pyrales) is remarkably well done. The description I made of it is as follows:—"Anterior wings whitish-grey, with a slight pinkish tinge; a dot in the place of the reniform; a row of tiny black dots in the place of the ^{el}elbowed line; and another row of similar dots in place of the subterminal. The hind wings whitish-grey, with the outer margin slightly darker and a small dark lunular spot." In my specimens of this species the variation is very slight, and chiefly in the direction of the quantity of the black markings and dots. In some specimens, the elbowed line is formed of black dashes, in others of dots, and occasionally it is almost obsolete. The orbicular stigma is also somewhat variable and differs considerably both in intensity and size. Guenée writes of this species:—"This species and the group (*Macrobila*, St.) which it comprises, is characterised by (1) the palpi, which are almost like those of *barbalis*; (2) the antennæ, which have only a slight swelling scarcely noticeable as far as the eighth joint, but which closely resemble in construction those of *crinalis*, but are still more slender; (3) the anterior feet, which are extremely long, although very slender, and furnished with fan-like tufts of scales, but without lateral brushes; (4) and lastly, by the wings which are more slender than the other *Herminia*, without a distinct elbowed line, and with the markings only faintly expressed" ('Histoire naturelle' etc. (Deltoïdes), vol. viii., p. 62).

Herminia, Latr., *derivalis*, Hb.

This species shows very considerable variation in the shading of the ground colour and in the intensity of the markings, and also striking differences in the shape of the angulated line which is sometimes sharply angulated, at others, regularly and slightly curved, whilst it is frequently elbowed with a distinct curve. The basal line varies also, sometimes it is sharply angulated, at others, straight, whilst it is often regularly curved. These lines, too, are frequently, as mentioned by Guenée and figured by Hübner, shaded interiorly with fuscous, this form being the type. The central line on the hind wings also varies much, and is in my own series, in different specimens, either curved, angulated or straight, whilst it is frequently considerably shaded interiorly with fuscous. Guenée writes of this species:—"It varies much in the shade of the ground colour which passes from yellowish-red to an almost testaceous-grey, but it is always of a shade more or less ochreous. I have seen specimens entirely

unicolorous and without transverse lines, and another taken at Domo-d'Ossola, in which the subterminal is very strongly marked, even on the lower wings with contiguous and denticulate lunules" ('Histoire naturelle' etc. (Deltoides), vol. viii., p. 55), whilst he afterwards adds:—"The figures and descriptions of *emortualis* made by English authors must be referred to this species. The description of Stephens would, however, leave us in doubt, if the figure of Wood which was made from his collection did not remove such doubt" (*l.c.* p. 56). If Wood's figure was really made from one of the specimens described by Stephens it would tend to show that the true *emortualis* was really not a British species until 1858 (*vide, ante* p. 74).

The description I made of Hübner's type figure is as follows:—"Anterior wings deep yellow-ochreous, almost brown, with the basal transverse line blackish-brown, the inner edges of the reniform and elbowed line, fuscous, the latter broken towards the centre. The hind wings of the same colour as the fore wings with two transverse fuscous lines and a dark lunule" ('Sammlung europ. Schmet.' etc. (Pyrales), fig. 19).

a. var. obsoleta, mihi.—The anterior wings with the transverse lines more or less obsolete and with no dark shading to these lines.

Zanclognatha, Ld., *grisealis*, Hb.

This dull coloured greyish-ochreous species is very common in the woods in the South of England. It varies considerably in size, the females being usually larger than the males, but not always so. The ground colour of the various specimens is of two shades, some being more ochreous and inclining to brown, others, more grey and looking much paler than their more ochreous brethren. The subterminal line is sometimes very strongly developed. On the other hand, the elbowed line is almost obsolete and lost in the ground colour in one or two specimens in my collection, although, like the subterminal, this is usually well-developed. A lunular mark shows the reniform, through which, in some specimens, run traces of the central shade which is especially strongly developed in one specimen I have. The elbowed line varies in obliquity and sometimes shows traces of being curved. The hind wings vary much in the shade of the ground colour in both sexes. In some specimens, these wings have a distinct central fascia; in others, this fascia is obsolete, whilst on the outer margin, a pale line, edged with darker internally, becomes reduced in some specimens, to a lunular mark near the anal angle.

Hübner gives a very good figure of this species. The description I made of it is as follows:—"Anterior wings brown with a straight dark basal line, a dark inner edge to the reniform, a dark elbowed line and a dark somewhat curved line from the apex to the anal angle. The hind wings grey, with a blackish median transverse line and another near the hind margin" ('Sammlung europ. Schmet.' etc. (Pyrales), fig. 4). Guenée writes of the species:—"This pretty species, the smallest of the European, has the greatest affinities with *tarsicrinalis* and *tarsipennalis*, although it has neither knots to the antennæ nor brushes to the anterior legs. It only varies in size" ('Histoire naturelle' etc. (Deltoides), vol. viii., p. 59). It is the *nemoralis* of Fabricius and also of Stainton ('Manual,' vol. ii., p. 131).

Zanclognatha, Ld., *tarsipennalis*, Tr.

There is very little difference in the tint of the various specimens, but some have the ground colour slightly darker than others. The subterminal line is generally distinct, but the basal and elbowed lines are rather obsolete in some of them. The reniform is only distinct in the better marked specimens. The hind wings also show a central shade in such better marked ones. The pale line parallel to the hind margin of these wings is distinctly marked by a dark inner marginal band in some specimens, although indistinct in others.

This species was well known to the older entomologists, but was confounded with *tarsicrinalis*. Thus Hübner's fig. 5 in the 'Sammlung europ. Schmet.' (Pyrilides) is *tarsipennalis* but he calls it *tarsicrinalis*. It was also known to the British authors, Haworth, Stephens and Wood by the same name. Treitschke first detected and differentiated this species from *tarsicrinalis*, Knoch. He writes:—"I invite our entomological friends in Brandenburg to make a closer observation, and should this really prove to be a newly discovered species, I propose to call it *tarsipennalis*. M. v. Ruhlwein has remarked that the last transverse line varied in different specimens, as it sometimes turned downwards, sometimes it bent more towards the apex and inner margin like Hübner's figure. Can the formerly described differences in the larvæ of *tarsicrinalis* be explained by there being two distinct species?" Guenée writes of *tarsipennalis*:—"This species, generally confounded with the true *tarsicrinalis*, is easily distinguished by the very slightly knotted antennæ of the male, the more rounded wings, the less clearly marked and less angulated lines, the straighter subterminal, the more unicolorous ground colour of the wings, and the absence of the reddish median shade, the anal brush not divided into divergent tufts," etc. ('Histoire naturelle,' etc. (Deltoïdes), vol. viii., p. 58).

The only British species that it resembles is *barbalis*, from which it is abundantly distinct in its browner ground colour and in the direction of the transverse lines, which are, however, almost identical in direction with those of *grisealis*.

Pechipogon, Hb. (rect. *Pechypogon*, Stdgr.), *barbalis*, Cl.

Although Clerck is really the nomenclator of the species it is impossible to look on his figure as representing any particular form of it. The note I made of his figure is as follows:—"The figure is very bad, the palpi, shape of the wings and the direction of the transverse lines all indicate that the species is really *barbalis* as we know it. But the paint has changed colour and is now almost black in all those copies to which I have access. The Linnæan description is also unsatisfactory. Guenée writes:—"A description of this species would be useless when it (the species) can be recognised by the characters of which I have spoken in the general notes, viz.—the second joint of the palpi straight and velvety above, the antennæ strongly ciliated, and the absence of the areole" ('Histoire naturelle,' etc. (Deltoïdes), vol. viii., p. 56). The Fabrician description from the 'Mantissa,' p. 216 is useless, for he only writes:—"Pyrilis palpis antennis pectinatis brevioribus, femoribus anticis barba porrecta."

This comparatively large, grey species, which is rather common in most of the woods in the South of England, is readily recognised by

the 'fanfeet' in the males, and the difference in colour from any of its allies. Our British specimens, or at least those from the South of England offer a slight variation in the ground colour, some being of a dark shade compared with others. The markings are variable in intensity and distinctness, and they also vary somewhat in shape. The hind wings of some specimens are very much shaded with darker on the outer margin, especially towards the centre. There is a distinct sexual difference in the form of the abdomen, but the sexes vary much in size, some specimens of either sex being above, and others below the average size.

a. var. pectitalis, Hb.—The darker form of this species is known as *pectitalis*, Hb. The description I made of Hubner's figure is as follows:—"Anterior wings grey with a slight slaty tinge; the basal line very much bent; the reniform (a linear spot only) and the elbowed line brownish, the subterminal yellowish with a yellowish marginal line just inside the fringe. The hind wings paler grey, whitish along the upper edge where it is in contact with the fore wing with two whitish transverse lines edged with dark grey" ('Sammlung europ. Schmet.' (Pyrales), fig. 122).

TABLE SHOWING THE CHIEF CHARACTERS OF THE SPECIES IN THE
SUB-CLASS *Deltoides*.

To enable British collectors to distinguish readily the species in the *Deltoides*, the following table is appended:—

I. HYPENIDÆ—

- a. Madopa salicalis*—Slaty-grey ground colour—transverse lines reddish edged with yellow.
- b. Hypena proboscidalis*—Large size—brown colour—inner line not indented on the fold.
- c. Hypena rostralis*—Raised tufts of scales on disc of wing—inner line sharply indented on the fold—almost straight elbowed line.
- d. Hypena obsitalis*—Raised tufts of scales on disc of wing—basal (inner) line not so sharply angulated on the fold—distinctly angulated elbowed line—sub-terminal line composed of pale dots.
- e. Bomolocha fontis*—Large reddish-brown or chocolate-brown costal patch at base and centre of wing—inner margin whitish.
- f. Hypenodes costæstrigalis*—With a dark costal patch before the elbowed line.
- g. Hypenodes albistrigatis*—No dark costal blotch before the elbowed line—the elbowed line conspicuously edged with white.
- h. Tholmiges turfosalis*—Of exceedingly small size for this sub-class.

II. HERMINIDÆ—

- a. *Rivula sericealis*—Bright straw colour—dark and conspicuous reniform.
- b. *Herminia cribrumalis*—White colour—purely a “marsh” or “fen” species.
- c. *Herminia derivalis*—Bright yellowish-brown or ochreous brown—subterminal line absent—dark central line crossing both fore and hind wings.
- d. *Zanclognatha grisealis*—Subterminal line runs from the apex of the costa—small size—greyish-brown in colour.
- e. *Zanclognatha tarsipennalis*—Subterminal line runs from before the apex—larger size—deep brownish-ochreous in colour.
- f. *Zanclognatha emortualis*—Yellower ground colour—pale yellow line crosses centre of fore and hind wings continuously—yellow lunular mark replaces reniform.
- g. *Pechipogon barbalis*—Distinctly grey ground colour—size of *derivalis* or *tarsipennalis*.



APPENDIX.

During the progress of this work, I have been able to get the original descriptions of some species which were not forthcoming at the time those particular species were described. Certain articles based on the variation of other species dealt with, have also been discovered or recently written. It has been considered advisable to add the references to such in the form of an Appendix. Notes also on such a species as *Catocala electa*, only once captured in Britain, etc., and not regularly included in the list of British species, are also appended to this part of the work.

ADDITIONS ETC., TO VOL. I.

Gonophora, Brd., *derasa*, L.

Vol. i., p. 2.—*Gonophora derasa* var. *intermedia*, Brem.—The original description of this variety is as follows:—"It is of the pattern of *derasa*, but the dentated line of the fore wings and all the other markings better defined and more distinct. The ground colour of the fore wings is very different and as grey as *abrassa*, Guen. from North America, thus being without the golden yellow colour of the central area found in *derasa*" ('Lepidop. Ost-Sibriens, insbesondere des Amur Landes,' p. 46).

Cymatophora, Tr., or, Fab.

Vol. i., p. 3.—*Cymatophora or*.—Sven Lampa in the 'Entomologisk Tidskrift' for 1885, p. 47, changes the name of this species to *ypsilon-græcum*, Göze, 'Btr.' iii., 3, p. 253 (1781).

Asphalia, Hb., *flavicornis*, Linn.

Vol. i., p. 6.—*Asphalia flavicornis* var. *finmarchica*, Schöyen.—Sven Lampa refers to Schöyen's variety as "morkare." It is described and figured in the 'Entomologisk Tidskrift,' 1881, p. 121, Pl. 1, figs. 3-4. This does not appear to be identical with my var. *scotica*, although very near it, and it is another illustration of the similarity in development between our Scotch and Scandinavian examples of certain species, influenced as the fauna of both countries are by similar meteorological conditions.

Schöyen's original notice of the variety is as follows:—"In my review of 'The Arctic moths of Norway' (p. 187), I have already mentioned this form, from a very worn species received from Sudvaranger, Ostfinmark, as *Asphalia* (n. sp. ?). Recently, I have received from M. Sandberg, several specimens, quite fresh, which were captured in June, 1880, at Kebberwick, near Klostervand in Sudvaranger, almost 70° North latitude, which have proved to be an excellent dark Polar form of *A. flavicornis*. The figures are those of the darkest specimens in my collection, and represent the extreme colour of the Polar form. The others are less dark, although the lightest is darker than the normal form. The markings of the fore wings are less distinct; in one specimen, the transverse lines are entirely absent, and in three others, the greenish-yellow spot has also become invisible; otherwise, the colouring is like that of the normal form. That this species occurred in the Polar region was mentioned by Dr. Tengström, who states 'Catal. Lepid. Faun. Fenn. prac.', No. 200) that it also occurs in Finnish Lapland, but does not mention its variation. In Scandi-

navia, the species, according to Wallengren, was found as far north as Dalarne and Helsingland, in Sweden" ('Entomologisk Tidskrift,' 1881, p. 121).

I have mentioned above that var. *scotica* is not identical with var. *finmarchia*, although both agree in being darker than the type. Our Scotch var. *scotica* has the markings specially clear and distinct, whilst, according to Schöyen's description and remarks above, var. *finmarchia* has the markings less distinct and tending to obsolescence.

Bryophila, Tr., *perla*, Fab.

Vol. i., p. 8.—*Bryophila perla* var. *pyrenæa*, Oberthür.—This local race was described by Oberthür, and the specimens comprised under this name appear to vary considerably *inter se*. The great character of one form appears to be its suffusion with a reddish tint; of the other, the white ground colour of the wings. The former would appear to be therefore an accentuated development of my var. *flavescens*, the latter is a distinctly interesting type with its darker markings of greenish-grey, such coloured markings not being, I believe, met with in Britain, where the markings tend when intensified to bluish-black. Mons. Oberthür's original notice is as follows:—"Common at Mont-louis, but appears to be rarer at Caunterets. This variety offers two types:—The one, with the ground colour of the wings of a yellow which is more or less rosy or reddish, the other, has the ground colour of the wings whitish. The latter is very close to our (French) type of the plains; it is distinguished, however, by its larger size, and more pronounced development of the markings and of the greenish-grey tint. The hind wings are very much shaded with brown above. In the Alps, the type of *perla* approaches very much the Pyrenean type with white ground colour, but I believe that the type with yellow ground colour and that with salmon-red ground colour, are restricted to the Pyrenees. I have figured the type with the yellow ground colour from Caunterets" ('Études d'entomologie,' viii., p. 48). The latter part of the description appears to suggest that Mons. Oberthür would separate the yellow form from the salmon-red form. It is the former, agreeing with my var. *flavescens*, that he figures (*l.c.* Pl. i., fig. 13). His idea that the yellow and red forms are peculiar to the Pyrenees, receives no confirmation with regard to the former, as we get it in England pretty freely, but with regard to the latter, I have not heard of its occurrence elsewhere.

Bryophila, Tr., *impar*, Warren (sub-species).

Vol. i., p. 10.—*Bryophila impar*.—Since my note on *impar* was written, I have had the pleasure and satisfaction of looking through Mr. Farren's series of some 50 or 60 specimens, and also of seeing the insect at large in Cambridge. There is a strong tendency in one's mind at first to assume the complete distinctness of *impar* as a species, because we are so accustomed to consider *muralis* as a coast species, that its occurrence in an inland town is rather startling; but, I believe it (*muralis*) used to be not uncommon on the walls of the Canal Bridge, Old Kent Road, S.E., now quite in London. After having thoroughly considered the matter, I cannot help coming to the conclusion that *impar* is specifically identical with *muralis*, and yet at the same time, the species has undergone by its isolation and peculiarity of environ-

ment sufficient modification to stamp it as a very distinct race, and to give it very marked characters of its own. It varies almost as much as *muralis* in its coast localities, but the green forms are exceedingly rare at Cambridge, thus presenting a marked contrast to *muralis* in its usual localities, where the green is the prevalent form. Occasionally, distinctly green specimens are found, closely resembling the type of *muralis*, and a form closely allied to, and in fact almost identical with var. *par* is also found. But a most striking form of *impar* which I have not noticed in any coast specimens, is a form with the markings and ground colour essentially black and white, the former being, in fact, almost blue-black, and thus forming a parallel variety to *Bryophila perla* var. *suffusa*. I would particularly keep the name *impar* for this form, the γ of Mr. Farren (*vide* below), which appears to be peculiar to Cambridge, and, so far as we at present know, does not occur elsewhere.

Mr. Warren who first described this species, did so under the name of *par*, assuming incorrectly that Hübner's *par* was a species distinct from *muralis*. His original notes on and description of *impar*, (under the name of *par*) are as follows:—"More than twenty years ago, I took a pair of a *Bryophila* at Cambridge, which at the time seemed to me to present decided points of difference from *glandifera*, but both Mr. F. Bond and the late G. R. Crotch, who saw them, referred them to that species as a variety, and I submitted to their decision. I have taken one or two at intervals since; but last year, having captured ten, quite fresh, and observing new points of difference, I sent a pair to Mr. Barrett, who forwarded them to Professor Zeller. The latter, at first, returned them as *glandifera* var. *par*, but has since, Mr. Barrett informs me, agreed with him that they constitute a distinct species. I will, therefore, now proceed to give, as far as mere description can do it, the main points by which I think the two species may be differentiated.

1st. The lines and markings of *B. glandifera* are much more sharply and distinctly marked than in *B. par*, which has, so to speak, a more mealy look.

2nd. Though the lines and markings of the two insects are exactly alike, *B. par* has all the lines starting as *dark spots* on the costa, and a decided dark line at the base of the cilia of both wings, but especially the hinder ones.

3rd. *B. glandifera* retains its green tinge after death, which continues for years if excluded from light. *B. par*, which, when fresh and alive, is of a much paler green, often with a beautiful pink tinge, fades directly it is killed, or when worn, to a dirty brick colour.

4th. While *B. par* has only, so far as I know, been taken in this country, on old walls at Cambridge, *B. glandifera* is, I believe, a coast species.

Lastly. *B. glandifera* runs slightly larger than the nearly allied species. I may add that a form of *B. glandifera* occurs, which has the mealy appearance of *B. par*, but without the dark costal markings and dark line at the base of the cilia, which are always observable in the latter. These differences may appear but slight, but to anyone who sees a row of the two insects, they will, I feel sure, appear sufficient to convince him of their real distinctness" ('Entomologist,' vol. xiii., pp. 225-226, and 'Ent. Mo. Mag.' vol. xvii., p. 115).

Having discovered that *par*, Hb. was actually a variety of *muralis* (*glandifera*), Mr. Warren then further wrote:—"In consequence of the confusion which appears to be made between the mealy-looking variety of *B. glandifera* (*muralis*), which occurs with the typical form on the coast, and which is sold by the dealers as var. *par*, and the *Bryophila* which we take at Cambridge, it will be as well to give the latter, which already has a local habitation, a distinctive name as well. Mr. Stainton, who has seen my series of the Cambridge insect, and considers it certainly distinct from Hübner's var. *par*, said, in his joking way, 'call it *impar*': and by this name I propose to distinguish it for the future. I should add that, besides Cambridge, we must now include Cork as a locality. I have seen specimens, belonging to Mr. W. F. de V. Kane, which he informs me were caught in that neighbourhood" ('Entomologist's Monthly Magazine,' vol. xxi., pp. 22-23).

Mr. Farren writes of the variation of the Cambridge specimens:—"Very little seems to be known about *Bryophila impar*; comparatively speaking, so few have ever been taken, that entomologists have not had a chance of comparing it with *glandifera* (*muralis*). I have made a careful comparison between a long series of each, the result of which may be interesting to many. There is a very great difference in the general appearance, caused chiefly by *impar* being thickly covered with black scales, and the blotch near the base, referred to in the table below as No. 2 marking, being so conspicuously black. This makes the markings very obscure, and causes *impar* to be a much darker-looking moth than *glandifera*.

A long series of *glandifera* shows a greater variety of colour than *impar*. The most frequent form of the latter is grey with a very slight tinge of dull green in it; and I have specimens varying from this to a very dark bluish-grey, which, with the thick covering of black scales, makes it much blacker than any form of *glandifera*. A much scarcer form is dark yellowish-green; and I have one specimen of a very pretty grass-green. The greenish-blue and sandy-coloured forms, as well as two or three shades of green, which are frequent in *glandifera*, I have never seen represented at all in *impar*.

I have been asked several times by correspondents whether I considered *impar* a distinct species, or a variety of *glandifera*. There are several points in favour of and against its being considered a species. It will be noticed in the above comparison of the markings, that although there are several features by which it can be readily distinguished from *glandifera*, yet, with the exception of the basal line, the distinctions lie in the markings of *impar* being less distinct, and in the case of the subterminal line almost entirely so, rather than in any real difference of shape.

The only Cambridge specimen anything approaching *glandifera* that I have seen, was taken by Mr. Alfred Jones, and it forms rather a strong point against its being a distinct species; it has the basal line broken and the distinct subterminal line, as in *glandifera*, but it has the blotch near the base very dark, as in *impar*, and is covered, although not so thickly as is usual, with dark scales. Typical *glandifera*, or anything more nearly approaching it than this one specimen, I do not think has ever been taken in or near Cambridge; if it did occur here, I think I should have taken it, as I look very sharply after *impar* when it is out.

Many entomologists confound *impar* with var. *par* of *glandifera* (*muralis*); this is the greatest mistake that can be made, for, as Guenée describes it, var. *par* is the form having all the markings as distinct as in the type, but of an iron-grey colour instead of black, and is peppered with scales of the same colour, and affords a very great contrast with *impar*. The var. *par* seems to be as common as the type where it occurs; most of my specimens of *glandifera* are from Folkestone, and quite half are var. *par*. In the 'Entomologist Synonymic List,' *impar* is left out altogether, and *par* inserted as a distinct species. Why this is, I cannot imagine, unless the compilers made the mistake of confounding *impar* with *par*; but, if so, why put it as a distinct species?

The earliest date on which I have taken *impar*, was July 27th of this year, and the latest, August 23rd, 1886; but this year I have seen none since August 14th. I have taken it in most parts of the town, but chiefly in one quarter, although even there it is scarce.

Whether it be a species or a variety, it is, I consider, the most interesting insect we take in this district, and will always hold an important place in collections, if not as a distinct species, at least as a very interesting Darwinian one" ('Entomologist's Monthly Magazine,' vol. xxvi., pp. 302-303).

I quite agree with Mr. Farren's notes and remarks on this form, and there can be no doubt that its peculiarities, developed most probably by its isolation and inland surroundings, will always be of the greatest interest to the philosophical lepidopterist. At my request, Mr. Farren has been good enough to write out the following tabulated comparison of *muralis* and *impar*. He writes:—" *Bryophila impar*, Warren, (sub-species of *B. muralis*).—In the absence of any knowledge of the earlier stages, I should not feel entirely justified in describing *impar* as a distinct species, nor can it be considered a mere variety—in the common acceptance of the term,—of *muralis*; a local race of this species it may be, probably is, but so decided a local race has it become, through long isolation from *muralis*, that it has acquired quite a distinct facies, and may well be treated as a sub-species.

To compare the two and enumerate as well as possible the differences between them, I have prepared the following tables:—

1. General or prevailing colour as shown by a long series.

B. muralis.

Ground colour—*clear bright green*,
—*dull green*,—*ochreous brown*,—
yellow,—or *white* faintly tinged
with green; with clear black
and white markings.

B. impar.

Ground colour varying from *blue-
grey*, to *greyish-white*, *yellow-
ish-brown*, or *grass-green*, always
thickly covered with black
scales, and having black and
white markings, but much less
white than *muralis*.

2. Markings.

1.—The first line from the base,
which, without reaching the
inner margin, curls outward
and returns towards the costa,
forming the inner marginal line
of the dark shade which sur-
rounds the orbicular stigma, is
disconnected at its base.

1.—This line is nearly always
unbroken.

- 2.—The dark shade (having in its upper part the orbicular stigma), is clearly outlined with black, and on the side next the base with white; the orbicular stigma (the same colour as the rest of the shade) is indicated by its marginal black line.
- 3.—The reniform stigma and the wavy line beyond it, are both distinct markings.
- 4.—The subterminal line is a clearly dotted black one, with two dark dashes on the inside, one not quite half way from the costa, and the other quite near the inner margin.
- 5.—There are 9 or 10 black spots along the costa.
- 6.—Posterior wings marked with two wavy lines.
- 2.—This shade is so dark as to form a distinct black blotch—so much so, that the margin of, as well as the orbicular stigma itself, is obscured.
- 3.—These markings are very indistinct.
- 4.—Is generally quite obsolete, and only indicated by a light shade. Some distinctly marked specimens, have a portion of it, from the inner margin, just showing the first dash. I know of two specimens having the line almost *entire*.
- 5.—These spots form almost a complete line which is densest near the base, and again about the centre of the costa.
- 6.—These lines entirely wanting.

To summarise from the above, and looking at a long series each of *muralis* and *impar*, the specimens of *impar* will look much darker and not so decidedly varied in colour, blue-grey, rather than green, as in *muralis*, the latter looking smooth and neat by the side of *impar*, the thick, loose look of which is caused by the scattering of black scales (not *ferruginous* as is the case with *muralis* var. *par*, Hb.).

It is not at all necessary to describe either of the sub-varieties of *impar* as the type, nor is it found quite practicable to give the right of precedence to the most frequent form. In the following table I have adopted the method of commencing with the form which most nearly resembles a form of *muralis*, though by no means the type form of *muralis*. At the same time, it happens to be the rarest form of *impar* I have taken.

a.—A sub-var. nearly resembling *muralis* var. *par*. Hb., as described in 'British Noctuæ and their Varieties,' vol. i., pp. 9-10; but the grey ground colour is not so strongly tinged with green, and the markings are not so red. This sub-var. is that in which *impar* approaches most nearly to *muralis*.

β.—A sub-var. in which the ground colour is greyish-white, covered with black scales, and with the usual black markings; the subterminal line however, obsolete, or indicated only by a light shade. This var. corresponds with *muralis* var. *pallida*, Tutt ('British Noctuæ and their Varieties,' vol. i., p. 10), but the scattered black scales render it distinct.

γ.—This sub-var., in which the ground colour is dark blue-grey, very thickly covered with black scales, and having the shade surrounding

the orbicular stigma conspicuously black, is the most striking of all the varieties, and finds no parallel in coast *muralis*.*

δ.—A sub-var. with the ground colour grassy-green, with the usual black scattered scales and markings, but the subterminal line only represented by a pale shade.

ε.—This sub-var. has the ground colour of a dull brownish-green, and the markings etc., the same as in the preceding.

As is the case with *muralis* vars., there are intermediate or modified forms of most of the above. So far as I can ascertain, *impar* is taken nowhere but at Cambridge, where it is anything but common" (*in litt.*, 29, 8, '92). Respecting this, I would only add that Mr. Farren seems to have overlooked the Cork locality.

Moma, Hb., *orion*, Esp.

Vol. i., p. 11.—*Moma orion*.—This species has its name, *orion*, changed by Sven Lampa to *alpium*, Osbeck, 'Götheb. Vet. o. Vitt. Samb. Handl.', p. 52; pl. i., fig. 2, a (larv.), b. (fjäril.) 1778. This change illustrates well the futility of agitating at present for a fixed specific nomenclature. In the present condition of our knowledge, and whilst the "order of priority" is to be maintained, the works of authors which are practically unknown outside their own country, must be, and will have in future to be taken into account, and this will necessitate constant change, which will be gradually lessened as years go on, until a fixed specific nomenclature can be successfully dealt with. Personally, I fail to see the use of changing a well-known name like *orion* to *alpium*, and should like to see a rule agreed to by the leading entomologists of all countries, not to alter a well-known name without some very special reason; but whilst our Museum authorities and many other writers on entomological subjects, fight for the hard and fast lines of "priority," little can be hoped for in this direction. With generic nomenclature, there can never be stability. A "stable" system in genera would mean a "stagnant" condition of entomology in general; and whilst genera show relationships and affinities, as they should do, every advance and new discovery in this direction will mean re-creation of new genera, and the re-arrangement of old ones.

Vol. i., p. 12.—*Moma orion*.—Oberthür records this species in his 'Lepidopterous Fauna of the Isle of Askold,' and states that it is of "a similar type but a little smaller than specimens from the West of France" ('Études d'entomologie,' v., p. 68).

Vol. i., p. 12.—*Moma orion* var. *runica*, Haw.—Haworth's original description of var. *runica* is as follows:—"Noctua alis læte perviridibus lituris numerosis nigris albo adnatis, striga marginali ex punctis trigonis extrorsum cuspidatis, abdomine graciliori." "Expansio alarum 1 unc. 5 lin. Præcedenti similis at valde distincta. Minor, abdomine fusco graciliori magisque cristato. Liture nigræ alarum longe grossiores, atque diversæ, strigâ tantum unicâ in ipso margine postico, expunctis magis trigonis quam sagittatis, extrorsum, nec introrsum cuspidatis. Alæ posticæ fere nigræ punctis parvis albis ad angulum ani; ciliis itidem albis ordine notarum fuscarum" ('Lepidoptera Britannica,')

* This corresponds to a certain extent to var. *suffusa* of *perla* (*ante*, Vol. i., p. 8), and is, in my opinion, the form most distinct from *muralis* that *impar* reaches.

Bisulcia, Chpmn., *ligustri*, Fab.

Vol. i., p. 12.—*Bisulcia ligustri* ab. *sundevalli*, Lampa.—This variety is described by Lampa as:—"Framvingarne sakna hvita fläckar" ('Entomologisk Tidskrift,' 1885, p. 50). This variety will therefore fall before Haworth's var. *coronula* which is a very much older name.

Cuspidia, Chpmn., *megacephala*, Fab.

Vol. i., p. 15, line 3 from bottom.—For *megacephalo* read *megacephala*.

Cuspidia, Chpmn., *strigosa*, Fab.

Vol. i., p. 16.—*Cuspidia strigosa* var. *bryophiloides*, Hormuzaki.—This small dark variety was first described by Mons. C. v. Hormuzaki of Czernowitz, and a comparison made with the type, as follows:—"On the 20th of June, 1884, I found here in Czernowitz, on a garden plank, a freshly emerged specimen of *Acronycta strigosa*, which differed so remarkably from the ordinary type, that it appeared to be worth while to give this variety special consideration. The type is not particularly common with us. I frequently meet with them here in gardens in June and the beginning of July, and in the mountains until the end of July, settled on trunks of trees, planks, and similar objects. In the evening they also fly to the lamplight. All my examples generally agree pretty well with each other and with specimens from Germany; indeed, *strigosa* is one of those species which rarely vary in size, wing-form, colour or markings, on which account I have made the following description.

Var. *bryophiloides* differs from the type, in the first place by its small size. Those of my typical specimens before referred to, give an average measurement of 29 mm., very few examples reaching below this (my smallest specimen measures 28·5 mm., the largest being 31 mm.), whilst var. *bryophiloides* scarcely reaches a wing measurement of 25 mm. The fore wing is also strikingly narrower, measuring only 5 mm. in var. *bryophiloides*. The inner edge of the hind wing is darker, and this makes them appear longer. The head, antennæ, thorax etc. are of a dark brownish and ashy-grey coloration, the same coloration in *strigosa*, which is only noticeable on the inner edge of the front wing, around the arrow-like mark. These dark ground colours spread out in the var. *bryophiloides* over the front wings, the inner half of which is not at all a clear white mixture as one sees in *strigosa*, also on the inner borders of the two transverse lines, and more especially in that part of the wing between the elbowed line and the reniform stigma as well as towards the outer margin. The orbicular is also dark grey, whilst in *strigosa* it is pale, often with a dark centre. There is also a darkening on the inner margin, at the base of the fore wings, and also between the reniform and orbicular stigma. The reniform and orbicular are much obliterated, one having only the convex side of the reniform and represented by a fine black semi-circle, with a slight yellow projection as in *strigosa*, but much darker and less distinct. The elbowed line is represented by three small indistinct black points, one of which is on the costal edge, the second in the centre, the third in the second cell. These points are the only remnants of the conspicuous, black, zigzag elbowed line, bordered internally

with white found in *strigosa*. The black arrow-mark near the root of the wing is only represented by two small black spots. The second and third arrow-marks between the outside transverse lines and the margin are as in the type. The outside transverse line is of the same shape as in *strigosa*, but is very fine, black, edged interiorly and indistinctly with light grey (not white), and approaches the margin very much. On the margin a row of black points as in the type, and at the inner edge of the base of the fore wing is an indistinct longitudinal yellowish-brown spot. The hind wings agree in their markings with *strigosa*, but they are darker, and the transverse line and lunule are very indistinct.

As a whole then, the variety will be remembered by its smaller size, by the slender body, by the long narrow wings, by its dark coloration, the partial obliteration of the markings of the fore wings, the reduction of the two outer arrow-like marks and of the one near the base of the wing to dots. These points resemble very much the well-known Bryophilid species (*raptricula* or *receptricula*). It appears to be at any rate the smallest *Acronycta* known" ('Entomologische Nachrichten,' vol. xvii., pp. 145-147).

Viminia, Chpmn., *euphorbiæ*, Fab.

Vol. i., p. 25.—*Viminia euphorbiæ* var. *montivaga*.—Dr. Chapman has bred this year a very fine specimen of this variety from a larva picked up in the Pyrenees last August. This he has kindly given to me. It is not at all unlike some of our paler specimens of *myricæ* from Scotland, especially some of the males from Aberdeen, the males there usually showing more distinct white markings than the females. Mons. Oberthür also records "var. *montivaga* from Causerets, taken in July, 1883" ('Études d'entomologie,' viii., p. 47).

Vol. i., p. 25.—*Viminia euphorbiæ* vars. *montivaga*, Gn. and *myricæ*, Gn.—Dr. Staudinger unexpectedly reports this variety from Central Asia, for as a rule the specimens from that district are paler in colour than is general on the Continent of Europe. He writes:—"Three specimens from the Saisan district (probably Tarbogatai) which I can only conclude to be a much smaller, darker, variety with *montivaga*, Gn. or *myricæ*, Gn. etc. One of the Saisan specimens has the ground colour of the fore wings greyish-black with entirely obsolete markings, whilst in the other specimens, pale grey transverse lines and the stigmata are observable" ('Stettiner entomologische Zeitung,' vol. xlii., p. 409).

Viminia euphorbiæ var. *obscura*, Ström.—In the 'Entomologisk Tidskrift,' 1885, p. 50, we find:—"Euphorbiæ var. *obscura*, Ström, 'Dansk. Vid. Selsk. Skr.,' 1783, p. 79 (? *montivaga*, Gn. i., 57). Morkare." I have not seen Scandinavian specimens of *euphorbiæ*, but I should assume that they would closely resemble, if not, be actually identical with our Scotch and Irish race, *myricæ*. The var. *montivaga* is characteristic of the South and Central European mountains, but the Scandinavian specimens would, I should consider, conform more to our British type. This is the case in the local vars. of *Agrotis candelarum*, and other species. However this may be, Ström's old name *obscura* will replace one of Guenée's more modern names—*montivaga* or *myricæ*, dependent, of course, with which form *obscura* is really identical.

Vol. i., p. 25.—*Viminia euphorbiæ* var. *myricæ*, Gn.—In vol. i., p. 25, I said:—"It is useless to redescribe a species which is in all our collections," &c. I have since then been most careful to give in every possible instance the earliest recognised description of each species and described form and, therefore, now add Guenée's original description. He writes:—"This has the shape and is of the size of *euphrasiæ*. The superior wings are distinctly more prolonged at the apex, or, if one prefers it, the outer margin is cut more obliquely, of a deep, dark, and uniform greyish tint strongly powdered, and with the markings black. The median lines very distinct, that of the lunules of the elbowed line, which is placed below the 4th inferior, tending to form a small annular spot. The ordinary stigmata well marked, the orbicular always smaller in the male. The fringe strongly intersected, and having the lower half concolorous with the wing. The inferior wings of a white, which is slightly tinged with violet; the nervures and the small terminal dots blackish. Their undersides have a cellular dot and the commencement of a transverse line near the edge. The ♀ is altogether similar in the superior wings, but the inferior wings are of a dark, uniform greyish-black, with white fringes" ('Noctuelles,' vol. v., p. 59). Guenée then further adds:—"This pretty *Acronycta* appears to me very distinct from its neighbours. I do not think that it is referable to the *abscondita* of certain authors, although it appears at first sight to have many characters common with it. It is found in marshy places, principally in the county of Perth. Its larva feeds on *Myrica gale* and *Salix capræ*" (l.c.).

Viminia, Chpmn., *rumicis*, L.

Vol. i., p. 25.—*Viminia rumicis* var. *turanica*, Stdgr.—Of this form from Central Asia, Dr. Staudinger writes:—" *Acronycta rumicis* var. *turanica*, Stdgr. I have received this species in quantity from almost all Central Asiatic localities from which I have received insects, particularly, however, from Margelan, Samarkand and Osch. A specimen was captured on the 15th March and another on the 10th of August, so that there appears to be two generations. I believe it to agree with *rumicis* although larger (33-40 mm.), and directly pointing out *turanica* simply as a pale local form of the first degree. Particularly striking about *turanica* are the almost entirely white hind wings only having a faint, almost obsoletely marked blackish-grey band, generally just before the outer margin. In a female from Margelan it is tolerably grey even in the inner part of the wing, and specimens from Saisan form, with regard to the hind wings, good intermediates between *rumicis* and *turanica*. The latter (*turanica*) has also considerably lighter grey fore wings mixed with blackish, although I received a single female in which an almost entirely greyish-black tone, similar to that which occurs now and again in *rumicis*, prevailed, only in this specimen, not of so dark a black and being at the same time, powdered with paler scales. The markings (transverse lines and stigmata) are almost similar although certainly rather modified from those of *rumicis*. The outer transverse line is in *turanica* generally not so sharply or distinctly toothed, although specimens exhibit precisely the same sharp dentate character of *rumicis*. That the white spot at the lower end of this transverse line is not so strongly developed and marked in the pale *turanica* compared with

that in the dark *rumicis*, follows as a matter of course. In the same way also the undersides of all the wings of *turanica* are paler, whilst the dark central spot of the hind wings stands out distinctly. *Acronycta rumicis* is one of the species, which, like so many others, tends to become paler in Central Asia than in Europe" ('Stettiner entomologische Zeitung, vol. xlix., p. 65). If this, therefore, be the *turanica* mentioned in vol. i., p. 15 which was there referred on Mr. Dobrée's determination as a pale var. of *menyanthidis*, it would appear that Dr. Staudinger and Mr. Dobrée differ in opinion as to which species *turanica* really belongs. I have never seen Central Asiatic specimens, so cannot judge. That *rumicis*, however, is occasionally of an almost pure white ground colour even in England is certain, for I have long had a specimen in my cabinet which I was unable to refer to either of our British species, but which I have now practically determined to be *rumicis*.

Viminia, Chpmn., *albovenosa*, Göze.

Vol. i., p. 28.—*Viminia albovenosa*.—The original description of this species is as follows:—"Phalæna with filiform antennæ, with robust, grey, tent-like wings, of which the nervures are of a whitish-grey" ('Entomologische Beiträge,' iii., 3, p. 251). Werneburg also refers the figure in De Geer's 'Memoires des Insectes,' ii., which reference Göze quotes, to Borkhausen's *venosa*.

Vol. i., p. 28.—*Viminia albovenosa*.—The American species known as *Arsilonche henrici*, Grote, is probably identical with our species *albovenosa*. This is also credited in Grote's 'Check List,' with two varieties *fumosum* and *evanidum*. Of these Mr. Grote writes:—"I saw the type of *ab. fumosum*. It seemed to me to be a small, entirely smoky, dark (almost black) accidental aberration. Whether our American species is really identical or not with *albovenosa*, I do not positively know. *Evanidum* is the form in which the interspacial lines and dashes are almost obliterated in the fore wings. Morrison says 'the most common form.' *Henrici* has the streaky lines and dashes very plain. Probably the two species are the same. Probably also *henrici* = *degener*, and *evanidum* = type form, *vide*, Tutt, 'British Noctuæ' &c., vol. i., p. 28" (*in litt.*, July, 1892).

Vol. i., p. 28.—*V. albovenosa* var. *ochracea*.—I find that this dark reddish-ochreous form belongs essentially to the brood which emerges in the early spring, the great mass of this brood consisting, however, of the typical form. Such a specimen would scarcely ever appear to occur among the autumnal emergences. On the other hand var. *albida* (var. *argentea*, Tutt), occurs only in the second brood, the great mass of this latter emergence being of the form known as *degener*, Hb. The species, therefore, shows decided seasonal variation, the spring brood being more ochreous, the autumn brood, whiter in tint.

Vol. i., p. 28.—*Viminia albovenosa* var. *murina*, Auriv.—In the 'Entomologisk Tidskrift,' for 1880, Professor Aurivillius described the varieties of this species. His paper, at the time I wrote vol. i., of this work, was quite unknown to me, and I find that I had been forestalled in my var. *argentea*. The type he describes as var. β , *flavida* (*l.c.* p. 38), the latter name being sunk (as representing the type) in the 'Entomologisk Tidskrift' for 1885, p. 48). His var. *murina*, however,

the ground colour of which is described as "grabrun" (*l.c.*) comes near my var. *ochracea*, whilst his var. *albida*, described as "hvitgra" replaces my var. *argentea*. Working independently, it is rather suggestive that Professor Aurivillius and myself should select almost the same three forms for description.

Synia, Dup., *musculosa*, Hb.

Vol. i., p. 29.—*Synia musculosa* var. *myodea*, Rbr.—I noted in vol. i., p. 29, that I had been informed that "the data for considering this a variety of *musculosa* rested upon a single imperfect specimen captured in Andalusia." I have seen since Rambur's work, and find no such data given. On the contrary, Rambur's figure is evidently drawn from a specimen in good condition and not particularly unlike the type, except that the grey shade above the median nervure is much intensified and extended. Unfortunately in the figure the paint has, as is so usual in figures of lepidoptera, changed, and the dark grey parts of the wing have become a dull leaden black colour.

With Rambur's figure before me, I made the following notes:—"The colour of all four wings is of a sulphur-yellow, with brownish nervures. A white longitudinal streak from the base to beyond the centre of the wing, runs directly under the median nervure. A blackish* (? dark grey) longitudinal shade, running along the upper side of this white streak, starts also from the base, and extends almost to the apex. Another longitudinal dark streak, much shorter and narrower, is below the white streak. The inner margin is also narrowly blackish. The hind wings have a blackish streak running from the base to the centre of the wing, occupying the central cell, and sending off a branch towards the anal angle. The undersides of the anterior wings show three longitudinal black streaks, whilst the hind wings have the basal area also black; this black area giving off four forks or branches pointing towards the outer margin, one, running parallel with the upper edge of the wing, two, pointing towards the central part of the hind margin, the fourth, more towards the anal angle" ('Catalogue systématique des Lépidoptères de l'Andalousie,' plate vi., fig. 3).

Leucania, Och., *lithargyria*, Fab.

Vol. i., p. 31.—*Leucania lithargyria* var. *argyritis*, Rbr.—This variety was first figured by Rambur, and the notes in vol. i., p. 31, which I have quoted from other sources are essentially correct, although I find by comparison with the original figure, that the specimen mentioned as having been taken by Mr. Young of Rotherham, is really this variety. The notes I made of Rambur's figure are as follows:—"This variety has the anterior wings of a pale wainscot, almost of a pale fawn colour, without a trace, however, of red. The abbreviated and complete basal lines are faintly marked, although the latter is edged externally with darker, and this becomes more conspicuous than it otherwise would be; the reniform is pale and lunular in shape, the elbowed line also pale, whilst the nervures are rather darker on the outer margin.

* Whenever "blackish" or "black" is used in this description, probably "dark grey" should be substituted, as the black is evidently due to a change in the original shade, which is now much darker than the artist intended or desired. Otherwise the plates in this work are generally excellent.

The hind wings are whitish, slightly tinged with ochreous at the base, and a little darker on the outer margin. The nervures are also slightly darker, and there are four distinct small black spots on the nervures " (' Catalogue Systématique des Lépidoptères de l' Andalousie,' Pl. viii., fig. 2).

Leucania, Och., *turca*, L.

Vol. i., p. 33.—*Leucania turca* var. *grandis*, Btl.—If all the Japanese forms of *grandis* are to be included under one varietal name, the term will necessarily be a very comprehensive one. Thanks to the courtesy of Mr. Doncaster, I saw a very large consignment of the species from Japan, and must express my doubt as to the wisdom of uniting it specifically with *turca* as we know it. The great mass of the specimens were more or less distinctly yellow-ochreous; a few were very deeply and richly ferruginous, whilst scarcely a specimen was of the shade of our British specimens. There appears to be no distinct character by means of which the two forms may be differentiated, but the two forms are so distinct in superficial general appearance, that one may reasonably express doubt as to their identity.

Leucania, Och., *unipuncta*, Haw.

Vol. i., p. 33.—Of the nomenclature of this species I wrote some time ago:—" *Leucania unipuncta*, Haw. = *extranea*, Gn.—There seems to be no doubt that the latter name, which is in use in all our books and lists, will have to give way to Haworth's earlier name. Haworth's description (' Lepidoptera Britannica,' p. 174, No. 37), is very distinct. He writes:—"Alis rufescentibus seu griseo atomosis lineola obliqua fusca apicis, punctoque minutissimo albo basi stigmatis postici. Stigmata ordinaria fero omnino oblitterata." In Guenée's original description of *extranea*, which is much longer, the only point of difference is that he lays more stress on the species being more strongly powdered with black scales (*vide* Guenée's 'Noctuelites,' vol. v., pp. 77-78). Anyone who will compare Haworth's description with that of Guenée, or with that in the "Entomologist," vol. xxi., p. 138, will, I believe, be at once convinced of their identity. The synonymy should therefore be:—

Leucania unipuncta, Haw., 1803.

extranea, Gn., Newm., Stdgr.

('Entomologist's Monthly Magazine,' vol. xxv., p. 56).

Leucania, Och., *loreyi*, Dup.

Vol. i., p. 35.—The original description of this species is as follows:—"This NOCTUA resembles *pallens* in shape and size. Its superior wings above are also of the same colour and striated very finely between the nervures; but they differ in that this species has a white triangular dot placed in the middle of a brown longitudinal dash which starts from the base, and, gradually rising, crosses the wing almost to the apex, losing itself in the reddish tint of the outer edge. A small black dot is also to be noticed, placed between the white dot just spoken of and the corselet of the thorax, as well as a row of indistinctly marked red dots parallel with the hind margin. Lastly, the fringe is grey. The inferior wings are as white above as below, with a mother of pearl reflection. The undersides of the fore wings are of a reddish-white and finely dotted on the borders. The head is

red, and the corselet (thoracic crest) of the same colour, with the anterior part cut by two lines and a bluish-grey band. The antennæ are yellowish and filiform" ('Histoire naturelle' etc., vol. vii., pp. 81-82).

Mons. Duponchel then goes on to say:—"I believe this species is unknown. It has been sent to me from Provence, by M. le Comte de Saporta, with the following notice:—"It is double-brooded, that is to say, it appears in the spring and in the autumn. The larva is grey, with many broad longitudinal lines of a darker tint. It lives on grass, pupates in the earth, and emerges 15 days after, at least this is so in the case of the autumn emergence. I have named the species after Dr. Lorey of Dijon'" (l.c.).

Of the fact that *loreyi* was identical with *caricis*, Staudinger writes:—"Leucania caricis of Treitschke = *L. loreyi* of Duponchel. I can scarcely understand how the true *Leucania caricis* has been so long misunderstood. To begin with, Herrich-Schäffer has figured quite another species, namely, *L. scirpi* of Duponchel, sub-fig. 324, 325, as *caricis* of Treitschke, and described it at p. 231; but this error he has subsequently corrected. Guenée also does not know what to do with *L. caricis* of Treitschke, and refers it (i., p. 80), with a query, to *L. putrescens* of Hübner, 730-731. In most collections, as well as in my own, a small paler coloured *punctosa* of Treitschke has hitherto been standing as the *caricis* of that author, because they were sent to us with this name, especially from Montpellier. I have never been able to find a difference between this and *punctosa*, which, indeed, does not exist. In Herr Lederer's collection I found as *caricis* the *Leucania zeæ* of Duponchel, and indeed there everywhere appeared the greatest confusion concerning the *Leucania caricis* of Treitschke. Now, in Treitschke's collection there are four splendid specimens of *L. loreyi* of Duponchel, as Treitschke's *caricis*, and everybody possessing the true *loreyi* of Duponchel will find, when reading the Treitschkian description (vol. x., pt. 2, p. 91), that it applies to it extremely well, and that therefore it must now be *loreyi*, Dup., vii., 1, p. 81, pl. 1,057, (1827), *caricis*, Tr., x., 2, p. 91 (1835). This species occurs everywhere in the most southern part of Europe; I possess it from Montpellier, Sardinia, Granada, Malaga and the Canaries. Dahl found it in Sicily, and E. v. Frivaldszky has obtained it from Crete as the *caricis* of Treitschke" (Müller, from 'The Stettiner Ent. Zeitung,' 1869, vide, 'Entomologist,' vol. v., p. 46).

Leucania, Och., *brevilinea*, Fenn.

Vol. i., p. 37.—*Leucania brevilinea*.—The original description and notes made by Mr. Fenn of this almost entirely British species is as follows:—"Nonagria brevilinea. Alis anticis brunneo-ochraceis, basi medio lineâ longitudinali brevi nigra, punctis pone medium in serie transversâ nigris, margine apicali immaculatâ; posticis griseis, punctis transversis vix obsoletis nigris.—Exp. alar. 1" 4'''."

"Fore wings rather sharply angulated at the junction of the costal and hind (apical) margins; brownish ochreous, with numerous scattered black scales; a sharply defined short black dash from the middle of the base; a curved row of small black dots reaches from the costa to the inner margin beyond the middle; apical veins conspicuously paler than the ground colour; apical margin unspotted.

Hind wings grey, paler towards the base, a very indistinct transverse row of black dots rather beyond the middle, uniform with those in the fore wings. This insect belongs to the same group as *N. neurica*, to which it is closely allied. It differs, however, in the following particulars:—the size is somewhat larger, the short black basal dash in the fore wing (which does not reach one-fourth the length of the wing) is represented in *N. neurica*, by an ill-defined, dark, greyish streak, extending to the middle of the wing, and in the latter species there are several conspicuous black dots near the base, towards the costa, of which there is no trace in *N. brevilinea*. In *N. neurica* the apical margin in all the wings is plainly spotted with black; in the species under consideration, this margin is perfectly immaculate, and as an important character, I may mention that the apical margin in *N. neurica* is more rounded. In the hind wings an indistinct lunule, present in *N. neurica*, is not found in *N. brevilinea*. The antennæ are darker, and the apex of the abdomen in the male is provided with larger curved appendages" ('Entomologist's Monthly Magazine,' vol. i., p. 107).

Tapinostola, Ld., *elymi*, Tr.

Vol. i., p. 43.—For *Tapinostola*, Och. read *Tapinostola*, Ld.

Vol. i., p. 43.—*Tapinostola elymi*, var.—Mons. Oberthür describes and figures a form of this species from the Isle d' Askold, which has a row of black spots in the nervures of the superior wings. He writes of it:—"I have figured, Pl. ix., fig. 2, of this vol. of the 'Études d'entomologie,' an example of *T. elymi*, taken at Askold on the 22nd July, 1878, distinguished from the ordinary type from the shores of the Baltic Sea, by having a row of small black spots on the nervures of the inferior wings. The type from Askold seems also more slender and of a less robust appearance than those from Prussia" ('Études d'entomologie,' v., p. 71). The figure shows a row of dots not only on the inferior, but also on the superior wings.

Tapinostola, Ld., *concolor*, Gn.

Vol. i., p. 46.—For *Tapinostola*, Och., read *Tapinostola*, Ld.

Chortodes, St., *extrema*, Hb.

Vol. i., p. 47.—*Chortodes extrema* = *C. bondii* (?)—It appears that the question of the identity of Hübner's *extrema*, that is of the actual specimen apart from fig. 412, with *bondii* was suggested many years ago by Dr. Knaggs. Mr. Doubleday then sent specimens of *bondii* to Professor Zeller, who wrote concerning them:—"After an examination of the figures and descriptions, I cannot suppose *bondii* to be the *extrema* of Hübner. Treitschke ('Die Schmet.' etc., vol. v., pt. 2, p. 316), who saw the originals, says that the cilia, though too darkly coloured, are really dark, as if singed, and adds, that in the least marked specimens there is always a dark dot in the outer (posterior or anterior) margin, which is visible on the outside. Moreover, the whole underside is white, sparingly dusted in the intervals of the prominent veins. I hope that when I am at Vienna I shall see the specimens in the Museum, and be able to inform you of the real difference of these two species."

Mr. Doubleday then added:—"I am rather surprised that these remarks of Treitschke were not quoted by Dr. Knaggs, as, if the

specimens examined were the true *extrema* of Hübner, it is quite certain that *bondii* is a distinct species. Lederer refers Herrich-Schäffer's figure 336 to *hellmanni* without any mark of doubt, and 337 to *extrema*, Hüb.; but if the above-quoted remarks of Treitschke be correct, it cannot possibly represent this species. I believe it was taken from a female *concolor*, but I do not think this species has occurred on the Continent, unless the specimens which Lederer captured some years since in a marsh near Vienna were *concolor*. In July 1843, I took several *concolor* to Paris, and the late M. Pierret, to whom I gave them, said it was a species unknown to him, but was probably the *extrema* of Hübner. In 1844, the late M. Becker had specimens from me, and as he sent many species which he procured in England to Herrich-Schäffer, I think it very probable that his figure 337 was taken from one of my specimens" ('Entomologist's Monthly Magazine,' vol. iii., p. 257).

What a pleasure it would be to relegate such a name as *extrema* to oblivion. The figure looks like *bondii*. Treitschke who saw the original specimens, says that Hübner's figure agrees with them. Zeller says that he does not consider that *extrema* represents *bondii*. Doubleday says that Herrich-Schäffer's *extrema* was probably figured from one of our British *concolor*. Ochseneimer made *extrema* the female of *fulva*, and had, Staudinger avers, a ♂ *fulva* and a *concolor* above the label in his collection. Staudinger referred *extrema* to *concolor* in the 'Stettiner entom. Zeitung' for 1869, but after he had seen what is supposed to be the specimen actually figured by Hübner, with its dark cilia, he wrote, not that it was identical with *concolor*, but that "it came nearest to a whitish female *concolor*, Gn., but certainly with blackish cilia," so that he, himself, was evidently not then quite satisfied even with the actual specimen under his eye, although from his 'Catalog,' 1871, he became certain after. It appears certain that when exact nomenclature is to be satisfied, the name *extrema*, with all its uncertainties and differences of opinion, will have to disappear altogether from our lists, as synonymous neither with *bondii* nor *concolor*, so much uncertainty is connected with it, whilst the undoubted identity of *morrisii*, Dale with *bondii*, Knaggs, will throw the latter name also out of the lists, the two species standing respectively as:—

Tapinostola concolor, Gn.
extrema, Hb.?
Chortodes morrisii, Dale.
bondii, Knaggs.
extrema, Hb.?

It will be well, perhaps, for the use of future readers, to quote in full Mr. Stainton's translation of Dr. Staudinger's article on the subject, as references are not always easily made in magazines as years pass by. Dr. Staudinger writes:—" *Tapinostola extrema*, Hb., fig. 412.— That we have had this somewhat puzzling species standing in our collections under another name, has long been tolerably evident to me. Hübner's figure 412 must, at any rate, have been made from an abnormal specimen, since a perfectly white NOCTUA with black cilia to the anterior wings has probably never been found. It was just possible that the English NOCTUA—*bondii*, might be the true *extrema* of Hübner, since that species in the coloration and spots of the anterior

wings agrees very fairly with Hübner's figure, and sometimes shows even a dark shade before the cilia which the colourer might by mistake have transferred to the pale cilia themselves.* But since according to Treitschke, vol. v., pt. 2, p. 315, Hübner's *extrema* † has lately been added to nearly all the larger collections from the neighbourhood of the Rhine and the Main, and *bondii* has hitherto only been taken in the South of England and on Mount Parnassus, it became highly improbable, independently of its slighter form, that it could be the *extrema* of Hübner. According to this statement made by Treitschke, it was evident that this *extrema* must be a species occurring with us in Germany, and probably existing in our larger collections. Now Guenée has in the 1st volume of his 'Noctuæ' at p. 103 ('Noctuélites' &c., vol. v., p. 103), described a new species from England, which in my 'Catalogue' of 1861, at p. 46, I referred to *extrema*, Hb., but without assigning any reason for this step, nor at that time indeed could I have done so, so that the union of the two, especially considering Hübner's fig. 412, must have appeared very venturesome. Guenée, in good truth, looking at Hübner's figure could not suspect ‡ in it his English species, and therefore described it as new under the name '*concolor*.' This English species, which, since the draining of the fens, where it formerly occurred, has not been met with in England for many years || has now been found, as I learn on good authority, near Berlin, in Silesia, near Vienna and in Hungary. There seems, therefore, no doubt that it frequents all similar marshy localities, consequently would be found at the Rhine and the Main, whence Treitschke obtained it, unless there also the marshy ground has been drained. Now what did I find in Treitschke's collection with the name *extrema*? Two indubitable specimens of *concolor*. In Ochsenheimer's collection were two old, bad specimens, the upper one being a ♂ *fulva*, Hb., the lower one, in very bad condition, seemed tolerably surely to be Guenée's *concolor*; the label written by Ochsenheimer himself, stands thus:—

'*Fulva*, Hb., ♂.
Extrema, Hb., ♀.'

"This agrees precisely with what Ochsenheimer says in his vol. iv., p. 82, and which Treitschke, vol. v., p. 313, takes for an error. Treitschke hardly appears to have known the red form of *Tap. fluxa*, the *fulva* of Hübner, and it is quite a matter of indifference whether in Hübner's fig. 413, he sees a ♂ or a ♀, since to my fancy this figure is incorrect, and does not suit either for *fluxa* or *fulva*, of which last name Hübner has given an excellent representation at fig. 496. Since amongst hundreds of *fluxa* and *fulva*, I never saw a specimen with per-

* This was exactly my view formed independently and without having seen this article.

† That is, a species called by collectors *extrema*, and which Staudinger further on says were *concolor*, Gn.

‡ Just so! If Staudinger agrees that "Guenée, in good truth, looking at Hübner's figure could not suspect in it his *concolor*," and if the real specimen is as Dr. Staudinger avers "almost precisely like Hübner's figure, why does he combine the two, except that the German collectors were then obtaining *concolor* and calling it, collector-fashion, *extrema*?"

|| It has, of course, been taken in comparative plenty the last few years by Capt. Vipan, and an odd specimen was captured in Essex, by Mr. Mera, in 1891.

ceptible reniform stigmata, such as Hübner's figure 413 decidedly shews, I would rather consider it as a variety of a red *hellmanni*, which always shows the reniform stigma, and which species is now found not uncommonly near Berlin, Brunswick, in Silesia, &c. Yet Hübner's figure is too bad to allow of our imposing his name *fluxa* on our present *hellmanni*. But at all events, we may now without hesitation understand by the *extrema* of Hübner, the *concolor* of Guenée, a species which appears to vary very much, and probably only when worn or faded occurs as white as Hübner's figure or Herrich-Schäffer's fig. 337, of which colour I have a wasted ♂. On the other hand, my ♀ which is quite fine, is yellowish (bone-coloured), somewhat powdered with grey, just as Guenée describes it. As, through the kindness of Mr. Henry Doubleday, I have also had typical specimens of *concolor* here for comparison, there can be no doubt about the identities of my species. After I had written the above, my friend A. Rogenhofer, Custos of the Imperial Museum at Vienna, on the occasion of the Naturforscher Versammlung here, brought me the *extrema* from the Museum collection. This specimen came out of Mazzola's collection, and there seems no reason to doubt that it is the original specimen figured by Hübner (fig. 412). It is nearest to a whitish female *concolor*, Gn., but certainly with blackish cilia, almost precisely like Hübner's figure. My friend Rogenhofer had the notion that the creature whilst drying its wings &c., came against some sooty object, and if I am not mistaken, Professor Zeller, who had previously examined the insect at Vienna, was of the same opinion. But, under the microscope, I could find no dark extraneous atoms (only dust) on the scales; indeed it rather appeared to me that a great many of the scales in the cilia and near the hind margin had naturally a dark edging. Quite recently I obtained a ♂ *Notodonta bicolora*, of which the white of the anterior wings was almost unclouded, but the posterior wings had the cilia and hind margin coloured blackish, which shows indubitably that this, though very rarely, may sometimes occur naturally in pale coloured insects. At any rate, this Hübnerian *extrema* should induce all young lepidopterists to write in their copy books—"In closely allied species don't describe or figure from a solitary specimen" ('Entomologist's Monthly Magazine,' vol. vii., pp. 34-36).

It will be here noticed that after Dr. Staudinger had seen the specimen which was probably the one figured, he does not use such positive terms as before, and without stating that the specimen in question was Guenée's *concolor*, says that "it is nearest to a whitish female *concolor*." Just previously he has written that "*concolor*, Gn., only when worn or faded occurs as white as Hübner's figure," but it can hardly be supposed that Hübner's specimen was wasted, as the perfection of the blackish cilia have been the cause of so much trouble. However, I would still suggest that the name *extrema* is so uncertain and unsatisfactory that it should be thrown out altogether.

Chortodes, St., *morrisii*, Dale.

Vol. i., p. 47.—*Chortodes morrisii*.—This certainly is not a pale variety of *arcuosa* as previously suggested to me by Mr. Dale. The original description and notes relating to *morrisii*, copied from Humphrey and Westwood are as follows:—" *Acosmetia morrisii*, Dale ('Naturalist,' vol. ii., p. 88 and Errata). 'This species measures about

an inch in the expanse of the fore wings, which, as well as the hind wings and body, are entirely of a pale whitish straw-colour; the costa of the fore wings slightly brownish.' Named by Mr. Dale after the Rev. F. T. Morris, who discovered it. It has been taken several times on the East Sea Cliff, Charmouth, Dorset, at the beginning of July. We are indebted to Beverley R. Morris, Esq., for the loan of two specimens, differing somewhat in size" ('British Moths,' p. 243; Pl. liv., fig. 12). There is no doubt whatever, that the figure in Humphrey and Westwood just quoted, is that of *Chortodes bondii*, and that *morrisii* is not a variety of *C. arcuosa* as suggested to me by Mr. Dale, and so stated in vol. i., p. 47. The probability of this being identical with *bondii*, on an examination of Humphrey and Westwood's figure, the hind wings of which are strikingly those of *bondii*, was immediately strengthened by the knowledge that Mr. Tugwell had previously recorded *bondii* from Lyme Regis, a few miles from Charmouth, where the typical specimens of *morrisii* were captured by Mr. Morris. I wrote to Mr. Tugwell, asking him about the probability of *bondii* occurring at Charmouth, and he wrote:—"The locality for *bondii* at Lyme Regis is, I believe, about 10 miles as the crow flies from Charmouth, but from what I saw of the coast line, I should judge that *bondii* might occur in many places between the two towns. I only worked the Devonshire side of Lyme Regis, but found it in plenty there" (*in. litt.*, 18-7-92). This, therefore, helps to support my determination of Humphrey and Westwood's figure, and *morrisii* will have to be struck out as a variety of *arcuosa* and added as a synonym of *bondii*, which name it will replace * if *extrema* be not generally accepted for this species, as *morrisii* is much anterior to *bondii*. There can be no doubt that Humphrey and Westwood's figure is made from indubitable *morrisii*, for the specimens figured were sent by Mr. Beverley Morris from the collection of the Rev. F. T. Morris, the original captor. It has always appeared strange to me, that so common a species as *bondii* has since proved itself to be in its favoured localities, should have been quite unknown to our older collectors who met with many of our much rarer species.

With regard to the occurrence of *bondii* in the neighbourhood from whence the original *morrisii* came, Mr. Goss writes:—"Although probably most lepidopterists are aware that *T. bondii* is to be found in the neighbourhood of Lyme Regis, I do not think the occurrence of this species in Devonshire has been noticed in this magazine. As the species is so extremely local, not only in this country but on the Continent of Europe, it may be as well to record the fact of my finding it in abundance, in the beginning of July last, on the rough broken ground forming the slopes of the cliffs immediately to the west of the cement works at Lyme Regis, well into Devonshire. It may be worth noting, that of the only two localities in this country from which this species has yet been obtained, one is in the South-east of Devon, and the other in the South-east of Kent" ('Entomologist's Monthly Magazine,' vol. xvii., p. 134); whilst the Editors of the 'Ent. Mo. Mag.' note at the same time that the species was first discovered at Lyme Regis by Mr. Wormald, and noticed in the 'Zoologist,' vol. xxi., p. 8861.

Cænobia, Stphs., *rufa*, Haw.

Vol. i., p. 48.—Of the nomenclature of this species I wrote some

*Independently of Mr. Dale's description, the figure and description in Humphrey and Westwood is much anterior to Knaggs' name.

time ago :—“ *Cœnobia rufa*, Haw. = *despecta*, Treit., Hb.-Geyer.—In Stainton’s ‘Manual’ and the ‘Doubleday List’, this species is known as *despecta*. In Newman’s ‘British Moths,’ and Staudinger’s ‘Catalog’ it is called *rufa*. Mr. South in ‘The Entomologist List,’ has followed the latter; whilst Guenée in his ‘Noctuelites,’ uses *despecta*, giving Haworth’s *rufa* as a synonym with doubt. Mr. Robson, in the list he has published in the ‘Young Naturalist,’ appears to have followed Guenée’s synonymy. The description of Haworth’s *rufa* (‘Lepidoptera Britannica,’ p. 260) is as follows :—‘*Alis oblongis ciliisque rufis unicoloribus; posticis ciliisque pallidis striga medio macularum obscurarum.*’ I consider this a good description of the insect we get. Haworth then goes on :—‘*caput inter antennis album.*’ I have a very long series, and this statement can readily be verified if one turns the drawer round with the heads of the insects towards one, and looks down the series from top to bottom. The head is ‘between the antennæ’ decidedly ‘white.’ Haworth then continues :—‘*Lingua et palpi Noctuarum, potius quam Bombycum,*’ of which I suppose its position in our classification is a sufficient proof. Comparing it with *lutescens*, a variety of *Acosmetia caliginosa*, Haworth goes on to say :—‘*Corpus paulo gracilius quam in ultimo (lutescens) et alæ magis oblongæ.*’ Both *lutescens* and *rufa* are slender-bodied NOCTUÆ, and were formerly by our older British authors, classified together in the genus *Acosmetia*.

There is no doubt, I think, that the synonymy should stand as :—*rufa*, Haw. 1803, Newm., Stdgr.

despecta, Tr., Hb.-Gey., Sta., Guenée.”

(‘Entomologist’s Monthly Magazine,’ vol. xxv., pp. 55-56).

Senta, St., *maritima*, Tausch.

Vol. i., p. 48.—*Senta maritima*.—The original description of this species is as follows :—“*Noctua lævis alis incumbentibus, anticis cinerascentibus, postice serie strigularum, obsolete in quarum lunulisque marginalibus, albo in quoque variis*” (‘Mémoires de la Soc. Imp. des Nat. de Moscou,’ 1806, p. 178).

Vol. i., p. 49.—*Senta maritima* var. *bipunctata*, Haw.—Haworth’s original description of this variety, which he classified as a *TORTRIX*, is as follows :—“*Tortrix bipunctata?* (The Wainscot Tortrix) *alis canescentibus punctis duobus, strigaeque humerali atris. Statura fere T. heracleana, Linn.*” (‘Trans. Ent. Soc. London,’ 1812, p. 337).

Nonagria, Och., *neurica*, Hb.

Vol. i., p. 50.—*Nonagrii neurica* var. *dissoluta*, Tr.—Treitschke was one of the first to unite typical *neurica* with the dark var. *dissoluta* as Hübner had originally done. Hübner called the pale form *neurica* in his fig. 381, he also considered the dark form the same species, as he named his figures of that form (figs. 659-660) also *neurica*. Considerable discussion appears to have occurred as to their identity or otherwise, and Treitschke then wrote :—“Ochsenheimer has mentioned and referred to Hübner’s *neurica*, and understood by it, the var. of a rushy colour without markings on the underside, of which there are a few examples under this name in Mazzola’s collection, and which came from the Rhine district. Later, we received from the same place a much darker moth, marked on the underside, under the name of *N. dissoluta*.

It tallied exactly with Hübner's figs. 659-661. I was assured that Hübner had only repeated the name *neurica* in error, as *dissoluta* should have been placed under the figures. Several consignments received since have proved that Hübner was undoubtedly right to designate all the specimens dark or light on the upper side and black on the underside as *neurica*, as they all belong together, and are united by intermediate and closely alike forms, and thus confirm what has already been said about them" ('Die Schmet. von Europa,' vol. v., pt. 2, pp. 319-321).

With regard to the synonymy of this species (*neurica*) I wrote some time ago:—" *Nonagria neurica*, Hb. = *arundineta*, Schmidt.—In Stainton's 'Manual,' vol. i., p. 193, we find the Norfolk and Cambridge *Nonagria* in question, described under the name of *neurica*. In Newman's 'British Moths,' it is described under the name of *arundineta*. Dr. Staudinger in his 'Catalog,' 1871, separates *neurica*, Hb. specifically from *arundineta*, Schmidt, and refers our British specimens to *arundineta*, which he treats as a variety of Treitschke's dark form *dissoluta*. I have been lately working at Hübner, and there is not the remotest doubt that our paler British specimens are identical with Hübner's figure 381, *neurica*. Some of the specimens sent to me by Mr. Warren are exactly like his figure, except in colour, which is dull brown and not reddish as in our forms, but there can be no doubt about its being our insect in its palest forms. Schmidt discriminates between his *arundineta* and Hübner's *neurica* as being 'more robust' (a vague difference it seems to me), and 'the underside spotted in *neurica*' (i.e., with a central spot on each wing). As Hübner only figures the upper-side, I do not see that this distinction would hold; and I find that our palest specimens have practically no central spots on the undersides, but that these spots, which are absent in the pale forms, gradually increase in intensity with the depth of colour on the upper surface. He also gives different dates for the appearance of his *arundineta*; but Mr. Warren ('Ent. Mo. Mag.' vol. xxii., p. 256) shows that *neurica* in Norfolk, is a fortnight earlier than the same species in Cambridge. I believe the dark form (*dissoluta*) used to occur in the Norfolk and Cambridge Fens, but Dr. Staudinger himself groups *arundineta*, Schmidt with *dissoluta*, Treitschke, and our species now gives us both *neurica*, Hb. and *arundineta*, Schmidt. There can be no doubt, therefore, that the synonymy should stand:—

Nonagria neurica, Hb., Sta.
var. *dissoluta*, Treitschke.
var. *arundineta*, Schmidt."

('Entomologist's Monthly Magazine,' vol. xxv., pp. 56-57).

I have since been informed by Mr. Warren that the dark specimens were not taken in "the Norfolk and Cambridge Fens" but in Yaxley Fen.

It is well to follow out the reasoning that led to Staudinger keeping *neurica* distinct as a species from *dissoluta* and var. *arundineta* which he united. Müller translated Staudinger's critical note on this subject in 'The Entomologist,' vol. v., pp. 45-46). He writes:—" *Nonagria neurica* of Hübner, *N. dissoluta* of Treitschke, *arundineta* of Schmidt.—In Ochsenheimer's collection there is a true *neurica* (Hübner, fig. 381) named as such, with a label in his own handwriting.

Below it, there is a typical *arundineta* of Schmidt, with a label whereon is written in Ochsenheimer's handwriting, 'An eadem cum præcedente? sub nomine *Noctua dissoluta*.' In Treitschke's collection there are five specimens, under the label '*neurica*,' of which the first is *neurica* of Hübner, 381; the second, third and fourth are *arundineta*, Schmidt, and the fifth is the dark form of *neurica* * (Hübner, figs. 659-661), subsequently *hessii* of Boisduval, and from this, as well as from what Treitschke says about *neurica* (vol. v., pt. 2, p. 319), it is strikingly shown that Treitschke threw together the three forms, although Ochsenheimer had previously rightly conjectured the latter to be another species, *arundineta* (so well distinguished by my friend Schmidt of Wismar, in the 'Stett. ent. Zeit.,' 1858, p. 369, etc.). The name *dissoluta* must therefore only be retained from the dark form of *arundineta* (for that only it certainly is), for Hübner's 659-661, and for *hessii*, Boisduv., as Treitschke, when mentioning this name, means only the dark form. But to act with strict propriety the name *dissoluta* of Treitschke must be retained as the typical name for the sake of priority; the name *arundineta* of Schmidt must be added to it as a variety, although this black *dissoluta* of Treitschke is now extremely scarce, and has not been found since the death of old Hess. Whether at all, and in what proportion, also the light form of *arundineta* occurs near Darmstadt, is unknown to me. Near Wismar, Schmidt never found the dark form" ('Stettiner entomologische Zeitung,' 1869).

Criticising this note of Staudinger, I wrote as follows:—"In the 'Stettiner Zeitung' for 1869, Dr. Staudinger wrote some notes on this species which were translated by Mr. Albt. Müller, and published, April 1870, in the 'Entomologist.' I gather from that note that the synonymy given there was adopted in Dr. Staudinger's 'Catalog,' published directly afterwards. This being so, I find that Dr. Staudinger, in his 'Catalog,' treats our British specimens as *dissoluta*, Tr. var. *arundineta*, Schmidt, as he gives England as a locality for that species, but not for *neurica*, Hb. In the two English counties, Norfolk and Cambridge, we get a species which has been variously known as *neurica*, Hb., *arundineta*, Schmidt and *dissoluta*, Tr. Dr. Staudinger has, apparently, come to the conclusion that *neurica*, Hb. is unknown in England, and that it is a species distinct from *arundineta*, Schmidt. There is no doubt that *neurica*, Hb., fig. 381, represents a form which occurs in England; the distinct ocellus so characteristic of Hübner's fig. 381 is well developed. Our specimens of this form are simply a little redder than Hübner's figure. Another variety of the same species, taken in England with the form described above (*neurica*, Hb.), is undoubtedly *arundineta*, Schmidt. According to Dr. Staudinger's own list we, in England, get *arundineta*, Schmidt. If so, our *arundineta* is certainly only a variety of Hübner's *neurica*. We

* A footnote is added by Müller to this name which reads as follows:—"Mr. Doubleday suggests that this name (*neurica*) should be printed *arundineta*, and that the name *neurica* has been written by Dr. Staudinger in mistake. In his 'Catalog,' *dissoluta* stands as a variety of *arundineta*. There is probably a dark form of the true *arundineta*, but Mr. Doubleday does not know that anyone has found it." To be consistent, it would appear that Staudinger should here replace "*neurica*" by "*arundineta*," but Dr. Staudinger's use of *neurica* is quite correct, as the dark specimens, afterwards referred by Staudinger to *arundineta*, were really called *neurica* by Hübner.

do not now get *dissoluta*, Tr., but if this and *arundineta* are, as Dr. Staudinger and others agree, only varieties of the same species, then *arundineta* and *dissoluta* are both varieties of Hübner's *neurica*, fig. 381. I have no doubt that Dr. Staudinger is wrong in separating these varieties. Certainly Hübner's *neurica* and Schmidt's *arundineta* must be grouped together, and since he himself groups *dissoluta* with *arundineta*, it follows that Treitschke was perfectly correct in treating all three forms in his collection as one species, *neurica*, Hb.

"I should like to offer a few remarks on the principal points of difference relied on by Schmidt, 'Stettiner Zeitung,' 1858, p. 367. He writes:—'The difference . . . is less in the markings than the different structure of the body and the wings. *Neurica*, Hb. is the more slender, *arundineta* the more robust form.' Our British specimens of *neurica* and its var. *arundineta* vary very much in the shape of the wings. Some specimens have the wings quite pointed, some very much rounded, and this, of course, makes a great deal of difference in general appearance, and also makes the extreme forms in the one direction appear more robust than the extreme forms in the opposite direction. Schmidt then writes:—'The colour of both forms varies in the same manner, but *arundineta* has a dark spot on the underside of each wing, which *neurica* never has.' This is quite correct; I find the paler specimens (*neurica*) of our species have no dots, whilst the darker var. *arundineta* have them very distinctly. But I find that these spots are directly proportional to the depth of colouring on the upper surface, and that a complete gradation occurs. Schmidt also writes:—'*Neurica* is on the wing 3 to 4 weeks earlier than *arundineta*.' This is no proof of distinctness. Mr. W. Warren, F.E.S. writes in the 'Entomologist's Monthly Magazine,' vol. xxii., p. 256:—'At the beginning of August, *Nonagria neurica* was abundant; near Cambridge I have never taken it before August, but in the Norfolk fens, I am told it is out during the second half of July.' This shows that in two adjacent English counties, in localities only a few miles apart, there is a difference of 2 to 3 weeks in the time of appearance. With regard to the statement of Schmidt as to his failure in pairing a *neurica* with *arundineta*, it proves nothing, as the ♂ may have partly lost its vitality. Such a thing often occurs when one breeds lepidoptera on a large scale. The natural history of the species in England entirely upsets Schmidt's theory of distinction, and disposes effectually of all his chief arguments" ('Stett. entomol. Zeit.,' 1888).

In the 'Trans. Ent. Soc. of London,' 1890, p. 664, Mr. Butler treats *dissoluta* and *neurica* as distinct species. He at the same time attempts to sub-divide the genus *Nonagria*, as we now know it, giving as his reason that "the antennæ of *cannæ*, *lutosa*, *sparganii* and *arundinis*, are thicker and more densely ciliated than those in the little dull-coloured species which remain in *Nonagria*, viz.:—*N. dissoluta*, Tr., *punctifinis*, Walk. and *neurica*, Hb." I presume it is to be expected that the antennæ of the former (and larger) species would be thicker. Even then, what a character for generic sub-division!

Calamia, Hb., *lutosa*, Hb.

Vol. i., p. 55.—*Calamia lutosa* var. *pilicornis*, Haw.—Haworth's original description of this variety is as follows:—"Noctua. Alis

cinereo, vix atomosis, striga postica curvata ex punctis obsolete fuscis 6 : posticis albis." "Affinis *N. crassicornis*" ('Trans. Ent. Soc. London' (Old Series), 1812, p. 336).

Helotropha, Ld., *leucostigma*, Hb.

Vol. i., p. 67.—*Helotropha leucostigma* var. *lævis*, Btl.—Butler in the 'Trans. Ent. Soc. Lond.' 1890, p. 679, refers his *Cerastis lævis* ('Trans. Ent. Soc. Lond.,' 1881, p. 181) to this species, and writes:—"The type of *C. lævis* is an unusually large dark male, the markings upon which are ill-defined; there is, however, no question of its identity with this species." *Cerastis* is a very strange genus to which to refer a species like *leucostigma*. At the same time a true *Helotropha*, the American *reniformis*, is placed by Butler in *Mamestra*. I wonder why!

Vol. i., p. 67.—There is an American species called *Helotropha reniformis* in Grote's 'Check List,' and this appears to be identical with our *leucostigma*. The type is, in the British Museum, placed by Mr. Butler among the species in *Mamestra*. It has a var. *atra*. Mr. Grote in answer to a query of mine wrote:—" *Helotropha reniformis* is probably a representative species differing specifically from *fibrosa* (*leucostigma*), but this is yet uncertain. The var. *atra* I described as follows:—' *H. reniformis* var. *atra*.—The fore wings are entirely of a dead black, so that the markings become inconspicuous, and can only be made out with difficulty. The reniform is, however, entirely white and becomes very prominent by contrast. The hind wings are more blackish than brownish-fuscous, as is also the under surface and the body' ('Proc. Acad. N. S. Phil.,' 200, 1874)" (*in litt.*). Regarding *reniformis*, I can only express an opinion for what it is worth, that *reniformis* appears to equal our *leucostigma* in every particular.

Xylophasia, St., *rurea*, Fab.

Vol. i., p. 76.—*Xylophasia rurea* var. *extincta*, Stdgr.—In the 'Zoological Record' for 1890 (Insecta), p. 56, is a reference to Staudinger's description of this variety in the 'Stettiner entomologische Zeitung,' vol. 1., p. 42. Staudinger describes the variety as follows:—" *Hadena rurea* var. *extincta*, Stdgr.—This is an analogous variety to *H. basilinea* var. *grisescens*, being an obsolete marked, grey local form of *rurea*, of which Herr Tancre sent to me a ♀ with the three specimens of var. *grisescens*. Although there is again the same failure of the black markings in the basal streaks of the fore wings, yet the undersides immediately separate *rurea* var. *extincta* from *basilinea* var. *grisescens*. The female specimens lying before me are somewhat smaller than typical *rurea*, of a light grey colour slightly shaded with light brown and almost obsolete markings. Of the three stigmata, the claviform and orbicular are faintly distinguishable by means of the light brown edging to them, whilst the reniform stands out conspicuously owing to its white edging and dark centre. In one female the wing is divided into two parts (the one above the stigmata and also beyond it) darker, with the inner margin and upper-half of the anal angle paler. The light brown transverse lines are perceived to be quite rudimentary, and the black and white spots on the nervures at the outer edge are in

the best marked ♀ clearly existent. On the undersides, particularly of the lighter hind wings, is a dark central spot, and beyond this is a distinct transverse line" ('Stettiner ent. Zeitung,' vol. 1., p. 43).

Apamea, Och., *basilinea*, Fab.

Vol. i., p. 84.—*Apamea basilinea* var. *griscens*, Stdgr.—In the 'Zoological Record' for 1890 (Insecta), p. 56, I find a reference to the 'Stettiner entomologische Zeitung,' vol. 1., p. 42, where this variety is described. Staudinger writes of the variety:—" *Hadena basilinea* var. *griscens*, Stdgr.—Of this interesting local form Herr Tancreé sent to me 1 ♂ and 2 ♀, captured south of Issyk-Kul, and I also possess a larger female which came from Alara (or Margelan?). This var. *griscens* is a pale ashy-grey local form of the common *basilinea*, with only a light brown tinge, and with the transverse lines also obsolete. Only the short black basal streak, with two indistinct blackish spots in the place of the stigmata beyond, and a faintly marked dark lunular line appear on the fore wings. The ♀ from Alai, forms a good connecting link with typical *basilinea*, as here the transverse lines appear on the fore wings faintly marked in light brown. In this specimen also one notices on the underside of the hind wings behind the dark central lunule, a dark transverse line found in *basilinea*, but of which there is no trace in the specimens from Issyk-Kul" ('Stettiner entomologische Zeitung,' vol. 1., pp. 42-43). This would appear to be almost identical with my var. *pallida*, except that the latter appears to be ochreous-grey rather than ashy-grey.

Miana, St., *bicoloria*, Vill.

Vol. i., p. 103.—*Miana bicoloria* var. *pallidior*, Stdgr.—Dr. Staudinger thus writes of this form:—"Eight specimens of this species from Lepsa (a good one being captured on the 11th of August) together with specimens from Margelan with which they agree exactly, form a curious local form which I name *pallidior*. The basal half of the fore wings is red-brown, sometimes with its outer part somewhat blackish. This is followed by the outer half being of a dirty yellowish-white, of course, with the exception in some specimens, of the almost obliterated dark outer margin. The hind wings are much paler, of a dirty white. Similar specimens are found in Europe, where they form distinct, but occasional, aberrations; but in Central Asia, *pallidior* becomes decidedly a constant local form" ('Stettiner entomologische Zeitung,' vol. xliii., p. 42).

Mamestra, Och., *abjecta*, Hb.

Vol. i., p. 111.—*Mamestra abjecta* var. *fribolus*, Bdv.—The original description which I made of Boisduval's figure of this variety is as follows:—"The fore wings blackish, with the abbreviated and complete basal lines as well as the outlines of the reniform, orbicular and claviform, of a deeper black. The elbowed line double; the inner line much shaded with black; the subterminal a little paler than the ground colour, but internally edged with black. The hind wings dark grey at the base, the outer margin blackish" ('Icones' &c., pl. 84, fig. 4).

Mamestra, Och., *brassicæ*, L.

Vol. i., p. 115.—*Mamestra brassicæ* var. *straminea*, Failla-Tedaldi.—A variety under this name is referred to in the 'Zoological Record' for 1890 (Insecta), p. 244, as described in the 'Nat. Sicil.,' x., p. 30.

This may be the same as Staudinger's var. *decolorata*, which latter is certainly the same as my var. *ochracea*, described from the Amur specimens, and since the description of *ochracea* was published in 'The Entomologist,' in Sept. 1889, and that of *decolorata* in March 1889, the latter will take precedence.

Dr. Staudinger's note and description of this variety is as follows:—" *Mamestra brassicæ* var. *decolorata*, Stdgr.—A quantity of specimens of this common species, collected in the district south of Issyk-Kul, are very much paler and more obsoletely marked than typical *brassicæ*, and I designate them therefore var. *decolorata*. It comes near to my *brassicæ* var. *andalusica*, but the latter is of a peculiar whitish-grey, in no way yellow or light-brown grey. The black transverse lines are more or less rudimentary, and other markings almost lost in var. *decolorata*, so that the transverse line with the M just before the outer margin disappears completely in the case of a ♀, and almost so in two other specimens. The hind wings also, as well as the undersides, are lighter in the latter and the dark transverse line is completely absent. A single specimen approaches very nearly to, and is very like, typical *brassicæ*, so that var. *decolorata* is only the predominant form from the South of Issyk-Kul. The *brassicæ* which I have received from Margelan are all darker and much resemble European specimens" ('Stettiner entomologische Zeitung,' vol. l., p. 34).

Mamestra, Och., *furva*, Hb.

Vol. i., p. 114.—*Mamestra furva* var. *infernalis*, Ev.—The original description by Eversmann is as follows:—" *Mamestra*. Alæ anticæ thoraci concolores, fusco-nigræ, atro-nebulosæ, strigis transversis ordinariis crenulatis pallidioribus, stigmatibus reniformi pallide circumscripto: posticæ nigricantes, externe obscuriores." "Eadem magnitudine, qua *Mam. persicariæ* eique maxime affinis; differt præcipue stigmatibus reniformi obscuro, non albo, et alis posticis obscurioribus, quam in illa, præcipue ad earum basin ceterum picturæ dispositio fere eadem est ac in *M. persicariæ*; item maris antennæ brevissime et raro ciliatæ sunt." "Volat in provincia Casanensi et Orenburgensi, circa Casanum et in promontoriis Uralensibus, Junio et Julio" ('Bulletin de la Soc. Imp. des Nat. de Moscou,' 1842, pt. iii., p. 547).

(?) Vol. i., p. 114.—*Mamestra furva* var. *sylvicola*, Ev.—This is treated by Staudinger in his "Catalog" as a probably distinct species, but he adds:—"Præc. var. *nigra* (?)." This refers it not to *furva*, but *rubrirena*, and as he appears to have had specimens his determination is possibly correct.

Eversmann's original description of *sylvicola* is as follows:—" *Mamestra*. Alæ anticæ nigræ, obsolete cinereo-nebulosæ, strigis ordinariis cinereo-albidis; posticæ fuscescentes lunula media strigaque externa fuscis." "Eadem magnitudine et omnino eadem statura qua *M. brassicæ*; pariter ac maculæ et strigæ ordinariæ directione et proportione non differunt, cognoscitur autem *sylvicola* alis anticis nigris, non fuscis, et maculis strigisque albis. Volat in promontorium Uralensium aus-

tralius sylvius, Julio" ('Bulletin de la Soc. Imp. des Nat. de Moscou,' 1843, pt. iii., p. 547). Certainly this description applies very well to our very dark Irish forms of this species (*furva*), but it is impossible to give a critical determination without specimens.

Mamestra, Och., *persicariæ*, Linn.

Vol. i., p. 117.—*Mamestra persicariæ* var. *unicolor*, Stdgr.—This variety, which is so rare in England, although fairly common in many parts of Europe, is recorded by Mons. Oberthür from the Isle of Askold. He writes:—"From Askold I obtained one ♂ of the type (of *M. persicariæ*) ordinarily found in Europe, and two others in which the ordinary white spot of the superior wing is merged in the ground colour" ('Études d'Entomologie,' v., p. 72).

Pachetra, Gn., *leucophæa*, View.

Vol. i., p. 121.—*Pachetra leucophæa* var. *pyrenaica*, Oberthür.—The local race which has been thus named is described by Oberthür:—"This is a very remarkable and very constant race, distinct from the ordinary French type by the darker colour of the wings. It appears that the *leucophæa* from Cauterets, are entirely covered with a blackish slaty-grey tint, on which only the black stigmata and the white circles which surround the orbicular and reniform stand out conspicuously" ('Études d'Entomologie,' viii., p. 50). Oberthür then adds:—"The imagines at Cauterets appear to incline to the same rules of melanic variation as in England" (*l. c.*).

Vol. i., p. 122.—*Pachetra leucophæa* var. *bombycina*, Ev.—The original description of Eversmann's variety is as follows:—"Hadena, antennis pectinatis; alis anticis fuscis griseo-nebulosis macularum ordinariorum marginibus, nervis dentibusque duobus externis albis; maculæ reniformis basi lata. Minor quam *H. leucophæa*, qua cum aliquando confudi, sed ei simillima. Antennæ eodem modo, ac in illa, late pectinatæ; alæ anticæ eodem colore eodemque modo dentibus duobus albis aut albidis, in marginem externum excurrentibus, signatæ sunt; sed macula sic dicta media seu reniformis, est alia: ejus basis sat lata et recta nervo mediano per totam extensionem insidet et angulus maculæ internus, acutus protensusque, in nervum illum excurrit. Ceterum maculæ ordinarie (rotunda et reniformis) sunt fuscæ, albo-circumscriptæ; nervi præcipue medianus et posticus, albi aut albidis. Alæ posticæ fuscæ, lunula media lineaque externa fuscis.—Subtus alæ pariter non differunt ab alis *leucophææ*. Habitat in promontoriis Uralensibus" ('Bulletin de la Société Imp. des Nat. de Moscou' &c., 1847, pt. iii., p. 78).

Eversmann gave another description in 1856, and then notes:—"Measures 16-17 lines. It offers some affinities with *leucophæa*. Antennæ of the male pectinated. Superior wings of a dark brown, shaded with paler brown, with the cubital and median space followed entirely by a whitish band; the subterminal line white and a little crenulate, and containing two white and very sharp teeth, which originate in the band, the teeth being prolonged into the fringe. The two median transverse lines black, and edged with whitish on the opposite sides; the inner one wavy, the outer bent inferiorly and toothed in its upper part. The stigmata brown with white edging, surrounded with black. The reniform with its base large and joined to the median nervure.

The claviform brown-black, encircled with intense black. The cuneiform spots in the subterminal space are also noticeable. The inferior wings grey, paler at base, with the discoidal lunule and transverse line darker" (*l. c.* 1856, pt. ii., p. 35).

Of this variety Staudinger writes:—"Received in small numbers from Saisan, and a pair of specimens also from Lepsa, taken on the 21st of May. *Bombycina* is on the average, considerably smaller than German *leucophæa*, and the markings of the fore wings are always particularly lighter and more distinct. This ordinarily comes about owing to the nervures being white and the markings black, the latter standing out clearly and distinctly. The cuneiform spots are exceptionally black and conspicuous. A couple of males are very dark" ('Stettiner entomologische Zeitung,' vol. xliii., p. 35).

Charæas, St., *graminis*, L.

Vol. i., p. 131.—*Charæas graminis* var. *albivirens*, Bdv.—I have been able to refer to Boisduval's figures and find that his figure of *graminis* represents the form of *gramineus* of Haworth, whilst his figure called *albivirens* closely resembles my var. *rufa* = the *tricuspis* of Hübner. "The anterior wings are brownish-grey with a reddish tint towards the inner margin, the costa ochreous, the nervures pale (whitish), the reniform and orbicular white, the transverse subterminal band ochreous, whilst there is a row of dark spots between the nervures, between the subterminal space, and the outer margin" ('Icones,' pl. 74, fig. 4).

Aporophyla, Gn., *australis*, Bdv.

Vol. i., p. 131.—*Aporophyla australis*.—Duponchel gives the following very interesting account of this species:—"M. Boisduval, after having placed this species among the *Xylinidæ* in the first edition of his 'Index,' placed it among the *Hadenidæ* in the second, but we consider it belongs to neither of these families, and that it ought to form, with other allied species, a special genus which we propose establishing.

"This species varies very much in the depth of the ground colour, but the persistence of the same design in all specimens makes it easily recognised. The upper wings are of a grey, more or less white above, often shaded with red; sometimes they are entirely red or even blackish, and in this case, the two inner transverse lines are ordinarily more or less bordered with whitish-grey. Of the three transverse lines, the innermost is the most apparent. It is lightly sinuous, and composed of a series of small black or brown or cuneiform spots; the space between this and the fringe is more or less pale, and bordered entirely by a row of small black lunules, which separate it from the fringe. The latter is brown, toothed, and intersected with reddish-grey. The median line is very much angulated like a saw; the inner is equally angulated and forms posteriorly two very elongated angles. These two lines finely marked in black, are absent in many specimens. The space which separates them is often traversed by an irregular brownish band. In the superior part of this band one notices the two ordinary stigmata, of which the orbicular is oblong and placed obliquely; the reniform is almost triangular, a little reddish towards its outer border, and marked with two or three brown streaks. Between the median and sub-median nervures, one sees a third stigma of elliptical shape,

and consisting sometimes only of a simple brown streak. Independently of this, there is a basal ray, and most of the nervures form black lines. In the whitish specimens, a brownish ashy tint occurs at the base of the wing, which extends broadly on the costa to the anterior edge, enveloping more or less the two ordinary stigmata.

"In the specimens with dark superior wings, the undersides of the upper and both sides of the lower wings are more or less bistre with the nervures brown; in those with whitish superior wings, the undersides of the upper and both sides of the under wings are of an almost pure white with the nervures slightly reddish. In both varieties the fringes of the inferior wings always remain white.

"*Xylina australis* has been discovered in Provence, by Messieurs Saporta and Solier. M. Rambur has found it in Corsica. It appears in November" ('Histoire naturelle' etc., vol. iii. (supplement), pp. 391-394).

In 'The Entomologist,' vol. v., pp. 46-47, there is a translation by Müller, of Staudinger's remarks in the 'Stettiner entomologische Zeitung.' He writes:—"Aporophyla ingenua, Fr., scriptura, Fr., orientalis, H.-S. = australis, Bdv.—The type of *ingenua*, Tr. (Plate 508, fig. 1) is in my collection through the purchase of Von Weissenborn's collection. The originals (types) of *orientalis*, H.-S., 502-503, I saw in Frivaldszky's collection, where there is also *scriptura*, Fr. (Plate 255, fig. 2). There is not the slightest doubt that all of them are only varieties or aberrations of the *australis* of Boisduval, which is the *ingenua* of Treitschke, and the *orientalis* of Herrich-Schäffer (the almost uniformly dark variety), and *scriptura*, the transition to it. The originals (types) are all from Crete, or at all events from the East. Such specimens occur near Montpellier, where I had formerly the opportunity of selecting from hundreds of *australis*. The English specimens of *australis*, which have very sharp markings (black and white), are very peculiar, and the dark variety seems never to occur. This form quite merits to be mentioned in our 'Catalogues' as var. *britannica*" ('Stettiner entomologische Zeitung,' 1869). This clearly does away with the ? which I placed after *orientalis*, ante vol. i., p. 133, and establishes that form as a variety of *australis*. The idea of naming our form *britannica* as suggested by Staudinger, was impossible, as it had been previously named *pascua* by Curtis.

Luperina, Bdv., *luteago*, Hb.

Vol. i., pp. 134-135.—*Luperina luteago*.—This species is now generally considered to belong to the genus *Dianthæcia*. A large number of entomologists, practically acquainted with the English form of the species, var. *barrettii*, are of unanimous opinion that it should be referred to the latter genus. A long discussion took place relative to this subject, and the details of this discussion will be found in the general notes on the genus *Dianthæcia* in vol. iii., pp. 24-26.

Luperina, Bdv., *dumerilii*, Dup.

Vol. i., p. 136.—*Luperina dumerilii*.—The original notes and description of this species by Duponchel are as follows:—"This is a species taken in the environs of Paris, which I believe to be unknown, and which, by its facies, comes near *N. hirta*. I have dedicated it to one of our first naturalists, Professor Dumeril, whose friendship I have had the honour to possess for many years.

“The superior wings of this *NOCTUA* are of a yellowish-grey above, with their central area occupied by a large trapezoidal band, of a dark brown colour, bordered laterally with two brown lines, and in which the two ordinary stigmata which are of a yellowish-white colour are placed. The terminal edge is shaded with brown and edged by a sinuous line of a paler hue. The head and the lower border of the wing from the central band to the corselet, are equally shaded with brown. Lastly, the fringe is yellowish. The inferior wings are entirely whitish above, and all four wings equally whitish below, with a small and obscure crescent in the middle of the inferior wings. The head and corselet (crest) are grey-brown, and the abdomen of the same shade as the inferior wings. The antennæ, of a reddish-grey colour, are pectinated in the male and filiform in the female, this difference being the only one that exists between the sexes, although the female is perhaps a little paler.

“This species, of which the larva has not yet been found, appears at the commencement of September. It is usually found on the *ormes* which border the roads” (‘*Histoire naturelle*’ etc., vol. vi., p. 277).

Vol. i., p. 136.—*Luperina dumerilii* var. *desyllesi*, Bdv.—Boisduval’s original description of this form, which he considered a species distinct from *dumerilii*, is as follows:—“*Statura dumerilii*: alæ anticæ fuscæ, strigis ordinariis obscurioribus, striga fulgurali albido-cinerea, macula reniformi albo nitide scripta, macula orbiculari ovata, pallida, intus infuscata, extus fusco circumdata, oblique posita. Alæ posticæ albidæ. Feminam tantum novi inde de antennis nil dicendum. Nominata in honorem D. Bottin-Desylles, Entomolog. oculatissimi, qui hanc speciem circa St. Sauveur-le-Vicomte invenit” (‘*Genera et Index methodicus*’ etc., p. 113).

Laphygma, Gn., *exigua*, Hb.

Vol. i., p. 144.—*Laphygma exigua* var. *pygmæa*, Rbr.—Rambur’s original diagnosis and description of this species is as follows:—“*Alis fusco-griseis macula subcentrali rufa.*” “This species is smaller than *C. exigua*, which it resembles slightly. Its superior wings are very narrow, and are square-cut at their outer edge. They are of a reddish-grey, varied with shades running in indistinct brown lines, although, however, the four transverse lines which usually cross the (anterior) wing are indicated by brown shades, above all the two external ones, which anteriorly, appear to form a sharp angle. The costa, marked with brown points, is in the greater part reddish, above all near the apex. That which distinguishes the species, however, more than all is a red spot, very wide, occupying the place of the ordinary stigmata, of which the reniform is slightly traceable in its external half; in the other portion a brown dot appears to replace the orbicular. The fringes are of the colour of the wing, traversed by many brown lines, of which one is darker. The inferior wings are very wide, white, edged near the fringe with a reddish-brown line, which tint extends slightly on the wing. The nervures are of the same colour, the fringes are white, with a brownish line on their inner edge. Below, the superior wings and the anterior margin of the inferiors are of a reddish-ash, the fringes are almost the same as on the upper side.

“The species was discovered by M. Solier, in the environs of Marseille” (‘*Annales de la Soc. Ent. de France*,’ 1834, pp. 384-385).

The figure accompanying this description has almost the shape of a *TORTRIX*, and there is a strong suggestion of crippling or malformation about the specimen, the costa of the fore wing on the left side being concave (*vide, l.c., Pl. viii., fig. 2*).

Caradrina, Och., *alsines*, Brahm.

Vol. i., p. 147.—*Caradrina alsines* var. *levis*, Stdgr.—This variety is described by Staudinger from specimens obtained in Central Asia, as follows:—“*Caradrina alsines* var. *levis*. I received this species in numbers, captured at Margelan in the beginning of August, also a female from Namangan. I can only look upon it as a strikingly light form of our local *alsines*. *Levis* is as large (31-35 mm.) but has a much lighter brownish or yellow-grey (difficult to define) ground colour of the fore wings, which contrasts much with the dark brown-grey of the German *alsines*. The two upper dark-centred stigmata, contrast particularly in this light *levis*; the round orbicular is sometimes nearly obliterated; and the dark line which runs before the reniform appears distinctly, sometimes very clear, almost black. Besides this, the dark inner border appears very distinctly before the scarcely visible outer zigzag line. The usual three transverse lines are entirely wanting or are only indistinctly marked, especially the third, by means of black dots on the nervures. The hind wings are whitish with somewhat darker nervures. In the female, they have a darker shade towards the outer margin. On the underside of all the wings in *alsines* are clearly marked dark spots, and the outer line missing or only faintly seen on the fore wings of some specimens. The female from Namangan is a transitional form, as it has almost as dark hind wings as *alsines*, also dark transverse lines on the light fore wings. A male from Achalzich in Caucasus is also a transitional form; whilst a male from Brussa, tallies almost exactly with the Central Asiatic *levis*. Perhaps this pale *levis* is the second generation in those parts” (‘Stettiner entomologische Zeitung,’ 1888, vol. xlix., pp. 29-30).

Caradrina, Och., *quadripunctata*, Fab.

Vol. i., p. 153.—*Caradrina quadripunctata* var. *grisea*, Ev.—The original diagnosis of this form under the name of *grisea* by Eversmann is as follows:—“*Caradrina*. Alæ anticæ thorace concolores, e fusco griseæ, strigis ordinariis per puncta nigra signatis, macula rotunda punctiformi nigra maculaque media reniformi, nigro interrupte circumscripta: posticæ albidæ, externe fuscæ, puncto medio fusco” (‘Bulletin de la Soc. Imp. des Nat. de Moscou,’ 1848, pt. iii., p. 215).

Vol. i., p. 153.—*Caradrina quadripunctata* var. *menetriesii*, Kret.—This has since been determined as a distinct species by the Scandinavian entomologists who obtain this particular form, and should therefore be in the best position to judge of its specific identity with *quadripunctata* or *vice versâ*. Sven Lampa writes a full account of it in the ‘Entomologisk Tidskrift,’ 1885, pp. 69-70.

Vol. i., p. 153.—*Caradrina quadripunctata* var. (?) *albina*, Ev.—Staudinger appears to be inclined now to treat *albina* as a distinct species, and *congesta*, which is given as a var. of *quadripunctata* in his ‘Catalog,’ p. 111, without a mark of doubt, as a variety of *albina*. He writes:—“*Caradrina albina*, Ev. and var. (ab.) *congesta*, Ld.—Eight

specimens were taken in September near Saisan and one on August 24th near Lepsa, belong chiefly to *albina*, which I should take as a different species from the variable *quadripunctata*. To this I add the dark form *congesta*, Ld., with which one specimen, captured on the 24th of May near Saisan, tallies exactly, while another specimen forms a transition between them. Possibly *congesta* is the first and *albina* the second brood" ('Stettiner entomologische Zeitung,' vol. xliii., pp. 43-44). This note of its habits, appears to ally it very strongly to our hibernating *quadripunctata*.

ADDITIONS, etc., to Vol. II.

INTRODUCTION.

Vol. ii., p. vii.—*Pieris napi* var. *flava* is yellow on upperside, vide 'Entom.,' 1889, p. 126.

p. viii., line 39.—For "1887," read "1877."

„ line 22.—The white form of *Rumia crategata* = var. *albescens*, Ckll.

Agrotis, Och., *saucia*, Hb.

Vol. ii., p. 7.—*Agrotis saucia* var. *unica*, Smith.—Mr. Cockerell writes:—"Described by J. B. Smith ('Revis. *Agrotis*,' p. 70) as follows:—"Very distinctly marked, without any confusing shades.' It must be almost the same as your var. *brunnea*" (*in litt.*).

Vol. ii., p. 7.—Delete var. *texana*, Grote.—My doubt as to this being a variety appears to have been well founded. Mr. Cockerell writes:—"A. *texana*, Grote, is a good species, formerly confounded with *segetum*, vide Smith 'Revision *Agrotis*,' p. 155" (*in litt.*). Grote writes:—"Texana is a perfectly distinct species" (*in litt.*).

Agrotis, Och., *segetum*, Schiff.

Vol. ii., p. 9.—*Agrotis segetum* var. (ab.) *pallida*, Stdgr.—Of this variety Staudinger writes:—"Agrotis *segetum* var. (ab.) *pallida*, Stdgr.—Of four specimens taken during the first half of August at Lepsa, two females are somewhat ordinary pale forms of *segetum*. One pair, however, looks quite different. The fore wings of the male are quite light yellowish-grey, with only the three stigmata developed. Those of the female are uniform ashy-grey without markings. As very many that I received last year from Margelan were almost as pale, some even almost white, they deserve a special name, appearing in parts of Central Asia as a constant local form, whilst the European form occurs as an aberration there" ('Stettiner entomologische Zeitung,' vol. xlii., p. 423). What Staudinger means by "the European form" in such a variable species is rather dubious.

Agrotis, Och., *obelisca*, Hb.

Vol. ii., p. 28.—*Agrotis obelisca*.—Of the Central Asiatic specimens of this species, Staudinger writes:—"Specimens from Lepsa (taken on the 11th of August) are somewhat smaller and less brown; in other respects, about as dark as the ordinary Hungarian and Austrian form" ('Stettiner entomologische Zeitung,' vol. xlii., p. 421).

Agrotis, Och., *nigricans*, Linn.

Vol. ii., p. 41.—*Agrotis nigricans* var. *armena*, Evers.—The original description of *armena* is as follows:—"Agrotis *armena*. Alis anticis

testaceo-albidis fusciscenti pulveratis: stigmatibus medianis concoloribus, interrupte fusco-cinctis; lineis medianis crenulatis fuscis, interruptis; linea subterminali pallida; posticis griseo albidis; subtus omnibus lutescenti-albidis; anticis levissime nigricante pulveratis" ('Bulletin de la Soc. des Nat. de Moscou,' 1856, pt. i., p. 222). To this Eversmann adds:—"This offers the greatest affinity with *valesaica*, from which it differs in the following characters,—the superior wings more prolonged at the apex; the ground colour of a clear testaceous, finely powdered with brown, and having the outer margin no darker. The inferior wings are whitish" (*l.c.*). Staudinger treats this as a probably distinct species in his 'Catalog,' but he marks it as not being in his collection. The British Museum specimens bearing this name are not very different from some of the palest British examples of this insect.

Agrotis, Och., *tritici*, Linn.

Vol. ii., p. 43.—*Agrotis tritici*.—The first volume of 'The Entomologist,' in which Mr. Bentley published his notes on the genera *Agrotis* and *Caradrina*, is so rare, that I have quoted at length his remarks on the various species he dealt with. By accident, I overlooked those relating to this species. He writes:—" *Agrotis tritici*, *vitta*, *pupillata*, *ocellina*.—These varieties were formerly rare, but have of late been taken in plenty in Devonshire, Kent and Essex. *Var. 1.*—Anterior wings pale brown, with a broad streak at the base spreading over the costa, rather paler than the wings, the ordinary stigmata pale with a black spot between them, teliform stigma large and dark; posterior wings white, extreme margin dusky. *Var. 2.*—*Tritici*. Anterior wings brown tinged with reddish, with a streak at the base upon the costa, paler than the rest of the wing, also a faint transverse striga before the anterior stigma, and a second behind the posterior, behind which is a row of wedge-shaped spots, stigmata pale, except the teliform, which is dusky, margined with black; posterior wings white, with margin dusky. I obtained this variety, as well as the preceding and following one, from the cabinet of the late Mr. Haworth, as the type of his *albilinea* now called *tritici*. *Var. 3.*—Anterior wings similar to the last, with the streak upon the costa, and the central nervure cream colour; posterior wings entirely white. *Var. 4.*—Anterior wings ashy, with a milk-white streak upon the costa; anterior stigma small and round; posterior very large, both milk-white, margined with black; the teliform stigma black; on the hinder margin are four wedge-shaped dusky spots, behind which is a waved striga, the extreme margin spotted with black; posterior wings ashy, with dusky margins. *Var. 5.*—Anterior wings ashy tinged with reddish, with a mere vestige of the white streak upon the costa, which is maculated with white spots and dusky streaks; at the base is a black spot united to a white transverse striga, which is margined with black; stigmata pale; towards the posterior margin are two whitish patches, the extreme margin deep fuscous; posterior wings ashy-white, deeply margined with fuscous. This beautiful link and the preceding variety, were taken in Devonshire by the late Captain Blomer. *Var. 6, vitta.*—Anterior wings reddish-brown, with a white streak upon the costa, extending from the base beyond the middle; the centre nervure of the fore wings is white; between the stigmata is a quadrate black spot; teliform stigma small and black; near it is a pale transverse striga; on the posterior margin is a row of wedge-shaped spots, and a white waved striga; posterior wings

cinereous, with dusky margins. *Var. 7.*—Anterior wings paler than the last, with a white streak upon the costa, and a black one in the centre from the base to the anterior stigma; posterior margin clouded with cinereous and a white waved striga; posterior wings dusky. Taken in Devonshire by Mr. Raddon. *Var. 8.*—Anterior wings reddish-brown, with three pale transverse strigæ; the two anterior margined with black; the first before the anterior stigma, the second behind the posterior, behind which are a row of wedge-shaped spots and the third pale waved striga; stigmata pale, the anterior ocellated. This variety has the characters of *pupillata* and also of *vitta*; it is as much like the one as the other. *Var. 9, pupillata.*—Anterior wings brownish with four transverse strigæ; the first at the base, the second before the anterior stigma, the third behind the posterior, and the fourth near the hinder margin; the costa is spotted with dusky and white, the space between the second and third strigæ rather pale, stigmata pale, the anterior ocellated. *Var. 10.*—Anterior wings ashy or greyish, with a few white spots upon the costa, and a black streak at the base in the centre of the wing, and a white waved striga near the posterior margin. *Var. 11, ocellina.*—Anterior wings dusky or blackish, with a short ashy streak upon the costa and with two black transverse strigæ, the first before the anterior stigma, the second behind the posterior; near the hinder margin is a pale waved striga, the anterior stigma ocellated. *Var. 12.*—Anterior wings blackish, with a black streak at the base, in the centre of the wing extending beyond the anterior stigma, posterior wings ashy, slightly margined with fuscous. I took this variety near Brockenhurst, Hants, in September. This variety expands only one inch. From its small size and black appearance I had considered it distinct, and had named it some time since, *pusilla*, but I examined many specimens at Darenth Wood, last summer, most of which were allied to *ocellina*, two or three being very small and having the characters of *ocellina*, with the black streak at the base, thus connecting my *pusilla* with that supposed species.

It will be useless for me to describe more of these varieties, for it is difficult to find two specimens perfectly similar; in some the teliform stigma is wanting; in others it is large; some have no transverse strigæ; others have from one to four; some are destitute of the white streak upon the costa, and some have their wings greyish, others dark fuscous; some are dark at the base, others at the posterior margin. These varieties are very perplexing, and I believe there are not two collections in London in which they are named alike, at least I have not seen two, except that of Mr. Chant. The conspicuous varieties are considered by some as distinct, thus multiplying species, when in fact they all constitute but one variable species. There are two or three other species in this genus that require investigation; the want of conclusive proofs compels me to leave them for the present. I trust that some of your practical correspondents will be induced to take up this subject" ('Entomologist,' vol. i.).

Vol. ii., p. 43.—*Agrotis tritici* var.—Staudinger writes of an unnamed variety from Central Asia:—"Some specimens from Saisan and Lepsa, are very similar to the South Russian form. They are somewhat smaller and lighter (variegated) than the German ones. The hind wings are sometimes pure white with a darker marginal line, although this is also sometimes absent in the males from Saisan. On the 25th August, at Lepsa (or Saisan), a somewhat worn ♀ was found with uni-

colourous grey fore wings and almost all the longitudinal markings absent, and with pale whitish hind wings which I concluded was a very doubtful variety of this species. I believe it may belong to a supposed species very near to *tritici* which is sent from Hungary and South Russia and called in letters var. *rustica*, *fictilis* and even *seliginis* as well. *Seliginis*, Dup. appears certainly identical with *eruta*, Hb. Guenée, for his *seliginis*, made only some philological observations on the name. Under the whole of these circumstances, I can only refer the before-mentioned Lepsa ♀ to this interchangeable doubtful species. I would prefer not to write a final opinion here" ('Stettiner entomologische Zeitung,' vol. xlii., p. 421).

Vol. ii., p. 47.—*Agrotis tritici* var. *varia*, Alph.—A variety described by Alphéraky under this name, is mentioned in the 'Zoological Record,' 1889 (Insecta), p. 248, where it states that it is described on p. 138, and figured Pl. vii., fig. 1, of Romanoff's 'Mémoires sur les Lépidoptères,' vol. v. This description is:—"Chiefly distinguished by the costa, the median nervure and the stigmata being greyish-white and standing out strikingly from the dark ground colour which is sometimes almost black. A series of wedge shaped spots on the undulated line, and the large and very dark claviform gives this variety a very different appearance from *tritici*."

Vol. ii., p. 52.—*Agrotis tritici* var. *detorta*, Evers.—Eversmann's original description of *detorta* is as follows:—" *Agrotis* alis anticis cinereis, fusco-obscuratis: strigis ordinariis denticulatis nigris maculisque ordinariis distinctis: maculæ reniformis margine interna recto; alis posticis fusciscentibus, albo ciliatis." "It very much resembles *Agrotis senna*, Hb. in size and shape, differing principally in the reniform, of which the edge turned towards the base is perfectly straight, whilst it is curved in *senna*. Its colour resembles that of *senna* as represented by Boisduval ('Icones,' Pl. 77, fig. 4), but not as figured by Hübner (figs. 771-772)" ('Bulletin Moscou,' 1851, Pt. i., pp. 628-629).

Agrotis, Och., *ripæ*, Hb.-Gey.

Vol. ii., p. 71.—*Agrotis ripæ* var. *desertorum*, Bdv.—This form from Southern Russia, was described as a distinct species by Boisduval, who wrote of it as follows:—"Sub-affinis *Ripariæ*: alæ anticæ angustæ, cinereæ, strigis tribus punctisque marginalibus nigris: maculis ordinariis fuscis; rotunda longitudinali, minuta; alæ posticæ niveæ; omnibus subtus albis, puncto discoidali nigro. Inventa in Russia, meridionali a D. Kindermann" ('Genera et Index methodicus' &c., p. 111).

Agrotis, Och., *lucernea*, Linn.

Vol. ii., p. 79.—*Agrotis lucernea* var. *renigera*, St.—Mons. Oberthür records this variety from "Cauterets (Pyrenees) in July, 1881; the form as dark as in England" ('Études d'Entomologie,' viii., p. 48). Dr. Chapman also gave me a specimen of this variety which was captured in the Pyrenees.

Agrotis, Och., *obscura*, Brahm.

Vol. ii., p. 83.—*Agrotis obscura*.—" *Clandestina*, Harr., placed in the British Museum series as a var. of this species, is a distinct species with structural differences, vide Smith, 'Revision *Agrotis*,' p. 94.—On the other hand, *unicolor*, Walk., is only a synonym or slight variety of

obscura" (Cockerell, *in litt.*, 31, 3, '92). Grote also writes to me that *clandestina* is distinct.

Agrotis, Och., *fennica*, Tausch.

Vol. ii., pp. 84-85.—*Agrotis fennica*.—Mr. Cockerell writes:—"As to great damage done by this species at Ottawa, in May, 1884, *vide* Fletcher 'Canadian Entomologist,' 1884, p. 214" (*in litt.*).

Agrotis, Och., *hyperborea*, Zett.

Vol. ii., p. 85.—*Agrotis hyperborea*.—It is well to have the exact citation of opinion by means of which well-known lepidopterists have united very distinct looking forms into one species. For this purpose, I quote the following note of Dr. Staudinger, who wrote in August, 1876:—"When I was in London last May, Mr. McLachlan had the kindness to show me the type of *P. alpina*, taken by Mr. Douglas in 1839, on Cairn Gowr in Perthshire, at an elevation of 3,000 feet. The only mention of it that I have seen is in Stainton's 'Manual of British Butterflies and Moths,' vol. i., p. 241. The species is described in Westwood and Humphrey's 'British Moths' (1843 or 1845) and I shall be glad to have the exact citation, as Stainton unfortunately gives no author's names. I recognised at first sight that *P. alpina* was the same species as the *Agrotis hyperborea* of my large 'Catalog' ('1871, No. 1098). Zetterstedt described it in his 'Insecta Lapponica,' in 1840 (p. 938), as *Hadena hyerborea*. The type of *P. alpina* is possibly a little darker than specimens from Lapland, but it is old, and even the Lapland individuals show aberrations. In 1860, I took this insect (in company with my friend Dr. Wocke) not unfrequently in Finmark (Norwegian Lapland), in July, and we found pupæ and also larvæ at the end of May, in moss. I detailed the account in the 'Stettiner entomologische Zeitung,' 1861, p. 361. Since then, the species has been found on the Dovrefjeld in the centre of Norway, on the Riesengebirge (Silesia), and on the Alps of Switzerland and Tyrol. On the Alps of Carinthia it has a reddish (instead of bluish) coloration, and this form was described by Hering as *carnica*, and by Herrich-Schäffer as *glacialis*. This is certainly only a local form of *hyperborea*. I saw, in the Museum at Pesth, a specimen taken by the younger Frivaldszky in the Carpathian Mountains, which is intermediate between the two forms. The reddish *Agrotis subrosea*, Steph., becomes blue (var. *subcærulea*, Stdgr.) in the North of Russia. The Scotch *Pachnobia alpina* must take the older name of *hyperborea*, Zett. The species has a wide distribution on the Continent" ('Entomologist's Monthly Magazine,' vol. xiii., p. 90). The original description of *alpina* has been given *ante*, vol. ii., pp. 87-88.

Vol. ii., p. 86, line 16.—for "Mr. Janos of Frivaldisky" read "M. Frivaldszky the younger."

Noctua, L., *baia*, Fab.

Vol. ii., p. 105.—*Noctua baia* var. *bajula*, Stgr.—This variety was described by Dr. Staudinger from Central Asiatic specimens which he received in considerable numbers from Lepsa. His original note on this form runs as follows:—"This NOCTUA has been sent in large quantities (chiefly females) from Lepsa, which had probably been taken at sugar in the autumn. These specimens differ from *baia*, but I take them to be the var. *bajula*. The latter is smaller on the average,

apparently narrower winged and especially paler than *baia*. Even the freshest specimens have the fore wings grey brown, and the hind wings dull blackish-grey. The decidedly black dots in *baia* on the costa (forming the short black mark characteristic of the species just before the tip of the fore wings) are generally absent, and only rarely developed to the extent that they are in typical *baia*. The under surface, thorax, and particularly the body, have never so reddish-brown a tint as ordinary *baia*, but are of a pale greyish-yellow colour" ('Stettiner entomologische Zeitung,' xlii., p. 411). Our British specimens of var. *grisea* must run this very close, but they always (so far as I know) have the small apical costal streak well-developed.

Noctua, Linn., *glareosa*, Esp.

Vol. ii., p. 108.—*Noctua glareosa* var. *hebraicaoides*, Gregs.—Mr. Robson in the 'Young Naturalist,' 1888, p. 121, writes:—"Var. *hebraicaoides* of this collection (Gregson's) has a dark cold brown ground colour, making the costal spots appear less distinctly defined, and the margins of the stigmata more so." These North of England dark forms seem to be very different to the Shetland var. *suffusa*, which is of a rich dark brown. I do not recognise any form I have seen by this description, and must assume that there is probably a second melanic form independent of var. *suffusa*, occurring in certain localities in the North of England.

Noctua, Linn., *conflua*, Tr.

Vol. ii., p. 123.—*Noctua conflua* var. *diducta*, Zett.—The Scandinavian description given by Lampa of this variety reads as follows:—"The fore wings are greyish-yellow with indistinct markings, the pyramidal spot scarcely visible. The type specimen is in the Svenska Museum," etc. ('Entomologisk Tidskrift,' 1885, p. 53).

Noctua, Linn., *xanthographa*, Fab.

Vol. ii., p. 124.—*Noctua xanthographa* var. *elutior*, Alph.—This variety is mentioned in the 'Zoological Record,' 1889 (Insecta), p. 248, as figured in Pl. vi., fig. 3, of Romanoff's 'Mémoires sur les Lépidoptères,' vol. v. I find it also referred to in the 'Zoological Record,' for 1887, as published by Alphéraky in the 'Stettiner ent. Zeitung,' vol. xlviii., p. 168. This original description is as follows:—"♂. 37 mm. Varietas major, alis latioribus, anticis (cum thorace) pallide-cinnamo(n)eis, macula reniformi albido-circumscripta; posticæ cum ciliis albidæ ad marginem sordide grisescentes; subtus alæ omnes pallidiores. Taschkent" ('Stettiner entomologische Zeitung,' 1887, vol. xlviii., p. 168).

Noctua, Linn., *plecta*, Linn.

Vol. ii., p. 127.—*Noctua plecta* var. *anderssoni*, Lampa.—The Scandinavian description of this variety reads as follows:—"The fore wings dark violet-brown, nearly violet-black, only the median nervure at the base, and the borders of the stigmata yellowish-white." "Many examples found by Andersson" ('Entomologisk Tidskrift,' 1885, p. 54).

Taniocampa, Gn., *instabilis*, Fab. (*incerta*, Hufn.).

Vol. ii., p. 136.—*Taniocampa instabilis* (*incerta*).—Mr. Cockerell writes:—"Taniocampa incerta, Hufn. is American, and has a synonym *alia*, Guen. It also has a var. *confluens*, Morr." (*in litt.*).

Vol. ii., p. 139.—*Tæniocampa incerta* var. *pallida*, Lampa (= *pallida*, Stdgr.).—Dr. Staudinger seems to have paid but little attention to already named forms in describing many of the varieties he has received from Central Asia. Thus, although a whitish-grey form of *incerta* was named *pallida*, in 1885, by Lampa, he described another pale form, apparently identical with Lampa's *pallida*, in 1888, under the same name. His name therefore will sink as a synonym. He writes of his var. *pallida*:—"The Central-Asiatic specimens of *incerta*, are very generally so exceedingly pale and clear, as to merit a distinctive name. The fore wings are light-grey, without any reddish or brown shading, the darker markings tending more strongly to obsolescence, than in the European type form. The hind wings also are almost entirely light whitish-grey. I obtained such specimens in number from Margelan (found in the commencement of March), also from Kuldja and the Alexander Mountains. From the latter locality (as I am informed), I also received quite typical *incerta*, which, I suppose were most likely taken in the higher region, so that the pale specimens apparently represent the form (Steppen-form) from the lower lying country" ('Stettiner ent. Zeitung,' 1887, vol. xlix., p. 32).

Tæniocampa, Gn., *opima*, Hb.

Vol. ii., p. 143.—*Tæniocampa opima* var. *fuscus*, Gregson.—A number of undescribed varietal names are mentioned by Mr. Robson as being used in Mr. Gregson's cabinet, in 'The Young Naturalist,' vol. ix., p. 122. Mr. Gregson seems to have had no idea of the type form or to have looked up the literature on this species before naming these varieties, with the result that the type appears to be called var. *distinctæ*; a form perhaps somewhere near my var. *intermedia* (but it is pure guess work to place it) is called *fuscata*; a form not quite so obsoletely marked as my var. *grisea* is called *cineræ*; whilst the only well-defined form, synonymous with my var. *unicolor*, "of an unicolorous dark brown colour with no band," he calls *fuscus*. Var. *unicolor*, Tutt ('Brit. Noct.,' vol. ii., p. 143), therefore, becomes *fuscus*, Gregs., Robson ('Young Nat.,' 1888, p. 122).

Tæniocampa, Gn., *gracilis*, Fab.

Vol. ii., p. 145.—*Tæniocampa gracilis* var. *pallidior*, Stdgr.—Another form described some 80 years ago by Haworth as *sparsus*, and recently redescribed by Staudinger under the above name. Staudinger writes:—" *Tæniocampa gracilis* var. *pallidior*, Stdgr.—In order to be logical, I must bestow a suitable name on the form of *gracilis* received from Kuldja, Margelan, and the Alexander-Gebirge (?), which is of an entirely pale, ashy, or sand-grey colour. I possess also an almost similar accidental aberration of *gracilis* from Denmark, as pale and light as var. *pallidior* (the light Central-Asiatic local form)" ('Stettiner entomologische Zeitung,' xlix., p. 32). This would appear to comprise also Guenée's var. *pallida*, as Staudinger refers to sandy forms. At any rate, his name has long been forestalled, owing to the pale form having been long ago described under another name.

Tæniocampa, Gn., *gothica*, Linn.

Vol. ii., p. 149.—*Tæniocampa gothica*.—The variety called *nigra* by Mr. Robson in the 'Young Naturalist,' 1888, p. 121, appears to repre-

sent the type of the species—"alis superioribus fuscescentibus; arcu nigro linea alba marginato" the description of Linnæus, agreeing with Mr. Robson's remarks "dark smoky-brown, with the black 'Hebrew character' very distinct."

Tæniocampa, Gn., *stabilis*, View.

Vol. ii., p. 152.—*Tæniocampa stabilis* var. *obliqua*, Vill.—Villers' diagnosis of this variety is as follows:—"Bombyx fusco-grisea, alis superioribus striga lutea obliqua. Tota unicolor fusco-grisea. Maculæ ordinariæ alis concolores sed peripheria lutea. Striga lutea fusco-antice marginata, a margine interiore versus exteriorem postice descendens" ('Caroli Linn.' &c., p. 147).

Tæniocampa, Gn., *pulverulenta*, Esp.

Vol. ii., p. 154.—*Tæniocampa pulverulenta* var. *irroratæ*, Gregs., Robs.—Mr. Robson in the 'Young Naturalist,' 1888, p. 121, mentions Haworth's *pusillus* under the above name. This haphazard naming of varieties, without reference to the positive type form, appears very likely to cause a great deal of unnecessary confusion.

Vol. ii., p. 155.—For "var. *cruda*, mihi," read "var. *cruda*, Hb."

Anchocelis, Gn., *helvola*, Linn.

Vol. ii., p. 162.—*Anchocelis helvola* var. *sibirica*, Stgdg.—This variety was first described by Staudinger, who writes as follows:—"More than 30 specimens of this species were received from Saisan, and they are all so much strikingly paler than German specimens, that they must be considered as a strong local variety. Two specimens were also received from Altai. The fore wings of this form are nearly always light yellow-grey with red-brown transverse markings which are mostly narrow and often very faint. The hind wings are dirty-white in colour, the middle inclining to blackish, and a reddish tint towards the outer margin. The undersides of all the wings are much larger than in German *helvola*, which show only occasionally transitional forms to *sibirica*" ('Stettiner entomologische Zeitung,' vol. xliii., p. 46).

Vol. ii., p. 163.—*Anchocelis helvola* var. *pallæ*, Gregs., Robson.—This is a form which I do not appear to have met with.—Mr. Robson describes it as:—"A straw-coloured form with the markings dark-grey" ('Young Naturalist,' vol. ix., p. 122).

Anchocelis, Gn., *lunosa*, Haw.

Vol. ii., p. 169.—*Anchocelis lunosa* var. *lunæ*, Gregs., Robson.—The reddish form named var. *lunæ* by Mr. Gregson is Haworth's type of *lunosa*. Mr. Robson adds:—"The type is a cold dark brown." This remark probably refers to Herrich-Schäffer's *neurodes*. Haworth says of the type:—"Alis griseo-rufescentibus" etc., which is I take it "the reddish form" described as *lunæ*.

ADDITIONS, etc., to Vol. III.

Orrhodia, Hb., *vaccinii*, Linn. and *O. ligula*, Esp.

Vol. iii., pp. 1-6.—*Orrhodia vaccinii* and *O. ligula*, Esp.—Mr. Butler complains that these allied but well differentiated species have been "laboriously sorted out into three," *N. ligula*, *vaccinii* and *spadicea*, by

“hairplitters who are purely European workers” (‘Trans. Ent. Soc. of London,’ 1890, p. 683). This is an error. We have always differentiated two species which Mr. Butler erroneously lumps together. We used to call our two species, *vaccinii*, Linn. and *spadicea*, Haw. The latter name gave way to the prior name of *ligula*, Esp., so that *ligula*, Esp. = *spadicea*, Haw.; *vaccinii* has always remained unchanged. Mr. Butler, too, states that “Zeller had 70 specimens and left a typical *ligula* among his *vaccinii* and divided the remainder somewhere in the middle, being evidently unable to find any constant character by which to distinguish them” (l.c.). It is not at all probable that Zeller left a typical *ligula* with *vaccinii*, and Mr. Butler simply states his own inability to distinguish them when he remarks that “Zeller could not find a character,” as Zeller did distinguish them and divided them into their respective species.

Orrhodia, Hb., *ligula*, Esp.

Vol. iii., p. 4.—*Orrhodia ligula* var. ? (ab. *subspadicea*, var.) Stdgr.—I have already (vol. iii., p. 5 and p. 6) referred Staudinger’s var. *subspadicea* to Haworth’s var. *spadicea*. Of the Central Asiatic specimens Staudinger writes:—“*Orrhodia ligula* var. ? (ab. *subspadicea*, var.), Stdgr.—Two large specimens from Lepsa, having a reddish-brown ground colour mixed with yellow-grey, I am inclined to class with *ligula*, which I am not at all sure is distinct from *vaccinii*. Some of my *subspadicea* closely resemble these Asiatic specimens, which differ decidedly from all other forms” (‘Stettiner entomologische Zeitung,’ vol. xliii., p. 47).

Vol. iii., p. 4.—*Orrhodia ligula* vars. *politina*, Stdgr. and *subspadiceana*, Stdgr.—Of these forms Dr. Staudinger writes:—“*O. ligula* vars. *politina* and *subspadiceana*.—Specimens of an *Orrhodia* were taken in large numbers at the end of February, near Margelan, and differ principally in the lighter ground coloring from the European specimens. Without entering into the difficult separation of the single vars. of forms of *ligula* and *vaccinii* (which perhaps belong to one species), I name as var. *politina* the Central Asiatic specimens with light ash-grey fore wings. They show mostly a more or less faint reddish-brown dark band before the reddish-white fringes and the lighter outer edges of the wings. Very rarely, light-grey specimens like *politina* are taken in Europe as aberrations, which, however, can be clearly distinguished from them. Even in Central Asia this form, *politina*, occurs really as a frequent aberration, for most specimens from there are of a reddish-brown colour on the fore wings, but much paler and tinged with grey. The hind wings of the var. *subspadiceana* are light in colour, similar to *politina* by which they are distinguished from all European forms which are similarly marked on the fore wings” (‘Stettiner entomologische Zeitung,’ vol. xlix., p. 35).

Hoporina, Bdv., *croceago*, Fab.

Vol. iii., p. 8.—*Hoporina croceago* var. *corsica*, Mab.—For “Mabelle” read “Mabille.”

Xanthia, Och., *gilvago*, Esp.

Vol. iii., p. 14.—*Xanthia gilvago* var. and ab. *palleago*, Hb.—Dr. Staudinger records specimens of *gilvago* from Central Asia, of which he writes:—“Taken at Lepsa, but they differ materially from the Euro-

pean *gilvago* and variety. Two of the specimens are similar to *gilvago*, but they have more yellowish primaries, almost exactly like *flavago* (for which species, indeed, I at first mistook them), and lighter hind wings, much like those of *fulvago*. Two other specimens show the same yellow coloration of the fore wings but are almost entirely without markings. These latter must therefore be classed as ab. *palleago*. I received two similar specimens from Margelan, and it would appear that the *gilvago* of Central Asia, consists of a peculiarly light variety like so many other NOCTUÆ from that district" ('Stettiner entomologische Zeitung,' vol. xliii., pp. 46-47).

Vol. iii., p. 14.—*Xanthia gilvago* var. *ocellaris*, Bkh.—It has been suggested that *ocellaris*, Bkh., is only the extreme form of *gilvago*, a view held by Rössler. With regard to this Fuchs writes:—"If Rössler acknowledges the existence of a form intermediate between *gilvago* and *ocellaris*, and has united them in consideration thereof, the proof is incomplete, for only in a certain sense can intermediate forms be said to unite two supposed distinct species. My own captured *gilvago* and *ocellaris*, however, leave me to believe in the identity of these species, as I have one *gilvago* with the tips of the fore wings acutely pointed as in *ocellaris*. All my specimens, both of *gilvago* and *ocellaris*, have been taken in the noted poplar avenue of Hamburg, where *gilvago* is the rarer and *ocellaris* the commoner species. The freshly emerged specimens were taken on the trunks of poplars during the afternoon" ('Stettiner entomologische Zeitung,' vol. xlv., p. 264). I believe the union of *ocellaris* and *gilvago* has never got beyond this, and up to the present I believe both species have not been bred from the same batch of eggs.

Mellinia, Hb., *circellaris*, Hufn.

Vol. iii., p. 15.—*Mellinia circellaris* ab. *nigridens*, Fuchs.—The following is the original note referring to a description of this variety:—"The chief characteristic of this interesting form, which contrasts strikingly with typical *circellaris*, is expressed by the name *nigridens*. Not only both transverse lines, but also the nervures towards the outer margin are black. Through this outer area the zigzag subterminal line shows up more distinctly on the nervures than is the case in the indistinctly marked *circellaris*. The coloration of the fore wings also shows some difference in the same direction, never appearing reddish, and generally darkened with brown scales. The species was taken very freely from Sept. 12th to Oct. 5th, 1882, but only towards the end of the time were a few specimens discovered belonging to this aberration" ('Stettiner entomologische Zeitung,' vol. xlv., p. 263). This form is apparently the var. *macilenta* of Hübner (*vide, ante* vol. iii., p. 15), or at any rate is sufficiently near to be classed with it.

Plastenis, Bdv., *retusa*, Linn.

Vol. iii., p. 19.—*Plastenis retusa*.—Butler refers his *curvata* ('Trans. Ent. Soc. Lond.,' 1886, p. 131) to this species and writes:—"The Japanese specimens are slightly larger and darker than most European examples. When I named '*Cosmia curvata*,' we had no European representative in the general collection. This was one of the many desiderata supplied by the Zeller collection" ('Trans. Ent. Soc. Lond.,' 1890, p. 681). Such an excuse as this is marvellous in one who is critically dealing with the NOCTUÆ of the world, and pleads ignorance of a species in every beginner's collection in this country.

Calymnia, Hb., *trapezina*, Linn.

Vol. iii., p. 22.—*Calymnia trapezina* var. *badiofasciata*, Teich.—The original notes on this variety are as follows:—"Of this species three specimens have been taken here, which vary so much from the normal form that they might almost be supposed to be another species. I, therefore, add a description, whilst I propose to name the form var. *badiofasciata*. The ground colour is similar to the ordinary *trapezina*, but the male is paler and the female more reddish-yellow. The markings above are those of the normal form, but the central area is dark chestnut-brown, and consequently the black spot is not seen; the wavy line towards the margin is also shaded with dark. The fore wings are darker underneath, and the hind wings have a broad blackish-grey band instead of the dotted arched streak; but between the base and central lunule the commencement of a similar band, which, however, soon becomes suffused, is still seen on the costal margin. They were taken at sugar during the second half of July" ('Stettiner entomologische Zeitung,' vol. xlv., p. 173). This variety comes very near my var. *rufo-pallida* (*ante*, vol. iii., p. 23), and may even be identical with extreme forms of it. The type of var. *badiofasciata* was taken in Riga.

Dianthœcia, Bdv., *cæsia*, Bkh.

Vol. iii., p. 39.—*Dianthœcia cæsia* var. *manani*, Gregson.—Mons. Oberthür records this from the Pyrenees. He writes:—"The type from Caunterets is dark, nearly approaching that from England" ('Études d'Entomologie,' viii., p. 49).

Hecatera, Gn., *chrysozona*, Bkh.

Vol. iii., p. 40.—*Hecatera chrysozona* var. (Stdgr.).—Of the Central Asiatic form Staudinger writes:—"Two very pale specimens were sent to me from Saisan, which, however, do not agree with my var. *innocens* nor with var. *caduca* (the latter I now consider to be certainly a form of *chrysozona*). From Margelan, I last year received a larger number of these paler but variable specimens, which I sent away at first as *caduca*, but which cannot be considered as this form which has no yellow shadings. Some specimens from Dalmatia resemble var. *innocens*, others are very different, yet I think they should be included under the same varietal name" ('Stettiner entomologische Zeitung,' vol. xliii., pp. 36-37).

Vol. iii., p. 40.—*Hecatera chrysozona* var. *caduca*, H.-S.—Staudinger considered this variety of *chrysozona* from Crete, as doubtfully belonging to *serena* or *chrysozona*, but in the 'Stettiner entomologische Zeitung,' vol. xliii., pp. 36-37, refers *caduca* decidedly to *chrysozona*. Herr Speyer then wrote:—"Until now, *Mamestra caduca* was unknown to me, but a male specimen captured by my brother in Granbünden on July 14th, 1861, agrees exactly with Herrich-Schäffer's description ('Schmet. von Europa' ii., p. 266) no less than with his exact figure (484). There can be no doubt about the identity of the species, and in my opinion, *caduca* is not a distinct species but an aberration of *chrysozona*, Bkh. (*dysodea*) very slightly coloured in the central area, in which the yellow is only represented by a faint shade. The markings tally exactly, especially those of the hind wings, with Herrich-Schäffer's figure; and the second transverse line of the fore wings, which in this species makes a sharp, wedged-shaped mark, in *serena* forms only a short

dentate mark. The antennæ are very distinct also from those of *serena*, with which Staudinger ('Lepidop. Griechenlands' etc., 121, and 'Lepidop. Kleinasiens' etc., 200) classes *caduca*. In *chrysozona* they are very weakly pectinated, but in *serena* they are always thicker and longer, almost hairy. Herrich-Schäffer received his original type specimen from Frivaldszky from Crete, taken in July. The flesh-coloured larva according to Frivaldszky, differs from that of *dysodea*. I certainly considered this a local form of *chrysozona* from Crete, which also occurs further north as an aberration" ('Stettiner entomologische Zeitung,' vol. xlviii., p. 338).

Referring to this note on *Mamestra caduca*, H.-S. in the 'Stett. ent. Zeit.,' 1887, p. 338, Herr Speyer further writes:—"On compiling the communication quoted, I have overlooked that Dr. Staudinger had in the 'Ent. Zeit.,' xliii., p. 36, altered his opinion respecting *caduca*, and that he himself now declares it to be certainly a var. of *H. chrysozona*. The difference in the larva has probably induced Herrich-Schäffer to put *caduca* as a separate species, in spite of his own statement that it tallies in all essential points with *dysodea*" ('Stettiner entomologische Zeitung,' vol. xlix., p. 207).

Herrich-Schäffer's original description of *caduca* is as follows:—"Cinerea fusco- et perparum aurantiaco-mixta." He further states that:—"It comes near to *dysodea*, but is smaller, although having the same markings. The same ashy-grey ground colour and a slight trace of yellow markings. The black markings are fainter. In the hind wings is a darker line parallel to the hind margin, and a dark lunule" etc. The figure accompanying this description is certainly a very pale *dysodea* with a very slight ochreous tint. The description I made of the figure is as follows:—"Fore wings grey, with a faint ochreous shade in the centre of the wing, and with the ordinary and abbreviated basal lines pale, with dark outer edges; the claviform is short, blunt, and very dark; the orbicular is ocellated; the reniform with a dark margin; the elbowed line pale with its inner edge dark; the subterminal very black. The hind wings whitish with a dark margin and lunule" ('Die Schmet. von Europa,' p. 266, and fig. 48).

Prodenia, Gn., *littoralis*, Bdv.

Vol. iii., p. 63.—*Prodenia littoralis*.—This species was first bred in Britain by Mr. Boden from an imported tomato. Of this we read:—"Mr. Boden, at the City of London Ent. Society's Meeting of August 6th, exhibited a specimen of a NOCTUA bred from a larva found feeding on a tomato. He stated that the 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" ('Ent. Record' &c., vol. ii., p. 167). Further we read:—"This specimen has since been identified as the *Prodenia littoralis* of Boisduval, a species hitherto unknown in Britain. He (Mr. Boden) stated that he had failed to obtain any information as to the locality from whence the tomato came, but expressed an opinion that, seeing how extensively this plant was now cultivated in England, it was quite possible that the insect might become naturalised in this country" (l.c. p. 260). Staudinger records it from "Crete, Syria and the Canary Isles" ('Catalog,' p. 104). Colonel Swinhoe records it "from Moulmein and Rangoon" ('Trans. Ent. Soc. of London,' 1890, p. 127).

Butler writes :—" *Prodenia testaceoides* (Guenée, 'Noctuelles,' vol. v., p. 165) is a slight variety, and *P. declinata*, Walker (*l.c.* vol. xi., p. 723) is a starved specimen" ('Transactions of the Entom. Society of London,' 1890, p. 666). I have not been able to test this statement, but as Colonel Swinhoe in the 'Trans. Ent. Soc. of London,' 1890, p. 227, adopts Butler's synonymy, probably it is correct.

Boisduval's original diagnosis of this species is as follows :—" *Alis anticis fusco violascentibus, maculis ordinariis nervo medio albedo junctis, strigis transversis pallidis, maculisque apicalibus sagittatis nigris; posticis albo-opalinis*" ['Fauna Madagas.' etc., p. 91 (1834)].

Aplecta, Gn., *advena*, Fab.

Vol. iii., p. 70.—*Aplecta advena* var. *adjuncta*, Stdgr.—Of this local form Dr. Staudinger writes :—" *M. advena* var. *adjuncta*.—Christoph found this species in the beginning of August near Whadiwostock. Dörries sent it me from Askold, Ussuri, Linfun and Sidimi. I took it first for another species, but I believe now that it is a local form of *advena*. *Adjuncta*, which on the average is somewhat larger than *advena* (48-55 mm), has the same markings, which, however, do not appear so clearly because it is darker than *advena*. The fore wings are dull grey-brown with very little or none of the blue-grey tint which predominates in *advena*. Through this darker coloration the markings in *adjuncta* appear less distinct, and the two discoidals are often scarcely visible, especially the white line surrounding the reniform, which is never present as in *advena*. The hind wings also, as well as the underside of both fore and hind wings are darker in *adjuncta*. The dark lunular spot on the hind wings appears either faintly or not at all" ('Stettiner entomologische Zeitung,' vol. xlix., p. 249).

Aplecta, Gn., *nebulosa*, Hufn.

Vol. iii., p. 68.—*Aplecta nebulosa* var. *askolda*, Oberthür (= var. *bimaculosa*, Esp.?).—Of this variety Oberthür makes the following remarks :—"It only differs from the ordinary French type in the tint being of a slaty-grey and in consequence much darker. Four ♂ and one ♀ exactly similar to each other were received from Askold" ('Études d'Entomologie,' v., p. 79). It almost seems as if this variety should be referred to var. *bimaculosa*, Esp. At any rate there can be no practical difference between var. *askolda* and our dark Yorkshire form.

Hadena, Och.

Vol. iii., p. 71.—Our *Crymodes exulis* (*ante*, vol. i., p. 118) is supposed by many well-informed entomologists to be nothing but a local form of *Hadena maillardi*, Hb.-Gey. At any rate the following note concerning this matter, written by Dr. Staudinger, is well worthy of notice. He writes :—" *Hadena maillardi*, Hb.-Gey. (*pernix*, Hb.-Gey. var.; *exulis*, Lef.?). A fresh male, and two fresh females, captured on the 19th of July, might be called *maillardi* equally as well as *pernix* or *exulis*. I feel almost certain now that *exulis* is only a var. of *maillardi* which has especially developed in Iceland. Specimens taken in the Dovrefjeld in Norway, which Wocke represents as *exulis*, and which, in fact, resemble many Greenland and Labrador *exulis*, are difficult to separate from small specimens of *maillardi*. The three Central Asiatic specimens are very similar to these Norwegian forms, indeed, I should not be able to distinguish the males. The two

smaller females, however, differ from the Norwegian examples, having no border to the stigmata, and are darker on the underside, without a distinct black central spot on the hind wings, which, however, the male shows very distinctly. Yet, I do not doubt but that the male is specifically identical with the female. I do not think it impossible that *zeta*, *pernix* and *maillardii*, which appear to comprise the variable European form, are identical with the Iceland and Polar-American *exulis*. Finland and Central Asia (and most likely also that part of North Asia which has not been explored) give all the transitional forms, but without such striking ones as *exulis* produces in Iceland. I also possess a specimen from South Caucasus which might be united with *pernix* and *maillardii*" ('Stettiner entomologische Zeitung,' vol. xliii., pp. 40-41).

Hadena, Och., *adusta*, Esp.

Vol. iii., p. 73.—*Hadena adusta* var. *vicina*, Alphéraky.—In the 'Zoological Record,' 1890 (Insecta), p. 250 we read:—" *H. adusta*, var. = *Mamestra vicina*, Alphéraky (Alphéraky, in Romanoff's 'Memoires sur les Lépidoptères,' vol. v., p. 163). Alphéraky's description of *vicina* is:—"This variety is of an uniform chocolate-brown, with black markings and with the claviform very distinct, producing at first sight an appearance very different from *adusta*. The wavy line is indicated only by a series of black sagittate streaks."

Hadena, Och., *trifolii*, Rott.

Vol. iii., p. 83, line 16 from bottom, for "*tripolii*" read "*trifolii*."

Hadena, Och., *dissimilis*, Knoch.

Vol. iii., p. 86.—*Hadena dissimilis*.—Dr. Staudinger writes—Two specimens of this species from Saisan, and seven from Lepsa, agree with the brown unicolorous specimens taken in Europe. Several specimens were also sent from Margelan" ('Stettiner entomologische Zeitung,' vol. xliii., p. 35).

Hadena, Och., *pisi*, Linn.

Vol. iii., p. 91.—*Hadena pisi* var. *pallens*, Stdgr.—This pale yellow-brown variety of *pisi* was thus noticed by Dr. Staudinger:—"I received 26 specimens from Lepsa, which are very similar, but differ so much from *pisi*, that I at first considered them to belong to a distinct species. The fore wings are yellow-brown, almost unicolorous, rarely with a reddish tint, but the white line on the outer margin with the large white spot at its extremity comes out very distinctly. The transverse lines are almost entirely absent. The discoidals are very faint but the nervures are often blackish towards the outer margin. The hind wings and the under surface are also paler, but the latter is reddish towards the front. The head and thorax are also pale yellow-brown, never red-brown. The Iceland *pisi* resemble this variety very much and form a transition between this and the type, the Iceland specimens agreeing very largely with the Central Asiatic form. It seems strange to find similar specimens in Central Asia and Iceland" ('Stettiner entomologische Zeitung,' vol. xliii., pp. 35-36). I have seen specimens, which Mr. W. F. de V. Kane captured in Ireland, very similar to this variety.

Xylina, Och., *lamda*, Fab.

Vol. iii., p. 99.—*Xylina lamda*.—A translation of the critical note in which Staudinger collected *lamda*, *somniculosa* and *zinckenii* into one

species, is given by Müller in 'The Entomologist,' vol. v., p. 47. He writes:—" *Xylina lambda* of Fabricius, *somniculosa* of Hering, *rubescens* of Ménétries.—Even to this day there stands in Treitschke's collection the type of *Noctua lambda* of Fabricius ('Ent. Syst.', iii., 2, p. 106, No. 317), a species which has been discussed at some length by Treitschke (vol. iii., p. 18). This *lambda* of Fabricius is doubtless identical with the subsequently described *somniculosa* of Hering ('Stett. ent. Zeit.,' 1851, p. 165) or the still subsequent *rubescens* (Ménétries, 'Étud. Ent.,' 1859), as the specimen seemed to me to be a sharper marked one. The Fabrician indication of the markings of the fore wings:—"Lineola baseos duabusque in medio atris," also applies better to the sharper-marked variety *rubescens* of Ménétries. I, therefore, believe that this *lambda* came originally from Lapland, whence it is known that Herr Schneider of Stralsund, from whom Fabricius received the specimen, often obtained collections, and where the species is not scarce, although I regard this form, as Treitschke has previously done, to be only a variety of *zinkenii*, yet as a well-defined local form it must keep its name, and must now stand as:—

lambda, Fab., 'Ent. Sys.,' iii., 2, p. 106.

rubescens, Mén., 'Ét. Ent.' (Europa Cor.).

var. *somniculosa*, 'Stett. Ent. Zeit.,' 1851, p. 165,
(Germania, Sept.-Or.).

var. *zinkenii*, Tr., v., pt. 3, p. 16 (Germania, Sept.-Occ.)"
('Stettiner ent. Zeitung,' 1869).

Calocampa, St., *exsoleta*, Linn.

Vol. iii., p. 108.—*Calocampa exsoleta* var. *impudica*, Stdgr.—This variety was described by Dr. Staudinger as follows:—" *Calocampa exsoleta* var. *impudica*, Stdgr.—As long ago as 1882 (in p. 47 of this journal), I mentioned the receipt of three specimens of a var. of *exsoleta* from Lepsa and Saisan. Since then, I have received the same in greater numbers as a special local form from Margelan and Samarkand, where they were found late in the autumn or hibernated in March. This var. *impudica* has the same peculiarity of all other Central Asiatic forms, namely, it is lighter in coloration than the European as well as less pronounced in its markings. The fore wings are ashy-grey without a brown tint mostly with striking lighter yellow-grey outer margin. All the darker markings appear more suffused. The hind wings are also lighter with paler almost white fringes. The underside is also coloured lighter in comparison. The hind wings are here almost whitish with darker dusted nervures. The black median spot is always present, but the dark transverse line behind it is often entirely absent " ('Stettiner entomologische Zeitung,' vol. xlviii., pp. 35-36).

Heliothidæ, Bdv.

Vol. iii., p. 121.—For "9. Family:—*Heliothidæ*, Bdv.," read "10. Family:—*Heliothidæ*, Bdv."

Heliaca, H.-S., *tenebrata*, Sc.

Vol. iii., p. 132.—*Heliaca tenebrata* var. *albescens*, Ckll.—On p. 132, I referred to a variety with white hind wings, which I said I thought Mr. Cockerell had named *albescens*. Mr. Cockerell now points out that the variety was named in 'The Entomologist,' 1889, p. 126, under the synonym of *H. arbuti*.

ADDITIONS, etc., to Vol. IV.

Brephos, Och., *notha*, Hb.

Vol. iv., p. 13.—*Brephos notha* var. ? (an *parthenias*), Stdgr.—Dr. Staudinger records a form from Central Asia which he assumes may be a variety of *notha*, but which is as mottled as *parthenias*. He is very uncertain, however, as to its actual specific identity, and writes of it as follows:—" *Brephos notha* var. ? (an *parthenias*).—Taken at the commencement of April at Lepsa. The males I can only determine as *notha*, which differs very little from *parthenias*, although they may be two distinct species. These Central Asiatic specimens are as small as *notha*, but the fore wings are as mottled as in *parthenias*. There is no difference in the transverse bands " ('Stettiner entomologische Zeitung,' vol. xliii., p. 57).

Plusia, Och., *chryson*, Esp. (*orichalcea*, Fab.?).

Vol. iv., p. 25.—*Plusia orichalcea* or *chryson*.—One of the reasons for dropping the name of *orichalcea* in favour of *chryson*, was due to the fact that Staudinger suggested that the Fabrician reference to the type coming from India was probably erroneous, but in the 'Études d'Entomologie,' vol. v., p. 84, two specimens are recorded from the Isle d' Askold, by Mons. Oberthür. Fabricius' original description of *orichalcea* is as follows:—" *Noctua cristata*, alis deflexis fuscis; macula magna lunata, orichalcea. Habitat in India. Koenig (colln.). Statura præcedentis (*chrysitis*). Alæ fuscae, anticis macula lunari orichalcea, nitida, posticis immaculatis " ('Systematica entomologica,' p. 607). Mr. Kirby refers this description to an Indian species allied to *chryson*, although the description applies fairly well to *chryson*; but although Askold and Japan are recorded as localities for *chryson*, specimens have not yet been recorded from India.

Plusia jota and *P. pulchrina*.

Vol. iv., p. 27.—*Plusia jota* and *P. pulchrina*.—The following note written by a Continental lepidopterist (Dr. Speyer) is sure to prove interesting to British lepidopterists. Dr. Speyer writes as follows:—" *Plusia jota* and *P. pulchrina*.—In England, the larvæ of both species are said to feed on the same plants which Stainton in his 'Manual' names as nettles, honeysuckle &c., without mentioning bilberry, on which I have here exclusively found *pulchrina* for many years. That my *pulchrina* and *jota* are identical with those of Guenée and those from England, the descriptions prove. In Germany, they are both classed together as varieties under the Linnæan name, but I have never seen an intermediate form. The larva of *jota*, here as elsewhere, feeds on many plants, and has been found chiefly in gardens, on nettles, *Lamium* &c., but is scarcer than *pulchrina*. I have also reared one specimen from a larva found on bilberry, which, however, may have got among the same accidentally. At any rate, I have since found only *pulchrina* on bilberry, and *jota* on other plants, but should not doubt a different experience on the part of others. That *pulchrina* in captivity will eat other plants is certain. A few larva taken on bilberry, in September, fed on *Lamium album* after hibernation, and thrrove well, in fact, they turned out quite typical *pulchrina*. Guenée seems in his description of *v. aureum*, not to

have had a sufficient number of specimens, for his marks of distinction are not at all to be relied on. The shape of the metallic mark is not a criterion, a better one exists in the fringes, which in *jota* are unicolorous, and in *pulchrina* dark-spotted, although in many specimens of the latter these spots are scarcely discernible. They vary according to my experience, much less than their somewhat larger and more robust relative, in which the metallic mark changes from the spots, being almost suffused on the one hand, and complete disappearance on the other. All *pulchrina* which I saw had it distinctly, and in the ordinary shape, that is, the v-shape and the spot separated; but I do not doubt that specimens may occur where both are united, and form a γ as in *percontationis*. The light purplish (tinted with blue) coloration, as also the more glossy fore wings, and the stronger angulated lines (almost always shining silvery in the basal area), give our European *pulchrina* quite a different appearance from *jota*, which is easily discernible when both species are before you. But they are still so similar that it is easily understood that there should be doubts as to their specific difference. In Curland, and probably in the Batish countries such doubt will not exist, as all their specimens resemble those which I saw in 1875, and shortly described under the names of var. *baltica* and var. *gammoides* in the 'Entom. Zeitung.' The considerably larger Batish *jota* is of a browner coloration, which has no resemblance to the grey gamma-like of their relative. Hübner's *jota* (fig. 288) belongs without doubt to *pulchrina*, but the coloration of violet and reddish is made to contrast too strongly, at least in Hübner's work in the Stettin library" ('Stettiner entomologische Zeitung,' vol. xlv., pp. 354-356).

Plusia, Och., *pulchrina*, Haw.

Vol. iv., p. 29.—*Plusia pulchrina* var. *monogramma*, Alph.—In the 'Zoological Record' for 1887 (Insecta), p. 250, we find:—" *P. pulchrina* var. *monogramma*, Alph., 'Stett. ent. Zeit.,' xlviii., p. 171." The original description is as follows:—"Varietas obscurior signis mediis aureo-argenteis anticarum in signum literam græcum γ simulantum conjunctis" ('Stettiner entomologische Zeitung,' vol. xlviii., p. 171). My var. *juncta* is not "obscurior," but is of the same tint as the normal British forms, otherwise the two varieties agree.

Amphipyra, Och., *pyramidea*, Linn.

Vol. iv., p. 37.—*Amphipyra pyramidea* var. *magna*, Walk.—The following is Walker's description of *magna*, which is now generally considered as a form of the above species:—"♀. Fusca, nigro conspersa; alæ anticæ fusciscente-cinereæ, fascia media lata dentata lineaque exterior nigricantibus linea ante media nigra undulata duplicata, orbiculari e annulo cinereo elliptico, reniformi suboboleta, spatio marginali fusco strigas nigras lineamque cineream dentatam includente; postica cupreo-rufa." "♀. Brown, speckled with black cinereous-brown beneath. Palpi nearly erect, rising a little higher than the vertex; third joint lanceolate, less than one-half the length of the second. Abdomen cinereous-brown, extending much beyond the hind wing. The fore wings brownish-cinereous, with a broad, blackish ventral band, which is dentate along its outer side, and is parallel to

an approximate blackish line; a double undulating black line at half the distance between the base and the band; orbicular mark forming an elliptical cinereous ringlet; reniform mostly or wholly obsolete, as is also the orbicular occasionally; marginal space brown, partly including a row of black streaks, which are traversed by a cinereous dentate line; marginal lunules dark brown, bordered with cinereous. Hind wings ochreous-red. Length of the body 13 lines; of the wings 32 lines. Localities.—*a*, North Hindostan, presented by the Secretary of the Indian Board; *b* and *c*, North Hindostan, presented by Capt. Strachey" (Walker, 'Catalogue, Lep. Het. Brit. Mus.,' 33, p. 868 [1865]).

Amphipyra, Och., *tragopoginis*, Linn.

Vol. iv., p. 39.—*Amphipyra tragopoginis* var. *turcomana*, Stdgr.—This Asiatic variety is described by Staudinger as follows:—"The specimens which are sent in large numbers from the province of Samarkand, taken at the end of May, as well as similar specimens from Margelan and Tekke, differ so much from the type in their paler coloration, that they deserve a varietal name. The fore wings are glossy, of a light, lead colour, instead of dark blackish-brown. The three dark dots near the margin and in the centre of the wing are generally suffused, whilst the darker, shadowy band near the outer margin is only faintly marked in some specimens. The hind wings of this var. *turcomana* are also much lighter, white-grey predominating. I sent out these light *tragopoginis* at first as var. *asiatica*, but as I afterwards received from Asia Minor, specimens as dark or darker than those of Europe, the name *asiatica* seems to me inappropriate" ('Stettiner entomologische Zeitung,' vol. xlix., p. 32).

Catocala, Och., *electa*, Bkh.

Vol. iv., p. 48.—*Catocala electa*.—This species has only once been captured in England, and this specimen was taken by Mr. Vine in the neighbourhood of Brighton. The original notice of its occurrence by its captor, is as follows:—"On the 24th of September, I had the good fortune to take at sugar, about eight miles from Brighton, a specimen of *Catocala electa*, which I think is the first recorded British capture. It was taken in a strong south-west wind off an elm tree, about 8 o'clock. It is now in the possession of Mr. Meek, of Brompton Road" ('Entomologist,' vol. viii., pp. 282-283). Mr. Meek adds:—"When at Brighton last Saturday, I bought what I supposed to be a var. of *Catocala nupta*, but, upon comparison with an European collection, I find it is *Catocala electa*" (*l.c.*). No other British specimen has been recorded of this species, either before or since.

The original description of this species is as follows:—"Phalœna Noctua *electa*. This moth has been confounded by modern authors with Linnæus' *pacta*. It is about the same size as *nupta*, the ground colour of the fore wings being of a light ashy-grey, mixed with light brown. Three whitish lines, edged with black, run transversely across the fore wings; the one nearest the base is short and broken; the second forms a strong curve and shows an M in the middle; the third is arched still more strongly, especially towards the outside, has irregular teeth and twice forms the letter M. Close to this latter, on the outer side, runs in similar curves a brownish shade joined by a

whitish one. Between the two last lines stands a lunar-shaped spot, and below this a light black-bordered reniform. From the base a rose-coloured streak runs as far as the second line. The hind margin is black, spotted with white, the fringes ashy-grey. The hind wings are rose-coloured, with a broad black band on the margin, and a similarly coloured but shorter one, curved strongly but not touching the inner margin, is in the middle of the wing. The fringes of the hind margin are snowy-white, but in the foremost angle they are on a black band and somewhat rose-coloured" ('Naturgeschichte' etc., pp. 26-27).

a. var. lugdenensis, Mill.—Millière figures and describes a variety of this species under the above name. This description is to be found in the 'Annales de la Ent. Soc. de France,' vol. iii., 1855, pp. 205-206, and it is figured in the same volume, Pl. xi., fig. 1. The latter has distinctly yellow hind wings, but with normal outer and central dark bands.

Catocala, Och., *nupta*, Linn.

Vol. iv., p. 50.—*Catocala nupta* var.—A specimen of this species was sold at Stevens' auction rooms with Mr. Howard Vaughan's collection, on April 23rd, 1890, which had streaks of the red colour normal on the under wings developed on the upper wings.

Vol. iv., p. 50.—*Catocala nupta* var., Stdgr.—Dr. Staudinger describes a variety of this species without a name as follows:—"Three specimens taken in the second half of August, near Lepsa, have nearly the same grey coloration of the fore wings as *adultera*, and as the two forms so closely resemble each other, I took them at first for *adultera*. According to the differentiation of Morawitz, they are doubtful *nupta* of pale colour, which occur frequently in both sexes in Central Asia" ('Stettiner entomologische Zeitung,' vol. xliii., p. 56).

Vol. iv., p. 51.—*Catocala nupta* var. *cærulescens*, Ckll.—A variety having all the essential characters of this form was captured by Mr. Winkley, in August of the present year (1892). The following note relative to this specimen occurs:—"Mr. Winkley exhibited a peculiar variety of *C. nupta*. Mr. Frohawk said that he had 'examined the specimen by daylight, and found the normal red colour of the hind wings was in this specimen pale brown, shot on the surface with purple.' By gaslight the specimen looked of a purple-brown tint" ('Entomologist's Record' etc., vol. iii., p. 216); whilst a full description of this particular aberration by Mr. Frohawk, reads as follows:—"I have pleasure in recording the capture of an exceedingly fine form of *C. nupta*, taken at rest at Mitcham, Surrey, on August 27th last, by my friend Mr. Mark Winkley. The coloration of the secondaries is remarkable, having all the usual red colour replaced by a very delicate warm brown, and a purplish glow covering the entire area of the wings; both the marginal and median bands are broader than usual, and finely shot with purple. The primaries are also considerably deeper in colour, the ground colour being of a deep smoky-grey; the dark markings are strongly pronounced; the reniform is large and black, in strong contrast to a whitish blotch bordering the inner edge. Under surface: the secondaries are coloured as above, there being no trace of any red colouring, and all the black bands of primaries and secondaries are shot with purple. It is a large female, measuring 3½-inches in expanse, and apparently freshly emerged" ('Entomologist,' vol. xxv., p. 243).

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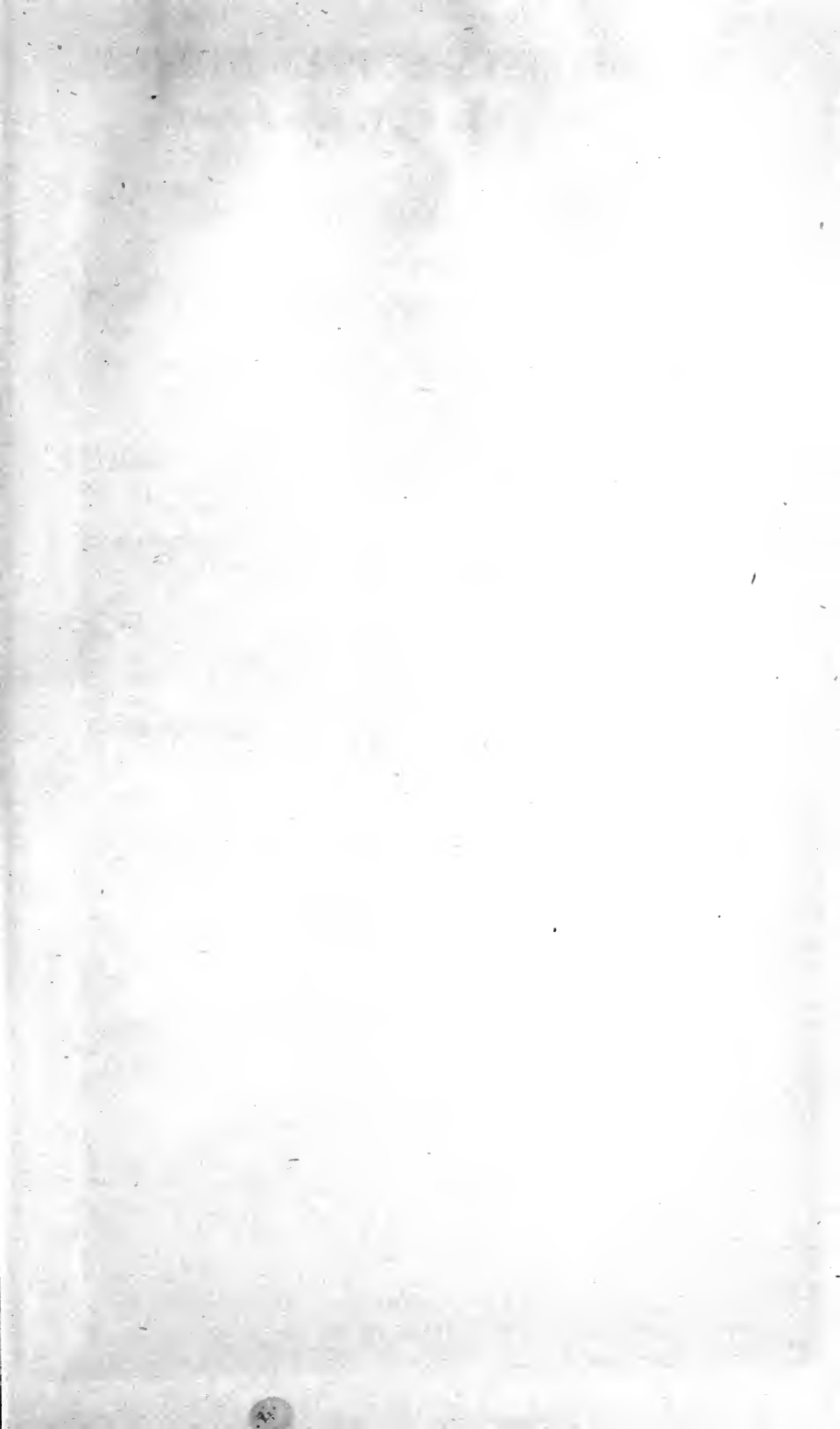
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