City of London Entomological & Natural History Society.

THIS SOCIETY has for its object the diffusion of the science of Natural History, by means of papers, discussions, exhibitions and the formation of collections for reference. Since its commencement in 1858, a valuable and useful Library has been formed, which comprises, amongst other works, sets of the "Zoologist." (1843 –1697), "Entomologist," (Vols. 1—37), "Entomologist's Monthly Magazine," (Vols. 1—39), and the Entomologist's Record and Journal of Variation." (Vols. 1—16). There is also a collection of British Lepidoptera, and collections of other orders are now in course of formation.

The meetings take place on the first and third Tuesdays in each month, EXCEPT JULY AND AUGUST, from 7.30 to 10 p.m., at the London Institution, Finsbury Circus, E.C., which is easily accessible from all parts. Exhibits are made at every meeting, and papers read on various Natural History Subjects, a special feature being the systematic discussion and exhibition of interesting groups of insects, &c.

The Entrance Fee is Two Shillings and Sixpence, and the Annual Subscription Seven Shillings and Sixpence, payable in advance, being fixed at as moderate a sum as is possible, consistent with the proper maintenance of the Society and its work, in order that all may avail themselves of the benefits offered. The Society therefore looks with confidence for the support of all who are interested in the study of Natural History.

The year commences on the first Tuesday in December, but intending members may join at any time, the ballot being taken at the next ordinary meeting after that on which they are proposed.

Further information may be obtained from the corresponding Secretary.

TRANSACTIONS

OF THE

CITY OF LONDON Entomological & Natural History Society.

FOR THE YEAR 1905.

PUBLISHED BY THE
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THE LONDON INSTITUTION, FINSBURY CIRCUS, E.C.

Price Two Shillings.

CITY OF LONDON

Entomological & Natural History

SOCIETY,

Established 1858.

MEETINGS HELD AT

THE LONDON INSTITUTION

FINSBURY CIRCUS, E.C.,

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and

Rev. C. R. N. Burrows and Messrs. A. Bacot, A. Harrison, W. J. Kaye and A. Sich.

TRANSACTIONS

OF THE

City of London Entomological

AND

Natural History Society.

PART XV.

(1905.)

WITH LIST OF MEMBERS.

THE SOCIETY'S ROOMS, LONDON INSTITUTION,
FINSBURY CIRCUS, E.C.
February, 1906.

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Merton Hall, Thetford, Norfolk.

31st December, 1905.

REPORTS OF MEETINGS.

Dec. 20th, 1904.—Citria icteritia (=fulvago, L.) var. flavescens. —Mr. G. H. Heath, a specimen taken during the second week in September, 1904.

Gortyna flavago.—Mr. V. Shaw, a bred series, from pupæ taken in Burdock, at Finchley, including a strongly marked specimen with dark outer margin.

Geometridæ from Iceland.—Mr. L. B. Prout, on behalf of Mr. H. H. Slater, various Geometridæ, including a series of *Rheumaptera thulearia*.

Pterophoridæ.—Mr. G. H. Heath, various species, including a fine series of *Platyptilia isodactyla*.

Paper.—Dr. T. A. Chapman read a paper, entitled "A few notes on Pterophoridæ." In opening, he alluded to the very diverse characteristics of the larvæ, some species having hairy external feeding larvæ, while in others the larvæ were perfectly smooth and internal feeders; moreover, hibernation is undergone in all stages of development, except the pupa. The foodplants are varied, but always herbaceous. The group, as a whole, certainly lacks uniformity, as the neuration also is very variable in the different genera; at the same time the group itself is very isolated.

The Pterophorid ovum is not highly evolved, but a very typical flat egg; the larval stage suggests relationship to the Gracilariadæ, and attention was drawn to the fact that the position of tubercles iv and v is very unstable. In the pupa the number of free segments is the same as in the Tortricidæ

In conclusion, Dr. Chapman urged that there were three main divisions of the group according to larval characters, which were of more value than the pupal characters as they are more constant.

Jan. 3rd, 1905.—Pocket Box Exhibition.—Spilote grossulariata, vars. and abs.—Mr. J. A. Clark, a scaleless specimen, and two others suffused with yellow. Mr. J. Riches, a specimen normally marked, but with smoky-brown ground colour. Mr. V. E. Shaw, a long series, including var. *varleyata*, a rather dark series from Polegate, and a very varied series from Bexley, including a smoky-black specimen with usual markings.

Pieris napi.—Mr. C. P. Pickett, bred series of spring brood, including specimens with dark undersides, a feature more usually met with in the summer brood.

Adopoea linea ab.—Mr. T. H. S. Grosvenor, a very pale form taken at Caterham, in late May, 1904.

Zonosoma pendularia var. subroseata.—From Stafford, Mr. A. Harrison.

Bombycia duplaris, dark form.—From Simondswood Moss, Lancashire.—Ibid.

Pachys betularia bred.—Messrs. Harrison and Bacot, long series, including many var. *doubledayaria*.

Senta maritima vars. and ab. - Mr. H. M. Edelsten, examples of vars. *nigrostriata*, *bipunctata*, *wismariensis and arundineta*, also a leaden coloured form, all bred from Norfolk broads district.

Synopsia abruptaria, dark form.—Mr. T. H. Hamling, a fine series of this species, including many very dark specimens.

Cidaria truncata.—Mr. G. B. Brown, a series bred from ova, laid by two Horsley ♀ s; the specimens were remarkably uniform in marking and coloration.

Triphæna fimbriata ab.—Mr. Payton, a remarkable imago, having large black spots on the inner margin of the hindwings.

Cleoris glabraria ab.—Mr. E. A. Bowles, a dark specimen, with the nervures clearly defined by light coloured scales.

Ectropidæ.—Mr. L. B. Prout, *E. consonaria* and *E. crepuscularia*, with black vars., in which the subterminal line remained pale.

Genus Melinea and Mimics.—Mr. W. J. Kaye, six species of the genus *Melinea* compared with six of genus *Heliconius*, as follows:—*M. mnemne* with *H. minata*, *M. messonaria* with *H. messone*, *M. egeria* with *H. sylvana*, *M. pardalis* with *H. pardalinus*, *M. idae* with *H. clara*, *M. imitata* with *H. telchinia*.

P. Betularia—Heredity statistics.—In connection with their exhibit, Messrs. Harrison and Bacot submitted the following figures:—

	♂ parent—*Doubledayaria*.	♀ parent—Type.
Bred 43 ♂.	Type 22. Var. 21. =	Type 20·2%. Var. 19·3%.
,, 66 ♀.	,, 37. ,, 29. =	,, 33·9%. ,, 26·6%.

Of 43 ♂ { 51·2% (Type) followed ♀ parent.
48·8% (Var.) ,, ♂ ,,

Of 66 ♀ { 56·1% (Type) ,, ♀ ,,
43·9% (Var.) ,, ♂ ,,

	♂ parent—Type.	♀ parent—*Doubledayaria*.
Bred 118 ♂.	Type 56. Var. 62. =	Type 24·1%. Var. 26·7%.
,, 114 ♀.	,, 67. ,, 47. =	,, 28·9%. ,, 20·3%.

Of 118 ♂ { 47·5% (Type) followed ♂ parent.
52·5% (Var.) ,, ♀ ,,

Of 114 ♀ { 58·8% (Type) ,, ♂ ,,
41·2% (Var.) ,, ♀ ,,

H. abruptaria—Heredity statistics—from Mr. T. H. Hamling.

Parents.	Pupated.	Bred.	Non emergences.
Dark ♀ Typical ♂.	28.	Type 7 ♂ 2 ♀ Dark 7 ♂ 4 ♀.	8.
Typical ♀ Dark ♂.	23.	,, 7 ♂ 1 ♀ ,, 4 ♂ 4 ♀.	7.
Dark ♀ Dark ♂.	80.	,, 10 ♂ 7 ♀ ,, 31 ♂ 17 ♀.	15.
Typical ♀ Typical ♀.	32.	,, 12 ♂ 6 ♀ ,, 0 ♂ 1 ♀.	13.

Jan. 17th, 1905.—Graphiphora gracilis abs.—Mr. A. W. Mera, three aberrations, *viz.*, a red form from the New Forest, a very pale specimen from Darlington, and a rather dark specimen with the usual markings exceptionally well defined; the latter specimen was from Hertfordshire.

Discussion *re* Sallowing.—An informal discussion *re* sallowing was carried on, which did not, however, bring to light any facts of importance.

Oviposition of G. gracilis.—Mr. V. E. Shaw stated that he had seen this species depositing ova on withered blackberries.

Feb. 7th, 1905.—Cerapteryx graminis.—Mr. W. J. Kaye, a series taken in September, 1904, by searching the grass at night in Richmond Park.

Misosemia eumeni.—Mr. Kaye also exhibited a specimen of this butterfly from British Guiana, set in its resting position, to show its resemblance to the head of a mouse.

Plusia gamma, dwarfed.—Mr. E. A. Cockayne, four very small specimens bred from larvæ found on Goosefoot.

Genus Perizoma.—Mr. L. B. Prout exhibited specimens of all the British species of *Perizoma*.

Paper.—Mr. L. B. Prout read his paper entitled "The British species of the genus *Perizoma* (=*Emmelesia*)," which is printed "in extenso" at the end of this volume.

Feb. 21st, 1905.—Donation.—Dr. T. A. Chapman presented to the Society a bound collection of his writings on Entomological subjects, printed since 1870.

Change of Secretaries.—Mr. W. J. Kaye, having announced his intention of adhering to his decision to resign, Mr. S. J. Bell consented to fill his place as Reporting Secretary, while Mr. E. Harris was appointed to the vacancy thus created as Corresponding Secretary.

Melanic lepidoptera from Sheffield.—Mr. E. A. Cockayne, a box of insects taken within five miles of Sheffield, including *Polia chi* var. *olivacea*, and melanic forms of *M. multistrigaria*, *G. gothica*, *P. chenopodiata* and *H. furcata*.

Cidaria immanata.—Mr. W. J. Kaye, a series from Oxshott taken in July, 1904, when the insect was abundant in this locality.

Leucania favicolor and L. pallens.—Mr. A. W. Mera, on behalf of Rev. C. R. N. Burrows, red and putty coloured forms of both species, pointing to parallel variation.

Hybrid N. ziczac and N. dromedarius.—A single specimen of this hybrid.—Ibid.

Discussion on The Numerical Flucuation of Lepidoptera.—Mr. W. J. Kaye, in opening a discussion on this subject referred to the various conditions that may give rise to abundance or scarcity, and dwelt particularly on the influence of ichneumons and the lying over of the pupæ of certain species; the migration of the host without the parasite and varying climatic conditions were also alluded to. It was obvious that the parasite did not everywhere occur in the same proportion; in London for instance *T. psi* and *A. aceris* larvæ were nearly always found to be "stung," while in the country the reverse was the case.

Mr. L. B. Prout pointed out that the abundance of one species may jeopardise the existence of another, and instanced the stripping of the blackthorn in Epping Forest by larvæ of *E. defoliaria*, thus depriving later species of food. Many other members also contributed to the discussion.

Perizoma unifasciata four winters in pupa.—Mr. L. B. Prout stated that he had in his possession two live pupæ from larvæ that "went down" in 1901.

Early appearance of Graphiphora stabilis.—Mr. A. E. Tonge recorded the capture of this insect at Redhill on February 20th.

March 7th, 1905.—New Member.—Mr. W. Beattie, of Glen Lodge, Mickleham, Surrey, was elected a member of the Society.

Triphaena orbona (=subsequa).—Mr. R. G. Benton, a specimen taken in Highgate Woods.

Polyommatus corydon abs.—Mr. J. A. Clark, a lengthy series including a golden brown ♀, many ♀s "shot" with blue and a ♂ of a pale lavender hue with brown marginal spots on the hind-wings.

Mr. C. P. Pickett also exhibted an extensive series of this species, including many varieties and aberrations, among them being a form parallel to the golden-brown specimen shown by Mr Clark.

Messrs. Harrison, Hodson, Mera and Prout also showed series of this insect.

Pyralis costalis.—Mr. T. H. Hamling, a series taken in a Highgate warehouse.

Paper.—Mr. C. P. Pickett read a paper on "*P. corydon*, Varieties and Aberrations," printed at the end of this volume.

March 21st. 1905.—Arctia caia abs.—Mr. H. Huggins, a number of aberrations in which the hindwings ranged in coloration from pale yellow to deep crimson; one specimen was remarkable for a white bar on the thorax, extending from the base of the forewings to the usual red collar, which was nearly effaced.

Spilote grossulariata ab.—A captured specimen with scarcely any markings on the hindwings, and very few beyond the usual bar of black and yellow on the forewings, the ground colour being milk-white. —Ibid.

Brephos parthenias at Theydon.—Mr. C. P. Pickett stated that this species was plentiful at Theydon on March 20th.

Paper.—Rev. C. R. N. Burrows, having been unable to complete his study of *Hemithea aestivaria* owing to the state of his eyesight precluding the use of the microscope, read, in place of his promised paper on that species, some notes on *Notolophus gonostigma*, which appear at the end of this volume.

April 4th, 1905.—Lepidoptera from Queensland.—Mr. A. Bacot, on behalf of Dr. Calpin, specimens of lepidoptera taken in Queensland, including *Papilio macleayana* and *Hypocysta metirius*.

Spilote grossulariata ab.—Mr. W. Beattie, an entirely black specimen, except as regards the thorax, which remained a dingy yellow; the exhibitor mentioned that the pupa which produced this imago lacked the usual yellow markings.

Boarmia gemmaria.—Messrs. Prout, Clark and Kaye exhibited series of *B. gemmaria*. Mr. Kaye's series included a pale form taken at Bude.

Paper.—Mr. Prout read a short paper on *Boarmia gemmaria*.

April 18th, 1905.—Asymmetric Triphæna subsequa (=orbona).—Mr. Bacot, a specimen having the right forewing distinctly darker in colour than the left.

Graphiphora miniosa ab.—Mr. A. W. Mera, a very pale imago lacking the central lunule and the discoidal spot on hindwings.

Attempt to cross Pachys strataria and P. betularia.—Mr. Bacot described an attempt to hybridise these species. A female of

each species was suspended in a cage in Epping Forest, and each attracted a male; these males were introduced into the cage of the other species, and made efforts to pair, which were, however, abortive, as the females persistently avoided them.

May 2nd, 1905.—Dark Malenydris multistrigaria.—Mr. A. W. Mera, a series bred from Yorkshire ova, which were darker and smaller than the southern form.

Bred Acronycta ligustri.—Mr. V. E. Shaw, a fine series bred from ova laid by a ♀ taken at Polegate.

Euchloe cardamines pupa.—Rev. C. R. N. Burrows exhibited pupæ of this species and asked if any explanatiom of the prolonged beak-like process had been attempted. He stated that this feature is developed after the larval skin has been cast, and that just before the emergence of the imago it apparently becomes empty.

Date of emergence of Eucestia obliquaria.—Rev. C. R. N. Burrows said that he had been taking this species at Mucking since the second week in April; hitherto he had believed it a June insect. Mr. L. B. Prout stated that it was most erratic in its time of emergence; bred specimens frequently begin to appear in March, and continue to emerge for months, and he had taken it wild in July.

Repeated pairing of Lycia hirtaria.—Mr. C. P. Pickett recorded that a pair of *L. hirtaria*, found *in copula*, separated when boxed, but later were again found *in cop.*, they separated again, and the female deposited some ova, after which the insects paired for the third time.

May 16th, 1905.—S.E. Union Delegate.—Mr. Bell announced that Dr. T. A. Chapman had consented to act as the Society's delegate at the annual conference.

Larvæ from the New Forest.—Mr. W. J. Kaye, living larvæ of *L. sibylla*, *H. quercana*, *C. glabraria*, and *C. lichenaria*.

Nyssia lapponaria.—Mr. A. W. Mera, 3 ♂s and 2 ♀s bred from Rannoch larvæ.

Coremia quadrifasciata.—Mr. L. B. Prout, a series bred from Cambridge ova, including two specimens with wings very thinly scaled, and of a uniform pale grey colour.

Angerona prunaria pupæ.—Mr. C. P. Pickett, many pupæ of this species "spun up" in lilac leaves.

Collecting in New Forest during first fortnight in May.—Mr. W. J. Kaye reported that he had found larvæ of *C. roboraria* and *L. sibylla* (common), and of *C. glabraria* and *C. lichenaria* (not uncommon); *L. aureola*, *M. bombyliformis* and *M. fuciformis*, were just emerging, and *E. consonaria* was frequently seen at rest on tree trunks.

Time of appearance of L. aureola.—Mr. A. W. Mera mentioned that on one occasion he had taken this species in Epping Forest on May 1st.

June 6th, 1905.—Lepidoptera from Mucking, Essex.—Rev. C. R. N. Burrows, a number of species taken during April and early May, including *E. rufata*, *L. suffumata* and *O. ferrugata*.

Coloration of cocoons of P. moneta.—Mr. S. J. Bell, cocoons of this species spun by larvæ confined in a glass cylinder with muslin covered ends; three cocoons spun on the muslin were quite white,

while one on a withered leaf was yellow, and another partly resting on a leaf and partly on the muslin was parti-coloured.

Melanic Synopsis Abruptaria.—Mr. E. Harris, a series, bred from melanic parents, consisting of 28 dark specimens and 11 typical forms.

Pachys betularia, Intermediate between type and var. Doubledayaria.—Mr. T. H. Hamling, a specimen, being one of three similar imagines taken within a few minutes at electric light.

Xanthorhöe oxybiata. – Mr. L. B. Prout, specimens taken by Dr. T. A. Chapman at Taormina, in Sicily. This species, the exhibitor stated, has only been taken at Cannes, and in Sicily and Palestine, and is closely allied to *X. galiata*: the antennæ are, however, pectinated in the ♂ so that *X. oxybiata* forms a connecting link between *X. galiata* and *X. fluctuata*.

Pachys cognataria. - Mr. L. B. Prout, a specimen from America, also *P. betularia* from England and Lugarno. The American species had the appearance of an intermediate form between the two forms of *P. betularia*, which differed considerably.

Xylena scolopacina.—Mr. V. E. Shaw, larvæ from Bexley, Kent.

Lithocolletis quercifoliella ovum. – Mr. A. Sich, a single ovum, laid on the side of a glass tube.

Wheeleria spilodactyla.—Mr. A. Sich, larva, pupa and imago of this species, which is confined to White Horehound.

Polyommatus adonis.—Messrs. Dale and Grosvenor reported that this species was out early in June at Folkestone and Reigate.

Eucestia rufata.—Mr. V. E. Shaw reported that he had taken this species at Bexley and had also obtained ova.

June 20, 1905.—Donation to Library.—The librarians announced the receipt of the 1904 volume of *The Entomologists Record* from Mr. A. W. Mera; a vote of thanks to the donor was passed.

Crab Spiders.—Mr. A. Bacot, some spiders received from Brindisi, known as "crab spiders," which secure their prey by frequenting thistle-heads and seizing the insects that visit the flowers; the exhibitor also showed several bees which had been captured by one of these spiders that he placed on a flower in his garden.

Nyssia lapponaria × N. zonaria hybrids.—Mr. A. W. Mera, larvæ reared from ova obtained from a pairing of *N. lapponaria* ♀ and *N. zonaria* ♂.

Callimorpha dominula from Deal district.—Mr. C. P. Pickett, a bred series, most of the specimens having an extra black spot on the hindwings.

Angerona prunaria vars.—Mr. C. P. Pickett, a bred series including a pale yellow ♀ covered with small brown freckles, similar to the speckled form of ♂.

Oinophila v-flava.—Mr. V. E. Shaw, larva of this species, which bores its way into the corks of wine bottles.

Sept. 5th, 1905.—Donation to Collection of Lepidoptera.—The curators announced the receipt of the following:—6 *Asthena blomeri* from Mr. C. P. Pickett, 1 *Synopsia abruptaria* (melanic) from Mr. E. Harris.

Lepidoptera from Penmaenmawr, N. Wales.—Rev. C. R. N. Burrows, a number of lepidoptera taken during a fortnight's stay at

Penmaenmawr from June 28th to July 11th; these included *A. contiguaria*, *X. galiata*, *O. atrata* and *E. nanata*.

Ochria ochracea.—Rev. C. R. N. Burrows, living pupæ taken in thistle stems at Mucking, in which district the exhibitor stated that this species did not seem to attack either the Burdock (*Arctium lappa*) or Mugwort (*Artemisia vulgaris*).

Gnophos obscurata.—Mr. T. H. L. Grosvenor, living imagines from Lewes.

Polyommatus icarus abs.—Mr. J. A. Clark, a variable series taken at Folkestone during August, including 1 ♂ ab. *obsoleta* and another ♂ approaching ab. *striata*.

Acidalia rusticata.—Mr. A. W. Mera, a short series of bred imagines; the larvæ were reared on dandelion and the specimens were larger than the average captured imago.

Agrotis nemoralis.—A single specimen taken at Brentwood.—Ibid.

Asthena Blomeri.—Mr. C. P. Pickett, a fine series taken at Chalfont Road.

Notolophus gonostigma.—Mr. J. Riches, larvæ feeding on Sallow.

Notodonta ziczac × N. dromedarius hybrids.—Mr. V. E. Shaw, on behalf of Mr. Newman of Bexley, two imagines of this hybrid bred from ova obtained from a pairing of *N. dromedarius* ♀ and *N. ziczac* ♂. Mr. Shaw stated that the imagines that emerged in the autumn were all ♀s, while the pupæ that went through the winter produced ♂s only during May, June and July.

Cymatophora gemmaria, Melanic form.—Two imagines taken at Bexley.—Ibid.

Pachys betularia var. doubledayaria and Synopsia abruptaria var. brunneata, were exhibited by Mr. A Sampson.

Cyaniris argiolus, second brood.—Rev. G. H. Raynor reported that the second brood had been abundant at Maldon, Essex. He found that the larvæ were easily reared on unopened buds of ivy.

Sept. 19th, 1905.—Donations to Society's Collection of Lepidoptera.—The curators announced the receipt of two *Plusia moneta* from Mr. J. A. Clark and two melanic *Synopsia abruptaria* from Mr. E. Harris.

New Members.—Rev. G. H. Raynor, of Hazeleigh Rectory, Maldon, Essex, and Mr. Charles Capper, "Glyndale," Glebe Road, Barnes Common, were elected members of the Society.

Lepidoptera from Mucking, Essex.—Rev. C. R. N. Burrows, very dark *Notodonta ziczac*, a very pale ab. of *Hama sordida*, a dark *H. abjecta*, and living larvæ of *Cerura furcula*, *Notodonta ziczac*, *Pterostoma palpina*, *Ptilodon camelina*, and *Eutricha quercifolia*.

Leucoma similis abs.—Mr. A. W. Mera, two ♂s with a black spot at the base of the forewings.

Thecla pruni, bred.—Mr. W. J. Kaye, a series bred from larvæ taken at Monkswood, Herts. The emergences spread over three weeks, from June 15th to July 7th.

Macaria liturata ab nigrofulvata.—From Delamere Forest, Cheshire.—Ibid.

Zonosoma pendularia.—A long and variable series bred from larvæ taken at Oxshott, including three specimens of second brood, the remainder of which was still in the pupal stage.—Ibid.

Ematurga atomaria ab.—Mr. C. P. Pickett, a unicolorous chocolate specimen.

Polyommatus corydon, abs.—Mr. C. P. Pickett, several aberrant specimens, including one with the marginal band on right forewing about double the width of that on the left wing, and another with the right forewing perfectly developed, but about the same size as the underwing.

Plusia moneta.—Mr. J. Riches, three imagines bred from larvæ found in a garden at Hornsey Rise.

Oinophila v-flava.—Mr. V. E. Shaw, five living specimens taken in a city wine vault.

Spilote grossulariata var. varleyata.—Several aberrant forms of this insect, including ab. *varleyata*, in which the whole area of the wings, save a small portion at the base, is deep black.—Ibid.

Peronea cristana.—Mr. J. A. Clark recorded the capture of this species in Epping Forest.

Sugaring forbidden in the New Forest.—Mr. S. J. Bell drew attention to the act that the Rangers had received instructions from the local Commissioner to stop sugaring throughout the New Forest; entomologists were to be warned to desist, and should they decline to do so, a mixture of clay and water was to be daubed on the sugar patches.

October 3rd, 1905.—Cyclophora punctaria, second brood.—Rev. C. R. N. Burrows, a series bred from ova laid by a ♀ taken at Brentwood.

Gnophos obscurata.- Mr. J. A. Clark, specimens taken at Folkestone during first week in August, which appeared to be of somewhat dark coloration for a chalk district.

Leucania albipuncta.- Mr. G. H. Heath, a single specimen from Sandown, Isle of Wight, September 7th, 1905.

Ochyria ferrugata bred from ova laid by an Eynsford ♀.—Ibid.

Lithosia deplana.—A series from Box Hill..—Ibid.

Chortobius davus.—Mr. A. Harrison, a series taken in Cheshire and Isle of Lewis during first week in July; those from the latter locality were paler than the Cheshire specimens, and had the white cilia much more accentuated. The Cheshire imagines were mostly var. *rothliebii*, while those from Isle of Lewis were the unocellated type form.

Callimorpha dominula from Deal.—Mr. C. P. Pickett, a very long bred series consisting of 74 ♀ s and 86 ♂ s; of these specimens 39 had an extra small black spot about the centre of the hindwings, 77 showed a faint suffused trace of same, and 38 had a faint yellow spot on the hindwings.

Hipparchia hyperanthus var. arete.—Two specimens from Folkestone, July 15th, 1905.—Ibid.

Maniola janira ab.—A male in which the usual bright brown on the wings was of a creamy shade.—Ibid.

Nonagria neurica var. hessii.—Mr. L. B. Prout, a series from the East Kent marshes, including the black form known as var. *hessii*, which is not known to occur in the Norfolk Broads, where the species is abundant.

Xylena sublustris.—Dr. J. S. Sequeira, various lepidoptera taken

at Folkestone during July, including *X. sublustris*, which was plentiful in the Warren.

Chœrocampa porcellus.—Mr. J. Riches, a series bred from larvæ taken at Eastbourne.

Coremia propugnata (designata).—Mr. V. E. Shaw, a series of second brood bred on July 29th and 30th from ova laid by ♀ taken at Eynsford.

October 17th, 1905.—Hesperia actæon.—Mr. S. J. Bell, a long series from Swanage, taken on July 21st, on which date the species was abundant, and both sexes about equally represented.

Cœnonymph pamphilus ab.—Mr. G. Benton, two specimens, the one with the marginal border very broad and dark, and the other with the ocellus on the underside of one wing almost obsolete.

Protective coloration in Papilio machaon pupæ.—Rev. C. R. N. Burrows exhibited seven pupæ bred from Horning ova; of these five were attached to carrot stems, and were pale green in colour, while the remaining two, one of which pupated on glass and the other on muslin, were of a dark grey shade.

Cidaria truncata.—Mr. H. M. Edelsten, a series bred from ova laid by a typical ♀ from the Norfolk Broads; the specimens ranged from the type through var. *comma-notata* to var. *perfuscata*, with many fine intermediate forms.

Amathes plecta.—From South Devon, with pale costal streak suffused with ground colour of the wings, and from Norfolk with this streak exceptionally wide and pale in colour.—Ibid.

Chœrocampa elpenor and its foodplants.—Mr. W. J. Kaye, a fine series bred from larvæ found on yellow balsam near the Basingstoke Canal. Mr. Kaye stated that although it was generally held that this larva would not accept a change of diet, he had found no difficulty in feeding his larvæ on willow-herb.

Anticlea cuculata.—Mr. A. W. Mera, a series bred from Cambridge larvæ.

Chrysophanus phlæas ab.—Mr. C. P. Pickett, a specimen taken at Dover, in August, 1905, with the spots on the hindwings elongated so that they coalesced with the marginal border.

Geometra smaragdaria.—Mr. J. Riches, a short series bred from Essex Marshes, including a specimen with the two left wings much paler than the right hand pair.

Xanthorhoe fluctuata, var. Costovata, taken at Hornsey.—Ibid.

Agrotis lucernea.—Mr. V. E. Shaw, 8 imagines taken at flowers of Valerian, at Torquay, on July 18th, 1905.

Cordylomera suturalis.—Mr. E. Harris, a specimen of this beetle found under the bark of a log of mahogany imported from the Gold Coast.

Xylina semibrunnea.—Mr. W. J. Kaye reported the capture of a single specimen at Leatherhead, Surrey.

Nov. 7th, 1905.—New Member.—Mr. E. A. Bowles, of Myddleton House, Waltham Cross, Herts., was elected to membership of the Society.

Heredity Experiment with Triphæna subsequa (=Comes).—Mr.

A. Bacot exhibited a number of broods reared from parents bred from wild larvæ, taken by Mr. Duncan, at Cluny, Aberdeenshire.

Brood *A*.—Both parents of red form produced two red imagines.

Brood *B*. - From very dark ♂ and bright red ♀, produced one dark and one red specimen. (*N.B.*—An accident to the larvæ of these broods accounts for the small number reared.)

Brood *C*.—From bright red ♀ and melanic ♂, 53 imagines, 60% red and 45% melanic, or with a melanic tendency.

Brood *B.* × *C*.—From a pairing between a red imago from brood *B*., with a red specimen of brood *C*., 135 imagines, all red, without a trace of melanism of the "grandfather."

Brood *C*2.—From two melanic imagines of brood *C*1, gave 70% melanic, and 30% red. Brood *C* 9.—A similar pairing, yielded the like result.

Brood *C* 7.—From a similar pairing, yielded 79% melanic and 21% red.

Brood *C* 3.—From two red imagines of brood *C* gave 19 red specimens. In the third generation—

Brood *C* 7 × 2.—From a pairing between melanic imagines of broods *C* 7 and *C* 2, consisted of 24 melanic specimens, and a second brood of similar parentage yielded 12 melanic imagines.

Brood *C* 3 × 3.—From two non-melanic parents, gave six non-melanic specimens, and second brood from similar parents resulted in 2 2 specimens of non-melanic form.

Messrs. Prout, Gardner and Harrison also exhibited series of this species.

Angerona prunaria abs.—Mr. C. P. Pickett, a bred series, including ♂s and ♀s heavily speckled with brown, an almost unicolourous chocolate ♀ and two ♀s bred from Monmouth ♀, and Raindene and Essex ♂, with usual chocolate bands a dull smoky-brown, and the yellow ground colour also very dull; also several asymmetrical specimens.

Scent glands in Epunda nigra.—Mr. G. H. Heath, a ♂ taken at Sandown, in October, 1905, showing the white tufted scent glands on the underside of the abdomen.

Malformation of Lygris testata.—Mr. H. M. Edelsten, a specimen, destitude of hind wings, taken at light, in Norfolk Broads.

Lycæna acis and Hesperia paniscus at Mickleham, Surrey.—Mr. W. Beattie exhibited two specimens of the former, ♂ and ♀, and one of the latter which he stated had been taken by himself or his daughter during 1903 or 1904, in the neighbourhood of Mickleham; the exhibitor had, however, no precise data concerning their capture.

Ematurga atomaria ab.—Mr. J. A. Clark, various aberrant forms including two ♀s and one ♀, almost entirely black, from Bury, Lancs.

Epirrita dilutata var. christyi.—Mr. E. A. Cockayne, examples of this form bred from larvæ beaten out of elm at Rannoch.

November 21st, 1905.—New Members.—Mr. F. Capel Hanbury, of 96, Clapton Common, N.E., and Mr. G. G. C. Hodgson, of "Stoneleigh," Oxford Road, Redhill, were elected members of the Society.

Breeding experiment with Synopsia abruptaria.—Mr. E. Harris exhibited a long series representing four generations.

The original parents were a dark ♀ and a light ♂ taken at

Clapton and Ilford respectively in May 1904. The ova which were laid between May 27th and 31st commenced to hatch on June 9th, and the larvæ pupated towards the end of July; eighteen specimens emerged between August 7th and 27th, of which nine were dark (5 ♂ s and 4 ♀ s) and nine light (5 ♂ s and 4 ♀ s) while two pupæ went over the winter and yielded a light ♂ and a light ♀ in April 1904. Two dark imagines were paired on August 12th, and the resulting ova hatched on August 27th, the larvæ pupating between October 11th and November 5th; from March 24th to May 6th, 1905, 39 imagines appeared, 28 dark form (12 ♂ s and 16 ♀ s) and eleven light form (5 ♂ s and 6 ♀ s), while a further eighteen which failed to break through the cocoons would have apparently yielded eleven dark and seven light imagines.

From this brood four pairings were obtained, *viz.*:—

A.—Dark ♂ and dark ♀.	Result 34 ♂ s and 34 ♀ s		—all dark.
B.—Light ♂ and light ♀.	,, 9 ♂ s and 9 ♀ s		—all light.
C.—Dark ♂ and light ♀.	,, 8 ♂ s and 16 ♀ s	dark	—3 ♂ s and 3 ♀ s light.
D.—Light ♂ and dark ♀.	,, 19 ♂ s and 15 ♀ s	dark	—7 ♂ s and 8 ♀ s light.

Asymmetric Angerona prunaria.—Mr. C. P. Pickett, a ♂ bred from cross between Essex and Raindene Wood specimens, the right side being ab. *sordiata* and the left ab. *pickettaria*.

Apatela aceris.—Rev. C. R. N. Burrows, a series of the form styled *Acronycta salicis*, by Curtis, from Barnsley.

Eupithecia subciliata.—Mr. V. E. Shaw, a series taken at Torquay on July 27th, 1905.

Spilote grossulariata ab.—Rev. G. H. Raynor, a specimen from Leyton, with forewings entirely black, with the exception of a narrow white band near the margin; the hindwings were normal.

Ova of Thecla pruni.—Two ova of this species.—Ibid.

Paper.—Rev. G. H. Raynor read a short paper entitled "A new Index Entomologicus," in which he pointed out the inconvenience of keeping a diary for each year, and enlarged on the waste of time involved in hunting up species in reference books, many of which are unindexed.

The essayist described his own method which consisted in devoting a page or thereabouts of a large volume to each species, the entries being made alphabetically; under each species entries were made of pages in various reference books, records of dates of capture, life history, description of varieties, and similar useful information.

In the discussion that followed it was pointed out that while a printed volume of this description would be invaluable its compilation by individual entomologists entailed then unnecessary multiplication of labour.

Dec. 5th, 1905.—Annual Meeting.—The treasurer, Mr. C. P. Pickett, read his annual report showing a balance in hand of £9 12s. 3½d. Mr. S. J. Bell moved the adoption of the report coupled with a vote of thanks to the treasurer. Mr. A. W. Mera seconded and the report was duly adopted.

Mr. S. J. Bell read the secretaries report, which was adopted on the motion of Mr. A. Sich, seconded by Dr. J. S. Sequeira.

The following were elected as officers and council for 1906.

President, Mr. A. W. Mera.

Vice-Presidents, Dr. T. A. Chapman and Messrs. J. A. Clark, F. J. Hanbury and L. B. Prout.

Treasurer, Mr. C. P. Pickett.

Librarians, Messrs. G. H. Heath and V. E. Shaw.

Curators, Messrs. W. I. Cox and T. H. L. Grosvenor.

Secretaries, Messrs. S. J. Bell and E. Harris, and as members of *Council*, Rev. C. R. N. Burrows, and Messrs. A. Bacot, A. Harrison, W. J. Kaye and A. Sich.

Acronycta leporina ab. melanocephala.—Mr. E. A. Cockayne a specimen from Warrington.

Nonagria sparganii ab.—Mr. H. M. Edelsten, a ♂ with upper wings powdered with black scales and an extra spot above the reniform.

Opisthograptis luteolata ab.—Mr. T. H. Hamling, a specimen bred May 1905, the ground colour being pale, the reddish-brown marking on the costa very indistinct and the apical blotch entirely obsolete.

Xanthorhœ fluctuata ab.—A specimen bred May, 1905, with wings smoky-grey and devoid of markings other than the usual basal blotch, a small triangular patch on the centre of the costa and a small apical patch.—Ibid.

Bombycia duplaris.—Mr. A. Harrison, a series of melanic specimens from Simonswood, Lancs., a locality where the exhibitor believed only dark forms were found.

Agrotis ashworthii, second brood.—A series which emerged in October, bred from ova laid by N. Wales parents, reared from larvæ collected in the spring.—Ibid.

Hydriomena furcata from Windermere.—A bred series varying from light mottled to almost black forms.—Ibid.

Hybrid lepidoptera.—Mr. C. P. Pickett, a long series of *S. populi* × *ocellatus* hybrids, including three specimens with almost black hindwings, on which the ocelli were very distinctly marked, and another specimen closely following *S. populi* in general appearance. Also hybrid *Melalopha curtula* × *reclusa* and *Eutrapela bilunaria* (*illunaria*) × *tetralunaria* (*illustraria*), the characteristics of both parents being easily traced in each hybrid, and two specimens of hybrid *Notodonta dromedarius* × *ziczac* resembling the former species in size and colour, but having the "pebble" markings of *N. ziczac*.

Notolophus gonostigma, second brood.—Mr. J. Riches, a series bred from Brentwood, Essex.

Jaspidia muralis from Torquay.—Mr. V. E. Shaw, a series taken in July, 1905, including forms ranging from very pale to dark green and dark olive.

Arctia caia ab.—Mr. R. G. Todd, a specimen with yellow hindwings, captured at Wicken in July, 1905.

Suggestion *re* donations to Society's cabinet.—Mr. Cox drew attention to the paucity of members' donations to the Society's collection, and suggested that members might give a few of their duplicates of the rarer species, even though they were not among the Society's desiderata; these, Mr. Cox proposed, could be kept in a store-box and displayed on "exchange night," when it might be possible to secure in exchange specimens required for the Society's collection. Mr. Cox's suggestion met with general approval.

Secretaries' Report for 1905.

Number 16 of the Society's rules, which governs the procedure of the Annual Meeting, provides, amongst other items, that one of the secretaries shall read a report of the General Progress of the Society since the last Annual Meeting, and reference to a dictionary confirms the prevailing impression that progress implies an advance, or a moving towards greater perfection; obviously, therefore, the members who compiled our rules were of an optimistic nature and did not contemplate any pause, and still less any retrogression in the Society's movements. This year, and we fear not for the first time, it is necessary to honour this rule rather in the breach than in the observance, unless we follow the example of military authorities who, when compiling their reports for the consumption of the public, generally affect to regard a step backwards as a mere strategical move towards two steps forward.

It is customary to give first place in the Secretaries' Report to the matter of attendance and, inasmuch as the attendance during the past year certainly provides food for thought, it shall, as Kipling has it, precede according to precedent.

Since December 6th, 1904, we have held 20 meetings at the London Institution, the average attendance at each meeting being less than 17 as compared with over 17 in 1904, and 18 in 1903. Now, in view of the fact that over 50 members reside within a reasonable distance of Finsbury Circus, the attendance can hardly be regarded as a cause for pride; moreover, a more minute analysis of the figures does not improve matters since it reveals the fact that the council, which consists of about one-third of the members to whom attendance is possible, is responsible for over two-thirds of the total attendances. Thus sixteen members of the council have to their credit a total of 230 attendances, while the remaining thirty-five or so members, resident in or near London, can only claim an aggregate of 107 appearances, that is three *per capita* per annum. Now, in so far as this proves that the Society's officers attend strictly to their duties, it is satisfactory, but it at the same time points to a regrettable lack of support from the non-official members.

The attendance of visitors, who, as being possible future members, should certainly be encouraged, is far worse. On the average we had one visitor at each meeting, but this includes the appearance of eleven visitors on the pocket box exhibition night, without which the average would be but ½ a visitor per meeting.

Before leaving this subject we think it should be recorded that Messrs. Shaw, Pickett, and Harris (if you will pardon the mention of a part of the secretariat) have been present at every meeting, and that our worthy President, Mr. A. W. Mera, has only been absent on one occasion.

As regards the membership roll we are at a standstill, which is a condition of things not usually considered as provocative of jubilation. Six new members have been elected, but six have resigned; the resignations unfortunately including two members of several years standing, *viz.*, Messrs. H. Heasler and H. H. May. So far the problem of increasing the attendance and membership have proved insoluble, and we fear that we can make no new suggestion, unless it be to make more

use of the optical lantern, a method which will probably not commend itself to the more learned members.

Conversazione signally failed to improve either the attendance or membership, and only depleted our private purses and added new terrors to the secretarial existence. Exchange Night and the Pocket Box Exhibition attract some twenty-five members, but we cannot make such matters a feature of every meeting. The figures we have submitted certainly suggest that the dignity of office begets increased interest in the Society's affairs, but it would hardly be possible to enlarge our council so that each member may have a post therein, and thus be encouraged to appear more frequently.

Our two field meetings—to Leith Hill and Chalfont Road—are a fitter subject for congratulation, as they showed a marked improvement both as regards the number of members and the number of lepidoptera present thereat; morover, the weather refrained from that tearful mood which it has usually assumed on these occasions. It is worth considering whether it be not advisable to increase the number of these expeditions now that they appear to have secured the approval and support of members; the social atmosphere that pervades them certainly draws members together and may perhaps lead to a better attendance at our rather more formal evening gatherings.

As regards exhibits, while we think they have been as interesting as usual, we still have to lament the frequent lack of the necessary details which give them scientific value; now that the Society's meetings are being reported in two of the Entomological Magazines—a new step which we trust may be regarded as progressive—it is more than ever important that exhibitors should supply the Secretaries with a brief written note of the noteworthy points of their exhibits, since it is obviously impossible for a secretary to record the features of an exhibit before him, and at the same time take notes of dates, localities, &c., with reference to other exhibits that are in the meantime being announced. This has been urged on members more than once before with little effect; will members now note once and for all, that so long as you honour the present reporting secretary with your patronage, he, with the consent of the council, will regretfully consider that exhibitors who do not furnish him with written particulars, do not consider their exhibit worth a detailed report.

Last year the Secretaries asked members to make an effort to improve the Society's collection of lepidoptera, and with that end in view a list of desiderata was published in the *Transactions*: the only members, however, who have responded to this request are Messrs. Clark, Harris, Pickett and Shaw. In the same report, the unsatisfactory position of the cabinet was referred to, and an attempt has since been made to induce the Institution Authorities to allow us to place it in a more suitable spot; unfortunately this effort altogether failed, so that the cabinet and book-case must apparently remain in the present unsuitable and isolated position.

Dr. Chapman has enriched our library with a collection of his papers on entomology during the past 35 years, and Mr. Mera has presented to the Society the 1904 volume of *The Record*.

The Society's position, with regard to the annual volume of *Transactions*, is decidedly satisfactory. The expense of publishing the 1904 volume, which was about 20% larger than that for 1903, has

been entirely met by voluntary subscriptions and the small amount received for advertisements,—a new departure—the insertion of which does not, we think, in any way depreciate the appearance of the volume (as was anticipated by some members), and brings a little grist to the mill.

In the matter of our winter programme, we believe members will agree that we have maintained our not altogether to be despised reputation, thanks mainly to the efforts of a few of our most loyal and more scientific members, who year after year place some of their literary output at the Society's disposal. We were disappointed *re* Rev. Burrows promised paper on *H. aestivaria*, owing to the state of the author's eyesight retarding its completion, but we are pleased, for more reasons than one, to be able to look forward to having the omission made good in March, 1906.

The 1904-5 programme was as follows :—

1904,	Dec.	6.	Annual Meeting. Presidential Address	Mr. A. W. Mera.
,,	,,	20.	"A few notes on *Pteropnoridae*"	Dr. T. A. Chapman, F.E.S.
1905,	Jan.	3.	Pocket Box Exhibition	
,,	,,	17.	Discussion on "Sallowing"	
,,	Feb.	7.	The British Species of the Genus *Perizoma* (*Emmelesia*) ...	Mr. L. B. Prout, F.E.S.
,,	,,	21.	Discussion on the Numerical Fluctuation of Lepidoptera, opened by	Mr. W. J. Kaye, F.E.S.
,,	Mar.	7.	*Polyommatus corydon*, vars. & abs.	Mr. C. P. Pickett, F.E.S.
,,	,,	21.	"*Notolophus gonostigma*" ...	Rev. C. R. N. Burrows.
,,	April	4.	*Boarmia gemmaria*	Mr. L. B. Prout, F.E.S.
,,	Nov.	7.	Exhibition of Duplicates with a view to exchange	
,,	,,	21.	"A New Index Entomologicus"	Rev. G. H. Raynor.

Dec. 5th, 1905.

S. J. Bell,
Edward Harris, } *Hon. Secs.*

TREASURER'S ACCOUNTS FOR 1905.

Dr. GENERAL FUND. *Cr.*

	£	s.	d.		£	s.	d.
To Balance from 1904 ..	3	10	2	By Rent, July 31st, 1904, to July 31st, 1905 ..	12	12	0
,, fifty-three Subscriptions for 1905, 7/6	19	17	6	,, Insurance	0	9	6
,, two Half-subscriptions for 1905, 5/-	0	10	0	,, Attendance	0	10	0
,, three Half-subscriptions for 1905. 5/-	0	15	0	,, Printing and Stationery	0	18	6
,, five Entrance-fees, 2/6 .	0	12	6	,, Postage	1	19	4½
,, one Arrear from 1904, 5/-	0	5	0	,, Subscription to "Entomologist"	0	6	0
,, three Arrears from 1904, 7/6	1	2	6	,, Subscription to S.E. Union of Scientific Societies	0	5	0
				,, Balance in hand ..	9	12	3½
	£26	12	8		£26	12	8

LIFE MEMBERSHIP FUND.

	£	s.	d.		£	s.	d.
To two Subscriptions	£10	0	0	By Balance in hand ..	£10	0	0

PUBLICATION FUND.

	£	s.	d.		£	s.	d.
To Balance from 1903 ..	1	3	0	By Printing expenses ..	12	9	6
,, Donations	9	18	0	,, Balance in hand ..	0	4	0
,, 3 Advts. in "Transactions"	1	11	6				
,, Sale of 1 Copy	0	1	0				
	£12	13	6		£12	13	6

Examined and found correct.

THOS. H. L. GROSVENOR
GEO. R. GARLAND } *Hon. Auditors.*

C. P. Pickett, *Hon. Treas.*
London Institution, December 5th, 1905.

PRESIDENTIAL ADDRESS FOR 1905.

(A. W. MERA.)

GENTLEMEN,

We have again arrived at the ending of another year of our Society's work, and I am once more called upon for an annual address.

I believe it has been remarked, on high authority, that Presidents of Societies frequently make a great mistake in endeavouring to introduce a certain subject into their annual addresses, and that the address should be composed of a general resumé of the Society's work during the past year, as well as of an annual account of what has taken place outside its own narrow limits; and also that it should give the President an opportunity of giving suggestions for the Society's progress.

Now I am going to ask your indulgence for not carrying out that excellent advice. In the first place, as doubtless, you already know I am not always up-to-date with regard to what is taking place outside our own Society, and secondly, our secretaries have shown you so well what has been done among ourselves, that it would be only repetition on my part to enlarge upon what has already been said; and as to the future guidance of our Society, my conservative nature precludes me from attempting to disturb the peace that exists, therefore, I have to attempt to make a few Entomological remarks, trusting that they may be of some interest to a portion of our members, at any rate.

Although I have not been as active in field work this year, as I sometimes have been, my experience as far as it goes would not lead me to think that it has been a red letter year for the collector. During the early spring, there were some remarkably late frosts, which probably may account for the scarcity of some species, more particularly those whose larvæ were recently hatched, for apparently larvæ that have hybernated are not inconvenienced to any extent from that cause. It has also been a year of remarkably few rarities; they have certainly not fallen to my lot, and according to the journals, very few insects of note have been recorded. Among the most interesting was the capture of several *Sphinx pinastri* in the usual localities of Suffolk. Although the insect is believed by some to have been introduced into this country, it is clear that it has a strong liking for the Eastern counties, as I remember seeing a specimen taken in the neighbourhood of Ipswich some 30 years ago. A few *Antiopa* have put in an appearance, and there is a record of *Fravini* from Suffolk.

It has sometimes seemed as if the study of British Lepidoptera was almost worn out, the "mere collector" knows where to take nearly everything, and the amount of reference literature on the subject has not left a stone unturned. My only excuse now for attempting to go over ground which, to some, has become trodden to death, is the consideration that we have young members in our Society, some of whom may still find interest in subjects which, to others, are entirely exhausted.

In the first place, I should like to pass a few remarks on that ever increasing tendency to melanism which we see in our London district. I have to confess that I have made no strict data as to the number of dark forms compared with the type of any one species observed during one year, but I can clearly see that *betularia* var. *doubledayaria* is much more frequently seen than it was, say eight years ago, when I took the first specimen I ever met with in London. I believe the latest addition to the list of melanic forms is a magnificent specimen of a black *Acronicta leporina*, bred this year by my friend Mr. Willsden. The larva was taken last year in south Essex, within the area affected by London smoke, and it produced an insect with glossy black forewings, with some of the markings which are usually black, showing up in a lighter colour. The thorax and body are black, but the underwings almost normal, only the veins showing out rather more strongly. I have seen specimens from Delamere with the thorax black, and smoky forewings, but they will in no way compare with the specimen just referred to. As far as my experience goes, this specimen is unique, but it is always dangerous to make assertions in Entomo-

logical matters, as possibly there may be more hidden away in known or unknown cabinets.

Another subject, which seems to be of growing interest, is the hybridism of Lepidoptera. I have heard it asserted that there is no such thing as a species, and I have also heard it vigorously contradicted; but I should gather that most of us are inclined to think a species is a species, however and whenever it arrived at that condition. And it would appear that there is very little doubt that new species are not arrived at by hybridism. In the whole course of my collecting I have never once meet with a hybrid in a state of nature, although it is no uncommon thing to meet with different species which have paired, but the result, for some reason, comes to nothing, or at any rate is seldom found.

It has always appeared to me that the most confused set of species that we have to deal with in British Lepidoptera are contained in the *Zygaenidae*: we have certain races of *Trifolii* which are strikingly distinct, then we have the species *Lonicerae*, and *Meliloti*, the latter somewhat resembling in size and shape a form of *Trifolii* from Hampshire, but, as in most races of *Trifolii*, the spots are very liable to coalesce, whereas, I believe, *Meliloti* seldom, if ever, shows that tendency. In the *Entomological Record*, vol. iii., page 281, there is a record of what was believed to be a race of six spotted *Trifolii*. but as that was written some time back the writer may have modified his views since then. Some years ago I paid a short visit to Lundy Island off the coast of Cornwall, where I found *Filipendulae* and *Trifolii* mixed up in a very confusing manner, and in some cases it was difficult to say whether the insect captured had five spots or six, but as they were mostly wasted it may have been largely owing to that. In going through our cabinets we continually come to what might be termed pairs of species, but though there may be strong evidences of close affinity, in only a few instances do they offer any real difficulty as to definition. In some cases the larvæ decide the matter without hesitation, such as in *Psi* and *Tridens*, and in others there may be some very distinguishing mark as soon as we know where to look for it, as in the case *Cidaria truncata* and *Cidaria immanata*. In *Immanata* the central line running through the under wing is more angular than in *Russata*, although without that distinguishing mark some of the specimens run so closely alike that it would be next to impossible to say to which species they belong. *Oporabia autumnaria* and *Oporabia filigrammaria* are so closely allied and similar in general appearance that I can't help thinking that they do not deserve the rank of separate species. It is true that there are some marked characteristics not found in both species; for instance, as far as my experience goes, the ova of *Filigrammaria* hatch considerably before the ova of *Autumnaria*, and the larvæ of *Autumnaria* are more uniformly green than in *Filigrammaria*, but slight characteristics of that sort may be attributable only to local races. The two so called species hybridise, with the greatest of ease, and their offspring are fertile. In 1900 I had ova from ♂ *Filigrammari* and ♀ *Autumnaria*, and from these I bred a series of hybrids in 1901, from these again I obtained eggs and bred a few specimens in 1902. One of these again paired with a wild ♂ *Autumnaria*, from which I obtained a very few ova, one or two of which hatched, but I did not succeed in getting any through. Then

we have intermediate races in a wild state. I have some in my cabinet from Pitfour, and it is difficult to say whether they are more like the moorland form of *Filigrammaria* or the Aberdeen form of *Autumnaria*. Bearing on the point of different races of one species appearing at different times, I think I am right in saying that there is quite a marked difference in the time of appearance between northern and southern *Taeniocampa opima*, and that the difference is not in the direction one would expect to look for it, as the southern *opima* are nearly a month later than those from Cheshire. In speaking of southern *opima* perhaps I should confine myself to Essex, as my knowledge goes no further. Another pair of species which are perplexing to many of us are *Tephrosia crepuscularia* (double brooded species), and *Biundularia* (single brooded species). In this case very few of us are inclined to deny specific rank, although I remember hearing the late C. J. Barrett contend that they were one and the same. Personally, I have never had an opportunity of hybridising these two, but I have hybrid specimens in my cabinet, all of which are males. It is pretty evident that in a state of nature the two keep absolutely distinct, although they are both occasionally taken in the same wood, *Crepuscularia* emerging first, but late ones overlapping *Biundularia*. My latest success in pairing two different species was to get a pairing between a ♀ *Lapponaria*, and a ♂ *Zonaria*. A large proportion of the eggs never hatched, owing, I believe, to sudden changes in temperature just as they were ready to hatch, but once started they did very well, and appeared to be quite strong and healthy. So far they have only arrived at the pupal stage and it still remains to be seen if any emerge. I also tried to pair a ♂ *Hirtaria* with a ♀ *Lapponaria*, but without success. Doubtless *Zonaria* is more closely allied to *Lapponaria* than *Hirtaria* is, but the resemblance in the larvæ of the two last mentioned made me think that there might be a possibility of success.

Perhaps the Noctuæ where species blend most is among the *Agrotidae*. Although our inland forms of *Nigricans* seem distinct enough, yet when taken on the Suffolk coast it is extremely like *Tritici* in some of its forms. I believe the generally accepted definition is that *Tritici* possesses some tooth-like marks towards the outer margin, whereas *Nigricans* does not. Then we have to consider the very wide variation of *Tritici*, if we accept var. *Aquilina* as only a var., which personally I am inclined to do. It is undoubtedly a very distinct race, and in some localities very constant, particularly in the marshy districts of Essex, and formerly I used to take a very specialised form from a garden near Ipswich. But practically all these forms may be taken on the Suffolk coast with true *Tritici* running into *Nigricans* in a most delightfully confused manner. Possibly the difficulty of getting Noctuæ to pair in confinement has prevented some of us from working out these species from the egg, and again there may be, I am afraid, the unscientific reason that when considerable labour has been expended in rearing them, they have a very poor exchangeable value. Going back to the Geometers, there is little doubt that one of the most closely allied groups is that of the genus *Ephyra*, where not only is there a strong family likeness in the imaginal stage, but also the larvæ are remarkably alike, as well as the pupæ. But with all that the several species appear to keep entirely distinct in a natural state. Occasionally one may meet with

strange looking *Porata* with the central spots on both wings almost absent, such as I once bred from Wimbledon common, but these have all the appearance of a local race rather than a cross with *Punctaria*, and in like manner we have that dark form of *Pendularia* from Market Drayton, which, of course, is but a local form. I think I may be safe in saying that seldom do genera retain so many points of affinity as in this group. It occasionally happens that we see traits of character in species that have a somewhat wide separation; for instance the larvæ of *Smaragdaria* have a peculiar habit of moving the head to and fro while holding on by the claspers and the same habit is to be seen in the larvæ of *Thymiaria*. I might mention incidentally that the habit just referred to is most useful to the collector when the larvæ are in that frame of mind. I was once on the Essex marshes with the late J. A. Cooper when we went over some saltings to pick up a bird he had just shot, and we came upon a colony of *Smaragdaria* larvæ with all their heads moving and showing up most conspicuously, and before we left the spot we had picked up over 100 larvæ. I could never make out what induced the larvæ to move, as I have been over the marshes many times since, but have always had to work hard to find them. Whilst touching on the affinity of species perhaps I may be permitted to criticise the severance of *Bondii* and *Arcuosa*, which is usually the case now in most lists. What could have induced the authorities to have placed *Arcuosa* with *Strigilis*, *Literosa*, and others, I certainly fail to see. The general appearance of *Arcuosa* and *Bondii* are similar, both possessing an unusually slender thorax, quite unlike *Strigilis* or even the more slender *Furuncula*; the flight of *Arcuosa* is different, having more the weakly flight of a Geometer, whereas the former species absolutely dash about. And above all there is a strong tendency to grease in *Arcuosa* which none of the *Miana* are troubled with. This fact in itself goes a long way to my mind, for although there are several widely different genera that always grease, I cannot call to mind another case of one species in a genera possessing this most annoying tendency and the next of kin being entirely free from it. I confess I know nothing of the larvæ of *Arcuosa*, but the fact of its being an internal feeder would not go for much one way or the other. It is a striking fact that insects whose larvæ are internal feeders are generally most liable to grease, and some of those feeding underground are equally susceptible, as in the case of the genus *Hepialus*. But in the genera *Miana* and *Apamea*, where many of them feed in the stems of grass, they are usually free from grease. Before concluding it now only remains for me to heartily thank all the officers of the Society for the manner in which their several duties have been carried out. In some cases the work entailed is very considerable, more particularly so with our Secretaries, Mr. S. J. Bell and Mr. E. Harris, and our Treasurer, Mr. C. P. Pickett, and I am sure I am not only expressing my own feelings, but those of the members at large, when I tender our sincere thanks to those gentlemen, and at the same time I take the opportunity of congratulating the members on retaining the services of the whole of the Officers of the Society.

In conclusion I have again to thank you, gentlemen, for once more electing me as your President, and although it might have been more beneficial to the Society if a new President had been elected, I

cannot do otherwise than accept the honour, and trust that we shall work together as before, to the continued success of our Society.

REPORTS OF FIELD MEETINGS IN 1905.

Leith Hill — June 24th, 1905.

Leader.—Mr. V. Eric Shaw.

Members met at London Bridge and caught the 2 p.m. train for Dorking; as the train stopped at Holmwood, which was nearer the collecting ground, the party travelled on to this station. A mile's walk brought us to the collecting ground, where about 40 species of macro-lepidoptera were taken, including *Cepphis advenaria*, *Macaria liturata*, *Eudalimia margaritata*, *Cidaria truncata*, *Erastria amata*, *Pachys betularia*, *Phytometra viridaria*, *Ptilodon camelina*, and *Hypena crassalis*.

After tea, at the Plough Inn at Coldharbour, a further visit was paid to the collecting ground.

About fourteen members and visitors attended, and although no rare species was taken it was generally agreed that the district was one of considerable promise.

Chalfont Road — Saturday, July 8th, 1905.

Leader.—Mr. L. B. Prout.

Thirteen members and four visitors attended, arriving by various routes and at various times, but all meeting for tea at the "Cyclist's Rest" (White Lion Inn) at about 6 p.m. During the early part of the day the woods and lanes in the neighbourhood of Chorley Wood, and between that point and Chalfont Road, were worked, and *Rivula sericealis*, *Euphyia annulata* (*unangulata*) and *picata*, *Mesoleuca albicillata*, *Ochyria quadrifasciata*, *Asthena luteata*, and other species were taken, besides one or two *A. blomeri*, as an earnest of what was to follow. Later on, the party in practically full force worked a small wood near Chalfont Road station, and here *Spilote* (*Abraxas*) *sylvata* was found in countless myriads, mostly in wasted condition, whilst *Asthena blomeri* was exceptionally common, over 150 being secured, and many making their escape. The majority were settled on beech trunks, as many as eight being once counted on a single tree; but they were, as usual, very shy. *Eurois prasina* (*herbida*), *Euphyia picata*, *Mesoleuca albicillata*, &c., were also seen in this wood, and a few members who stayed for "sugaring" added *Thyatira batis*, *Bombycia duplaris*, &c., to the "bag," and had a specimen of *Cosmotriche potatoria* fly up to their lights. Altogether, 50 or more species of "Macros" were recorded as observed, and a fair number of these were of sufficient interest to be worth taking, so that the excursion may fairly be regarded as an entomological success.

PAPERS READ BEFORE THE SOCIETY.

THE BRITISH SPECIES OF PERIZOMA (EMMELESIA).

(Read February 7th, 1905, by Louis B. PROUT, F.E.S.)

The genus *Emmelesia*, as constituted in the "Entomologist Synonymic List," consists of the following species: *affinitata*, Stph.; *alchemillata*, Linn.; *albulata*, Schiff. =*niveata*, Stph. (nec Scop.); *flavofaciata*, Thnb. =*decolorata*, Hb.; *taeniata*, Stph.; *bifaciata*, Haw. =*unifasciata*, Haw.; *minorata*, Tr. =*ericetata*, Stph.; and *blandiata*, Schiff. =*adaequata*, Bork. The generic name of *Perizoma*, Hb., which you will find used in our London List, in our National Collection, and in the writings of Warren, is certainly older than the *Emmelesia* of Stephens; its exact dimensions will depend upon the generic characters accepted; with Hübner (*Verzeichniss*, p. 327) it consisted only of *blandiata* and *albulata* (*niveata*), *alchemillata* going to *Calostigia* and *decolorata* (*flavofasciata*) to *Trichopteryx*, while the other four were unknown to Hübner. Stephens' *Emmelesia* (*Cat. Brit. Ins.*, ii., p. 147) comprised eighteen supposed species, called by him *decolorata*, *alchemillata*, *affinitata*, *rivulata*, *nassata*, *ericetata*, *albulata*, *trigonota*, *blandiata*, *unifasciata*, *bifasciata*, *rusticata*, *rubricata*, *purpurata*, *sylvata*, *candidata*, *luteata* and *heparata*—*purpurata*, however, being only included with a query; *rubricata* and *purpurata* were removed to *Ptychopoda* by the author in 1831 (*Ill. Haust.*, iii., p. 308), the second and third species merged into one (the true, typical *affinitata*) and *taeniata*, n. sp. added to the list, resulting in a total of sixteen. The further addition of *blomeri*, Curt., raised the total to seventeen in Humphreys and Westwood's "British Moths," but no further purification of it was effected until Doubleday brought out his "Zoologist Synonymic List," in which *rusticata* is made over to *Dosithea* (on p. 19), *sylvata*, *candidata*, *luteata* and *blomeri* to *Acidalia* (p. 20), *heparata* to *Eupisteria* (p. 16), *trigonata* is sunk, the *alchemillata* group is reduced from three species to two, and it is suggested that *unifasciata* is a var. of *bifaciata*, which has since proved to be correct; in short, the composition of the genus is exactly that to which we have been accustomed for so many years. French and German authors had ignored *Emmelesia* in the meanwhile; but Guenée, in 1857, accepted it *in sensu Dbldy*. Most subsequent workers have again merged it in one of the larger related genera; thus Meyrick has all its species in his *Hydriomena* (*Trans. Ent. Soc. Lond.*, 1892, p. 72), of which he confesses that it is "a very large genus" in which "there is naturally some slight structural variation in most details." The only modern authors who revive *Perizoma* (=*Emmelesia*) as a genus are Gumppenberg (*Nova Acta Acad. Caes. Nat.*, liv., 1890, p. 396), where both Hübner's original species are

excluded*) and Warren (*Proc. Zool. Soc.*, 1893, p. 377, where *albulata* is cited as type; also *Nov. Zool. passim*); Warren has not diagnosed it, but gives the reference to Stephens' *Emmelesia*, "Ill.," iii., p. 296. This author (Stephens), after giving the characters, admits that his genus "is probably a very artificial one," and that "the first twelve" (*i.e.*, Guenée's eight and *rusticata*) "and the last species" (*heparata*) differ considerably in habit from the intermediate ones and from each other, and adds that "the genus must hereafter be subdivided." As the only subdivider to give a diagnosis is Guenée, it is his which I must quote to show what we are to understand by the genus. He says (*Ur. et Phal.*, ii., p. 289): "Larvæ short, attenuated at the extremities, head small and globose; living sometimes exposed, sometimes enclosed in the seed capsules of low plants. Pupæ small, pointed at the extremity, contained in a small earthen cocoon. Antennæ short, filiform and hardly pubescent in the ♂. Palpi short, extending little or not at all beyond the frons, squamous, remote, with joints indistinct. Frons unicolorous. Abdomen of ♂ slender, subconical, having at one end a little tuft of hairs inclining to be raised, no dorsal spots. Wings entire, rather slender, the fringes little or not at all interrupted; superiors with waved lines; the band which follows the elbowed line always distinct, with subterminal fine and dentated; inferior always paler and weakly marked." He adds that he has conserved this small genus of Stephens', which "has sufficient characters, as one may satisfy oneself on examing those given above." It is rather hard to say which of those characters are sufficiently sharp to mark it off from some of the adjacent Larentiid genera according to modern ideas. As, however, the object of the present paper is not to revise generic classification, there is no need to go into the question in detail. The genus, as we have accepted it, contains all the smallest British Larentiid species which are not "pugs," and most of its members agree more nearly with certain pugs than with their other allies in the larval habits, feeding during part, at least, of their lives, within seeds. Guenée was certainly rather fortunate in pitching upon this as a salient point in the genus, seeing that he only knew one species (the non-British *hydrata*) in life, and only two others (*affinitata* and *alchemillata*) from books. We now know that not one of our eight British species is a normal leaf-feeder; *taeniata* feeds on the spores, etc., of moss, and will sometimes accept dry leaves in confinement, but all the others favour seeds, *unifasciata* necessarily completing its larval economy externally, as it soon outgrows its first home, inside the small seeds of *Bartsia odontites*. I believe all the larvæ are somewhat stout, and have more or less of the form that Guenée ascribes to them—attenuated at the extremities.

One can easily perceive that there are at least two or three groups contained in this genus, which groups Mr. Tutt would no doubt require us to make into genera, until such time as closer comparisons should have revealed affinities between individual members of the groups themselves, to justify a yet further splitting up; I have on previous occasions expressed the conviction that the necessary ultimate

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* By a similar creditable performance this same writer adopts "*Emmelesia*, Stph., Gn.," for *lacteata*, Pack., alone! *Vide* "Nova Acta" etc., lxv., 1895, p. 206).

outcome of Mr. Tutt's attitude to this question will be the reduction of most of our genera to a single species, and of nearly all the residue to two species only, or at most three or four. For the present, we may view our Perizomas as dividing as follows: (*a*) *affinitata* and *alchemillata*; (*b*) *flavofasciata*; (*c*) *albulata*, *blandiata* and *minorata*; (*d*) *bifaciata*; (*e*) *taeniata*. Or we may merge (*a*) and (*b*) together, for, notwithstanding its very different colour, I suspect that *flavofasciata* is pretty closely related to *affinitata*; possibly, too, (*d*) may be merged in (*c*).

Affinitata and *alchemillata* are the British representatives of a puzzling little group of European forms, which will need much careful revision before we understand them. There are six or seven forms which have, at some time or other, laid claim to specific rank; the others being *hydrata*, Tr., *lugdunaria*, H.-S., *flexuosaria*, Bch., *fennica*, Reuter, and *rivinata*, F. v. R. (=*turbaria*, Stph., *ex err.*). The last-named —the *affinitata* var. *turbaria* of Guenée and Staudinger—is now generally conceded to be co-specific with typical *affinitata*, and seems to be occasionally connected with the type through intermediates, though such are rare; it is therefore very unlikely that any discovery awaits us which shall lead to the separation of these two, notwithstanding that I do not think any absolutely conclusive evidence has been brought forward. I ought to mention that Gumppenberg (*Nova Acta Acad. Caes. Nat.*, liv., p. 399) makes *affinitata*, Stph., one species, with *alchemillata*, Linn., as a var. (!!); and *turbaria*, Stph., a separate species, though admitting he does not know it.

As to *hydrata*, Tr., it is a well-known species on the Continent, and need not concern us now, as it could hardly have been overlooked so long if British; its non-occurence with us is one of those problematical questions with which we are so often confronted, for it reaches to Finland and Russia, and to the Pyrenees, and its foodplants are species of *Silene* which occur in England—*S. nutans*, even if not also the commoner *S. inflata*. This *Perizoma* and its two British allies, *affinitata* and *alchemillata*, have been satisfactorily differentiated upon their ♂ genitalia, both by Aurivillius (*Nordens Fjärilar*, pp. 247-248) and Petersen (*Lep. Faun. Estland*, p. 135).

Concerning *P. lugdunaria*, H.-S., I know very little. Herrich-Schaeffer's figure (fig. 565) appears to be well executed, and seems to me to show a tolerably close ally of *P. alchemillata*, with which also Herrich-Schaeffer compares it; he gives no description whatever, merely saying that it is "from H. de la Harpe, from Lyon, near *rivularia* [*alchemillata*] yet certainly distinct." In his 1861 catalogue (p. 81), Staudinger cites it with a ? to *hydrata*, but by 1871 he had evidently learned to know it, as he makes it a good species, placed between *hydrata* and *unifasciata* (ed. 2, p. 189), and gives, for localities, "Gal. m. et c. Hung.," Berce in 1873 (*Faune Ent. Fr.*, v), seems to have had no knowledge of it, nor am I aware of any further references to it in literature, until Bohatsch wrote in 1885 (*Wien. Ent. Zeit.*, iv., p. 178), recording it from Vienna, Lipik and Switzerland; he says that it is certainly overlooked, and has often been confused with *hydrata*, Tr., from which it differs chiefly in its white apical spot, and in the clearly defined white upper half of the outer rivulet, whereas its lower half is more obsolescent, as in *hydrata*.

As regards *flexuosaria*, Boh., and *fennica*, Reuter, there is still

considerable uncertainty, and it is not out of place to mention them in a paper on "The British Species of *Perizoma*," as they seem so closely connected with our British representatives of the group that they might have been overlooked here, even if not merely of varietal rank. The type specimen of the former, was taken by Boheman, at Rönneby, in the province Blekinge, southern Sweden, on the occasion of an excursion to that part of the country, more than half a century ago, and was published as a new species under the name of *Cidaria flexuosaria* (*Kongl. Vet. Ak. Handl. för* 1851, p. 135). The diagnosis runs: "Capillis prothoraceque cinereis, alis anterioribus fusco-griseis, fasciis duabus sat latis, dentatis, una ante medium obsoleta, altera pone medium evidentiore lineaque tenui undulata ante apicem, albidis, fimbriis griseis; alis posterioribus cinereis, fasciis duabus, transversis, tenuibus, dilute griseis. Long, al. exp. 21 millim." It was a ♂, and was taken among hazel on June 26th, 1851. A detailed description is added, slightly amplifying the diagnosis, but adding little, if anything, which could be of much use for elucidating the identification of the species. This type specimen has remained unique (at least for Scandinavia), and one would not have hesitated to suggest it must have been an aberration of some known species but for the testimony of recent Scandinavian authors. It is fortunately preserved at Stockholm, and has been redescribed by Lampa (*Ent. Tid.*, vi., p. 115) and Aurivillius (*Nord Fjär.*, p. 247). The former says that in markings it "much resembles *affinitaria* ♀, H.-S., fig. 319" (*i.e.*, var. *rivinata*), but is much smaller and paler. Dark central band of forewings brown-grey, not yellowish, its projection in cell 2 long, broadly lanceolate, and not blunted at the tip; near the inner margin this band forms a pointed tooth in cell 1*b*. Fringes apparently lack the whitish spots. Hindwings nearly white, with two indistinct greyish bands. Aurivillius describes the genitalia (as he does of all the Scandinavian species of the genus), and says that these prove it a "certainly distinct species." This would be conclusive, were it not for two considerations: (1) that the examination may be presumed to have been made without dissection, and that therefore it is hard to conceive that an absolutely perfect study can have been made; and (2) that Aurivillius did not know *every* described species of the group. I do not see much in the description to suggest that it might be united with *lugdunaria*, H.-S., but the possibility is not to be altogether lost sight of. The description of the genitalia runs "♂ sidoklaffer i inre delen jemnbreda, utåt afsmalnande till en rätt skarp spets; undre kanten hela vägen nästan rak, den öfre först rak, sedan i yttre delen ända till spetsen afsneddad nedåt; spetsen bildas således af det nedre hörnet." Aurivillius also adds to Lampa's description of the specimen, that its outer-marginal line is more or less distinctly broken up into dots. Staudinger and Rebel (p. 308), without a query, and without any citation which will help one to explain their action, refer *flexuosaria* as ab. to *hydrata*, giving as localities southern Sweden and Carniola; one can only conclude that one or more specimens agreeing with Boheman's description have recently been taken in Carniola, and have convinced the authors that they were aberrant *hydrata*: but the diagnosis is given "sec. specim. typ."

Fennica, Reuter, is almost equally puzzling. It was founded (*Acta Soc. F. F. Fenn.*, ix., no. 6, p. 75, 1893) upon two specimens, ♂ and

♀, the ♂ taken long before by Carlenius, the ♀ in 1889 by Reuter himself. The former had been determined by Tengström as a variety of *alchemillata*, but as this did not satisfy Reuter, he sent his to Aurivillius, who said it "gave one the impression of being a distinct species." Unfortunately, the next step was to send both the specimens to "the well-known specialist, Freiherr von Gumppenberg." How much light was likely to be thrown on an obscure form by a gentlemen whose writings show that he cannot distinguish *affinitata* from *alchemillata*, *rectangulata* from *coronata*, or *minorata* from *blandiata*, while making *hastata* into three species, *ferrugata*, Linn. (*unidentaria*), into two, etc., and "hashing up" nearly every intricate bit of synonymy to which he has put his hand, I leave you to imagine. He pronounced them to constitute "decidedly a new species," and gave a list of the characters which distinguish them from *affinitata* and "var." *alchemillata*. It is only fair to Gumppenberg to add that these seem to have been very carefully worked out, and perhaps the very fact that he could differentiate the new *fennica* from its two older relatives, better than he could separate these, the one from the other, speaks well for the specific right of *fennica*. Reuter himself, in publishing Gumppenberg's judgment, adds further differences noted by himself. In brief, it appears to be a small insect, of about the size of *alchemillata* (9mm.-9½mm., of course for *one* forewing), somewhat different in ground-colour ("more inclined to coffee-brown"), more thickly scaled, and more unicolorous, *i.e.*, less traversed with wavy markings, the outer white band *undivided* on both pairs of wings, and not sharply bounded posteriorly, the discal spot distinct and somewhat "crooked" (curved?), surrounded by some whitish scales, the shape of the central fascia somewhat different, and the black marginal line almost absent in the ♀, formed of distinctly separated geminate spots in the ♂. Staudinger and Rebel suggest doubtfully (*Cat.*, p. 304), that *fennica* may be a synonym of *hydrata* ab. *flexuosaria*, adding "an spec. propr.?" There seem to be one or two points of agreement between *flexuosaria* and *fennica*, but surely they are outweighed by the differences? Petersen (*Lep. Estl.*, p. 134) does not think they can be synonyms, asserting that Aurivillius had already published his description of *flexuosaria*, Boh., *before* pronouncing *fennica* an apparently new species; but I do not find any conclusive evidence in this direction, and fancy Petersen has missed the true chronological sequence; as I read it, Reuter probably sent his specimen of *fennica* to Aurivillius about 1889 or 1890, whereas the latter author did not work out the *Geometridae* of his "Nordens Fjärilar" till 1891. For the rest, Petersen suggests that it is probably a variety of *alchemillata*, and inclines to refer to it the prevailing Esthonian form, "in which the central area is bounded on both sides by more or less distinctly dark-divided white stripes," adding that in this case var. *fennica* could be briefly diagnosed thus: "area media fasciis albis terminata." I do not at all dispute the possibility that it may turn out to belong to this species, but I do not quite see how the form can be that which Petersen supposes, for in *fennica* the inner band is said to be "obsoleta" and the outer *not* divided by a dark line. I possess an aberration of *alchemillata* from Paisley agreeing with *fennica* in this particular, and examples from northern Finland showing the inner white band; but I

cannot make either square with true *fennica* in other respects, and only mention them to show the variability of some of the characters.

I will now add a few notes on the variation, habits, &c., of each of our eight known British species.

Perizoma affinitata, Stph.—The familiar name is still the oldest known for this species, and, indeed, it is the only one known for the type form; the synonymy in Staudinger (*Cat.*, ed. 3, p. 304) is decidely faulty. Stephens, from the time when he first erected the species, knew both the principal forms; the one with the less white in it (hindwings more approaching those of *alchemillata*) he rightly believed to be a new species, which he named *affinitata* (*Ill. Haust.* iii., p. 297); the other (with more white, especially on hindwings) he wrongly identified with the quite distinct species *turbata*, Hb. = *turbaria* Tr., calling it by the latter name (*tom. cit.*, p. 298). It should, perhaps, be added that earlier (*Syst. Cat.*, ii., p. 148), he had introduced *affinitata* as a "nomen nudum," preceded by an **alchemillata*†, which proved to be that of Haworth, but neither Linné's nor Hübner's, and was really a synonymy of *affinitata*; and followed by **rivulata*, "the middle rivulet," for which he later changed his identification to **turbaria*, the said var. with whiter hindwings. Staudinger has maintained this invalid name—"No. 3455 a. Var. (et. ab.) *turbaria* Stph." Wood (*Ind. Ent.*, fig. 694) figures it very defectively; Humphreys and Westwood (*Brit. Moths*, ii., pl. lxxi., fig. 14) a trifle better. I have carefully gone through the synonymy, and find that the names *inciliata*, Zett. (*Ins. Lap.* p. 961, not 960), [1]*rivinata*. F. v. R. (*Ber. u. Erg. Schmett.*, p. 100, *anno* 1837), Zell. (*Is.*, 1846, p. 202, *Sine descript.*)[2], and *turbulata*, Stdf. (*Bresl. Ent. Zeit.*, 1851, p. 81)[3], all most certainly belong to this var.; **rivulata* ♀ var., Tr., x., 2, p. 206?, Haw. p. 335, Stph., *Cat.*, p. 148, should also be added to its synonymy. "Var. (et ab.) *rivinata*, F. v. R." is, of course, its oldest valid name. "Major" must be deleted from its diagnosis, as the size factor is far too inconstant; the smallest specimens I possess (from Esthonia) are distinctly var. *rivinata*, and it is noteworthy that Stephens made *affinitata* larger than *turbaria* (= *rivinata*). The majority of our British specimens of this species seem to be somewhat intermediate between the two most extreme phases of *affinitata* and *rivinata*; and this notwithstanding that their differentiation was first made by English authors. I have a few from Darlington which grade through from one to the other, but most of my other British examples are nearer the type, yet with less *alchemillata*-like hind-wings than my four from Stettin and several other continental specimens which I have seen. Our series in the National Collection is interesting, and shows a good deal of variation, notwithstanding that the species is generally credited with being rather constant. Most of them divide very readily into the two races, although just a few may be regarded as intermediate. Those from Scandinavia, Livonia, &c., all seem to be var. *rivinata*, the seven from Dovrefjeld

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†"Invalid as not containing the type of the conception." *Merton Rules*, No. 50.

[1]Lampa (*Ent. Tid.* vi., p. 115), rightly unites this with var. **turbaria*. The description sent by Zetterstedt to Zeller leave no doubt.

[2]Zeller compares the form to *turbata*, Hb., and is surprised that Fischer should compare it rather with *alchemillata*.

[3]Staudinger suggests "an var. sequens?" Standfuss' description, and an example sent by him to Zeller comfirms this.

(especially five from Sir George Hampson) suggests almost a "local race," being of a greyer brown colour, rather rough looking, with a good deal of whitish in the forewings, one or two with a slight suggestion of the shiny appearance so characteristic of many Iceland Larentiids (notably *Rheumaptera thulearia*). Of the typical forms (*affinitata*, Stph.), two of Zeller's (labelled "Europa") bear the manuscript name of "*deplorata*, Z.," which I cannot find to have been published; seven others labelled either Waldeck, or as coming from Dr. Speyer (probably also Waldeck) quite agree with my Stettin form.

An aberration is figured by Herrich-Schaeffer (*Neu. Schmett.*, fig. 28), and is described by him (*Syst. Bearb.*, vi., p. 138) as: "♂. A var. from Reutti, from Lahr. Small, the white double band broad, exactly in the middle of the wings." It is almost the colour of the Dovrefjeld form, described above, and the outer margin of the central area is almost straight, as is consequently the "rivulet."

I know of no recorded foodplants excepting species of *Lychnis* and perhaps *Silene* and *Dianthus*. I have an impression that I have seen some continental records for *Silene nutans*, but I believe that in this country it is confined to *Lychnis*, and indeed has a decided preference for the common red species (*L. dioica*). Stange (*Stett. Ent. Zeit.*, xlvii., p. 280) records variation in larval (and imaginal) dates, and finds the pupæ generally go over more than one winter. I have occasionally found larvæ which I have believed to belong to *P. affinitata*, but they have all been ichneumoned; like Buckler, the only member of the genus which I have yet succeeded in breeding from *Lychnis dioica* is the common *P. flavofasciata*. The lifehistory was first worked out by Lyonet, who gives excellent figures and description (*Recherches, &c.*, p. 565, pl. 27, fig. 7-12, first published in 1830), named "*alchemillata*" by the editor De Haan. The larva was rediscovered by Plötz, on "*Lychnis sylvestris*" (=*dioica*), and was figured by Freyer in 1856 (*Neu. Beitr.*, vii., pl. 655.1, p. 95) together with an extreme var. *rivinata* bred therefrom. *P. affinitata* seems to be very subject to parasites, and I should not call it at all a common species. I have very occasionally beaten it from hedges by day, at Sandown and Lynton, or netted it on the wing at dusk among its foodplants. It has not a very wide geographical range, but is well distributed through the British Isles; I have an impression that it is commoner in parts of Scandinavia, and in the Baltic provinces, than elsewhere in Europe.

Perizoma alchemillata, Linn.—This common little moth was long known on the Continent by the name of *rivulata*, Linné's *alchemillata* having been misidentified by Schiffermüller (followed by Hübner and others), and its name applied to the "common carpet" (*alternata*, Müll., =*sociata*, Bork.). Laspeyres (*Ill. Mag.*, ii., p. 163), was the first to suspect that *rivulata*, Schiff., was the true *alchemillata*, L., and although Treitschke (*Schmett. Eur.*, vi., 2, p. 42) wrongly controverted this, it was confirmed from the Linnean collection and other sources, and is now universally accepted. True, it involved a "false proposition," but fortunately, the British Association rule permitting alteration on this score is falling into deserved disrepute, and I regard the immutability of this name, imposed in the very first year of binomial nomenclature, as well assured. The name, of course, suggests some connection with the botanical genus *Alchemilla*, while no such connection exists: the explanation being that Linné thought he recog-

nised his insect in a figure of Degeer's, of a geometer bred from an *Alchemilla* larva (really, I believe, *Larentia didymata*), and chose a name accordingly; but his description was *not* drawn up from Degeer's figure. Another synomym, *nassata*, Fb. (*Mant. Ins.*, ii., p. 212), is not quoted in the present edition of Staudinger, yet has had a certain degree of usage, namely by De. Villers, Haworth and Stephens *olim* (1829). Curtis, on the other hand, from the first preferred to use *rivulata*, Hb., for this species, while Doubleday, in his first "Synonymic List" (p. 18), erroneously identified our small rivulet with *hydrata*, Tr. I think these are all the synonyms known in connection with this species; the nomenclature of it and the preceding were finally set straight by Guenée in 1858.

P. alchemillata shows a good deal of minor variation, but I know of no legitimately named form, unless *fennica*, Reuter, described above, be referable here. Var. **fennica*, Peters. (*Nassata*, Haw., p. 335) with the inner rivulet band recognizably defined*, is hardly more than an aberration in Britain, though I fancy more general in Scotland than in the south of England. I have bred many of the species from Sandown, without getting more than one or two examples of it, and even they are not at all extreme; whilst three of my four Scotch specimens belong to it (Muchalls, Forres, Paisley), and the fourth (Forres) approaches it. In my experience, the increased expression of the inner white band is accompanied by a widening of the outer, and a slight increase in the distinctness of the pale band on hindwings. On the other hand, I have one Sandown specimen almost unicolorous, with merely a white spot on the inner margin to represent the inner band, an extremely narrow outer band somewhat clouded over in its central part, and an ill-defined subterminal. There is also some variation in the ground colour in this species, the usual rather bright brown being occasionally replaced by a somewhat darker and greyer brown.

The moth may readily be beaten from hedges by day, or netted at dusk. At Muchalls, at the beginning of August, 1902, I netted two a little before 9 p.m. at honeysuckle flowers, when working for *Plusia braceta*. That was an exceptionally backward season, and the species generally emerges in June or early July; but both it and its ally *P. affinitata* (cfr. Stange, *Stett. Ent. Zeit.*, xlvii., p. 280), seem to have a protracted emerging period. I have never found the larva on any plant but the common hemp-nettle (*Galeopsis tetrahit*), on the seeds of which it may generally be obtained in profusion in August and the beginning of September. Other foodplants have been recorded, some without doubt correctly, and I intend to search them, with a view to personal variation. *Galeopsis ladanum* is readily accepted in captivity; and—much more strangely—I have had the larvæ take to the common toad-flax, *Linaria vulgaris*. I believe the *Scrophularinae* have some affinity with the *Labiatae*, which furnish all its natural foodplants;

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* The inner fascia is traceable in Hübner's figure of *rivulata* (fig. 259), but not white, except at inner margin (compare also *rivularia*, H.-S., fig. 289); in any case we could not substitute "var. *rivulata*" or "var. *nassata*" for "var. *fennica*"—(1) because Schiffermüller's *rivulata* is not known to have had the inner fascia; (2) because Fabricius (*Mant.*, ii., p. 212) changed the name to *nassata* to avoid homonymy, and his description (like Linné's of *alchemillata*), also gives only one white fascia.

but one would not have expected to find a relationship close enough to satisfy the requirements of so comparatively specialised a feeder. It is worthy of note that the *Scrophularinae* afford nourishment to just half our British species of *Perizoma*—*P. albulata*, *blandiata*, *minorata*, and *bifaciata*. Other recorded foodplants for *alchemillata* are *Ballota* (Heinem., *Schmett. Deutsch.*, i., p. 773), *Lamium* Treitschke, *Schmett. Eur.*, vi., 2., p. 43 [ex Hübner, "*Lamium purpureum*," in error], vii., p. 216 [from Nature], (doubted by Freyer, *Neu. Beitr.*, vii., p. 54, who says: "I have never yet found it on *Lamium*; moreover, Hübner does not figure it on such, but on *Galeopsis*"), "seeds of the common dead-nettle" (Buckler, *Larvae*, viii., p. 3—perhaps used loosely for *Galeopsis?*), once on *Stachys sylvatica* (Rössler, *J.B. Nass. Ver. Nat.*, xxxiii.-xxxiv., p. 167), seeds of *Urtica urens* (Renton, *Entom.*, xxxvi., p. 60—misidentification?). Sand (*Cat. Lép. Auvergne*, p. 109) says in capsules of *Dianthus superbus*: I felt incredulous and am much interested at finding an explanation, namely, that the only "*alchemillata*" from the Sand collection (purchased by Leech) is a good specimen of *hydrata*, a much more likely species to take to *Dianthus*. The best known foodplant, *Galeopsis tetrahit*, is that on which Hübner figures it (*Larv. Lep. Geom.*, ii., H.b., fig. 2a, b), and Freyer's note (quoted *supra*) was soon followed up by Koch, Martin, etc , although our Stainton loosely says "nettle," and Werneburg (*Ber. Lep. Tauschver.*, 1856, p. 51), overlooking Freyer. suggests *Impatiens noli-tangere*, amongst which he had seen the moths sitting in numbers. The occasional statements that it feeds on *Alchemilla* are the fruits of Linné's error. I have taken it in all localities where I have searched *Galeopsis*, but these are only four—Horsley, Sandown, Brendon and Forres.

Perizoma flavofasciata, Thnbg.—This species has been almost universally known by Hübner's name of *decolorata*, and although Werneburg and the Scandinavians (cfr. *Ent. Rec.*, ii., p. 224) have claimed priority for Thunberg's name, it has only recently obtained world-wide recognition (Stgr., *Cat.*, ed. 3, p. 305). The insect was described *and figured* by Thunberg in 1792 (*Diss.*, iv., p. 62, fig. 12), while Hübner did not commence his Geometers till 1796, and there is absolutely no shadow of argument against reinstating *flavofasciata*. I know of no other synonyms, nor of any varietal name. The species is, on the whole, very constant, though some, even when bred, are a good deal paler than others. It is extremely similar in markings to *P. affinitata*, notwithstanding its very different colour, and I have little doubt that they are really pretty closely related, especially as the larvæ seem to have much in common. But its yellowish colour has led at least two modern writers to separate it from its congeners. These writers are Poppius and Staudinger. The former, in 1891 (*Acta Soc. F. F. Fenn.*, viii., no. 3, p. 75) places it between *luteata* and *parallelolineata* (**respertaria*, Schiff.), remarking (*l.c.*, p. 22) on its approach to the former, though, I think he only means superficial approach, and separating it by eight less-related species from *blandiata*, and then inserting six or seven other comparative strangers before *affinitata*, his next *Perizoma*, while *albulata* occupies another position, namely, *before* the *Asthena* group. Staudinger and Rebel in 1901 (*Cat.*, p. 305), place *flavofasciata* between *luteata* and *albostrigaria*, separating it from the other Perizomas by the *Asthena* group. Lederer, in 1853, had all our Perizomas together (though in *Cidaria* and without any sectional

characterisation), but even he placed *flavofasciata* at the opposite end of them to *affinitata*, and made it (the former) lead on to *luteata*, &c. Meyrick (*Trans. Ent. Soc.*, 1892, p. 73), improves the sequence, placing *flavofasciata* between the *affinitata* group and *albulata*: but he has *blandiata* (*adaequata*) separated from the rest of our genus by three apparently much less related species.

P. flavofasciata is widely distributed in Europe, though it is not certainly known to extend much beyond. In Britain it is considered fairly common, but somewhat local. I have met with it in most of the southern localities where I have done much collecting. Like most geometers, it may be beaten from hedges by day, or taken on the wing at dusk. The larva is attached to *Lychnis*, though in Ireland it is said to have been taken on *Silene inflata*. Barrett (*Lep. Brit.*, viii., p. 230) considers *Lychnis alba* (*vespertina*) its favourite foodplant, but at Sandown, where both these species and *L. dioica* abound, I am almost sure I have found it more freely in the latter, and near Brendon, N. Devon, where *L. alba* seems very rare, I have taken it *only* in *L. dioica*.

Perizoma albulata, Schiff. (*niveata, Stph.).—This is, from the point of view of its variation, the most interesting species of the genus, having a considerably wider range of variation than any of its congeners, and being more or less addicted to the formation of geographical races. In our City of London List (*Trans. City Lond. Ent. Soc.*, x., p. 68) I followed Snellen in calling the species *niveata*, Stph., to avoid collision with *albulata*, Hfn. (=*candidata*, auctt.). But it is not quite certain whether a change was necessary, as Schiffermüller's species was erected as *Geometra albulata* and Hufnagel's as *Phalaena albulata*, and I do not find positive proof that they have ever collided with a common generic name; I think, therefore, that the familiar name should be given the benefit of the doubt, and would let the two species stand as *Perizoma albulata*, Schiff., and *Asthena albulata*, Hfn. In any case, **niveata*, Stph., is unavailable, as I find he simply used it upon an erroneous determination of *niveata*, Scop.; should a change prove necessary, *ablutata*, Ev. (*Faun. Volg. Ural.*, p. 398), will have to be adopted—though probably, originally, only a slip for *albulata*.

The synonymy given in Staudinger (*Cat.*, ed. 3, p. 305), is fairly correct. It seems a pity that the forms *griseata*, Stgr., and *thules*, Weir, should be nearly lost sight of under "var. et. ab. a., *subfasciaria*, Boh.," which is recorded as an aberration for England, Scandinavia and Lapland, and merely as becoming a "var." in Shetland; I am bound to admit that the true *thules* form, as figured by Jenner Weir (*Entom.*, xiii., pl. iv., fig. 4, 5,) is only an extreme form, and will have to be called "ab.," rather than "var.," but both it and *griseata* certainly deserve separate entry in the Catalogue. There are considerable obstacles in the way of an ideal scheme; for although series of, say, a dozen representative specimens from each of three localities (England, Shetland, Finmark), could easily be localised by experts, and would fully attest the existence of geographical races, yet there is so much variation in any given locality, that individual specimens would certainly be found in each series which agreed practically with the form more prevalent in some other locality. Of course, this is only what, to a greater or less extent, prevails everywhere, and bothers us in our attempts to make a cut-and-dried varietal system; but it is not always nearly so manifest as in the present case—for instance,

I believe that almost *every* specimen of Arran *Cidaria truncata* (var. *concinnata*, Stph.) or Shetland *C. immanata* (var. *pythonissata*, Mill.), could be recognised at a glance.

In *P. albulata*, one would like to be able to differentiate several races, somewhat as follows :—

1. Ground-colour and hindwings white or whitish, markings distinct, generally yellowish, size not dwarfed. This would cover most of the lowland specimens of the continent of Europe, except its most northerly part.

2. Specimens similar to form 1 still prevalent, but with an admixture of more suffused examples, sometimes with the ground-colour and hindwings greyer or yellower, sometimes with the markings greyer. This would cover the ordinary English range of variation.

3. Suffused specimens (yellowish-grey, etc.) prevalent, often weakly marked; if strongly marked, with the markings more grey than yellow, culminating in almost melanic specimens, size reduced. This would cover the Shetland forms, and possibly those of some mountain districts in Scandinavia, etc.

4. Small pale specimens prevalent, markings rather weak. Northern Norway.

5. Very pale specimens prevalent, culminating in unmarked, white examples. Hebrides.

Form 1 is certainly the type—"Lilywhite, yellowish-striped geometer," Schiff. (*Schmett. Wien.*, p. 109); "alis anticis niveis, . . . alis posticis . . . immaculatis," Fab., *Mant. Ins.*, ii., p. 212). The whitish continental examples would, I believe, be almost rarities in England. Yet many normal continental ones, such as Hübner's figure 257, and Duponchel's plate cci., figure 2, or Freyer's plate 645, figure 1, would be normal also in many parts of England and Scotland. I do not propose a varietal name for these, but would define the type as having white *or whitish* ground-colour, and would give the same citations as does Staudinger, excepting *nivea*, Stph., Wood, which belongs to form 5 (ab. *hebudium*).

Form 2 unfortunately cannot be named in its entirety, as it includes so many specimens agreeing with *albulata*, Hb., and a few even with the more extreme *albulata*, Schiff. Haworth got hold of a specimen, or specimens, with somewhat infuscated hindwings and more greyish markings—"al. ant. fasciis griseo-rufescentibus albisque alternis, strigaque alba undulatis communi in fimbria griseo-rufescente," etc., hindwings "fuscescent with whitish fascia behind middle"—and Wood figures the same (*Ind. Ent.*, fig. 698). Guenée received three males of the same from England, and this led him to make a "var. A" (*Ur. et Phal.*, ii., p. 292) for the *albulata* of Haworth (p. 336), Stephens (iii., p. 299) and Wood (fig. 698), remarking that, at first sight, it looks specifically different from the type, and that it has only been found in England. The localities given by Wood (*Ind. Ent.*, p. 109) are Battersea Fields, Epping Forest, and Meldon Park, near Morpeth. I have seen the form from Epping Forest and Darlington, and similar, but smaller, examples occur in Shetland. Staudinger, in 1871 (*Cat.*, ed. 2, p. 190), named it *griseata*, which name I should resuscitate for it. Form 2, then, consists of a blend of typical *albulata* with ab. *griseata*, Stgr.; in my Darlington series, *griseata*, etc., preponderate.

Form 3 has to be called var. *subfasciaria*, Boh., as Staudinger shows in his new edition, and ab. *thules*, Weir, is only a more extreme aberration of it; form 2, and probably even form 1, occur also occasionally as aberrations, only in smaller average size. Boheman (*Kongl. Vet. Ak. Handl. for* 1851, p. 133) erected *subfasciaria* as a distinct species—"*Acidalia subfasciaria*," differing from *A. albularia* in its darker tone and its cinereous hindwings, etc.; he describes the forewings as pale mouse-colour, with the central area a little darker, and the subterminal whitish; two from southern Sweden. Lampa (*Ent. Tid.*, vi., p. 115) first identified it, and doubtfully sunk *griseata*, Stgr., to it. His suggestion has unfortunately been followed by Aurivillius (*Nord. Fjär.*, p. 246) and Staudinger (*Cat.*, ed. 3, p. 305); the former describes var. *subfasciaria* as being almost unicolorous yellow-grey, with almost obliterated markings, central fascia indistinctly darker, hindwings grey; the latter diagnoses it as "al. ant. fere unicol. flavescenti-griseis, al. post griseis." What connection this has, excepting in the grey hindwings, with the well-marked ab. *griseata* (*vide* Wood, fig. 698, or Haworth's or Guenée's description) it is not easy to see. Weir describes ab. *thules* (*Entom.*, xiii., p. 219) as "luteous lead colour, weakly marked;" Hoffmann (*Stett. Ent. Zeit.*, xlv., p. 370) considers Weir's figures intermediate between the type and the extremest Shetland form, as he possesses them decidedly darker.

Form 4 has recently been differentiated by Strand (*Nyt. Mag. Nat.*, xl., p. 167, 1902), who names it var. (et ab.) *dissoluta*: "minor, dilutior" would sufficiently characterise it. According to its author, it forms a local race in the north of Norway, and perhaps an occasional aberration in Bucovina and Roumania; I think I may add, on the evidence of our national collection, also in the Swiss Alps. Fifteen, which Dr. Chapman brought from Bossekop in 1898, and some Finland examples in the Natural History Museum, are certainly *dissoluta*, yet hardly "minor"—not nearly so small as the Shetland race [*cfr.* Staudinger, *Stett. Ent. Zeit.*, xxii., p. 399.] On the other hand, the Dovrefjeld examples (Br. Mus. Coll.), one from Harstad (coll. L. B. P.), etc., favour the *subfasciaria* form.

Form 5 culminates, as I have said, in the extreme Hebrides form named *hebudium*, by Jenner Weir (*Entom.*, xiv., p. 221, pl. 1, fig. 17). *Hebudium* was, of course, a misprint for *hebridium*, but Mr. Weir had the wisdom to abide by the published spelling, which is now firmly established. Staudinger's diagnosis "al. unicoloribus albidis" is exactly correct. He overlooks the fact that Stephens made the form known just 50 years earlier (*Ill. Haust.*, iii., p. 291), and that Wood figured it in his *Index Entomologicus* (fig. 684). This oversight, however, does not affect the name, as Stephens and Wood misnamed it *Cleogene niveata* (*i.e.*, **niveata*, Stph., *nec* Scop.). Stephens' specimen was received from Scotland, but there is no clue as to the exact locality; of course it may possibly appear as an aberration in other places besides the Hebrides, occasionally the Finmark examples run decidedly in this direction. Clean white forms, weakly marked, are also recorded by Christoph, from north Persia (*Horae Ross.*, x., p. 40) and by Hoffmann from the Caucasus (*Stett. Ent. Zeit.*, xlv., p. 370).

This species is generally out about June, but there is some reason to suspect a partial second brood. Strand (*Nyt. Mag. Nat.*, xl., p. 168) reports a freshly-emerged specimen in Sudal on September 13th, 1901,

but says such an occurrence is doubtless quite exceptional in Norway; he takes the opportunity, however, to point out that Frey, Hormuzaki (in *Verh. z-b. Ges. Wien.*, xlix.), Nolcken, Teich, etc., have stated that there are two broods, whilst various other writers give one only. I took one or two good specimens in Scotland at the beginning of August, 1902, but we were getting quite a number of May and June species at that time, in that extraordinarily backward season. The moth is easily kicked up by day, and I believe its flight-time is a little before dusk, when it may sometimes be observed in clouds. It thrives well in the far north, indeed Staudinger in his "Reise nach Finmarken," records (*Stett. Ent. Zeit.*, xxii., p, 399) that at Bossekop it was "in such fabulous profusion as he had never seen in any other Geometrid species." Hoffmann (*ibid.*, xlv., p. 370) says there is probably periodicity in this appearance of such masses; he himself saw it in millions some two year previously, in the Upper Hartz, but had since found it scarce there. I have never seen it in anything like profusion round London, but in 1891 it was distinctly common in fields on the outskirts of Epping Forest, since which time I have hardly seen it there. The only known foodplant is the yellow-rattle (*Rhinanthus crista-galli*), in the seeds of which the larva feeds up rapidly. Its first discovery (so far as I know) was by Plötz, and was made known by Freyer in 1855 (*Neu. Beitr.*, vii., p. 70, pl. 645-1). The pupa—at any rate of the Shetland race—very often goes over two winters (*Ent. Rec.*, i., pp. 19, 47, ii., p. 47, etc.).

Perizoma blandiata, Schiff.—I have very little hesitation in placing this species, with its evident ally *minorata*, next to *P. albulata*, and in the same group with it, although I have not studied the early stages. De la Harpe long ago remarked on the close alliance of these three (*Faune Suisse*, iv., p. 115). Gumppenberg finds them congeneric on his system of wing-form, although I should not attach any importance to this alone; he places them in his genus *Rheumatoptera* (*Nova Acta Acad. Caes. Nat.*, liv., pp. 294, 296), whereas the *affinitata* group goes to his *Perizoma*, and *taeniata* (*loc. cit.*, p. 413) to *Chloroclysta*, along with *ludificata*, Stgr., *miata*, L., and *siterata*, Hfn. I do not think any of our systematists, except Meyrick and Barrett, separate *minorata* from *blandiata* by other species, though Gumppenberg is alone in making it a mere "var." thereof; some, such as Staudinger (*Cat.*, ed. 3, p. 305) and Aurivillius (*Nord. Fjär.*, pp. 246-7), have also wisely placed *albulata* next to these, while others (Guenée, Meyrick, and especially Herrich-Schaeffer and Poppius) have interposed between them less related forms, as it seems to me. I fancy Aurivillius' sequence is particularly happy, unless it be as regards the position of *taeniata* and *flavofasciata*; it runs thus: *taeniata*, *flavofasciata*, *albulata*, *blandiata*, *minorata*, *unifasciata*, *hydrata*, *alchemillata*, *flexuosaria*, *affinitata*. *P. blandiata* was first made known as a species by Schiffermüller in 1775 (*Schmett. Wien.*, p. 316); he simply describes it as "milk-white, black-grey striped geometer," and this has led Staudinger to reject it as a "catalogue name," for it was not further adopted till 1796, when Hübner figured it, and in the meanwhile Borkhausen (*Eur. Schmett.*, v., p. 444, *anno* 1794) had given a good description under the name of *adaequata*. But as *blandiata* was certainly more than a "nomen nudum," and its identification has been elucidated by Hübner and Treitschke, it must certainly be accepted on the score of priority.

In 1802 Schrank (*Fauna Boica*, ii., p. 49) added another synonym, *derasata*, which is not quoted in Staudinger; Zeller (*Verh. zool.-bot. Ver. Wien*, xviii., p. 590) refers this name of Schrank's to *minorata*, which must be a *lapsus calami*, as it is an excellent description of *blandiata*; if it really belonged to *minorata* it would have precedence over it by 26 years. More recently, synonyms of this by no means variable species (*blandiata*) have multiplied, Eversmann naming it *albidata*; Zetterstedt, *dilacerata*; Stephens and Wood, **trigonata* [*trigonata*, Haw., p. 338, one only, Westerham, was probably =*bicolorata*, Hfn.] *; and Boisduval, *jucundaria*. I suppose the fact that the first two figures (Hübner, fig. 258, and Dup., pl. 189, fig. 5) are very unsatisfactory, is largely responsible for this. Hübner's figure would have been passable but for an absurd bright orange blotch filling the space from the basal patch to the median band, which gives quite a deceptive appearance. Duponchel's is very bad, rather *minorata*-like, with a rather wide central area; I would not like to say certainly that it even represents this species, with which Duponchel probably had no intimate acquaintance, as he only records a single specimen from the neighbourhood of Paris. *Albidata*, Ev. (*Bull. Mosc.*, 1842, p. 557, pl. vi., fig. 10) was fairly normal, rather well banded. Zetterstedt's *dilacerata* (*Ins. Lapp.*, p. 967) was described as "white with three blackish spots," and was probably the form with the inner-marginal half of the central fascia weak; its union with *blandiata* was made by Staudinger, 1861 (*Stett. Ent. Zeit.*, xxii., p. 399), from a specimen sent him by Boheman. *Trigonata*, Wood (*Ind. Ent.*, fig. 699), is less excusable, as our English authors had certainly recognised *blandiata*, and Wood had figured it fairly well at fig. 697, the great similarity between the two figures makes it rather discreditable that the specific identity was not recognised; fig. 697 (*blandiata*) shows the central band widening and becoming paler after the costal patch, fig. 699 (*trigonata*) is the better figure, and shows the costal blotch rather more triangular. Lastly, *jucundaria*, Bdv. (*Gen. et. Ind. Meth.*, p. 271), was admitted to be "Statura *blandiariae* et forsan tantum varietas alpina," and probably its author only knew *blandiata* from Hübner's and Duponchel's figures, as he gives no localities; at any rate, the description and the type-specimen fix its identity, disproving Guenée's suggestion (*Ur et Phal.*, ii., p. 295) that it is =*minorata*. The true identification was first suggested by De la Harpe in 1853 (*Faune Suisse*, iv., p. 115; see also *Supp.*, ii., p. 13).

Like nearly all Larentiids, the present species varies somewhat in the breadth of its central area, and there is also some variation in the strength of the expression of the dark band therein; but the only indications of local races, or of important aberrations, so far as I know, are (1) the Hebrides form, which seems usually - according to Barrett (*Lep. Brit.*, viii., p. 241) and the sole example at the British Museum - to have the central fascia dark and complete, and may perhaps be worth naming; and (2) an aberration with thread-like central fascia, figured by Herrich-Schaeffer (fig. 291)—ab. *coarctata*, mihi, n. ab.

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* Frey (*Lep. Schweiz.*, p. 230) erroneously suggests that *livinaria*, Lah. (*Supp.*, ii., p. 14, pl. i., fig. 3), is a further synonym (or, rather, aberration), ignoring the pectinated antennæ; I believe Staudinger (*Cat.*, Ed. 3, p. 297) is right in making it an extreme aberration (more so than ab. *confixaria*, H.-S.) of *spadicearia*, Schiff.

Like several of its congeners, *P. blandiata* thrives well in the north of Europe; indeed, I believe it is mainly "alpine and boreal," though in Germany, etc. (*e.g.*, Berlin, *vide* Bartel and Herz, *Gross. Schm. Berl.*, p. 55), it descends lower than *minorata*. There is an old record for the Isle of Wight, and one or two others for the south of England, but I feel convinced they must have rested on incorrect determinations. The only occasion on which I have taken it was during a brief visit to North Wales, at the end of June, 1902, when I beat out a couple in the afternoon near Cwn Bychan—a locality where some of my friends have taken it regularly. I believe it often flies in the afternoon, like *minorata* and a few other geometers.

The larva, like that of *albulata*, is restricted to a single foodplant, namely, the eye-bright (*Euphrasia officinalis*); and it perhaps confirms one's suspicion as to their community of origin, that the two foodplants are botanically related. We owe our first knowledge also of the present larva to Freyer (*Neu. Beitr.*, vii., p. 7, pl. 604, 1), who shows the adult stage, with the gay, somewhat pug-like coat of green with red dorsal markings. A fuller description is given by Buckler (*Larvae*, viii., p. 15), who shows us that the life-history is very similar to that of *P. bifaciata* (*unifasciata*), the larva first feeding concealed in the seeds, and changing its colouring and habit at the last moult, after which it feeds externally but is remarkably well protected by its tints. Another point of resemblance, though Buckler does not say so, is mentioned (*loc. cit.*, p. 16), namely, that the rich yellow colouring of the egg and young larva assimilate wonderfully with certain spots, apparently some fungus, with which the euphrasy is much infested. I have independently noticed the same thing when working for eggs of *P. bifaciata* on the allied *bartsia*, or red eye-bright (*Bartsia odontites*, formerly known as *Euphrasia odontites*).

Perizoma minorata, Tr.—This pretty little species is by no means so over-burdened with synonyms as its predecessor. I know of no older name than Treitschke's, given in 1828. About the same time, Dale appears (*teste* Stephens) to have given it the MS. name of *ericetata* in Britain. Stephens published this as an *Emmelesia* in 1829 (*Nomencl. Brit. Ins.*, p. 45; *Cat. Brit. Ins.*, ii., p. 148), but still as a "nomen nudum"; Curtis followed suit early in 1831 (*Guide*, col. 164), introducing *Emmelesia ericetata* and a new *E. monticola* (probably a synonym or an aberration of *ericetata*, as Stephens, in 1850, suggested), both undescribed; at last, in a number of his *Illustrations*, dated July 31st, 1831, Stephens made it known to science, giving an adequate description and a figure (*Ill. Haust.*, iii., p. 298, pl. 32, fig. 3—not fig. 2, as cited in the text). I think no other synonyms really belong here; I have shown under *blandiata* that *derasata*, Schr., and *jucundaria*, Bdv., are referable to that species; in the 1871 *Catalog* (p. 191), Staudinger suggests, with a query, that *linulata*, Gn., may be synonymous with *minorata*, but examination of the type specimen has since shown that it belongs to *bifaciata* (*Cat.*, ed. 3, p. 304).

As regards the range of variation in the present species, it is by no means inconsiderable, although not so extreme as in the allied *albulata*. I have long been of opinion that our British forms constituted a local race, smaller and darker than the type, and which might be called var. *ericetata*, Stph.; and I still think the differences so general that

they ought not to be lost sight of, although the study of more extensive material has shown me that they are not altogether reliable; for instance, a few which I have from Heiligenblut (N. W. Carinthia) run the British rather close both in size and colour, those from Pontresina are nearly as dark as ours (though not quite), and many of the Norwegian are as small as ours (though usually considerably paler). Of course, Guenée's idea (*Ur. et Phal.*, ii., p. 295) that *minorata* and *ericetata* were two species, has long been exploded; he knew the former from only a single specimen, which, in its ample wings, pale colouring, broad band, etc., offered the maximum of differences from our British race, or possibly, even the said specimen was wrongly identified, though his description tallies fairly well with two or three of my *minorata* from the Tyrol, Engadine, etc., and, in some respects, with Duponchel's figure (*Hist. Nat. Lép.*, Supp., iv., pl. lix., fig. 8). Freyer also (*Neu. Beitr.*, vii., pl. 615.1) figures rather a broad-winged form.

The question remains, can we, as a broad generalisation, call our British race "var. *ericetata*, Stph."? I think perhaps we can, as a matter of convenience, though we shall need to allow ourselves a little latitude, as Stephens unfortunately figures rather a large specimen and not very characteristic of our ordinary range of forms; still, he gives the measurement as 7-8 lines, which is decidedly below the average for the continental type, and we might diagnose the form thus: v. (et ab.?) *ericetata*, Stph., Wd. (minor, sæpe obscurior, al. ant. distinctius signatis).

Wood figures (*Ind. Ent.*, fig. 696) a much more characteristic British example, perhaps rather extra darkened. Duponchel's figure of *minorata*, already alluded to, was from a specimen sent by Parreyss from Vienna; it represents broadly the type form, the central fascia weaker than in our British figures, composed of one (broken) line before and three (waved, approximated) behind the central spot. Freyer's is larger than our English ones, but has a pale ground with strong medium-brown markings, the median band well consolidated, hind-wings pale.

Specimens from Norway—to judge both from my own series and that at the British Museum—form a second local race, as small as the British, but even more weakly marked than the continental type; hence in this respect, the very antithesis of ours, much as the washed-out var. *lapponica* of *Xanthorhoë montanata* is of our handsome var. *shetlandica*. I do not think Strand has named this race; if not, I would suggest calling it: v. (et ab.?) *norregica*, n. var. (minor, indistinctius signatis).

There is an occasional aberration in which the darkening of the central area (which is hardly ever very *complete*) is entirely absent, the said area being only indicated by the two lines which border it; this has been named ab. *monticola* by Strand (*Nyt. Mag. Nat.*, xl., p. 166, *anno* 1902). I possess an example from Kaafjord, and Barrett figures an apparently similar form from Mr. Capper's collection (*Lep. Brit.*, pl. 352, fig. 1a), though the execution of the figure leaves something to be desired*; possibly also an atrocious figure given in Humphreys and Westwood (*Brit. Moths*, ii., pl. 71, fig. 19), as *Emmelesia*

* "A very pretty variety, in which the central band and all the markings of the middle portion of the forewing were absent," is mentioned by Barrett (vol. viii., p. 232) as having been taken by Mr. W. Herd, of Seoonieburn, Perthshire, and must be even more extreme than Mr. Capper's.

taeniata (to which it does not bear the remotest resemblance) may represent this same variety. In any case, Westwood does not seem to be very familiar with *taeniata*, as he suggests (*tom. cit.*, p. 70) that *trigonata*, Haw., Stph., may prove to be a variety of it.

One other aberration must be mentioned, though, as I cannot determine it from the description, I shall not suggest naming it; this the *ericetata* var. A. of Guenée (*Ur. et Phal.*, ii., p. 296), described from a north British pair, and said to differ from the ordinary form of *ericetata* (Gn. restr.) in its bluish-ashgrey markings with no shade of russet in the pale bands, etc.

P. minorata is locally abundant in mountain country in a good part of Europe, but does not need extremely high altitudes, at least, in the north. I am told it flies freely in the afternoon sunshine, but, I think, there is no doubt it is on the wing again at dusk, or later; and I recollect that our friend, Mr. J. A. Clark, brought in a specimen from an evening (or night) expedition in Aberdeenshire, when we were collecting together in 1900. The only specimen which I have myself taken was secured on August 25th, 1902, at Muchalls, in the day time; but I cannot be sure whether it was flying naturally or I had disturbed it. I left the locality a day or two afterwards, before the species was fully out. Both it and *P. blandiata* seem, in many localities, not to emerge until the summer is well advanced, although hibernating as pupæ.

I believe the larva was long suspected of feeding on eyebright (*Euphrasia officinalis*)*, but it was considerably the most recent of our British species to be discovered; it was not until 1892 that any account was published of it (*Stett. Ent. Zeit.*, liii., p. 160). Habich there tells how he watched females depositing eggs on the euphrasy in August, and the next month got his friend, Planner, to collect him bags of the plant, with the result that he obtained numerous larvæ, feeding on the ripe seeds. He gives a description of them, comparing them with those of *blandiata*, and says part of the pupæ of both these species lie over to a second year.

Perizoma bifaciata, Haw.—It is perfectly well known that this name has page-priority over *unifasciata*, Haw., by which the species has been so very generally known, and there is no possible question of erroneous determination or of preoccupation; its rejection, except by one or two authors, has been purely a matter of caprice, and originated with Guenée, who was one of the first on the continent to give the species a Haworthian name (Herrich-Schaeffer having renamed it *aquilaria*, although in his indices, in 1855 and 1856, he reinstated "*bifasciata*, Haw."), and certainly one of the first *definitely* to pronounce Haworth's two species to be but one. Why he preferred the latter it is hard to see, unless because the type of *bifaciata* was très-mauvais (Gn., *Ur. et Phal.*, ii., p. 294). Newman (*Brit. Moths*, p. 115) points out that *bifaciata*, Haw., is prior, and has been better figured, but does not adopt it. By the way, nearly everyone who uses, or quotes the last-mentioned name "emends" it to *bifasciata*. It is a very plausible assumption that this is what Haworth meant, as he calls this form "The Double Barred Rivulet," and *unifasciata* "The Single Barred Rivulet," but there is no more *proof* that he did not consider the former a "double-faced"

* Renton's statement that it "is said to feed on heath" (*Entom.*, xxxvi., p. 60) is, as far as I know, without authority; probably the name *ericetata*, the "Heath Rivulet," led to the conjecture.

species, than there is that von Rottemburg did not dedicate his *Sphinx gallii* to Herr Gall; and we must abide by Haworth's spelling. Moreover, there is an additional advantage in so doing in the present case, as it escapes homonymy with *Phalaena bifasciata* of Cramer, and others. I believe it has thus far only found currency in Heinemann (*Schmett. Deutsch.*, i., p. 744, following Herrich-Schaeffer's latest nomenclature) and Snellen, *Tijd. Ent.*, xiii., p. 87; *Vlind.*, ii., p. 1184), and in each case in the emended form *bifasciata*.

Haworth's type of *bifaciata* (*Lep. Brit.*, p. 334), had a cinereous ground-colour, and two fuscous bands, the one near the base, and the median; *i.e.*, it represents the lighter and more sharply marked of the ordinary forms; it is well figured by Millière (*Ic.*, pl. 114, fig. 12), and very recognizably by Wood (*Ind. Ent.*, fig. 702), and Humphreys and Westwood (*Brit. Moths.*, ii., pl. lxxi., fig. 21). Ab. *unifasciata*, Haw., (*Lep. Brit.*, p. 335), was "griseo-fuscous," *i.e.*, the darker form, with only the median fascia well expressed in darker fuscous. *Aquilaria*, H.-S. (*Syst. Bearb.*, iii., p. 163, fig. 336), treated by Staudinger as "ab. obscurior," seems to me hardly appreciably darker than ab. *unifasciata*, Haw., and might easily be sunk to it; his figure is spoilt by having the tinted halves of the rivulets coloured bright orange! *Scitularia*, Ramb. (*Ann. Soc. Ent. Fr.*, ii., p. 42, pl. ii., fig. 8) from Corsica, was first determined by Herrich-Schaeffer as belonging to this species; this was confirmed by Guenée (*Ur. et Phal.*, ii., p. 294), and the determination has been accepted, although Millière (*Ic.*, iii., p. 147), feels somewhat dubious, as Rambur gives the epoch as June, whereas with Millière (as with us in England), *bifaciata* does not appear till August. Rambur's figure is unrecognisable, but his description fits fairly well to *bifaciata*, and *probably* to the type form—I have seen no examples from Corsica; he makes it "fusco rufoque variis liniis quatuor transversis albis, externa dentata," etc. Herrich-Schaeffer (*Deutsch. Ins.*, p. 161, pl. 165-5), gives a small well-marked Prussian specimen as "*scitulata*, Ramb.;" his *temperata*, which precedes it (*loc. cit.*), and which is preceded in its turn by *hydrata*, was no doubt also a *Perizoma*, but I cannot at present identify it, and it is nowhere quoted. *Linulata*, Gn. (*Ur. et Phal.*, ii., p. 298), founded on a single, poor example from the Pyrenees, was probably a small ab. *unifasciata*.

Millière (*Ic.*, iii., p. 148, pl. 114, fig. 13, *anno* 1870), gives us a remarkable variety which is virtually overlooked by Staudinger, who merely cites the figure to the type form, and ignores the name (or names). Millière says: "Je signale une jolie variété constante de cette *Emmelesia*; je la nomme var. *euphrasiata*. Elle est plus petite que le type, a la fond des ailes blanchâtre, avec les bandes d'un gris de souris." He suspects it may be a distinct species. On the plate, it is named "var.? *odonata*," but the name in the text is evidently the one to be adopted, as the author himself uses it in his *Cat. Lép. Alpes-Marit.*, in 1874, p. 217. This "var. *euphrasiata*" is puzzling, totally unlike anything I have seen in *bifaciata*, and reminding almost more of *minorata*; it is about the size of our English var. *ericetata*, about the colour of some pale continental ones, has central fascia about the same width as in *minorata*, but with rather dentate margins, a distinct waved line before the subterminal, the fringes with distinct dots on the *hind-wings* only. I learn from Barrett (*Lep. Brit.*, viii., p. 235), that Prof. Meldola has a lovely aberration of *P. bifaciata*, from Surrey, with the

ground-colour nearly white, and the central band sharply black-brown; this cannot be the same as "var. *euphrasiata*," but it would be interesting to see how near it comes to it.

I do not know of anything in the nature of geographical varieties with this local species, unless *euphrasiata*, Mill., really be such. Dark specimens, such as Staudinger would have called ab. *aquilaria*, may turn up anywhere; in our National Collection, the example most nearly approaching Herrich-Schaeffer's figure is from Valais, from Frey's collection. According to Millière the type form (*bifaciata*) is generally commoner than ab. *unifasciata*, especially in Provence.

P. bifaciata is mainly confined to central, and some parts of southern, Europe. Staudinger (*Cat.*, ed. 3, p. 304), is wrong in excepting Holland; see Snellen (*Tijd. Ent.*, xiii., p. 87). In Britain, it is very far from being the rarity it was considered in Newman's time; in fact, especially in the southern counties, it seems to occur wherever its foodplant, *Bartsia odontites*, occurs freely; I can mention Epping, Coulsdon, Sandown and Torquay, from my own experience. It is somewhat kept in check by the ichneumons which infest it, and which, now and then, seem completely to get the upper hand; but in average years plenty manage to escape them. The imago may sometimes be beaten from edges in the day-time, but flies at dusk, and is attracted by light.

Guenée (*Ur. et Phal.*, ii., p. 294) mentioned that this species bears some resemblance to "*Coremia ferrugata*," etc. Newman (*Brit. Moths*, p. 116) "went one better," and thought it looked quite out of place in *Emmelesia*. The discovery of the larva, with its apparent connection with that of *blandiata*, the apparent contact of the imago with *minorata* through *euphrasiata*, Mill., etc., show that it is correctly placed, and my only hesitation is whether I ought not to have united it with the *blandiata* group, instead of indicating it as forming a group apart. The larva was made known in a brief note by Anton Schmid, in 1863 (*Berl. Ent. Zeit.*, vii., p. 57), and more fully by Millière, in 1870 (*Ic.*, iii., p. 147). Both found it on *Euphrasia* (*Bartsia*) *lutea*, a non-British species; but it also feeds on the allied *Bartsia odontites* (= *Odontites rubra* = *O. divergens*), as recorded by Hellins and others in England (*Ent. Mo. Mag.*, vi., p. 187, January, 1870), and by Sand in France (*Cat. Lép. Auvergne*, p. 109). It eats the seeds, commencing by burrowing, but feeding exposed in its last stadium, when it becomes variable in colour—brown or dull green, etc., but always assimilating well with its surroundings. The eggs are very easy to find in plenty, if one looks closely at the calyx, etc., of the flowers on which they are laid. The pupa generally goes over two winters, as was first noted by Dardouin, and published by Millière (*loc. cit.*); he says "casually only eleven months," and though I always get a few emergences after the first hibernation, I agree that the larger number are to be expected the second year. Some, however, go over a *third* winter; especially was this the case with the pupæ from larvæ which I collected in 1901, only about 8 or 10 emerging in 1902, 18 in 1903, and 15 in 1904; they can hardly be blamed for having thus shown their disapprobation of the summers of 1902 and 1903. Of all the species which I breed regularly, this is the latest to appear from over-winter pupæ; a few straggle out in July, occasionally beginning as early as about the 10th; but the great majority do not appear till August, keeping on regularly

till about the middle of the month—1896, to August 8th ; 1897, 1903 and 1904, to August 13th ; 1898, to August 17th ; 1899, to August 15th ; 1900, to August 16th, and one straggler on the 25th (they had been with me to Scotland, and, perhaps, got a little upset in consequence) ; 1901 and 1902, to August 16th. It will be noticed that no less than five of our *Perizoma* species show a partiality for passing more than one winter in pupa ; as *P. taeniata* hibernates in the larval stage, and is doubtfully congeneric, this leaves only two possible species—*alchemillata* and *flavofasciata*—in which the habit is not known to prevail, and it may almost be spoken of as a generic habit. It is not improbable that we have yet to learn that in the far north, *alchemillata* is in like case, but I have found it always emerge after the first winter in southern localities, and a few which I bred from Forres did likewise.

Perizoma tæniata, Stph.—I have just now expressed a doubt whether this may not be *sui generis*, so far as regards our British species. It is a member of a rather large group (so far as one may judge from a superficial examination of the imagines), which has its headquarters in Asia ; while very few of the other Perizomas extend far, if at all, out of Europe. Staudinger, in both his 1871 and 1901 editions, places *taeniata* far away from the rest of the Perizomas, on account of its "long, strong, anal clasps," which formed a primary division of the genus *Cidaria* (*Larentia*) on the Lederer system. Meyrick, on the other hand, ranges it between *minorata* and *bifaciata*, Aurivillius at the head of our *Perizoma*, Poppius after *hydrata* ; Lederer himself, not having studied the species, placed it between *hydrata* and *bifaciata*. Gumppenberg (as mentioned above, under *blandiata*) finds the wing form different from his *Perizoma* and *Rheumatoptera*, and makes it a *Chloroclysta*. The only other members of the group which Staudinger catalogues as palæarctic, are *vinculata*, Stgr., which he thinks may be a "Darwinian form" of *taeniata*, and *minimata*, Stgr. (*vide Cat.*, 3rd ed., p. 294, no. 3325 and 3326). I have no knowledge of either, except from Staudinger's original descriptions in *Iris*.

The three names which quite certainly belong to this species, and more or less to the type form, are *taeniata*, Stph., *arctata*, Zell., and *albimacularia*, Frr. *Fulvida*, Butl. (*Tr. Ent. Soc.*, 1881, p. 422), sunk by Leech (*Ann. Mag. Nat. Hist.* (6), xix., p. 664), seems to me—from examination of the type specimen—somewhat doubtful ; but the few Japanese examples which I have seen of the group are aberrant and puzzling, and require closer study than I have been able to give them. As to *basaliata*, Walk. (*List*, xxv., p. 1184), with its synonym *explagiata*, Walk. (*tom. cit.*, p. 1728), which has been treated as the North American form, or even synonym, of *taeniata* (Hulst, *Ent. News*, vi., p. 103 ; Dyar, *List N. Amer. Lep.*, p. 283 ; also in our National Collection as arranged by Warren), it proves to be a separate, though probably closely related species. Walker's types were worn, and certainly looked extremely like the wasted *taeniata* with which we are all too familiar, so that the mistake was very excusable. The error was first suspected by Dyar (*Proc. U. S. Nat. Mus.*, xxvii, p. 899), and good specimens of *basaliata*, sent me by my kind correspondent, Rev. G. W. Taylor, confirm its distinctness ; as he will probably publish some differentiation of the two, I need not do so here.

Staudinger says of *P. taeniata* "sp. valde aberrans." I have seen so comparatively little material in really first-class order that I do not at present feel competent to work out the variation, of which the British Museum material certainly shows a fair range. Stephens' original figure (*Ill. Haust.*, iii., pl. 32, fig. 2—not fig. 3, as cited in the text) shows a good representative British example, with fairly broad band. Herrich-Schaeffer's *arctaria* (*Syst. Bearb.*, iii., fig. 416) has a much narrower band; I fancy the specimen he figures may be one of Zeller's—he seems, on p. 149, to differentiate his own specimen. Freyer's of *albimacularia* (*Neu. Beitr.*, vi., pl. 534-5) has more brown in the ground colour, the central band dark grey, of medium width, and hardly bulging posteriorly. Wood's of *taeniata* (*Ind. Ent.*, fig. 700) is dull, and none too well done, but represents much the same form as Freyer's. Recently (in 1903) Strand has named two aberrations according to the extremes of width of the band—ab. *latefasciata* and ab. *angustifasciata* (*Arch. Math. og Nat.*, xxv., no. 9, p. 17). A further "ab.," or "var.," paler and with more indistinct or almost obliterated markings, is described by Alphéraky from Kamtchatka (*Rom. Mém.*, ix., p. 342), but he forbears to give it a name, as he has only seen a single specimen; of course it may well be some closely allied species, though I understand the true *taeniata* does extend away to Amur, even if my suspicion of some of the other far eastern forms is well grounded. Britain, Scandinavia, parts of the Alps, and parts of eastern Europe furnish its best known localities, but it always seems to be very local. In Britain it is certainly so, and is confined to certain rocky localities in the north and west—Ireland being apparently more favoured than the rest of the United Kingdom. Barrett (*Lep. Brit.*, viii , p. 239) gives a fair list of localities, but was unacquainted with the only one where I have myself taken it—a few miles from Lynton, N. Devon. It is there extremely localised, and I did not find it common; in 1901 I took several, in 1903 two only.

The habits of *P. taeniata* seem fairly uniform in all localities where it has been specially observed. It is out about midsummer and on through July, but very soon gets almost hopelessly wasted; if it is taken on the wing at dusk, or beaten out of hedges or trees by day, it is seldom in a condition worth having. Of course, it may occasionally be picked up freshly emerged, if one is working in the spots where it breeds; but these are generally somewhat dark and inaccessible. Eggs are easy to obtain, although the rearing of the resultant larvæ is quite another matter, unless one is in a favourable locality for getting moss to feed them on; I have tried substitute plants, but have failed ignominiously. Unlike nearly all other British Geometrides, *taeniata* nearly always lays her eggs unattached; without doubt, they would, in nature, be simply dropped into the moss, and be quite secure there.

We owe our knowledge of the lifehistory mainly to Buckler (*Larvæ*, viii., p. 7), Hodgkinson (*Entom.*, xi., p. 231; xiv., p. 257; xv., p. 285; xxviii., p. 141), and Gross (*Stett. Ent. Zeit.*, xlvi., p. 375). The British references are readily accessible to our members, and show that the larvæ can occasionally adapt themselves partially to a leaf- or flower-feeding habit ("phanerogamophagous"—shall I say?), such unlikely pabulum as *Hypericum* (flowers and seeds) and *Tropaeolum* (leaves) having been casually accepted. To Hodgkinson, and again quite independently to Gross, we owe the discovery of the moss-feeding,

and in both cases quite by accident; Hodgkinson gives the details in the *Entomologist*, vol. xv., pp. 285-6; from Gross, in his interesting account of his rearing the species from the egg, we learn that he had tried all sorts of alpine and other plants without signs of success, and in despair threw his little larvæ into a cage in which he was going to hibernate those of *Cidaria scripturata*, and which happened to contain some moss. Till October he saw no more of them, but then, chancing to disturb the moss, he found nine larvæ of not quite 1c.m. length, which he compares in form and colour with those of *Eupithecia campanulata;* they had evidently kept concealed, and only fed late at night. He hibernated them in the open, and began forcing them at the end of February, when they took to chickweed, and finished feeding up on this. They spun up between April 6th and 15th, and four moths emerged from April 28th to 30th. Both Gross and Hodgkinson compare the later-stage larvæ, with their diamond markings, to those of the "pugs," but this would not necessarily isolate the species from others which we have been considering this evening, for the adult *blandiata* is also adorned much in this way. Hodgkinson (*Entom.*, xi., p. 231) remarks that "the habit of the larva is much after that of *P. bifasciata;* when touched it frisks about as if it wanted to be played with." He also tells us (*Entom.*, xv., p. 286) that "it has a very peculiar habit when at rest; it looks like a pot-hook." Hofmann (*Raupen Gross-Schmett. Eur.*, p. 236) says that before hibernation it feeds on dead leaves of low plants. This statement is repeated, probably from personal observation, by Gross (*J.B. Wien. Ent. Ver.*, xi., p. 75). I should have liked to be able to add further quotations, but my paper has already far outgrown the limits which should have been maintained; reference to the places I have cited will supply all the rest which I could have furnished.

POLYOMMATUS CORYDON. VARIETIES AND ABERRATIONS.

(Read March 7th, 1905, Mr. C. P. PICKETT, F.E.S.).

P. corydon has always been one of my favourite blues; its exquisite colour reminds one of the lovely silvery moonlight on a summer evening. When we speak of *P. corydon*, we naturally think little or nothing about this common species, but when we come to look deeper into the lovely forms and aberrations we then begin to feel how little of real entomology we take up. Just go on to the ground of some of our common butterflies, when they are in abundance, and put in a little hard work, examining each specimen carefully, and your surprise will be as mine was.

The blues as a family are much given to variation, and one is astonished when one comes to examine each specimen carefully. The fact of their being so common is one reason of their being passed over by the careless observer without any special notice. This is what I used to do till 1894, when in the August of that year, when staying at Folkestone, I found *P. corydon* were very few in number, so occasionally went over to Dover for them, all books giving Dover for *corydon* in plenty. I was a long time before I dropped on them in any numbers; in various hollows they simply swarmed, but away from these only spare ones here and there were found, and so marked is this peculiarity that, while in the hollows this side of Cornhill Coastguard station they revel in hundreds, on the other side of Cornhill (I do not mean the Cornhill near Fenchurch Street, but Saint Margaret's Bay) you can go a thousand yards and only see a few, until you get to the next hollow, where they again occur in hundreds. It is very easy to account for this, as it is very bleak at times on the top of these cliffs nearly 400 feet above the sea, as anyone who gets caught in a storm of wind and rain will soon discover. There is always, more or less, a breeze on top of these heights, and when it blows hard nothing can withstand the strong hand of the invisible—not even an ardent entomologist. The hollows, on the other hand, are sheltered and afford a good ground for breeding. My first aberration was taken in August, 1894; before this time *P. corydon* was no more to me than an ordinary white. I prize my first aberration as I look on it as the start of my search for these lovely forms, and each year has found me more keen than ever in the pursuit. I could not understand my capture of a *corydon* without any spots, and I thought I had something extraordinary, but did not think of making further search that season, or I might have got more. I had, however, often seen collectors on the spot boxing insects, but could never find out what insect they were after. I noticed that when they came up to me they asked if I had taken anything good, and when I showed my captures they would carefully scrutinise them without comment. They did not show me any of their captured aberrations, otherwise my eyes would have been opened.

In August, 1895, I gave a little more attention to the species, but not so much as I do now. I find by my diary that I took three abs. all being ab. "*obsoleta*." During August, 1896, I took four more, all being ab. *obsoleta*, also one dwarf male, ab. "*Minor*," this being the first small *corydon* I ever captured. During August, 1897, I stayed at Folkestone and made occasional visits to Dover, not especially for *corydon*, but anything that might turn up. Of course, *P. corydon* was in abundance and six aberrations were taken, which I then considered was a very good bag. August, 1898, was like the previous season, six abs. were taken, all *Obsoleta*. During 1899 I paid more attention to the males and was much struck by the range of colour, the blue varying from whitish-silver-blue to almost a sky-blue, one of my captures coming very near to *adonis*. I was also struck by the deep marginal bands in some of the specimens, and began to realise for the first time that there was something more in *corydon*, than a mere blue butterfly. In all I took nine ab. *obsoleta*.

I well remember August, 1900, for I took some of my rarest forms, including a lovely female of a golden-colour, a most extraordinary capture which, when I first saw it I passed by, thinking it was *C.*

pamphilus: it came across my path again about an hour afterwards, and thinking its flight was more swift than *pamphilus*, I netted it. I have since seen others of this form in collections. Mr. J. A. Clark has two, I think, but their colour is not quite so bright as mine. I find this form is unnamed, and is a rare variety. I have not taken anything like it since, though I have one or two approaching it, but with the ground-colour more brown. I also took what I thought was a male, but with a dark border, and came to the conclusion it was a blue female, and within an hour afterwards I captured another. I began to think I was in for a brood of them, but I have examined hundreds since, and have not come across any more of this rare form which has been named ab. "*syngrapha*." Beside these two blue females I took six aberrations "*obsoleta*," which is certainly the commonest of the aberrations. It has always puzzled me how these aberrations occur in such numbers; I have tried to account for it in all sorts of ways, but am still ignorant. I thought perhaps that wet seasons had something to do with it, but a dry season produced almost as many, though I got more crippled aberrations during a wet August. There is always plenty of foodplant, so this has nothing to do with it. Almost every season, the heat sets fire to the long waving grass, which grows in these hollows over four feet high. I have often seen it burnt down to the roots, and wondered if the heat had any effect on the pupæ, as they must get a good scorching, and many must die. I have spent many hours in trying to beat out the flames. Not only does the sun do such mischief; sometimes picnic parties camp out here, and they also set fire to the grass and enjoy the fun of seeing it burn, whilst I burn with rage, and long for a man in blue to be near them, as there is a heavy penalty attached to such incendiarism. Of all the aberrations taken here, 90 per cent. are cripples, so it looks as if it may have something to do with the baking treatment; in nearly every underwing there is a round hole, some having one wing entirely destroyed. I have taken specimens with only three wings, the fourth wing being entirely absent; these were caught on the wing, and could hardly fly. The hindwings are usually attacked, which seems all the more remarkable, seeing that the forewings come in contact with the pupa-case. What is the real cause of this crippling, I have tried in vain to determine, but am still baffled. I have taken perfect aberrations without any signs of crippling, but they are few and far between.

Each year, some particular form or aberration would be more in evidence; in 1903, ab. *marginata* was fairly common; in 1904, it was almost absent, and in its place, var. *hispana* reigned, a form in which the broad black bands are almost absent, and are replaced by a row of conspicuous whitish marginal spots, five being taken without any bands at all, and ground-colour being a dirty looking blue.

In 1901, shotted females were fairly common; whilst in 1902, '03, and '04, I did not take so many as I did in this single season. In 1900, most of the females had a small dot in the centre of each wing, the shape of wings also being more square. During August 1902, ab. *minor* showed up in good numbers, and I was able to get a nice row for the cabinet; they say the cause of these dwarfed specimens is due to the foodplant becoming scarce, but this does not hold good at Dover, for this same year I took some unusually large specimens, and the

foodplant was abundant. When *corydon* (males) first emerge, and their wings are dry, their first flights are indeed very swift and straight, and would compare favourably with that of *hyale* or *edusa*. 'Tis a pretty sight to see nature's beautiful bit of electric blue flash by in the sun; they seem to have no purpose in view, but to see how far they can travel, trying their newly developed wings; this, however, does not last long, and the flowers soon begin to attract them. Towards the afternoon this power of flight seems to be forgotten, and attention is turned to flirting, courting and marriage.

By far the greatest number of aberrations are taken when they are at rest, and in a favoured corner, where *P. corydon* can catch the last rays of sun, they cluster together in little colonies, and can be counted by the dozen. The males usually rest head downwards on the grass, stem immediately under the flower, and are wonderfully protected; the females choose the dark grass, and many are also to be found resting on the undersides of the dried flower heads of the Knapweed, and are even better protected than the males. After a little while, the eye becomes accustomed to their habits of concealment, and by careful searching this way between four o'clock and seven, one can examine a great number without disturbing them. Even when carefully searching, the females are easily passed over, so you have to give extra careful attention to them.

I have series of *corydon* from various localities. In some places they are constant, and an aberration is reckoned a rarity; sheltered spots seem to produce the most varied forms. In those that come from Lewes the variation is very slight, whereas those taken from the downs behind Worthing are much more variable. Both Lewes males and females are dull—especially the females, which are of a dull brownish colour—they are also smaller in size, and there are exceptionally few aberrations taken here. Although Worthing is such a near neighbour, quite different forms of *P. corydon* are found there, and specimens are much richer, and of a darker hue. Of aberrations very few are taken, according to my friend, Mr. J. W. Chadwick, who has collected on these downs for the last five years; the only aberrations he has ever taken, are the ones with the spots united into a line at the base of the forewings (this being somewhat common, both in males and females), a few shotted females and an occasional bleached specimen—aberration *obsoleta* does not appear in his series at all. Possibly aberrations are to be got here, if properly worked for. The females are a rich velvety blackish brown, corresponding to the dark females of *icarus* (August brood), which occur here, and also *argiolus* (second brood), with very deep black banded females —deeper and richer in colour than any I have seen. The ground here is similar to Dover, falling back in sheltered hollows, and seems better adapted for *corydon*, producing fine specimens, both in colour and size.

Lewes ground is much more exposed and does not afford the larvæ such snug shelter as do the hollows, therefore we get a smaller race. *Corydon* from Hastings, Eastbourne, and Beachy Head, are similar to those from Lewes, and are all found in exposed positions; they swarm at these places but aberrations are rare. At Ventnor matters change considerably, the ground is very much the same as at Dover, and we find similar varieties and aberrations, although the type is slightly smaller. *Obsoleta* occurs freely and should be taken every year.

Inland we find *corydon* abundant in certain localities. At Clandon they swarm, but a variety or aberration is rarely met with. I have never seen or taken any aberrations here, but, I believe, one of our members (Mr. Grosvenor) took a male of a dull greyish colour; the ground is very open and exposed. At Reigate *corydon* is losing ground and is not nearly so abundant as a few years ago, and a variety or aberration is the exception. Nearer London, at Caterham and Croydon, it has almost disappeared; no doubt the nearest localities get so worked that the species has not a chance to hold its own. At Shoreham, in Kent, *P. corydon* is much more abundant, both males and females being well up to size; the females vary occasionally and are slightly more sprinkled with blue than those from any other locality near London, but aberrations are again conspicuous by their absence. In one inland locality, which is very little known, I believe, however, you can get all forms in one year, at least I have read so. This is Alton, in Hants. Mr. L. B. Prout has a couple of blue females from here, one of which is very fine in colouration, approaching very near *Adonis*. I have not yet discovered what sort of a place Alton is, but should think it was a very sheltered spot; it would be interesting to know whether it is hilly and sheltered or open and exposed country.

The varieties and aberations found in England are as follows:—

Males.

Uppersides.—*Corydon* (type).—Bright silvery-blue, with a distinct greenish tint.

Ab. *Marginata*.—With distinct broad black border to forewings, with only faint dots on hindwings. This is a very fine form, and looks lovely on the wing, and is usually larger than the type.

Var. *Hispana*.—Pale silvery-blue, with very pale outer margins to forewings, containing a row of conspicuous marginal spots edged with white-ish. This is a most dull and quaint var., but none the less interesting; it is called pale silvery-blue, but really this term is too good, it is more of a dull, dirty, white-washed blue. The marginal bands are almost absent (in some specimens entirely absent) and are replaced by a row of white-ish dots, the look of these dots giving another appearance altogether.

Ab. *Punctata*.—Bright silvery-blue with white-ish spotted margins; this is a very pretty form and is much more scarce. I have only taken a few specimens.

Ab. *Caeruleo-marginata*.—Silvery-blue, with broad, black, unspotted, marginal bands. This also is not a common aberration, and is absent some seasons.

Ab. *Suffusa*.—Is of a dark suffused hue. This is also a much coveted aberration and is scarce. It is hard to draw a line sometimes between this and ab. *marginata*, the only difference being that *marginata* nearly always shows a distinctly defined inside edge to the black band, and runs equally along the edge. This edge is sometimes partially suffused into the blue, but not enough to come under ab. *suffusa*. In true *suffusa* the bands are well suffused into the blue, sometimes half-way across the wings, and have no distinct margins.

Ab. *Minor*.—Small dwarf specimens. These occur in both sexes. I have taken them no larger than *Cupido minima*, but the usual size is about equal to an ordinary *Aegon*.

The following two vars., which I have taken, were not supposed to occur on our shores :—

Var. *Corydonius.*—Perhaps this is the most beautiful form of *corydon.* A lovely violet blue. I have only taken one. This comes very near to our *Adonis*, but is a trifle paler.

Var. *Caucasica.*—Ground-colour approaching sky-blue ; much larger than type. The largest specimen I ever captured measured $1\frac{5}{8}''$. In this variety the cilia are pure white. giving it a striking appearance.

FEMALES.

UPPERSIDES. — *Corydon.* — Dull blackish-brown with indistinct marginal spots.

Ab. *Aurantia.*—Dull blackish-brown with distinct marginal orange spots, edged internally, with paler.

Ab. *Semi-Aurantia.*—Dull blackish-brown with distinct marginal orange spots, with blue scales at base of wings.

Ab. *Albicincta.*—With discoidal spots edged with white and streaks of blue on hindwings. In this form the shape of the wings is much more square than in any other females ; it was very much in evidence during August, 1900.

Ab. *Semi-Syngrapha.*—With blue base (as far as discoidal spot) to the forewings, blue from the base to the outer margin of hindwings. This is a very pretty form, and met with in almost any locality where the species varies at all.

Ab. *Syngrapha.*—With wings entirely blue and marginal spots. This is an exquisite form, somewhat rare, and occurring mostly where the range of variation is greatest.

Ab. *Inaequalis.*—With blue streaks, sometimes varying on opposite wings of the same insect ; this is also taken more freely some years than others, usually when the shotted forms are more in evidence.

UNNAMED.—There are also two other female forms which do not appear to have been named. The first is that lovely golden brown form already mentioned, and the second a very pretty form in which the discoidal spot in the hindwing is blue, and with a row of blue dots above each of the orange spots on the margin. This is near to ab. *albicincta*, only the discoidal spots do not show on the forewings, and the ground-colour is much darker and richer.

Of course, many of these forms overlap, and it is very puzzling to know really where to put them. We get a form almost entirely black, another quite a warm brown, approaching the golden form ; others with small bleached patches, some with discoidal spots enlarged, one of which looks like a huge *Artaxerxes* ; but take them as a whole they work out remarkably well.

UNDERSIDES.—Again, there is a wonderful variation of colour from whitish to dark grey in the males, and greyish to dark ochreous or fuscous in the females ; sometimes a female with very light undersides approaching that of the male is found.

Corydon (Type).—Underside greyish in males, dark ochreous in females.

Ab. *Pallida.*—Underside white in males, pale ochreous in females.

Ab. *Striata.*—With spots on underside, more or less united into streaks.

Ab. *Obsoleta.*—With spots on underside tending strongly to obsolescence.

In my experience this is the commonest of all these aberrations, perhaps because I was fortunate in discovering the exact spots for them, nearly all my specimens being taken within a radius of 1,000 yards. They are not taken everywhere however; indeed, if you did a hard week's collecting in August, at Worthing, Lewes, Brighton, Eastbourne, Hastings, Beachy Head, or Clandon, you would think yourself very fortunate if you got half-a-dozen aberrations. I have taken males and females of *obsoleta* in copula, but am never able to get any ova, although I have placed them in the sun in a large breeding cage with plenty of the favourite flowers and foodplant. It would be very interesting to know if the progeny of these aberrations in nature would throw *obsoleta* forms. Of course the obsolescence varies from perfectly spotless forms (which are rare) to almost the typical underside, with only two or three spots absent. Some have one wing entirely spotless, whilst the other three are normal, many have lower wings spotless with upper wings normal, and *vice versâ*: in nearly every case these aberrations are asymmetrical. It is a rare occurrence to get an absolutely symetrical specimen. The deformity that this form suffers is very bad, some having a wing entirely gone, while others have only a small stump showing. I have taken them also with the wings fully developed, but with a large piece taken out of the forewing, as if a bird had pecked at it; three-fourths have the lower wings crumpled up with a small hole in the centre, but it is very curious that the forewing is rarely attacked.

I took a most remarkable specimen in August, 1898. At the time I took little notice of it, but since I have been working these forms up, I find I have got a very interesting specimen. The ground-colour is neither *corydon* or *adonis*, but the two washed into one and the shape of the wings is more like *adonis*; it was taken towards the end of the month, but *adonis* was not out. I have heard that hybrids have been taken in nature, Mr. J. W. Tutt's book also records one capture, and I wonder if I am fortunate enough to have secured this hybrid. I have on more than one occasion taken *corydon* and *adonis* in copulation on this very spot, but could never get any ova.

ORGYIA GONOSTIGMA.

(Read March 21st, 1905, by Rev. C. R. N. BURROWS.)

I feel that I ought, in the first place, to apologise for the alteration in the subject which I had promised to bring to your notice this evening. The real fact of the matter is that I have found my eyesight so much altered of late that I am unable to make use of the microscope for the minute drawings necessary for my promised paper on *H. strigata*, a species which would, to my mind, give very little matter for study, except upon the lines which I have tried to follow of late years. To some, perhaps, this may prove a matter of relief, but to me it is a great disappointment, and I cannot help hoping that I may yet be able to continue the examination of the young larvæ of the Emeralds, and perhaps complete what has been to me a matter of intense interest. However, *H. strigata* failing me, I felt sorry to disappoint the Secretaries after their energetic efforts to fill up the programme for the season, and therefore promised to offer a few notes upon a species which is of interest to most collectors, and which I have been fortunate enough to be in a position to study somewhat closely. *Orgyia gonostigma* came before me informally, within the first year of my residence at Brentwood (1884). I have not the date, but being out with my lantern one evening my eye fell upon a something which my mind recognised as a male specimen of this insect, while my common sense seemed to refuse consent, and I went on half wondering, half doubting. Of course I should have looked again, but I did not, so convinced was I that the mental impression was false. But some time later in the season I called in to see Thomas Eedle, who had been living in my former parish for a good many years, and who was, therefore, an old friend and entomological confidant. Said he, "Have you come across *gonostigma* yet?" No! I had not. "Oh! said he, "well! Brentwood is just the place I should expect to find it." This conversation set me thinking, and, of course, regretting. However, I waited my time and proved during the rest of my residence in those parts that the hint was really a confidential present of what appears to have been then a somewhat close secret. I suppose the Brentwood locality is no secret now, but whether or no, there is no reason against the publication, as the insect has been so scarce of late years that the hardest work seems to have been very ill paid to those who have tried to collect specimens.

The real point of my remarks to-night is, as I have been good naturedly charged with intending, the hope that I may elicit information as to the occurrence of what is generally considered an exceedingly local species. Is *O. gonostigma* as local and as rare as is commonly thought? There are a great many records of localities in magazines of late years, and I have gathered together such as I have been able.

Coventry.—Entom., 1874, p. 204, 226, 227.

Bexley.—Entom. Record, 1898, p. 277; 1899, p. 278.

Sherwood Forest.—Entom. Record, 1900, p. 250.

Wimbledon.—*Entom.*, 1874, p. 226, 227.
Entom. Annual, 1857, p. 114; 1865, p. 109.

Coombe Wood.—*Entom. Annual*, 1857, p. 114; 1865, p. 109.
Noel Humphries Moths, vol. i., p. 28.
Stainton, vol. i., p. 133.

Doncaster.—*Entom.*, 1874, p. 226-227.
Stainton, vol. i., p. 133.
Noel Humphries, vol. i., p. 28.

Tooting.—*Entom. Ann*,. 1866, p. 153.

Isle of Wight.—A most unsatisfactory record, *from egg* August 15th, ditto 152.

Epping.—*Noel Humphries*, vol. i., p. 28.
Stainton, vol. i., p. 153.

York.—*Entom.*, 1889, p. 106.

Wyre Forest.—*Entom.* 1896, p. 338; 1897, p. 327.

Ipswich.—Wood. Mera.

Meyrick gives Hants to Cornwall, Essex to Norfolk, Leicester to Stafford, York.

To this list one would be pleased to add. I have no doubt that Meyrick is more or less right, and one would wish to know more about the records which the grouping includes.

One thing is certain. The species has various centres so far as our present knowledge tells us. But I am myself inclined to think that it would be found in many other localities, if only its habits were better known.

I myself only know two of the localities specified, doubtless some of you know others. The Brentwood habitat is a large extent of scrub, oak, birch, etc., surrounded by woods. Some years ago a portion of this was destroyed by fire, but the range of species proves to have been too extensive to allow of extermination. The usual methods of capture are beating the larvæ, and "assembling" the males. Both methods are uncertain, unless the insect be much more abundant than it has been of late years. During the years of my residence at Brentwood, I could always be sure of finding specimens, and I have been inclined to think that under like favourable conditions I could find them now.

I had an opportunity, thanks to Mr. Bacot, of trying to assemble the insect in its Ipswich locality in, I think, 1890, but without any success. The females had come to me by post, and were nearly if not quite dead, which perhaps accounts for my failure.

The tabulation of dates presents some difficulties, on account of the intrusion of artificial data amongst natural. Perhaps, however, if I arrange the conditions separately, I may make the points clearer.

	Larvæ taken wild.	Pupate.	Emerge.	Netted.	"Sembled."	Ova hatched.	Larvæ taken.
1885	10th June	—	5th July	—	5th July	—	—
1886	—	—	5th July (a pair 1st July)	3rd-6th July	5th July	—	21st August
1887	29th May to 13th June	11th June	28th June to 10th July	—	10th July	18th July	—
1888	—	—	15th June to 5th July	—	—	—	—
1889	—	—	26th June	—	—	—	5th Sept.
1890	19th May to 3rd June (1 pupa)	—	26th June to 4th July	—	27th June (18) to 4th July	27th July	—
1893	23rd May	4th June	14th June	—	19th June	27th June	—
1896	—	—	—	—	17th June to 22nd June	2nd July	—
1897	1st June (1)	—	—	—	—	—	—
1902	9th June (2)	—	—	—	—	—	—
1903	6th June (2)*	—	—	—	—	—	—

* Excursion to Brentwood by City of London Entomological Society.

It will be seen from this table that the earliest date on which I have found the hybernated larva wild is May 23rd, and the latest June 13th. For assembling the males, my earliest date seems to be June 14th, and the latest July 10th. The divergence of dates appears to result from the season and the state of the weather.

The artificial rearing of the insect carries on the life-history and habits a little further. In captivity I find the hybernated larvæ moving as early as February 5th, 1894, of course indoors, in 1887 and and 1891 they did not move until April 30th. In 1893 I reared a second brood from August 25th-28th, in 1895 from 6th September, and in 1896 from August 14th-September 3rd. The 1893 brood was carried one stage further, for I find ova hatching September 15th-20th, I think I am right in saying that these larvæ did not survive the winter, the brood which I record as waking up, February, 1894, being the laggards from the former year. I believe Mr. Bacot has succeeded in bringing through a third brood, although I failed.

It appears to me, from these observations, that *O. gonostigma* really, under favourable conditions, tends to become continuously brooded. There seems to be no tendency to lag at any stage but the larval, and the hesitation at this point is very easily overcome by care.

The food plants are very numerous. I have found it on oak and birch. It is very fond of rose and sallow, upon which latter plant the older entomologists reckoned they could best secure a second brood. Probably they were correct, at any rate, sallow offers a convenient and succulent pabulum for the young larvæ. I am very much inclined to think the hybernating stage in this species is a fixed one. There is a marked difference between those larvæ which run away and those which elect to abide the (in this country) more natural course. One very noticeable point about this species is the invariable habit of changing skin before eating in the spring. I have no doubt that these things are better known to Mr. Bacot than to myself, and I hope he will set me right if I am not correct.

I have, in old times, found the full-fed larvæ feeding *exposed*. It is very conspicuous when revelling in the bright sunlight, and I remember one day, when I had been pulled up by an enquiring gamekeeper, after telling him what I was after, suddenly dropping my eye upon a lovely larva, and being able to point out to the man that *that* was *my* game ; he knew enough of me to believe my statement.

I have twice found the cocoon in nature, once with a pupa enclosed, and once with a pair of imagines. The facts concerning this latter experience have been recorded by Dr. Chapman in his notes on the genus. I will simply mention, for the assistance of those who have not read his paper, that the full fed larva of *O. gonostigma* differs in its habit from *O. antiqua*, and I think most of the other species, in that it constructs a double cocoon with a loosely connected bunch of leaves. The inner cocoon is closely wrought of dirty white silk, but is full of holes of various sizes, while the innermost is very like that of *O. antiqua* and *O. leucostigma*, the only species known to me. The female emerges from her sanctum, and, at least in the instance which I found, the male enlarges one of the entrances, and meets his mate within. This was the state of things which I observed. Of course in captivity, the conditions being so different, we find the larvæ dispensing with the

outer bunch of leaves, and the cocoons are so huddled together that natural conditions are impossible.

I have only once or twice found assembling really successful. If I must fix upon a lucky year, I should point to 1890. I am afraid that the records in my diary are very incomplete, inasmuch as the numbers of my captures are not always recorded, and on this account I feel justified in adding the year 1887, when I found more larvæ than usual, and the insect was therefore more than usually abundant. Generally speaking, and this not only in late years, one does not see many males. Over and over again I have been out and seen at most one, often I have not seen even one. So much depends upon the weather, and the insect appears to be exceedingly nervous, darting away directly efforts are made to capture him. I suppose it is the same with other species, but being often so scarce it is more noticeable here.

We come now to the question whether *O. gonostigma* is really more scarce, and if so what is the reason? I think we must all admit the insect is at present in considerable demand. This proves that the supply is limited. And this, remembering the large number of eggs laid by a single female, seems at least strange. As far as I know, the Brentwood locality is, at least at present, unable to provide for our wants. I don't in the least know how it is in the other places. Possibly some of our members may be able to tell us. One recognises the fact that species with apterous females, too large for the males to carry, must have the greatest difficulty in increasing their radius. But how general some of these species are. Think of most of the Hybernias, the Psychids and *Orgyia antiqua!* I have no doubt that the fire at Brentwood in the early "90's" destroyed great numbers of the insect, but it exists, as I have proved, in the parts where no fire came. It would be interesting to find out how long it will be before it is found again within the burnt region!

I am myself greatly inclined to ascribe the scarcity to the late succession of mild winters. The larva I have shown can be easily persuaded to avoid hybernation. Consider its condition when it finds itself confronted by a winter too warm to allow it to remain asleep. Insomnia in the human subject is bad and may lead to serious results, but I fancy that with our insect it may, or even must, end in death. For our larva, after trying to get to sleep, after a nod or two, wakes up. He has been dreaming, perhaps, of the past season, perhaps thinking of the coming spring. He feeels the warmth, he takes the decisive step, casts his skin, and then comes a frost, and a succession of damp cold. There is no food, he cannot eat the coarse bramble leaves which still adorn the bushes. I don't think he cares for low growth. There is nothing left but death for him.

Where do the larvæ hybernate? In confinement they generally spin up to the side of the box in which they are living, but often to the stems of their foodplants or within the curled and withered leaves. The only observation as to their habit in nature, which I have found, is the note in the *Record* last year (*Entom. Record*, 1904, p. 241), by Mr. Whittle, who brought home a larva, almost certainly hidden in an oak apple. There appears to be no other explanation possible of its appearance in his breeding-cage.

The last point I want to make is this. Why is *O. gonostigma* so local? Is it because we don't look for it? That was my initial mis-

take in 1884. Many of us will do a lot of collecting this spring. We must remember that this species hibernates in the larval state while *O. antiqua* does so in the oval. Now I am inclined to think that we may sometimes pass over larvæ of *O. gonostigma* without remembering this fact. I am not prepared to say at which exact point the two species are about as larvæ together, but, if ever, then the rarer larva must be vastly larger than the commoner. In fact one can hardly fancy that they could ever be confused. One never knows. Impulse is accountable for many strange mistakes, even in the best regulated entomological minds, and it is possibly responsible for the rarity of *O. gonostigma*. How many individuals have escaped an early death in this way one can never know. The lateral brushes of the larva of *O. antiqua* and the absence of these from that of *O. gonostigma*, are generally accepted as the most marked points by which they may be distinguished, but Dr. Chapman has quite lately pointed out, *Entom. Record*, 1904, pp. 271, 328, that there may be a race of the common species which lacks these distinguishing marks. However that may be, the brushes are so delicate, and their removal by accident so easy, that one feels that they are after all but small helps to identification. However that may be, again we shall be in the safer position if we imprison all the larvæ without these brushes. I have never heard that *O. gonostigma* develops them.

As to likely localities, I can only speak of that which I know best. About Coventry I have heard that the larvæ are taken from the roadside hedges. I have never been to Wimbledon Common. But speaking of the Brentwood locality, I have mentioned that it consists of scrub. *O. gonostigma* does not appear to be a tree feeding species, and I should think that the most likely places to find it would be open places near woods (or not) where there is plenty of scrubby growth of oak, birch, etc. I hope that these notes may induce our members who have the opportunity, to search likely localities, and that our "*Proceedings*" may be enriched this year by some notes which will enlarge the range of the species.

I may perhaps be allowed to close my remarks with one suggestion without causing offence. If any member be so fortunate as to rear a female, and uses her for "sembling" purposes, please leave her comfortably placed upon a bush before you return home. I always tried to do this. The female does not vary, and one or two specimens are enough for any collection. It seems a duty, unless we really want to continue the race in captivity, to do what we can to save the species from extinction. One cannot regulate the seasons, but can hope to enjoy the comfortable reflection that one has not taken the last specimen.

I may perhaps be allowed to add that, since reading this paper, Haslemere, Surrey, has been added to my list of localities, also Barton Broad, by Mr. Bacot, and Horning, by the Rev. A. Moss (*Entom. Record*, vol. xvii., p. 225). It is most interesting also to note that the insect has returned to the burnt part of the Brentwood locality, and that both larvæ and imagines were captured there during the early summer (*Entom. Record*, vol. xvii., p. 299).

FURTHER NOTES ON "ANGERONA PRUNARIA."*

(Read March 15th, 1904, Mr. C. P PICKETT, F.E.S.)

Following on my paper on *Angerona prunaria*, read before this Society on March 3rd, 1903, I now report on eight broods bred during June, 1903. The larvæ of six broods were hibernated outdoors, the other two broods being kept in a greenhouse. The latter kept well throughout the winter, there being no mortality, were much larger, and looked healthier than the larvæ of the other six broods. The cold weather of February, 1903, killed off many outdoor larvæ; the sleeves were often white with frost, the larvæ being in a kind of refrigerator. The two greenhouse broods started feeding at the beginning of April, while the six outdoor broods did not start till the middle of April, this being two weeks later than usual, doubtless on account of the bad weather. They were then placed on fresh privet bushes. The broods at this stage were as follows:—

Brood.	1	2	3	4	5	6	7	8
Larvæ.	150	200	200	160	150	150	140	120

Brood one larvæ were nearly all killed off by a nest of earwings in their earlier stages, leaving only 17 to go through hibernation. Prior to hibernation, the numbers in each brood were as follows:—

Brood.	1	2	3	4	5	6	7	8
Larvæ.	17	84	200	53	150	25	73	51

Thus about one-third of the larvæ sleeved outdoors died during the winter, while all those kept in the greenhouse, *viz.*, broods 3 and 5, survived.

Of these 653 larvæ some 170 were given away to friends with a request to let me know the results, but I have not yet received any news. The remaining larvæ fed up well and pupated from May 12th onwards till the end of the month. One larva was most peculiar in its habits. It came out of hybernation April, 1903, changed its skin and fed up very slowly; when about half fed it seemed to get no bigger, ate nothing during cold weather, and rested head uppermost, but on warm days would nibble a little. It went into second year's hybernation at the beginning of September, 1903, this time resting head downwards. Looking in the cage on October 21st, I found it had fallen and was dead; thus it was in the larval stage for sixteen months.

My first *A. prunaria* to emerge was on June 3rd, and they continued coming out throughout the month. During June we had some most extraordinary weather, that reminded one of the days of Noah and his invincible boat. June 4th, six emerged, June 5th, 6th and 7th, were extremely hot, and *Prunaria* emerged with a rush, some 200 coming out during this time. June 8th and 9th were not so hot, and I only had to set some 40 imagines. June 10th was wet, and only twelve

* Omitted from Volume for 1904.

emerged. June 11th it rained and turned much colder, only 5 emerging. June 12th to 14th were very cold, and only a few emerged. On the 14th I found a pair of *Prunaria* in copulâ. On the 15th, it rained all day and only one female emerged, which paired the same evening with the same male that came out on 14th. It is not at all an uncommon thing for *Prunaria* to pair a second time. I have seen several such pairings during my acquaintance with *Prunaria*, but in each instance (except the present) the ova of the second pairing have proved infertile. On the other hand I have had five pairings this year (1903) resulting in infertile ova, although copulation in every case lasted from 12 to 24 hours, and the normal number of eggs were laid. Probably their being the fifth years inbred stock had something to do with it, although the moths paired were amongst the largest I have every bred, and larger than the ordinary type. The 23rd, although cold, was a brilliant sunny day, the first sunshine after thirteen days of rain, during the last eight of which nothing emerged. After this *Prunaria* came out freely till the end of the month. In all 437 imagines emerged, as follows :—

Brood 1.—13 emerged, 8 ♂ s, usual orange type, 5 ♀ s, usual yellow type. Parents, orange ♂ × yellow ♀ .

Brood 2.—55 emerged, 19 ♂ s orange and 26 ♂ s banded, 3 ♀ s yellow and 7 ♀ s banded. Parents, orange ♂ × banded ♀ .

Brood 3.—147 emerged, 60 ♂ s orange and 51 ♂ s banded, 21 ♀ s yellow and 15 ♀ s banded. Parents, banded ♂ × yellow ♀ .

Brood 4.—35 emerged, 26 ♂ s banded, 9 ♀ s banded. Parents, banded ♂ × banded ♀ .

Brood 5.—93 emerged, 70 ♂ s banded, 23 ♀ s banded. Parents, dark banded ♂ × dark banded ♀ .

Brood 6.—18 emerged, 13 ♂ s banded, 5 ♀ s banded. Parents, light banded ♂ × light banded ♀ .

Brood 7.—42 emerged, 31 ♂ s banded, 11 ♀ s banded. Parents, dark banded ♂ × light banded ♀ .

Brood 8.—34 emerged, 24 ♂ s banded, 10 ♀ s banded. Parents, light banded ♂ × dark banded ♀ .

Total.—437 emerged, 328 ♂ s, 109 ♀ s.

In connection with these broods the following points may be noted :—

Brood 1 includes a male with a cross in the centre of each wing, giving it a striking appearance, also a female approaching very near to this. Brood 2, two dwarf banded males, one with hindwings bleached a light unicolorous brown, the other with bleached hindwings of a unicolorous dirty-brown. Brood 4 produced the only female of the new ab. *Pickettaria*. I kept it a long time waiting for a male *Pickettaria* to emerge, but did not get one in time. Brood 5, one female showed an attempt to throw back to the usual yellow form, on the right hand forewing the deep chocolate band is suffused and broken, showing the yellow markings crossing the band. Brood 6, one male is worth notice ; it approached the curious female of brood 5, with the chocolate band suffused with yellow on the right forewing This male has both the hindwings suffused in the same way, and the chocolate bands are broken up and are mixed with the orange. Brood 7, the only male ab. *Pickettaria* came out in this brood.

From the various broods I paired the following :—

1.—	Orange	♂	×		Yellow	♀.
2.—	,,	♂	×		banded	♀.
3.—	Banded	♂	×		yellow	♀.
4.—	,,	♂	×		banded	♀.
5.—	Dark ,,	♂	×	dark	,,	♀.
6.—	Light ,,	♂	×	light	,,	♀.
7.—	Banded	♂	×		banded	♀.
8.—	Same male		×		yellow	♀.

The larvæ of these broods hatched within two weeks; when young they move about quickly, and are a delicate apple-green with a dark line running down the sides. When about four to eight weeks old they hang motionless in the air, two or three inches from the foodplant, remaining in this position for two or three hours at a stretch, usually about an hour after dark; directly it is dark they start feeding for about an hour, and after this comes this aerial flight. I have watched and tried to find out the reason; the same thing occurs with *S. abruptaria*, *H. syringaria*, *L. hirtaria*, and several "thorns." I put many *prunaria* larvæ out in my garden on different privet bushes. I found they all left the leaves during the day, crawled down towards the base of the bush and got between the forks of the stems. At nightfall they would ascend and feed for about an hour, then lower themselves down some three inches, hanging motionless in the air. I found they timed this suspension very well indeed, for after then, I found a host of small creatures—earwigs, spiders, beetles, etc., all of which prey on these young larvæ, came up the stems for food, but when they found there was nothing to be had they shifted to other quarters. I saw several earwigs seize the young larvæ; also a spider tried to descend the thread of a suspended larva, but it found it could not, so I placed the larva on a leaf and watched it. The spider soon discovered its prize, but did not make a dash for it as some spiders do; it walked round it a few times, and on closer examination I found it was spinning a web over it. Then the larva began to plunge about, but found it could not release itself, and soon became exhausted, when the spider seized him and made a pleasant meal, after which *I* finished *him*. I found some spiders left their meal till next day, the larvæ then being almost dead, and much easier to tackle.

All larvæ went into hybernation at the beginning of September, 1903, and were examined from time to time, taking strict precautions not to let any earwigs get into the sleeves. Onwards to March of this year the weather has been one long spell of wet and cold. Almost every night during February, 1904, we had a severe frost, which made the sleeves quite stiff and white. A glance into one of the sleeves to-day, March 12th, 1904, leads me to expect plenty of dead larvæ; during the next two weeks they will all be shifted to fresh plants. I hope to let you know later in the season the results in 1904.

LIST OF DESIDERATA FOR THE SOCIETY'S CABINET.

LEPIDOPTERA.

P. Daplidice
A. Lathonia
P. C-album
E. Antiopa
P. Iris
N. Semiargus
L. Arion
D. Galii
D. Lineata
C. Celerio
D. Nerii
H. Tityus (Bombyliformis)
Æ. Myopæformis
Æ. Formiciformis
Æ. Asiliformis
Æ. Ichneumoniformis
Æ. Cynipiformis
Æ. Allantiformis
Æ. Sphegiformis
Æ. Scoliæformis
Æ. Chrysidiformis
T. Bembeciformis
M. Castaneæ
H. Asellus
Z. Exulans
L. Pygmæola
E. Striata (Grammica)
E. Cribrum
B. Pulchella
O. Fascelina
L. Cœnosa
T. Cratægi
M. Castrensis
G. Ilicifolia
P. Harpagula
C. Bifida
G. Crenata
N. Tritophus
N. Bicolor
D. Dodonea
B. Fluctuosa
B. Duplaris
B. Ocularis

J. Algæ
T. Tridens
A. Strigosa
A. Auricoma
A. Menyanthidis
S. Musculosa
H. Vitellina
H. Obsoleta
H. L-album
S. Maritima
N. Neurica
N. Concolor
N. Cannæ
X. Conspicillaris
L. Exigua
P. Leucophæa
A. Corticea
A. Cinerea
A. Aquilina
A. Præcox
A. Obscura
T. Subsequa
A. Depuncta
A. Subrosea
A. Sobrina
P. Hyperborea
P. Leucographa
G. Populeti
G. Erythrocephala
D. Rubiginea
J. Croceago
I. Retusa
C. Pyralina
V. Olcagina
M. Satura
M. Exulis
M. Peregrina
T. Atriplicis
C. Polyodon (Perspicillaris)
L. Semibrunnea
L. Socia

C. Scrophulariae
C. Lychnitis
C. Asteris
C. Gnaphalii
C. Absinthii
C. Chamomillæ
H. Armigera
A. Cordigera
E. Ostrina
B. Notha
P. Chryson
P. Moneta
P. Interrogationis
P. Bractea
S. Anomala
C. Fraxini
N. Lunaris
E. Erosaria
D. Obfuscata
M. Cineraria
P. Fuliginaria
T. Papilionaria
C. Orbicularia
L. Contiguaria
A. Circellata
P. Straminata
R. Sacraria
E. Filigrammaria
P. Affinitata
P. Alchemillata
P. Tæniata
C. Sparsata
L. Halterata
T. Cognata (Simulata)
H. Ruberata
A. Cuculata
A. Derivata
P. Fluviata
C. Lapidata
C. Polygrammata
E. Silaceata
L. Prunata

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