









S. 170.

TRANSACTIONS

OF THE

CITY OF LONDON

Entomological & Natural History

SOCIETY

FOR THE YEAR 1899.



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CITY OF LONDON ENTOMOLOGICAL SOCIETY,  
THE LONDON INSTITUTION, FINSBURY CIRCUS, E.C.

CITY OF LONDON

# Entomological & Natural History SOCIETY.

ESTABLISHED 1858.

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MEETINGS HELD AT

## THE LONDON INSTITUTION

FINSBURY CIRCUS, E.C.,

*On the 1st and 3rd Tuesdays in each month.*

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### Council for the Year 1900.

President..	..	..	..	L. B. PROUT, F.E.S.
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Hon. Secretaries	..	..	{	W. J. KAYE, F.E.S., Worcester Court, Worcester Park, Surrey. S. J. BELL, 17, Wiltshire Road, Brixton, S.W.

AND

A. BACOT, E. M. DADD, E. HEASLER, H. H. MAY, H. A. SAUZE.

# TRANSACTIONS

OF THE

## City of London Entomological

AND

## Natural History Society,

PART IX.

(1898-9.)



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REPORTS OF MEETINGS.

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

1900.

## REPORTS OF MEETINGS.

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Dec. 20th, 1898.—POCKET BOX EXHIBITION.—Mr. J. A. Clark exhibited *Miana arcuosa* from Abbott's Wood, *Carabus nitens* from the New Forest, and *Astynomus acclilis* from Scotland. Mr. E. M. Dadd bred specimens of *Deilephila galii*, *Catocala nupta*, *C. electa* and *C. clolata*, also captured specimens of *Anthrocera trifolii* of the *palustris* form from Sandown, Isle of Wight. Mr. J. W. Tutt, for Mr. Harwood, eight specimens of *Anthrocera filipendulae* of the intermediate forms between the type and the var. *flava*. Mr. Donisthorpe a coleopterous monstrosity of *Pterostichus gracilis* which had three distinct tarsi on the right hind leg. The specimen was taken in Dorsetshire.

SANDOWN INSECTS.—Mr. H. H. May, two *Triphaena orbona* (*subsequa*), seven aberrations of *Agrotis exclamatoris* in which the orbicular and reniform stigmata were joined with varying amount of suffusion. In one the two spots were distinct but very small; also specimens of *Trochilium crabroniforme* from larvae raised on poplar trunks instead of the usual osier twigs.

SANDOWN AGROTIDS, ETC.—Mr. S. J. Bell, good series of *Agrotis corticea* and *A. lunigera*, together with *Macroglossa stellatarum*, eggs of the latter being found on *Galium verum*.

DASYCAMPA RUBIGINEA.—Dr. T. A. Chapman bred specimens of this species from Devonshire, Germany and Carinthia for comparison.

EXODIA HYPERANTHUS.—Cumberland specimens shown by Mr. A. F. Bayne. The undersides were unusually pale.

NOCTUA AUGUR BRED.—Mr. J. Riches, two specimens reared from Hampstead Heath larvae.

CAMPTOGRAMMA BILINEATA VARS., ETC.—Dr. J. S. Sequeira exhibited a long and varied series of *C. bilineata* from the New Forest, which included some fine dark banded forms. Mr. A. W. Mera showed several *Spilosoma lubricipeda* var. *radiata*. Mr. C. Oldham, series of *Hydroleucia nictitans* and *Agrotis puta* taken at sugar in Epping Forest, also a ♀ specimen of *Polyommatus icarus* of a drab colour from Folkestone in October.

EXOTIC LEPIDOPTERA.—Mr. A. Bacot, on behalf of Mr. A. Quail, specimens from Ceylon, of *Junonia laomedea*, *Acrava violae*, *Ypthima ceylonicus*, *Catopsilia pyranthe*, *Terias suava* and *Ereces parrhasius*, and from Australia *Heteronygpha merope*.

MELANIPPE ABERRATIONS.—Mr. L. B. Prout, a drawer of *Melanippes* with many aberrations; a variable series of *Leucania albipuncta* from Sandown, *L. putrescens* from Torquay, and two *L. vitellina* from Sandown. Several forms of *Gnophos obscuraria* including a sandy variety from Torquay.

HYDRILLA PALUSTRIS AND OTHER LEPIDOPTERA.—Mr. Hodges sent for exhibition two *Pachetra leucophaea*, four *Hydrilla palustris* from Wicken. *Camptogramma gluciata*, *Leucania vitellina* and *Laphygma cingia* from S. Devon, and a dark *Leucania albipuncta* from Isle of Wight. Mr. Christy forwarded for exhibition a series of *Oporabia autumnata* from Rannoch.



HEMIPTERA-HETEROPTERA.—Mr. F. B. Jennings exhibited *Nepa cinerea*, *Aphanus pini* found under ling in Epping Forest, *Eysarcoris melanocephalus* from Chiddingfold, *Pyrrhocoris apterus* from Oreston Rock, Devon, per Mr. G. C. Bignell, also *Gonocerus renator* from Box Hill, the only known British locality.

EXOTIC LEPIDOPTERA.—Mr. A. Heyne, a visitor, exhibited a large number of exotic and continental lepidoptera, including: *Apatura ilia* ab. *assasioides*, *Vanessa io* abs. *fischeri*, *antigone*, and *bellisaria*, *Aglaia urticae* abs. *ichnusoides* and *nigrita*, *Pyrameis atalanta* ab. *klymeni*, *Eugonia polychloros* ab. *testudo*. *Lophopteryx siccersi* from Dorpat, Russia. *Aphnacus hutchinsonii* from Natal. *Smerinthus austanti* and *S. atlanticus* from Algeria. Mr. H. S. Woolley, cases of American lepidoptera, including *Innomia coenia*, *Aglaia milberti*, the American representative of *urticae*, *Amphion nesusus*, *Thyreus abbottii*, *Hyperchiria io*, and many species of *Catocala*, including *cara*, *ridua*, *ilia*, *obscura*, and *antinympa*.

Jan. 3rd, 1899.—Mr. W. J. Kaye, F.E.S., of Worcester Court, Worcester Park, Surrey, was elected a member.

CATOCALA ELOCATA.—Dr. J. S. Sequeira, a specimen of *C. elocata* which had been recognised by Mr. E. M. Dadd, in Dr. Sequeira's series of British *C. nupta*. The Doctor said he had no doubt that the specimen was set by himself, and that the insect was taken unawares in these Islands. This would be the first record of the species in Britain.

COLEOPTERA FROM EPPING FOREST.—Mr. F. B. Jennings exhibited three *Anchomenus angusticollis* (*juvencus*) from Epping Forest, which had been found hibernating. The beetle was new to the district.

NORTH AMERICAN LEPIDOPTERA.—Mr. H. S. Woolley showed three drawers of Rhopalocera taken in the neighbourhood of New York including, *Papilio monus*, *P. troilus*, *P. asterias*, *P. ajar* and *P. philenor* all in series. *Satyrus alope* and var. *nephele*, *Neonympha canthus*, *N. erythrus*, *Limnitis arthemis*, *Endanms tityrus*, *Polygonia interrogationis*, with its var. *umbrosa*, *Thecla crysalus*, *Cyaniris pseudargiolus*, with its var. *lucia* and *Anthocaris gentia*.

SANDOWN AGROTIDS.—Mr. H. H. May, a fine series of *Agrotis corticea* and *A. lunigera* from Sandown, also a bred specimen of *Aplecta tineta* from Wimbledon.

COAST INSECTS.—Dr. T. A. Chapman in starting a discussion on "Coast Insects," sought an answer to the question "Why are lepidoptera of certain species confined to our coasts in England, which on the continent occur inland?" If not occurring in a given locality, insects must either be unable to reach it, or the locality must be unsuitable in some way. In considering why our coasts are more suitable for some species, there were many views which might be taken. The air is pure—certain food-plants are found round the coast, not occurring inland—the air is drier—it is less cloudy, resulting in more sunshine than enjoyed inland—climate differs at sea-coast, there being an increase of temperature in winter, and a decrease in summer, and a milder winter does not perhaps demand the quiescence of hibernation. The fixed life-history of a given insect, may conflict with conditions of temperature inland. In the matter of hibernation, the habits of insects are divergent. In some cases hibernation appears to be a

habit which must be indulged in at all hazards. Some insects commence hibernating, but re-emerge from their winter quarters at the least incentive. Others give an impression that they must hibernate, but do not want to. Cultivation may, and does destroy habitats in inland localities, while at our sea-coasts the ground often presents steep slopes affording special protection. In seeking a cause of lepidoptera appearing only on our coasts, species must be treated individually. The habit of the larva feeding during the winter may account for this restriction of *Aporophyla australis*, *Heliophobus hispidus* and *Leucania albipuncta*. A mild winter is essential to *L. putrescens*. Sunshine is necessary for the day-flying *Melitaea cinxia* and *Thymelicus actaeon*. Nature of the soil may account for suitability of locality of *Nyssia zonaria*. In the cases of *Phorodesma smaragdaria*, *Acidalia immutata*, *Eupithecia castrensis*, it may be a question of food-plant. The following species were also considered—*Dianthobocia albimacula*, *Heliopsis peltigera*, *Agrotis lunigera*, *Xylophasia sublustris*, *Rhagades globulariac*, *Emydia cribrum*, *Callimorpha hera*, *Deilephila galii*, *Argynnis latona*, *Epunda lichenea*, *Malacosoma castrensis* and *Pachygastris trifolii*, and immigrants *Colias edusa*, *Pyramis cardui* and *Euvanessa antiopa*. Mr. Bacot wondered whether there were other causes still, for the greater abundance of insects at coast localities, generally attested by the better productivity of "sugaring." Could the sea-birds keep off insectivorous birds of smaller size, and cause an absence of enemies of lepidoptera? Is it probable that the strong winds often prevalent keep down hymenopterous parasites? He thought there was an absence of honeydew at coast localities, and the purity of the air might benefit species such as *Malacosoma castrensis* and *Pachygastris trifolii*, which he had found difficult to rear, they being in his experience liable to a diarrhoea disorder. *M. castrensis* requires sunlight. One cause, however, will not account for all. Temperature is a factor, but not so in many cases, amongst which he put *Phorodesma smaragdaria*. He moved a vote of thanks to Dr. Chapman. Mr. Clark considered that the scarcity of *P. smaragdaria* was owing to the hardships of its locality, a bleak coast, often under water, while at other times its food-plant, *Artemisia maritima*, was dried and caked with mud. It hibernates on the plant in winter, looking like a dried-up piece of the plant. In spring it fixes on its body new pieces of fresh plant. Mr. Prout said that in sheltered spots *Colias edusa* occurred year after year. Dr. Chapman thought it a question of frost. If the frost is severe, the brood is killed off in these islands, and the country must be replenished with fresh immigrants. *Deilephila galii* is an immigrant—the caterpillar will feed up and pupate here, but the imago emerges too late to persist. Mr. Dadd seconded the vote of thanks, which was carried.

Jan. 17th, 1899.—Mr. J. A. Clark exhibited *Peronea umbrana* and *P. cristana*, from the New Forest, in great variety.

DIPTERON ON SLOE.—Mr. F. B. Jennings, a fly *Pipiza noctiluca*, taken in Epping Forest, on sloe.

AGROTIS CINEREA.—Mr. A. F. Bayne exhibited two specimens of this species, one being very large, taken at Tring, on the chalk. A dark specimen of *Thera variata* was also shown.

TRINIDAD LEPIDOPTERA.—Mr. W. J. Kaye, five boxes of Trinidad Rhopalocera, taken by himself, showing many Hesperids in great

variety. Many of the insects were species new to science, and were awaiting description. The named species included *Pierella dracontis*, *Tithorea flavescens* (megara), *Danaüs gilippus*, *Lycorea aterygatis*, *Ithomia pellucida*, *Eucides isabellae*, *Zeonea chorinnaeus*, *Siderone ide*, *S. isidora*, *Eurema gratiose*, *Morpho peludes*, *Caligo iloneus*, *Eryphanis automedon*, *Erenus nobilis* and *Tmolus demonassa*.

PUBLICATION OF PAPERS.—The question as to the desirability of definitely forming a publication fund was raised for discussion. In the present state of the Society's finances it was thought desirable to keep such a fund quite distinct from the ordinary income of the Society. The President remarked that the main object of the Society should be to record its proceedings. Letters were read from Messrs. Tutt, Donisthorpe, and Dr. Chapman, regretting their absence, and saying that in their opinion the publication of papers is one of the most important things that a society exists for, and that they would support a fund if started.—Mr. Clark thought that if the papers read before the Society were of use they should be reported by the Society, and not go into other journals.—Mr. Kaye thought that it would be as well to get some papers into the *Entomologist's Record* if the Society were not able to publish everything themselves.—Mr. Nicholson drew attention to the fact that the London Fauna Lists had been drawn up by members of the Society on the understanding that they would be published, and nothing had yet been done towards that end.—Mr. Prout said that no doubt if these lists were published there would be a demand for copies by people who were not members of the Society. The lists would require bringing up to date. Mr. Heasler had promised to do this with the Coleoptera, Mr. Clark would take the birds, while Mr. Prout was willing to take the list of the Lepidoptera in hand.—Mr. Clark, seconded by Mr. Garland, proposed that a special publication fund be started forthwith. Carried.—Mr. Kaye, seconded by Mr. Riches, proposed that the meeting should recommend to the Publication Committee that whatever is decided to be published should include some of the papers read before the Society. Carried.—Mr. Bayne, seconded by Mr. Bacot, moved, as a second recommendation to the Publishing Committee, that no matter be published in the *Transactions* which has been published elsewhere.—Mr. Tremayne, seconded by Mr. Bacot, moved "That the Secretaries be requested to write all members that the Society have decided to publish our *Transactions* by a voluntary subscription on the terms of the resolution of April 19th." Carried.—Mr. Bacot, seconded by Mr. Kaye, proposed that "Those who subscribe shall have a vote in the formation of a Publication Committee, who shall decide what is to be published, and that only subscribers shall be eligible for the Publication Committee."—Mr. Tremayne, seconded by Mr. Nicholson, moved as an amendment, "That the President be instructed to appoint a Publication Committee from among the subscribers." The amendment was carried with one dissentient.

Feb. 7th, 1899.—NEW YORK LEPIDOPTERA.—Mr. Woolley showed a box of lepidoptera from New York, and remarked upon a species that appeared to be a *Catocala*, as having both the fore- and hind-wings protectively coloured. Mr. Dadd pointed out that he knew of no *Catocala* that had more than two bands on the underside, and that the insect must be referable to another genus.

MIANA STRIGILIS.—Mr. May exhibited a short series of this species of an unicolorous dark brown, from Sandown. The specimens were quite distinct from the form *aethiops* of the London district.

HAWTHORN IN LEAF.—Mr. Jennings remarked that he had seen a hawthorn in leaf at Edmonton already, it being the first week in February.

MOLLUSCA.—Mr. Jennings read an interesting paper on "Mollusca." Mr. Bacot, in proposing a vote of thanks, made some interesting remarks about pearls. Mr. H. H. May asked how long Mollusca were in coming to maturity, and how long they lived. Mr. H. Heasler inquired how the colouring matter of the shells was formed. Mr. Donisthorpe called attention to the fact that *Lampyris noctiluca*, *Drilus glavescens* and *Phosphænus hemipterus* fed on certain species of snails, the females of the two latter being about the rarest of British beetles. He also pointed out that the larva of the glow-worm (*Lampyris noctiluca*) has an instrument at the apex of the abdomen for cleaning itself, and removing the slime from its body after devouring a snail.

Feb. 21st, 1899.—Mr. D. E. Figgis, of 99, Forburg Road, Clapton, was elected a member.

EXHIBITS.—Mr. C. Oldham, a series each of *Cosmia diffinis* and *C. affinis*, taken in Epping Forest in the summer of 1898, and four *Euchelia jacobacæ* from Mid-Norfolk. The President remarked on the fact that *C. diffinis* could still be found in Epping Forest, and elicited the statements from the Revs. G. H. Raynor and C. R. N. Burrows, that it swarms at Maldon and Mucking.

GONOPTERYX RHAMNI AB.—Mr. J. A. Clark showed a specimen of this species captured at Croydon in the autumn of last year (1898), the two forewings having the coloration of a ♀ and the hindwings that of a ♂. Mr. Riches, a number of the carnivorous shelled-slug, *Testacella haliolitea*, from Hornsey. Mr. A. Bacot, a box of South African Lepidoptera, from a station nine miles from Johannesburg. Of these Mr. Tntt observed there were many which appeared identical with British insects, such as *Sphinx convoluti* (though smaller than our insect), a large sized *Lithosia complana*, also two were *Laphygma ævigna* and *Heliothis armigera*.

SPILOSOMA LUBRICIPEDA, ETC.—Rev. G. H. Raynor, about 300 specimens of *S. lubricipeda*, the produce of wild larvæ obtained from the Lincolnshire coast. Larvæ sent him from this district in 1893, being obtained late in the season, were ichneumonid, but from some taken in August, 1894, about 50 were bred. Four years' breeding resulted in the numbers exhibited, but he had been unable to spare time to keeping the broods distinct, and to working out statistics of typical and varietal forms. Many of the dark *radiata* aberrations were remarkable, but he had not got representatives of all the Yorkshire forms. He also exhibited an *Epinephela tithonus* ♂, caught at Hazeleigh, near Maldon, last August, in which the rust-red colour is replaced by light yellow, and one *Noctua rubi* ab. taken at same locality and month. A male *Angerona prunaria*, of an unusual unicolorous brown tint, with a spot only of orange on disc of each wing, was exhibited, together with some very variable forms of ♂ and ♀ obtained by pairing this insect with a typical ♀.

QUEENSLAND BEETLES.—Mr. F. B. Jennings, specimens of *Cyproca*

*carniola* and *C. poraria*, from Raeni Island, Queensland, and *Hyalinia glabra*, known by its small umbilicus, from the Lea valley.

JAMAICAN PYRALIDÆ.—Mr. W. J. Kaye, a box of Jamaican *Pyralidæ*, collected by himself in August, 1898.

SPILOSOMA LUBRICIPEDA.—Mr. H. Massey had most kindly forwarded from Manchester his drawer of *Spilosoma lubricipeda*, bred from wild larvæ from York and Manchester, including the vars. *eboraci* and *fasciata* (from Yorkshire larvæ only). Mr. A. W. Mera also brought up drawers of this insect showing the type, and vars. *fasciata* and *radiata*, to illustrate his paper of the evening.

CHARICLEA UMBRA.—Mr. Bell exhibited a series of *Chariclea umbra*, from the Isle of Wight. When captured bright green "spikes" could be noticed on their heads, but were now withered. Mr. C. Nicholson, on examining these, said they were pollinia of orchids, and showed the flowers which these insects had been visiting.

HAWTHORN IN BLOOM AND SPRING BUTTERFLIES.—Mr. Jennings said the hawthorn at Edmonton, referred to by him at the last meeting, was now showing flower buds, with one actually in bloom. Mr. Donisthorpe had seen *Gonopteryx rhamni* flying at Chiddingfold, Surrey, on the 17th inst.

SPILOSOMA LUBRICIPEDA.—Mr. A. W. Mera read a paper on "Notes on *Spilosoma lubricipeda*" (printed in *Transactions*). A long discussion followed, justifying Mr. Prout's remarks about the advantage of having a paper on an insect well known to all members. Rev. G. H. Raynor asked what was the food-plant of var. *radiata* from York. In Lincolnshire that of *lubricipeda* was the elder, which had the tendency to produce dark forms. Mr. Dadd proposed a vote of thanks, and spoke about the fact of *lubricipeda* swarming on elders. He asked if *radiata* was the only form in Heligoland, and was informed it was the type there. Rev. G. H. Raynor, in seconding the vote, said his and the lecturer's experiences did not correspond in two matters. A second brood of *lubricipeda* was never reared at Maldon, and he found eggs from pairings always hatched. Mr. Bacot found that it would feed on virginia creeper and scarlet runner beans. He regretted no statistics of the broods were available with Rev. G. H. Raynor's fine exhibits. Mr. Nicholson could speak to ivy, ferns, Japanese anemone and chrysanthemums being eaten by the larva of this insect, and wondered what it would not eat in the London district. Mr. Dadd cited nasturtium as being unpalatable. Mr. Tutt regretted that the scientific value of all the Rev. G. H. Raynor's trouble was practically lost by not keeping the series separate and preserving parents of each brood. He threw strong doubts on the British origin of the very first Yorkshire parents from which have been bred most of the var. *radiata* in the English cabinets. He understood that the British *lubricipeda* type was unknown in Heligoland, where the dark form only was reported to occur. A wild form or race on the Lincolnshire coast will produce dark *radiata* forms if inbred and taken care of artificially, but dark forms are not found naturally in any numbers. In Heligoland Nature had apparently preserved the race by what breeders try for, isolation. If it is only a question of moisture or wet climate, why are the Irish and west of England specimens so buff? Food can affect the imago in other directions than size. A succulent and abundant diet will alter the size, but indirectly food might also alter the scales, the last outcome

of growth, by producing a physically strong or weak race. It is possible to get no scales at all in imagines. The abnormality of these *radiata* is evident, and aberrant insects tend to produce a second brood. He could add dock, syringa, and raspberry to the list of known food-plants, but had never met with it on oak, poplar, or birch. It was remarkable how common the insect was in the neighbourhood of towns, as if it had less difficulty in fighting for existence there. The vote of thanks put to the meeting was carried unanimously; and the Secretary was desired to write and thank Mr. Massey for his kindness in forwarding for exhibition his series of the insect mentioned above.

March 7th, 1899.—Mr. Herbert Massey, of Ivy Lea, Burnage, Didsbury, was elected a member.

LARVÆ, ETC.—Mr. Bacot exhibited larvæ received from Dr. Chapman found on walls, case-bearing micros apparently allied to the Psychids, also larvæ of *Cnethocampa pityocampa*, which he described as having pockets or folds in the middle of the back of the first eight abdominal segments. These folds were furnished with lips which, if the insect were irritated, open and disclose tufts of hairs somewhat loose, and readily becoming detached, float in the air, and possess an urticating property. The larvæ, if disturbed in their nests, move in a jerky, spasmodic fashion. Drawings of the hairs of *Porthesia auriflua*, *Cnethocampa pityocampa*, and *Lasiocampa quercus*, and showed the actual hairs under a microscope.

TEPHROSIAS.—Mr. Prout exhibited some Tephrosias taken by Mr. Routledge, a series of *T. crepuscularia* (*biundularia*) taken at Orton, and a number of *T. bistortata* (*crepuscularia*) from Keswick.

AUSTRALIAN COCKROACH.—Mr. Marsh, a specimen of the Australian cockroach found flying at Lymington (Hants). It produced seventeen young, but these he failed to rear, but exhibited one larva. He also showed specimens of *Acanthosoma hoemorrhoidale*, *Tropicoris rufipes*, and *Asilus crabroniformis*.

HYDROCAMPID LARVA.—Mr. Pearson, a larva feeding in water, which he thought was that of a Hydrocampa. It had been hibernating in a web for one month.

PAPER.—Mr. F. Bouskell forwarded a paper on "Poisonous Plants in relation to Medical Jurisprudence" (printed in *Transactions*).

March 21st, 1899.—Messrs. Frank Bouskell, F.E.S., of Market Bosworth, Nuncaton, B. H. Crabtree, F.E.S., of The Acacias, Levenshulme, Manchester, and S. J. Marsh, of 152, Friern Road, Dulwich, were unanimously elected members.

OPORABIAS EXHIBITED.—Mr. Prout brought up a cabinet drawer of *Oporabias*, specially to illustrate his paper on *O. autumnata*. The long series of this species were principally bred from eggs obtained from Mr. Horne, of Aberdeen. There were also long and beautiful series of *O. piligrammaria* and *O. dilutata*; also a box of continental *O. autumnata* from many localities, and a fine series of the same bred by Mr. Christy from Rannoch parents, which were larger than those from Aberdeen.

THE ENNOMIDS.—Mr. J. A. Clark, a cabinet drawer of the "Thorns," showing series of all the species of *Ennomids* and a series of *Crocallis clingularia*, with some vars.

EARLY APPEARANCE OF PANOLIS PINIPERDA.—Mr. Bacot, a specimen of *P. piniperda*, taken on the 19th instant, being a very early appearance, at Oxshott. It was of an unusual silvery-grey colour.

PUBLICATION COMMITTEE.—The President chose the following members to form the Publishing Committee for 1899: Messrs. J. A. Clark, J. W. Tutt, C. Nicholson, H. Donisthorpe, and H. A. Sanzè.

PAPER.—Mr. Prout then read a paper on “The Life-history of *Oporabia (Upirrita) autumnata* (Bkh.)” (printed in *Transactions*). Mr. Tutt proposed, and Mr. Porritt seconded, the vote of thanks at the close.

April 4th, 1899.—STILICUS FRAGILIS.—Mr. Donisthorpe exhibited a series of the Staphylinid beetle *Stilicus fragilis*, taken the previous day from faggot-stacks at Shirley. He had taken this beetle at the same place for several years, and found that a larva which he believed to be that of this Staphylinid, was generally shaken out on the same occasions, and he had one preserved in spirit, which was remarkable for the length of the styles at the apex of the abdomen.

TINEIDS.—Mr. J. A. Clark, a cabinet drawer of *Tineina*, including the Psychids, of which he had a very full series, with examples of the larval cases in most instances.

SALLOWING AT RIPLEY AND ELSEWHERE.—Mr. Bacot said he had visited Ripley for working the shallows, but had taken nothing beyond ten *Panolis piniperda*, the shallows not being properly out. At Selborne, however, they were more forward, but still insects were few, and the only insects taken were *Taenioampa gothica*, *T. stabilis*, and *Vachnobia leucographa*, with worn *Cerastis vaccinii*. Mr. Dadd, in giving his experience at the shallows, remarked that he had taken twelve *T. stabilis* and two *T. gothica* at Broxbourne, and had found nothing to speak of at Oxshott, with the exception of *Anarta myrtilli* on heath. Mr. Clark, at Epping Forest, had already seen many *Breplos parthenias*, but had only secured five, the insect being very partial to the tree-tops. He had captured two *Larentia multistrigaria*, and saw plenty of *Diurnea jagella* and *Tortricoides hyemana*.

PAPER.—Mr. Bacot read a paper entitled “Notes on the Relationship of Insects to Man.” He said, insects have been in the past of vast importance in the history of life, both of the vegetable and animal kingdoms. Such is the vitality, persistence, and adaptability of the class, aided by the rapid rate at which the species breed, that it has occupied, in one form or another, almost every portion of the globe. The beauty and grace of form of some, and, again, the mechanical perfection of structure in others are unsurpassed throughout the animal world. In intellectual development and social organisation, too, certain species of Orthoptera and Hymenoptera far outclass many of the Vertebrata. Speaking of intelligence, he instanced the fact of *Ammodiplosis unaria* having been known to use a small pebble held in its mandibles to flatten down the earth over the nest in which its eggs were laid, in order to more conceal the situation, and showed this using of a tool placed the insect in some respects as high as the gorilla or fox. While man dominated the terrible Carnivora and took toll of Cetacea and Ruminantia, even to the point of nearly exterminating forms that once occurred in hordes, insects, even in temperate climes, but especially in tropical countries, were irrepressible, and it is often as

much as he can do to hold his own against their attacks. He thought that if the restriction on their size were removed while their rate of multiplication remained, man would be relegated to a secondary place. But as things are, man's size, upright posture, and development of the hands, with intellect, constitute him at present the dominant species on earth. Insects have had an actual influence on man's development, both as regards his physical and mental abilities. Few, if any land animals can lay claim to so ancient a lineage or compete for priority with the Insecta. They have been traced back to the Devonian strata, which perhaps presupposes the existence of primitive forms at a very much earlier time. Long previous to any serious rivalry or interference in their arboreal and aerial domains, insects must have exerted a vast influence on, and consequently produced sweeping changes, in plant life. Plants acquiring antiseptic properties, gummy and resinous saps, nauseous features, poisonous, purgative, emetic and narcotic qualities in their passive resistance to insect attack. By the agency of insects, flowers with their tints, scents and nectar, were evolved. From the earliest known mammals—the insectivorous marsupials—have sprung the bats, the only mammals perfectly equipped for flight. The Carnivores and Primates have without doubt risen through the insectivorous lemuroids from the same source; and it is to the habits and needs of these insectivorous ancestors of his, that man owes the development of the hand with its opposable thumb. Man in truth, has had not only his senses and aesthetic tastes largely developed in accordance with standards which were raised by insects before his advent, but his structure also clearly shows traces of the habits and needs of his insectivorous progenitors. A discussion followed, in which Messrs. Dadd, Cox and Dr. Sequeira took part.

April 18th, 1899.—Mr. L. B. Hall, of 7, Union Road, Tufnell Park, N., and Mr. J. C. Moberly, of 9, Rockstone Place, Southampton, were elected members.

TUDDENHAM LEPIDOPTERA.—Mr. J. A. Clark exhibited specimens from Tuddenham of *Spilodis verticalis (vinctalis)* that were strongly marked. Also two aberrations of *Arctia villica* bred from larvæ taken at Harwich, each having a very large cream-coloured area at the apex of the upper wings.

EUCHLOË ? HYBRID.—Dr. Chapman, a specimen of *Euchloë* caught at Cannes, which he supposed to be a hybrid between *Euchloë cardamines* and *E. euphenoides*.

PIMELIA BIPUNCTATA.—Mr. Jennings showed a Tenebrionid beetle, *Pimelia bipunctata*, collected by Dr. Chapman on the coast sandhills at Alassio, Gulf of Genoa, in March. He said the genus *Pimelia* contained a number of species of rather large size, but is not represented in Britain. *Heliopathes gibbus* of which a type was shown, was said to be probably the nearest ally with us. The specific name *bipunctata* at first puzzled him to see its appropriateness, but it was perhaps explained by the fact that in one specimen the thorax had two rough punctures. In all the others, however, the thorax appeared to be nearly, if not quite, smooth.

AGARICUS CAMPESTRIS.—Mr. Riches, an abnormal specimen of the common mushroom, *Agaricus campestris*, in which the stalk was



continued beyond the apex of the pileus for a short distance, the skin of the pileus near the apex being reflexed and forming the same, covering the gills of a small reversed mushroom.

PAPER.—Mr. Donisthorpe read a paper on the “Coleoptera of Weymouth.” The following is a brief summary: He remarked at the commencement that the strata of this part of the country belong chiefly to the Oolitic group; the chalk formations are also largely represented. The “Chesil Beach” was found to be a good collecting ground. The severe drought of 1896, following a mild winter, made things scarce, and also appeared to have some effect on the individuals that succeeded in completing their development. Several abnormal forms were taken, among them being a very small specimen of *Geotrupes mutator*, *Harpalus caspius*, quite green instead of the usual black, tinged with green about the thorax, a small specimen of *Taphria nivalis*, quite unlike the type form, and most curious of all, a specimen of *Pterostichus gracilis* with three tarsi on one leg. Members of the *Carabidae* and *Staphylinidae* were principally met with, but he, with his friend Prof. Beare, was able to compile a list of species amounting to nearly 300. Two myrmecophilous beetles occurred, the rare *Trichonyx markeli* taken by Prof. Beare, with *Formica flava*, near the Chesil Beach, and the curious *Claviger testaceus* at Upwey and Portland, with both *Formica flava* and *F. nigra*. Three species of *Bledius*, *B. spectabilis*, *B. unicornis* and *B. arenarius*, were obtained by digging up the sand on the Chesil Beach, and dropping it into small pools of water. *Cyllenus lateralis* occurred in profusion on the flat sand near the mouth of the Fleet; the insects being totally covered by the sea for several hours at high tide. Of rare species, two *Harpalus obscurus* were taken under stones near the Chesil Beach, quite a new locality. The existing specimens have previously been obtained in Cambridgeshire. *Cymindis avillaris*, *Masoreus wetterhali*, *Harpalus picipennis* and *H. melancholicus* from the Chesil Beach. *Pterostichus gracilis*, *Bembidium clarkii* and *Lathrobium filiforme* were secured in a marshy field near Dorchester, all that is now left of the Herringstone Marshes, a locality mentioned in Dawson’s “Geodephaga Britannica.” Mr. Heasler proposed a vote of thanks, and referring to the destruction of localities, such as the Hammersmith Marshes, said that he had found *Bembidium clarkii* at Hendon Reservoir, and *Acupalpus consputus* on Mitcham Common. Dr. Chapman, Messrs. Jennings, Clark and Tutt continued the discussion, which became animated over the probable cause of the increased number of limbs such as was mentioned in the paper. Mr. Tutt suggested the cause must be the division by fission from some reason of the imaginal disc or germ within the larval form. Mr. Clark, referring to his having bred *Stauropus fagi*, said that he had known the larvæ fight, and a leg bitten off in that stage resulted in a shortened leg in the imago. Dr. Chapman had recently seen a lizard with two tails, a possibility of which he had been formerly sceptical. In this instance the bifurcation did not commence until about three inches from the root, and both divisions were slender and tapering, showing the latter acquisition was of some standing. The lizard must have received some injury at the spot where the bifurcation occurred.

May 2nd, 1899.—CHRYSOMELA LAMINA.—Mr. T. B. Jennings passed round specimens of this species on its food-plant *Anthriscus sylvestris*

(wild parsley), and contributed a note on the discovery of this beetle in Pymme's Park, Edmonton, where he had found a colony of the imago in the summer of 1898. The larva was said to be white with a faint bluish tinge, and had a dark dorsal longitudinal stripe on the body. He also exhibited a beetle, larvæ found in rotten wood at Chingford Ferry, but could not suggest its identity.

EGGS OF CNETHOCAMPA.—Dr. Chapman had eggs for exhibition of *C. pityocampa* laid round the stems of *Pinus pinaster*, on which the mass of eggs resembles a bud of the pine, it was also to be found on *Pinus aleppensis*. The moth uses the large scales of its body as a "thatch" to cover the eggs, directed downwards to throw off rain and wet. The eggs themselves are oval in cross section, and so are probably "flat" eggs—like those of the Lasiocampids laid in a similar manner. Mr. Tutt said the eggs had a vertical micropylar axis, and if they are laid like those of *Eriogaster lanestris* on each other, the moth should be placed amongst the Lasiocampids, and not with the Liparids, where American writers placed it. Mr. Bacot, who referred to some observations of the larvæ, favoured the placing of the insect with the Lasiocampids.

SALLOWS.—Mr. Dadd, sallowing at Wimbledon on April 26th, found little to reward his search. One very fresh specimen of *Phlogophora meticulosa* came as surprise. He regarded it as an early emergence of one of the spring brood. Mr. Jennings reported that he found the season a backward one. So far, both diptera and hymenoptera were very scarce in his district. Dr. Sequeira spent a short time at Brockenhurst—from April 22nd-30th. Very few lepidoptera were on the wing. *Gonepteryx rhamni* were flying when the sun shone. *Pieris napi* and *Pararge aegeria* were in good condition. All vegetation was in a backward state; sallowing and sugaring were both disappointing. One *Scoliopteryx libatrix* came to sugar, and a few larvæ of *Triphaena jimbria* were taken at night. Dr. Chapman said he had just bred *Tachicampa gothica* from a larva taken at Avignon; it pupated, and had emerged at the time *T. gothica* appears here, and not at the time it should (August) if it remained in its true habitat.

CUCULLIA SCROPHULARIAE.—Mr. Tutt said that of some pupæ of this species, left dry for four, if not five years ago, two had lately emerged; he then damped the rest and put them where they could be kept heated, and two more emerged. *Lachneis lanestris* has been known to go over as many as six years in pupa. With reference to these remarks Mr. Heasler asked if an ichneumon was known to go over two years. It did not appear to be known in the case of *L. lanestris*.

ANNOUNCEMENTS were made to the effect that Mr. F. B. Jennings had been appointed Librarian in place of Dr. Chapman, resigned. Also that the Annual Congress of the South Eastern Union of Scientific Societies was to be held May 25th-27th, Mr. Tutt being appointed official delegate. That the Society's Excursion this year would be to Darenth Wood, under the leadership of Mr. Cox, and that the Hackney and E. Middlesex Band of Hope Union, were about to hold an Industrial Exhibition, and asked help towards a loan exhibition.

PAPER.—Mr. Heasler read a paper on "Secondary sexual characters in Coleoptera" (printed in *Transactions*), and exhibited ♂ and ♀ upper and undersides of *Dytiscus marginalis*, and undersides of the following

species of *Pterostichus*, to illustrate these characters appearing on the last ventral segment—*P. niger*, raised keel in ♂ and ♀ —*P. anthracinus*, depression in ♂ —*P. nigrita*, tubercle in ♂ —*P. minor*, a raised keel—*P. madidus*, a raised transverse ridge. Mr. Donisthorpe spoke later of a secondary sexual character not mentioned in the paper, *viz.*, the horns developed in some ♂ and not in ♀. Darwin had called them sexual ornaments, Bates giving no indication. Mr. Bacot asked if these minute characters (of *Pterostichus*) were of use sexually—*i.e.*, prevented hybridising. Mr. Heasler thought not. But, it was asked, if there were not a sexual difference, why were they different in the sexes? Dr. Chapman said although the characters referred to in *Pterostichus* were minute, it could not be said they were of no use, nor could one well say what the use was, until more observations were made. Few could guess the use of the whip-like tip of the antennæ of the ♂ *Odynerus spinipes*, until one had seen these clinging round the antennæ of the ♀ when the insects were *in cop.* A question was asked, if ♀s require protection. If, for instance, ♀ *D. marginalis* receives protection, why does not the male require it? Mr. Prout thought the ♀ always has more need of protection for the due propagation of the species.

May 16th, 1899.—DONATION.—Mr. F. J. Hanbury kindly presented the Society with a copy of "Kent Flora," of which he is a part author. Mr. Nicholson proposed that a vote of thanks be accorded. Mr. Jennings seconded, and the vote carried.

EXHIBITS.—Mr. E. M. Dadd bred specimens of *Araschnia lerana*, *Notodonta bicolor*, *N. torva*, *Valeria oleagina*, *Gastropacha tremulifolia*, *Clostera pigra*, *C. curtula*, *Pamphila egermet* and *P. riator*. Mr. F. B. Jennings, imagines of *Sialis lutaria*, contributing a note about this Neuropteran. The unknown larva exhibited by him at last meeting having been pronounced by Mr. McLachlan as that of this insect.

VALERIA OLEAGINA.—Mr. Dadd stated that a pupa of *V. oleagina* showed a white spot on the wing-case in October, the moth emerging in April. Mr. Tutt thought this indicated that the moth matured the previous autumn.

PAPER.—A paper, contributed by Mr. Tutt, on "Nature's Scavengers," was read by Mr. Sauzé. It was pointed out that all vital processes produce waste material, which has to be reduced by chemical action to its elements, or else reconverted by "scavenger" animals into organic products. Some of these go to work in a perfectly sanitary way, others the reverse, *i.e.*, some creatures have the instinct to bury waste, like the "sexton" and dung beetles. Some feed on offal, &c., like the carrion birds and carrion-eating mammals. And thirdly, there is a dangerous class, such as the carrion and dung flies, which although doing good by laying their eggs in putrid matter, are often the means of carrying diseases, &c. Of the first-mentioned class the habits of *Cicotrupes* were detailed, its burrow, vertical and even, reaching to some eight or ten inches below the excrement, some of which they bury and lay an egg therein. The *Aphodii* have similar habits, but it is to be noted they are always shining and clean in appearance. The *Necrophori* undermine and "bury" the dead bodies of the smaller mammals and birds, laying their eggs in the flesh. Four specimens of *N. velutinus* have been known to drag a swallow a distance of six

feet four inches, to suitable ground, and half bury it during the night. Dead trees are soon opened to the action of rain and air by the attacks of wood-boring beetles. *Euplectus*, *Seydmannus*, *Battisus*, *Trichonyx*, *Ptiella*, *Trichopteryx*, and *Lathridium* prefer standing rotten trees, in which the bark forms a rain-proof covering to the rotten wood beneath. *Paromalus*, *Baptolinus* and *Conurus* prefer the wood to be thoroughly wet, whilst *Platypus*, *Melasis*, *Trypodendron* and *Phloeotrypa* bore into the solid wood of fallen trees, whilst dead branches not yet fallen to the ground are the home of a destroying host of *Anobiidae*, *Ptiidae*, *Cissidae* and *Scolytidae*. Amongst the second group of "scavengers" are such creatures as vultures, pariah dogs, wolves, jackals, and hyenas. The kite was once tolerated as a "scavenger" in English towns. In many parts of the world noisome birds are protected from a sanitary point of view. The carrion and dung flies, taken as examples of the third dangerous class of sanitary workers, are specially well equipped for the performance of their duties, in the rapidity with which the eggs produce larvæ after being laid. Nature has further specialised the development of *Sarcophaga*, in that they are able to produce their young alive, the eggs hatching just previous to extrusion. The numbers of the progeny of Carrion-Diptera, and the voracity of the grubs, together with the rapidity of their development, are added factors in this equipment. That this is a result of natural selection is evident, those individuals whose eggs hatch most quickly, and the grubs from which come to maturity most rapidly, will succeed where the slower ones must fail, and heredity would soon establish the race. Other broad questions arise. Certain insects must have developed particular habits after certain evolutionary changes had taken place in other directions. Thus the special functions of the dung-beetles must have originated after the development, or side by side with the development of herbivorous mammals. It is probable that some primitive species, feeding at first on animal or vegetable substances, became modified, as the competition for existence increased, so that it could feed on the excrement of animals which had already existed for a considerable time, and multiplied sufficiently to allow of such a scavenger to follow in their wake.

June 6th, 1899.—DONATIONS.—"Annual Report of Ent. Soc. of Ontario, 1898," and "Journal of City of London College of Science Society."

ELECTION.—Mr. Robertshaw, of Ellenroyde Hall, Luddenden Foot, Yorks, was elected a member.

EXHIBITS.—Mr. Jennings, the pupa of *Chrysomela goettingensis*, which was found under moss, and of a yellow colour. The species was taken on Box Hill. Mr. J. A. Clark, a series of *Boarmia cinctaria* showing much variety, and a red form of *Tacuiocampa gracilis*, all taken in the New Forest at the beginning of May. Mr. W. J. Kaye, pupæ of *Thecla pruni*, *T. w-album* and *Zephyrus quercus*. Dr. Chapman, a larva of a species of ant-lion in sand from its habitat. When exposed for inspection it burrowed backwards into the sand. Rev. C. R. N. Burrows, larvæ from Mucking of *Leioptilus lienigianus*, in their protective "tents," on the back of leaves of mungwort (*Artemisia vulgaris*). He confirmed the known fact that as soon as the larvæ find they are protected by being placed in a box, they cease con-

structing "tents." He also exhibited *Cerastis ligula* with two vars., also *Hydroecia nictitans* with vars., and *Miselia ocyacanthæ* with some yellow forms, from Mucking. A specimen was also shown of *Plusia iota*, taken by Dr. Lang, in his house at Southend, in 1896. Mr. Prout, a series of *Taeniocampa incerta*, bred from the egg, the ♀ parent being from Aberdeen. Cases of the Psychid *Proutia betulina* (?), from Epping Forest, were exhibited, that had been taken off hawthorn. Mr. Bacot, two ♀ *Agdistis bennettii*, imagines and pupæ of *Aciptilia galactodactylus*, one being red marked. He said nearly one-half of those bred by him were so marked. Mr. Prout had met with one in a few bred, but the rest were all green. Mr. Bacot also exhibited the larva of *Eidematophorus lithodactylus*, on flea-bane.

COMMUNICATIONS.—Mr. Dadd said Noctuae, taken as larvæ at Wimbledon, were now emerging; he had already bred four *Noctua augur* and two *N. festiva*. At Horsley he had taken *Nemobius lucina*, *Cupido minima*, and *Callophrys rubi*. Mr. Donisthorpe, at Woking, at the commencement of June, took *Donacia cinerea*, a beetle usually considered rare, in great profusion by the canal on the reeds. A boat was necessary to reach the plants. Mr. W. J. Kaye a week ago had visited Wicken, and had taken *Meliana jammaea*. *Hydrilla palustris* was not seen. At Chippenham one larva of *Plusia chryson* was found.

June 20th, 1899.—PTILINUS PECTINICORNIS.—Mr. Jennings, *Ptilinus pectinicornis* ♂, from Edmonton, which had probably been burrowing in ash. The flabellate antennæ of the ♂ are at once noticed.

ATHOUS RHOMBEUS.—Mr. H. Donisthorpe, a specimen of a living *Athous rhombus*. This very rare click beetle had been taken in some numbers in the New Forest, he and Professor Beare digging out of beech stumps eighteen in all—pupæ and imagines. One black larva was exhibited preserved in spirit. He had been successful in rearing all the pupæ into imagines.

PLUMES.—Dr. Chapman, larva of *Pterophorus rhododactylus*, which has been looked upon as nearly extinct. Also larvæ of *Eubulea crocealis*, from Reigate, feeding on flea-bane.

EGGS.—Mr. Bloomfield, ova of *Macaria notata*, *Zonosoma punctaria*, *Lomaspilis marginata*, *Bapta bimaculata*, the insects being taken at Darenth.

SYNTOMIS PHEGEA.—Mr. Bacot, a living *Syntomis phegea* ♀, the larva being taken by Dr. Chapman in S. Europe.

COMMUNICATIONS.—Mr. Jennings reported he had found the larvæ of *Chrysomela hyperici* on the occasion of the Society's excursion on the 17th inst. Like that of *C. lamina*, it had a longitudinal band, and in colour somewhat resembled that of *C. goettingensis*, being a dingy brown. He took *Cryptorephalus parvulus*, *Rhynchites pubescens*, &c., and mentioned that Mr. J. J. Walker found *Triplax lacordairei* there. Mr. W. I. Cox reported that the excursion to Darenth had been very successful, the party numbering fifteen. A list of Macro-lepidoptera taken totalled 69 species, including *Cyaniris argyolus*, *Heterogenea limacodes*, *Arctia rillica*, *Eurymene dolobraria*, *Zonosoma porata*, *Empithecia renosata*, *Phibalapteryx tersata*, *P. vitalbata*, *Dianthoecia carpophaga*, *D. conspersa*, *Acontia luctuosa*, and *Phytometra rividaria*.

REPORT.—Mr. Tutt gave a report of the Congress of the South-Eastern Union of Scientific Societies, which he had attended as the

delegate of the City of London Entomological Society, and in his comments strongly recommended that the organisers should on future occasions provide for the subdivision of the work of the Congress into at least three sections—Geological, Botanical, and Zoological, each with its own President.

July 4th, 1899.—EXHIBITS.—Mr. A. Bacot, two *Thyris fenestrata* ♂ and ♀ alive, with eggs on clematis, a case of *Psyche villosella* with the ♀ emerged, ova of *Platyptilia gonodactyla* on coltsfoot, ova of *Oryzophilus teucris* on wood sage, ova of *Acipitilia galactodactyla* on burdock, ova of *Leioptilus licuigiannus* on mugwort, and larvæ of *Talacporia pseudo-bombycella* feeding on dead body of *Calliphora vomitoria*. Mr. W. I. Cox, a large collection of Rhopalocera from W. Africa, obtained during the Benin Expedition, also an exotic Lamellicorn beetle of a light shimmering blue colour, used in Paris to decorate ladies' bonnets. Mr. J. A. Clark, forms of *Noctua rubi* from Wicken, and an almost black *Agrotis segetum*. Dr. Sequeira, insects obtained at Wicken, visited at the same time. No *Hydrilla palustris* were taken, nor were moths plentiful at light. Some fresh *Hadena dentina* were taken, and one good specimen of *Papilio machaon* was caught on the wing. Mr. D. C. Bate, three lampyrid beetles from New Jersey, locally known as "Lightning Bugs."

July 18th, 1899.—SMERINTHUS TILIAE VARS.—Mr. J. A. Clark, a box of insects containing, amongst others, two specimens of *Smerinthus tiliae* without the central bar, two specimens of *Agrotis agathina*. Dr. Sequeira showed four specimens of *Triphaena fimbria*, bred from larvæ obtained in the New Forest. Also cocoons of *Bombyx mori* with almost white silk. Mr. Fuller said he believed it was a question of diet, the light-coloured silk being the outcome of feeding the larvæ on dandelion and lettuce. Dr. Sequeira said the cocoons exhibited were made by mulberry-fed larvæ. Mr. Clark confirmed this view. Mr. Bacot, larvæ of *Larva l-nigrum*, the peculiarity of which was that when small, if touched, they would jump forward. He said it was the first larva he had seen with this peculiarity.

MALACOSOMA CASTRENSIS, ETC.—Mr. Bacot also showed larvæ of this species from Port Victoria. Previously he had failed to breed this insect. He had tried to feed them up on leaves sprinkled with salt. At present he was trying them on sallow and knot-grass, and he suggested that they were confined to the salt-marshes on account of the temperature being higher. Pupæ and cocoons of *Porthesia chryssorrhoea* from larvæ taken by Mr. Dadd at Deal, were exhibited. He also remarked on having seen a *Lycæna* in Cornhill.

TRIPHAENA FIMBRIA.—Mr. Dadd stated that this insect was very common in the New Forest. Many imagines were to be seen at sugar. A discussion ensued concerning the apparent larger size of moths seen at electric lamps. Rev. C. R. N. Burrows mentioned that he had been nearly tripped up over the shadow cast by a small clothes' moth.

August 1st, 1899.—BOMBYX MORI COCOONS.—In referring to the note at last meeting's minutes, Mr. Bate said in his experience if the insect was fed on lettuce the cocoons were white, but yellow if fed on mulberry.

DICYCLA OO AT WALTHAMSTOW.—Mr. Fuller exhibited a series of this moth captured at sugar in this neighbourhood, also, from Darent, a specimen of *Mamestra sordida*.

ABRAXAS GROSSULARIATA.—Mr. Riches showed a specimen of *Abraxas grossulariata*, found on a wall at Hornsey Rise. The central area of the hindwings had no black spots arranged as a fascia across the middle. Mr. Bate was of opinion that *A. grossulariata* tended to produce darker specimens with less yellow if fed on *Euonymus*. This view was not shared by Mr. Clark, who had brought up a number of specimens fed on this plant, being all he had bred this year. Although all were not dark, the majority were so tending, a few being very dark. Mr. Riches said his custom was to feed these larvæ on currant, and thought his were darker than those exhibited. Mr. Clark mentioned that he had found it feeding wild on hawthorn.

SMERINTIUS POPULI VARIATION.—Mr. Bate exhibited *S. populi*, remarking that the ♀s showed variety in colour, but the ♂s were all of the same tint.

NOCTUIDS.—Mr. J. A. Clark, two beautiful vars. of *Noctua festiva*, and one of *Grammesia trigrammica*, which was much suffused and very dark, from Polegate.

SATURNIA PAVONIA COCOONS.—Mr. A. Robertshaw had sent to the Secretary for exhibition two cocoons of the above species, the one brown and the other pale. Mr. Robertshaw drew attention to a note of Mr. May in the *Transactions* for 1896, in which it is stated that if the larvæ are kept warm and moist brown cocoons result, but if kept cool and dry, pale. Mr. Dadd mentioned a case in which he had known a cocoon of this species go brown on one side when wet remaining white on the other. Mr. Clark said, in a place where no damp could get, he had some cocoons brown and some pale.

MALACOSOMA CASTRENSIS BRED, ETC.—Mr. Dadd said Mr. Bacot's *M. castrensis* had pupated, and three had emerged. Of the *Porthesia chrysorrhoea* 38 imagines had appeared.

August 15th, 1899.—ABRAXAS GROSSULARIATA ON DIFFERENT FOOD-PLANTS.—Mr. Riches exhibited a series of *A. grossulariata*. These were the picked specimens out of 300 bred. He had commenced feeding the larvæ on *Euonymus*, and had finished on currant. Under these circumstances the point raised at the last meeting as to which food-plant (*Euonymus* or currant) produced the blackest imagines could hardly be judged by these specimens. Some were as dark, some darker, and some were lighter than Mr. Bate's specimens fed entirely on *Euonymus*.

ORGYIA ANTIQUA IN LONDON.—Mr. Bate said, having seen in a daily newspaper that the trees in the avenue of limes at Buckingham Palace were being destroyed by caterpillars, he had visited the place to discover the identity of the larvæ, and found *Orgyia antiqua* on the trees in thousands, and their cocoons were packed together in masses. There were also immense numbers of cocoons of ichneumon flies, the cocoons being golden yellow, and of the size of rice grains. A pupa of *O. antiqua* taken home produced a ♀ moth, which attracted into the house several ♂s. Leaving the box open in the room, he forgot it for a day or so, and on next remembering it he found the ♀ dead, but a few males still in the room, and for two days after he knew the insect to

be dead he noticed males flying into the room. He did not know for certain whether a pairing had taken place before its death, but a few eggs were laid it being uncertain whether they would prove fertile or not.

Sept. 5th, 1899.—*DICRANURA BIFIDA* BRED.—Mr. J. Riches exhibited 13 imagines of this species that had hatched from 27 pupæ, the result of a batch of ova obtained at Hornsey. He thought the remainder of the pupæ were probably dead, but would keep them to see if they were lying over another year. Mr. Tutt said the pupæ must not be allowed to get too dry.

*PYRALIS FARINALIS*.—Dr. Sequeira, a dark form and a red form of *P. farinalis*, from Hackney. He found the red form more commonly, but the chairman thought this to be the most noteworthy.

*CNETHOCAMPA PITYOCAMPA*.—Mr. Bacot exhibited living ♂s of *Cnethocampa pityocampa*, a continental processional moth.

*LACHNEID LARVÆ*, ETC.—Dr. Chapman exhibited a batch of larvæ from Arolla, which might prove to be the well known var. *arbusculæ* of *Lachneis lanestris*. Members thought it was probably distinct. He also exhibited a larva of *Melitara cynthia* black, and with the spines black, together with set ♂ and ♀. The ♀ is comparable with British *M. artemis*, but the ♂ is distinct. Mr. Jennings showed *Tettigouia viridis* a homopteron from the Lea valley.

*CATOCALA NUPTA* AT HACKNEY.—Dr. Sequeira said he had taken twenty *C. nupta* at Hackney, for the first time in many years' collecting. There was no willow in the immediate neighbourhood, but members said that the larvæ would feed up on poplar.

*MACROGLOSSA STELLATARUM*.—It was reported that this moth had been abundant this year at Clapton, Reigate and Hornsey. Mr. Tutt mentioned that *Pyramis atalanta* was exceedingly plentiful at Chattenden. At Fontainebleau he had met with *Plebeius aegou* in June and again in August, which indicated there, at least, two broods in the year.

Sept. 19th, 1899.—*COLEOPTERA*.—Mr. Jennings exhibited an aberration of *Mycetophagus quadripustulatus* taken on fungus in the Lea valley. The two red spots on the right elytron were normal, but on the left the spots had run together at their inner sides in a straight line parallel with the suture. He also showed a living specimen of *Byrrhus dorsalis* from Box Hill, and a Swiss specimen of *Emus hirtus* taken by Dr. Chapman.

*NOCTUA DITRAPEZIUM*.—Mr. H. H. May, a fine series of *N. ditrapezium* with dark and pale forms, bred from larvæ taken at Wimbledon. Mr. Dadd, specimens of *Phibalapteryx vittata* and *Camptogramma fluriata* from Wicken.

*PORRHETRIA DISPAR* ABERRATIONS.—Mr. Garland, several ♂s of *P. dispar*, splashed irregularly with patches of ♀ coloration.

*EXOTIC ERYCINIDÆ*.—Mr. W. J. Kaye, a large exhibit of exotic *Erycinidæ*, including *Eurybia salome* from Venezuela, *Ancylyris atahualpa* from Columbia, and *Anteros formosus* from Trinidad. Also the rare Sphingid, *Aellopus commassiae*, from W. Africa, with other *Sphingidæ*.

*TERATOLOGICAL SPECIMEN OF APPLE*.—Mr. Kaye also exhibited a double apple, the two having coalesced at the sides, and having two cores, but a common stalk.



NOCTUIDS.—Mr. Bloomfield, a series of *Hydroecia nictitans* from Niton, Isle of Wight, with one dwarfed, also one *Agrotis obeliscæ*.

CAMPTOGRAMMA FLUVIATA.—Mr. Dadd said he had just returned from Wicken, where the weather had been bad. *C. fluvjata* was his best catch. He had also taken seven *Nonagria lutosæ* and worn *Apamea leucostigma*. The larvæ of *Papilio machaon* were common, and he had collected bull-rushes for *Nonagria arundinis*, and one ♀ had already emerged.

COLLECTING AT DEAL.—At Deal in August, Mr. Dadd reported having taken *Agrotis tritici* in numbers, *Apamea leucostigma*, *Aspilates ochrearia* and *A. gilraria*.

LEPIDOPTERA AT TORQUAY.—Mr. Prout, at Torquay, had found *Leucania putrescens* common, and *Acontia luctuosa* still about. At Sandown, where he had been last, few insects were to be taken. Three *Aporophyla australis*, one *Leucania albipuncta*, and one well marked *L. vitellina* were secured.

COLLECTING IN CORNWALL AND THE BROADS.—Mr. Kaye in Cornwall, in June, found *Sesia musciformis* in numbers on thrift, and *Plusia festucae* at iris blossoms with *Dianthoecia carpophaga*. At the "Broads," in August he had taken *Nonagria brevilinea*, *Celaena haworthii*, *Nonagria neurica*, *Arsilonehe alborensa*, *Phibalapteryx vittata*, &c., and pupæ of *Nonagria arundinis* in the bull-rushes.

INTERFERENCE WITH COLLECTING IN EPPING FOREST.—Mr. Garland reported that he had been stopped beating for larvæ in Epping Forest, in the Loughton district, and objection had even been made by the keeper to his sugaring. Mr. Jennings had been spoken to about the barking of trees. Mr. Tutt thought if anything that could be called damage were really done, it was of no use interfering with the keeper, but if this keeper was taking upon himself to stop ordinary beating and sugaring, a letter should be written to Mr. E. N. Buxton. The Secretary thought the matter might first be mentioned to Mr. Cole of the Essex Field Club, and this he was desired to do by the Meeting.

Oct. 3rd, 1899.—Mr. Russell James, of 3, Mount View Road, Stroud Green, was elected a member.

WICKEN LEPIDOPTERA.—Mr. E. M. Dadd exhibited a large number of insects taken at Wicken. He mentioned *Epimda luteolata*, *Nonagria arundinis*, *Calamia lutosæ*, one with the nervures of the wings much suffused, a pale *Xanthia fulva*, *Cidaria testata* was noted as common all over the Fen, and it was remarkable how many specimens were malformed. In ten captured specimens this was noticeable, the right hindwing being badly formed or quite absent. He did not see an instance of the left wings being abnormal, but in one specimen both right wings were malformed. Mr. Prout asked if they were all captured, and suggested that the specimens, although taken dispersedly, might all be of the same brood, or that it might be a matter of heredity from a weak strain in the Fen. Rev. C. R. N. Burrows thought he had seen more malformed specimens of lepidoptera this past season than usual, and suggested it might have been caused by the exceptionally dry weather.

AGROTIS TRITICI AT DEAL.—Mr. Dadd showed a long series of *A. tritici*, from Deal, taken in August, which varied so much that he was in doubt whether he had not got other species mixed with it; also

*Porthesia chrysorrhoea*, bred from larvæ taken early in the year at Deal.

**SPILOSOMA LUBRICIPEDA VAR. RADIATA.**—Mr. S. J. Bell bred *S. lubricipeda* from one batch of ova received from Mr. Harrison, of Barnsley, exhibiting much variation in the direction of ab. *radiata*: one noticeable specimen had clear white central areas on the fore- and hindwings, with black margins, thin on forewings, but deeply radiated at inner angle of hindwings. Mr. H. H. May, who had received some of the eggs, bred insects varying from the type to ab. *radiata*, one approaching ab. *fasciata*. He also showed four bred *S. menthastri*, which were very large; in one the black spots were larger than in those usually captured. Living larvæ from Sandown were also shown, along with one *Leucania albipuncta* and three *Caradrina ambigua*.

**AGROTIS EXCLAMATIONIS AB., ETC.**—Mr. W. J. Kaye, an aberration of *A. exclamationis* from Cornwall, it being more ample than usual, and having the reniform stigma approaching that of ab. *plaga*. An aberration of *Amphipyra tragopogonis* from Worcester Park, with pale marginal area; a very small *Noctua xanthographa* from Narborough, and a specimen of *C. ambigua* which he had taken so near London as Worcester Park. Mr. Prout said he had taken several narrow-winged malformed *N. xanthographa* at Sandown.

**DYTISCUS DIMIDIATUS AT WICKEN.**—Mr. Donisthorpe, four *D. dimidiatus*, two ♂ two ♀, out of nine specimens altogether, taken this year at Wicken in August. This insect has not been taken for about 30 years, with the exception of one specimen caught three years ago by Mr. Bouskell, also at Wicken.

**MALACOSOMA CASTRENSIS BRED.**—Mr. Bacot bred *M. castrensis*, contributing a note, read at meeting (see *Transactions*).

**CATOCALA NUPTA AT HACKNEY.**—Dr. Sequeira, series of twenty *C. nupta* captured at Hackney over a period of six weeks. He supposed they must feed up on poplar, no willows being in the neighbourhood. Mr. Prout thought the larvæ would feed on apple, on which he believed they had been found at Sandown. The eggs do not all hatch at once, but the hatchings extend over a period of six weeks or two months. Mr. Dadd said the American species attack apple and plum.

**LEUCANIA LITHARGYRIA AB.**—Mr. Prout, a pale specimen of *L. lithargyria* from Torquay, almost answering to the description of the silvery aberration mentioned in Mr. Tutt's *British Noctuae*: two bred *Cidaria testata*, one from Nottingham and one from Sandown, exhibiting two extremes of colour, purplish and orange, *Gnophos obscuraria*, two forms from Torquay, one ordinary and one sandy in colour, and four *Anticlea rubidata* bred two from Torquay, and two from Sandown, the latter having a rosy tinge, of which the Torquay insects were devoid. The forms were interesting as the species is generally considered a constant one. The dark form he considered as an aberration. Mr. J. A. Clark said he had bred the rosy form from Croydon larvæ.

**DEILEPHILA EUPHORBIAE.**—Dr. Chapman, a specimen of *D. euphorbiae* which had emerged in the autumn, having been three weeks in pupa. It was exhibited to show the broad blue scales at the incision of the abdomen.

**ABUNDANCE OF PYRAMEIS ATALANTA, ETC.**—Mr. Donisthorpe spoke of the abundance of *P. atalanta* everywhere this autumn. He had noticed

this abundance at Peterborough, Leicester, The Fens and Chiddingfold. Mr. Clark had seen it in hundreds at Ilfracombe. Mr. Bacot had seen great numbers at Loch Fyne, Carlisle and Newcastle, and Mr. S. J. Bell in N. Wales. Mr. Clark said *Macroglossa stellatarum* occurred in hundreds at Ilfracombe, and Mr. Fuller had seen an unusual quantity of them in the Channel Islands, where also *Lampides boetica* had turned up in some numbers. Of *Colias edusa* Mr. F. J. Hanbury had seen a few in Devonshire, Mr. Clark had observed two at Ilfracombe, and Mr. Cox recorded seeing about a couple of dozen in the south and south-west of Ireland, and one in September was seen at Boxhill by Mr. Dadd.

LETTER FROM SECRETARY OF ESSEX FIELD CLUB.—A reply from Mr. William Cole, Hon. Sec. of the Essex Field Club, was read, stating in answer to the Secretary's letter, he knew of no bye-law forbidding beating and sugaring in Epping Forest, and thought more enquiries should be made. Mr. F. J. Hanbury moved that a letter be now written to Mr. E. N. Buxton. The motion was carried.

Oct. 17th, 1899.—HABITS OF MELIANA FLAMMEA.—Mr. E. M. Dadd exhibited two pupæ of *Meliana flammea*, and mentioned that the species hibernates as a pupa. The larva was said to be found feeding on sedge at night unconcealed.

CARADRINA AMBIGUA EARLY STAGES.—Mr. S. J. Bell, two larvæ, pupa and cocoon of *Caradrina ambigua* from Sandown, also a dark form of *Boarmia repandata* and *Spilosoma menthastri* aberrations *carbonacea* and *ochracea*.

TRIPHAENA VARS.—Mr. C. Oldham, one light *T. pronuba*, five *T. orbona*, one of which was identical with one of the forms figured in Newman, having two zigzag transverse lines across the forewings, and one had but a very faint discoidal spot on the hindwings, one *T. himbria* and also a dwarf *Pyramis atalanta*. All the specimens were from Woodford.

CHOEROCAMPA PORCELLUS BRED FROM THE EGG.—Mr. May, a series of *C. porcellus* bred from ova taken at Sandown. The moths were observed ovipositing on *Galium verum*. The eggs were laid singly, and from one to 25 on a stem. He also showed a *Polyommatus icarus* which had the appearance of *P. astrarche*.

OVA OF MALACOSOMA CASTRENSIS, ETC.—Mr. Bacot, ova of *M. castrensis*, of *Psilura monacha* and *Cnethocampa pityocampa*.

ADELID LARVA CASE.—Dr. Chapman, the case of an *Adelid* larva, *Nemotois fasciellus* from Mucking, and a specimen of *Arctia pudica* from Cannes, which was interesting from the habit of the larva remaining three months in the cocoon before changing to pupa. This specimen had spun up in April, had changed to pupa in August, and emerged at the end of September.

HISTER UNICOLOR.—Mr. F. B. Jennings exhibited a series of *H. unicolor*.

CLEORA LICHENARIA BRED.—Mr. J. A. Clark, a series of *C. lichenaria* bred from eggs received from the North.

LEUCANIA VITELLINA.—Mr. L. B. Prout, a fresh specimen of *L. vitellina* from Sandown, caught on September 5th last, and a long series of *Acidalia rusticata* bred from North Kent larvæ, all of which were half as large again as the normal size.

DISCUSSION ON OVA.—Mr. Prout suggested that the discussion might range round three points: (1) How to induce moths to lay eggs when captured; (2) Where to look for ova in the field; and (3) What use could be made of them, *i.e.*, what light did they throw on the grouping of moths, and would they help in the differentiation of species. Mr. May said he advised keeping for egg-laying a worn ♀ of any rare species, even if the insect was thus lost as a specimen. He remarked that the way he induced moths to lay was to put into the box with them split cork or muslin, and he had also found a piece of sponge especially useful, the moths inserting their ovipositors into the crevices. During the captivity of the moths moistened sugar was said to be palatable nourishment. Mr. Bacot had found that crumpled paper is often of use for grass-feeding moths, such as *Leucania littoralis*. Grass should be put into the boxes, as the ♀s will lay their eggs in the turned down edge of the withered leaf. Canvas will tempt *Amphidasys betularia* and *A. strataria*. He gave an instance where *Phlogophora meticulosa* was induced to lay from 2-3000 eggs by a course of feeding and starving alternately, but the eggs proved infertile. Mr. Nicholson spoke of the similarity of the eggs of *Triphaena pronuba* and *Naenia typica*, but said those of *N. typica*, the smaller moth, were double the size of those of *T. pronuba*. He recommended feeding the moths and also supplying them with moisture, while keeping them for egg-laying. It did not, he said, appear to be so necessary in the case of geometers, which generally lay at once in chip boxes, choosing any prominences there may be. These often lay their eggs in bunches, as if they did not move while laying. To get insects to deposit eggs he had sometimes put them into the cyanide bottle, allowing them to be just overcome by the fumes, and on release and reviving, found they dropped their eggs. He suggested this latter might be done as the effect of fright, lest they should die before providing for a succeeding generation. Mr. Bell mentioned a case where he had thought he killed a *Lasiocampa quercus* with oxalic acid, and after setting discovered it had laid eggs 24 hours afterwards. Some members thought this acid unsatisfactory for killing, but Mr. Clark recommended it if applied on a pin thrust into the junction of head with thorax on underside, and the point of the pin then given a turn downwards. In the case mentioned by Mr. Bell, he thought the acid had killed the ganglia in the thorax, but the abdominal ganglia being unaffected, and to a certain extent independent of the thoracic, the insect continued to protrude eggs. Mr. Prout spoke of *Deilephila livornica* laying nineteen eggs in a net when captured, attributing it to fright. Mr. Clark attested to the value of placing fresh pieces of the food-plant in with the imago as an inducement to lay. He cited *Chrysophanus phlacas*, with which he had been successful. Mr. May said in the matter of finding eggs as laid by wild insects, he had watched *Callophrys rubi* laying her eggs on the flower, buds of rock-rose, *Helianthemum vulgare*, and *Sphinx ligustri* on young shoots of privet. Liparids were said to be fond of laying their eggs near their old cocoons. *Triphaena pronuba* on exposed dry twigs, and even round galvanized wire. Mr. Dadd said he had been successful in obtaining eggs from *T. jimbria*, and had tried to humour *T. janthina* by placing string in the box with her. *Triacna tridens* and *T. psi* liked the presence of their food-plant, and *Leucania impudens* would lay a string of eggs along the edge of a blade of grass, if it were placed

in the cage. Mr. Prout had found that *Galium*, put in with *Melanippe rivata*, induced egg-laying. Three moths, in his experience, laid on this, and one which would not lay proceeded to do so when this plant was introduced. He felt it of importance to supply moisture for the ♀ moths, usually employing cotton wool saturated with water. He found Noctuids put off egg-laying as long as possible, perhaps waiting for their natural environment, and would at last lay all their eggs in a very short time. Some might be waiting for fertilisation. He once got 1500 eggs from a dilatory *Agrotis saucia*, but they were infertile. The eggs of *Cheimatobia brumata* and *C. boreata* were very different and easily distinguished. *Oporabia dilutata* has smooth eggs, which are laid in crevices, while *O. piligrammaria* has rough eggs, which are fastened to twigs. *Catocala sponsa* lays very far down the cracks of oak bark, while its near ally *C. promissa* lays on the bark. The eggs of *Hemerophila abruptaria* and *Biston hirtaria* are similar, those of *Himera penularia* are sugar-loafed in form, the smaller end adhering to the object on which they are laid. *Ennomos alniaria* lays her eggs in a line, *E. quercinaria* in a batch arranged tile-like. The eggs of *Dicranura rivula* are dome-shaped with a fine netting, whilst those of *D. erminea* are flat, of oak-spangle shape, and with an obvious netting.

Nov. 7th, 1899.—SCOTCH INSECTS.—Mr. Bacot exhibited a large number of insects from Scotland, including many specimens of *Hydroecia nictitans* var. *lucens* and *Cularia immanata*, also specimens of *Scoliopteryx libatrix*, *Cirrhoedia scampelina*, *Calocampa solidaginis*, *Oporabia piligrammaria*, *Celaena havorthii* (Argyllshire) and several *Erebia aethiops* from Isle of Bute.

BREPHOS PARTHENIAS.—Mr. May, specimens of *B. parthenias*, those from Wimbledon in some cases having the dark markings on the hind-wings, leaving rounded spots near the outer margin, while those from Theydon Bois had the band continuous across the underwing.

FUMEA CASTA AT WICKEN.—Mr. W. J. Kaye, cases of *F. casta* from Wicken Fen.

DYTISCUS MARGINALIS AT EDMONTON.—Mr. F. B. Jennings, living specimens of *D. marginalis* from Edmonton, also *Naucoris cimicoides*, a rather important addition to the Lea valley list of Hemiptera, and a larva of *Sialis lutaria*.

TRANSACTIONS FOR 1898.—The President announced that the *Transactions* for 1898 had been received from the printers.

PAPER.—Mr. F. B. Jennings read a communication on "Some marsh beetles of the Lea Valley." A hearty vote of thanks was accorded on the motion of Messrs. Dadd and Nicholson.

ON VARIATION OF CERTAIN SPECIES OF LEPIDOPTERA.—Mr. Bacot followed with a very minute study carefully worked out of the variation in broods of *Malacosoma castrensis*, *Aeglia putris*, *Spilosoma urticae* and *Cuenclia umbratica*. An interesting discussion followed, in which Messrs. Prout, Dadd, Mera and May took part, Mr. Jennings moving, and Mr. May seconding, a vote of thanks. The paper was illustrated by the broods in question (paper printed in *Transactions*).

NOTES ON EUPITHECIA CORONATA.—Mr. L. B. Prout read a communication on "Notes on *Eupithecia coronata*," Messrs. Kaye, Nicholson and Dadd contributing to the discussion, Messrs. Nicholson and Bate expressing the thanks of the members (paper printed in *Transactions*).

Nov. 21st, 1899.—*PAPILIO MACHAON* ABERRATIONS.—Mr. Clark exhibited specimens of *P. machaon* from Wicken, taken between June 10th and 17th, one having an extra black spot at the apex of the forewings. Dr. Sequeira, also a specimen taken in 1894, of abnormal form which he identified with aberration *watzkai*, Garb., mentioned in Tutt's *British Butterflies* under the description "an abnormal form in which the outer and inner margins are strongly bent inwards, making the wings narrower and smaller, and forming at the anal angle a deep inlet of elliptical form."

*AGROTIS SAUCIA* FROM SANDOWN.—Mr. May, several *A. saucia* from Sandown, picked out of a bred series from larvæ. One had a dark band on outer margin, and two were of the ab. *nigricosta*.

*PAPILIO MACHAON* AND ALLIED SPECIES.—Mr. Bacot, a large selection of *P. machaon*, including both captured and bred specimens, from Wicken and Norfolk. A series of *P. hospiton* was also shown, and this was said to be the Corsican form of *machaon*. A single *P. podalirius*, bred from a continental pupa, was very pale, but this was said to be the usual result obtained by those who breed *P. podalirius* in captivity.

COLLECTION OF PSYCHIDS.—Dr. T. A. Chapman, a collection of Psychids, including *Proutia betulina*, one taken in Epping Forest, continental forms, and one bred by Mr. Whittle, of Southend, *Bacotia sepium* and one which he believed to be *P. salicolella* from Epping Forest, bred by Mr. Prout, but this might prove to be a new and undescribed species.

*DYSCHORISTA SUSPECTA*.—Mr. Prout, specimens of *D. suspecta*, from Wimbledon and Aberdeen. He mentioned that Mr. Kaye had raised a question as to whether this species was congeneric with *D. fissipuncta*, as placed by Lederer. Mr. Prout also thought that the larva did not seem to be congeneric with that of *D. fissipuncta*.

*OPORABIA AUTUMNATA*.—Mr. Prout mentioned that misfortune had attended his breeding this species. A few interesting forms had hatched. The dates of emergence were from July 30th-November 14th, these being actually the offspring of the same parents, and having pupated at the same time. The difference of dates is wide enough to be interesting. Of two found feeding on pine, by Dr. Chapman, near Cannes, one proved to be ichneumonid and one was crippled, but showed itself to be a dark *autumnata*.

INTERFERENCE WITH COLLECTING IN EPPING FOREST.—A letter had been received from the Epping Forest Committee of the City Corporation, stating that in answer to the representations of the Society the keepers will be instructed not to interfere with entomologists in their pursuits, unless there is actual damage to the trees.

DISCUSSION ON *PAPILIO MACHAON*.—Dr. Sequeira remarked on the fact that in June last all stages of the butterfly were to be obtained at one time, *i.e.*, ova, young larvæ, fullfed larvæ, pupæ, and imagines. Mr. Prout suggested that anyone able to give proofs of its being double-brooded, or who could show that the pupa goes over two years, should do so. Mr. E. M. Dadd asked "why was this insect confined in England to the Broads and Wicken Fen"? The food-plant occurs plentifully in marshy places in several parts of England. In Germany he had found the imago on hill-tops. Mr. J. A. Clark confirmed the fact that in June, larvæ, pupæ, and imagines could be taken at one

time in Wicken. Dr. Sequeira said he had never seen the imago so late as in September. Mr. Bacot was of opinion it had a fixed hibernating stage, that of pupa. The larva feeds rapidly in sunny weather. Although he would have thought the Fens were bleak, yet after visits he came to the conclusion that in summer the marshy ground here absorbed much warmth, and the reason for *P. machaon* being limited in range he attributed to lack of sufficient heat elsewhere. He pointed out that the larva was first spiny and then smooth, indicating that it was specialised when first hatched, and had probably lost the primitive stage. Dr. Chapman had found on the continent that butterflies will fly to the top of hills, not because the larvæ fed there, but because they apparently like to be at the top, and will drive others away. He had noticed this habit in *Apatura iris*, *Papilio podalirius* and *Pyrameis atalanta*. Mr. W. J. Kaye had found the larva on wild angelica in England, and questioned whether the food-plant on which it occurs in the Fens was really ever wild carrot. He believed it to be *Pewcedanum palustre*, a species not unlike the wild carrot (*Daucus carota*). He thought there were three points remarkable about this butterfly: (1) Its wide range throughout the world, (2) its narrow range in England, (3) the fluctuations in the numbers of its occurrence. The scarcity of it in some years he attributed to its being too prolific. If it produces a second brood rather late in the season the larvæ are not able to feed up in time to change to pupa before the winter, and the following year's supply of imagines suffers. He also thought it was an insect requiring, besides great warmth in summer, also a sufficient amount of cold in winter. Mr. Nicholson spoke of the two colour forms of the pupa, and had obtained both in rearing his larvæ without being able to distinguish the determining cause. The wild pupæ were generally of the green and yellow form. Mr. Clark mentioned they pupate on reeds in the Fens, although they feed up on "wild carrot." Mr. Bacot had found a pupa on dwarf sallow. Dr. Chapman referred to Mr. Merrifield's recent experiments. If the larvæ were allowed to pupate on black sticks the pupæ were dark and were green if surroundings were made suitable for inducing this. The pupa was always one of these two well-marked forms.

Dec. 5th, 1899.—ANNUAL MEETING.—ELECTION OF MEMBERS.—Messrs. V. Eric Shaw, of 8, Moss Hall Grove, North Finchley, and C. P. Pickett, of The Ravensrofts, 52, Columbia Road, Hackney Road, N.E., were elected members.

MUD-WASPS.—Mr. Bacot exhibited some mud-wasps, believed to be *Rhynchium synaproides*, from Florida, and Witwatersand, South Africa, with a specimen of their mud-built egg-cells, which had been plastered up in the centre of a ball of string left for a time in a room of his correspondent.

LYCAENIDS FROM DOVER AND FOLKESTONE.—Mr. C. P. Pickett, a series of pretty forms of *Polyommatus corydon*, from Dover, and *P. bellargus* from Folkestone, also three *Pyrameis atalanta*, bred indoors, the last emerging December 3rd.

AUSTRALIAN PSYCHID.—Mr. H. A. Fuller, specimens of cocoons of the "house-builder" moth from Australia. These were probably the cases of a Psychid moth, referable to the genus *Clania*.

AGROTIS SAUCIA AB. NIGRICOSTA.—Mr. Prout, a long series of *Agrotis saucia*, from Sandown, with ab. *nigricosta*.

## SECRETARIES' REPORT FOR THE YEAR 1899.

The following Report was read by Mr. H. A. Sauzé:—

Twenty-four meetings of the Society have been held during the last year, the normal number according to our rules, unbroken by a failure to hold one even in the height of the summer, when it often happens many of our usual attending members are away from town at the same time, and when the temptation is strongest, to forsake the customary indoors gathering in this place, either to go collecting or to finish work resulting from that collecting. We touched low water mark in the matter of numbers at our second meeting in August, there being four only present on that occasion. The question is often started whether it is worth while continuing the holding of meetings during the summer months, but if I were to give my opinion as a member, and not as an official, I should certainly say it is better for the Society to hold the meetings, so that members may know there is still a rallying point if they wish to avail themselves of it. Our average attendance for the last year stands at fifteen, including our visitors, which is a slight decrease on the previous year. Out of our list of 67 members at which number we now stand, why cannot we get more than 22% to appear regularly here? Is it because we require a few members with theories so startling, audacious or exasperating, that shall compel attention, and call up all the reserves of the wit of the Society to combat?

The chief events of our past year have been the struggle to print "Transactions," a successful summer outing, and the representations to the Epping Forest authorities as to the interference of the keepers with the doings of the mild and virtuous entomologist. The Society is to be congratulated on having had its "Transactions" for 1898 duly printed, a work which of course falls into the business of the preceding year, and although our volume has been published uncommonly late in the year, it must be remembered that at the commencement of 1899 it appeared very doubtful if we could publish at all. By taking the charge off the income of the Society, and inviting the liberality of our staunchest members to form a separate Publication Fund, this printing has been accomplished.

That the summer outing was a success no one who was present will deny. A locality (Darent Wood) was chosen easy of access, and not too long a distance from London. Our conductor, Mr. W. I. Cox, had been collecting here from time to time, and knew this resort of the older London entomologists was not yet played out. He did everything in his power to make the outing as comfortable as possible by telling us our trains, and making the necessary preliminary arrangements for tea, and was rewarded by seeing fifteen persons attending, and the list of Macros captured was run up to 69.

The correspondence with the Epping Forest Committee of the City of London Corporation was undertaken at the instance of our member, Mr. Garland, who had been interfered with by a keeper in the Forest while collecting, who spoke to our member as if his tapping at the trees for larvæ could be interpreted as doing "damage." A reply in due course was received from the Town Clerk, announcing that the Committee had given instructions to the keepers not to interfere with entomologists in their collecting providing no actual damage was done to the trees, a reply which your Council looked upon as satisfactory.



The Curators report that there has been less demand this year on their services than last, both as regards the arrangement in the cabinet of donations, which only number 48 specimens for the year, and also as regards calls upon them for the inspection of the collection under their care. Six of the Society's cabinet drawers of lepidoptera were exhibited at the Hackney and East Middlesex Band of Hope Union Industrial Exhibition, our Curators taking upon themselves the responsibility of conveying them backwards and forwards.

The Secretaries have to thank many members for ungrudgingly contributing to the enjoyment and knowledge of the Society, by writing papers or making shorter communications, or starting discussions. The following list will remind us that we have had a good programme during the year, and the discussions which we have recently re-commenced have been well taken up, and that interest has been excited is apparent by the number of those joining in and sustaining them.

- 1898, Dec. 20. Pocket Box Exhibition, when unusually rich collections of specimens were brought up for members to admire and discuss.
- 1899, Jan. 3. Discussion, "Coast Insects," led by ... .. Dr. T. A. Chapman.
- " " 17. Society Business Discussion, "Can we publish Transactions for 1898?"
- " Feb. 7. Paper on the "Mollusca," by ... F. B. Jennings,  
F.E.S.
- " " 21. Paper, "Notes on *Spilosoma lubricipeda*," by ... .. A. W. Mera.
- " March 7. Paper, "Poisonous Plants in relation to Medical Jurisprudence," by ... .. F. Bouskell,  
F.E.S.
- " " 21. Paper, "The Life-History of *Oporabia (Epirrata) autumnata*, Bkh.," by ... .. L. B. Prout, F.E.S.
- " April 4. Paper, "Notes on the Relationship of Insects to Man," by ... .. A. Bacot.
- " " 18. Paper, "Coleoptera of Weymouth," by ... .. H. St. J. K. Don-  
isthorpe, F.E.S.
- " May 2. Paper, "Secondary Sexual Characters in Coleoptera," by ... .. H. Heasler.
- " " 16. Paper, "Nature's Scavengers"
- " Oct. 17. Discussion, "Ova."
- " Nov. 7. Communications: "Some Marsh Beetles of the Lea Valley," by F. B. Jennings.  
"On variation in broods of *Clisiocampa castrensis*, *Arylia putris*, *Spilosoma urticae*, and *Cucullia umbratica*," by ... .. A. Bacot.  
"Notes on *Fupithecia coronata*, Hb.," by ... .. L. B. Prout, F.E.S.
- " " 21. Discussion, "*Papilio machaon*."

We think it is to the advantage of the Society that we are to have

a change in the secretaryship, and are quite certain that in the persons of the two new Secretaries, Mr. W. J. Kaye and Mr. S. J. Bell, the Society will be the gainer, and we hope our members will support them as steadily, and with the same kindness as they have extended to us.

H. A. SAUZÉ } *Hon. Secs.*  
H. DONISTHORPE }

### PRESIDENTIAL ADDRESS,

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

the theme of which was :

#### OUR SOCIETY AND ITS WORK.

He claimed for the Society an unique position amongst those of the Metropolis in respect of the large amount of scientific work done relatively to the small membership, a position which was at once a source of pride and of anxiety; and he urged members to give that financial support which was needed for the maintenance of such a position. Reference was made to the commencement, in the recently published *Transactions* for 1898, of the long promised "London List" of Lepidoptera, and to the deep indebtedness of the Society to Dr. F. J. Buckell, M.B., both for the inception of this project, and for the excellent work which he put into his own department of the compilation. The suggestion was thrown out that the Coleoptera list, by Mr. H. Heasler, might well be published separately as one volume, by special subscription.

The remainder of the address dealt with the ordinary objects and conduct of the Society, and it was claimed that, in accordance with its name, entomology ought to have the first place, even if the words "and Natural History" might not advantageously be dropped altogether. The President thought also that there was room for more punctuality and more orderly procedure at the meetings, especially in connection with the passing round of exhibits, which he considered a most important part of the proceedings; and while expressing his intention of doing his best to secure an improvement in these respects, he begged every member to co-operate with him in maintaining perfect order, while any exhibit was announced, or other communication made. He had good hopes for the special discussions which were a prominent feature in the programme for the coming months; and he reminded the younger members in particular that an accurately *observed fact* was of just equal value whether communicated by the veriest tyro or by the most advanced scientist. He trusted that it would be remembered that we are all students together, and that none would be too diffident to add their mite to the common store of knowledge.

## PAPERS READ BEFORE THE SOCIETY.

### NOTES ON *SPILOSOMA LUBRICIPEDA*.

(Read Feb. 21st, 1899, by Mr. A. W. MERA).

In reading a few notes on *Spilosoma lubricipeda*, I am going over ground that has already been well trodden, but as I have recently bred some interesting forms of the species, both from Lincolnshire, and also from the strain originally started by Mr. Harrison, of Barnsley, I may be able to offer a few remarks of some interest. It would be useless to attempt any description of a larva so well known to all of us, but perhaps it would be as well to notice a phase connected with the egg of this insect when breeding it in for a generation or two; and that is, the number of eggs that do not hatch although apparently fertile. The whole batch of eggs will change colour, and will have every appearance of hatching, but only perhaps a third of the young larvæ will escape from the shell. This is doubtless owing to general debility through breeding in, and as far as the breeder is concerned it is much more satisfactory for the weakness to show itself in that stage than in any other. I have always found that when once the larvæ commence to feed they are then easy to rear.

Although *S. lubricipeda* is one of our commonest insects in the south of England, its range north is not so great as its congener *S. menthastri*, for apparently it is rarely taken even in the south of Scotland. I am told by Mr. Arthur Horne, of Aberdeen, who, as most of us know, is one of our most active Scotch lepidopterists, that he has never taken the insect in the north or east of Scotland, nor in fact does he ever remember seeing a Scotch specimen. Mr. J. J. F. X. King, of Glasgow, who has compiled a list of the lepidoptera of south-west Scotland, tells me that formerly it was taken in the counties of Bute and Ayrshire, but has not been recorded for some years past. Even in the extreme north of England its numbers appear to diminish, as the late Mr. J. Finlay called it rare at Morpeth. It occurs in the north-west of Ireland, where I believe it is not rare.

But the great interest in the species is caused by its wide range of variation, which until recent years had passed comparatively unnoticed. As most of us know there are three distinctly specialised forms of varieties which have been named *radiata* or *satima*, *choraci* and *fasciata*, and it appears that the counties producing these varieties are pretty well limited to Lincolnshire and Yorkshire.

The origin of our Yorkshire *radiata* from Mr. Harrison's stock has been a bone of contention to many, and doubtless the beautiful forms of *radiata* which are now so often to be seen in our cabinets, are the

result of breeding by careful selection. But when we place by their side specimens of *radiata* from the Lincolnshire coast, which if not from wild larvæ were only bred in once, I think we may well dispel from our minds the idea that the Yorkshire bred *radiata* must necessarily be of foreign origin.

There is little doubt that true *radiata* is now rarely, if ever, taken in Yorkshire in the wild state, as none of the records I have seen are of recent years. By the extreme kindness of Mr. Herbert Massey, of Manchester, who has entrusted me with one of his cabinet drawers, I am enabled to exhibit to-night, a remarkably fine series of *S. lubricipeda* all bred from wild larvæ collected from the neighbourhood of York, over a series of years, comprising forms both of *eboraci* and *fasciata*; but no true *radiata*, which that gentleman is convinced does not occur round York. This drawer also contains a long series of *S. lubricipeda* from the Manchester district, which show no marked tendency towards either *eboraci* or *fasciata*, in fact they are as near our London form as can be. There is one specimen among the series that deserves special notice, and that is a male with the coloration of the female, very suggestive of a case of hermaphroditism.

Some of the *eboraci* here exhibited from the Yorkshire wild larvæ, are very strongly marked, and it would take very little more darkening to make them *radiata*: but taking them as a whole, they are certainly different, and deserve their varietal name. There is one point of difference which appears striking, and that is, that the underwings are not so dark as some of the Lincolnshire intermediate forms, more particularly in the females. There is another unusual specimen among the Yorkshire *fasciata*, the ground colour being much darker than the type.

In speaking of *eboraci* as the York form of *lubricipeda*, it must not be understood that this represents the usual form taken there; for I learn from Mr. W. Hewett, of York, that certainly not more than 5% of the larvæ taken round York produce *eboraci*; and not more than 1% would produce *fasciata*, and this fact is fully borne out by Mr. Jackson, of York, who has had many thousand larvæ through his hands. This shows that really fine *eboraci* or *fasciata* are very difficult to get from wild larvæ.

It was by the kindness of the Rev. G. H. Raynor, that I have had the opportunity of breeding the insect from the Lincolnshire coast. The first batch of larvæ which I had were wild ones, and as from that locality they are exceedingly liable to ichneumonous, I only succeeded in rearing one, which produced an almost typical specimen. After that Mr. Raynor was again so good as to send me larvæ from two different pairings, one lot from strongly marked parents, and the other, a small lot, from a pairing of *radiata*. Both batches produced specimens of very wide variation, but the best Lincolnshire *radiata* that I bred was from *radiata* parents. I succeeded in pairing them once again, but only from the first mentioned strain, namely, that of the strongly marked parents, and this time it was a most haphazard pairing, without any careful selection, the male in particular being almost typical, and the female with nothing more than indications of *radiata*. But the result was very satisfactory, for although I bred a very large majority of the type, there were some very striking variations among them. With these, as with Mr. Harrison's strain of *radiata* they produced

a partial second brood; and it appeared to me that those specimens emerging in the autumn produced more aberrations than those lying over until the spring. There is one autumnal form in the female, which has a row of dots running through the underwings, producing almost a pencil line. This form I did not observe in those that emerged in the spring.

There is another series of nine specimens in the same drawer, which I bred from larvæ given me by the Rev. C. R. N. Burrows, who told me they were sent to him by Mr. Hewett, of York, and were the product of selected best forms of *fasciata* for three generations, but the result can hardly be called satisfactory as showing any great tendency to heredity, for although some of them are strongly marked forms, they appear to have entirely lost their *fasciata* form, and to be rather inclined towards *choraci*, while four out of the nine specimens are typical.

The majority of specimens in my own cabinet are from the Harrison strain, and besides showing strongly marked *radiata* and *fasciata*, I think I am right in saying that some correspond entirely with *choraci*, while others are clearly intermediate forms, showing some very pretty results. The whole series was started from eighteen larvæ which were kindly sent to me. The parents I did not see; but as it is shown here they must have been a considerably mixed race. I bred them in once or twice, but not in the numbers one might have expected, the race soon becoming very weak, and the specimens produced small. I was unable to cross them with wild *S. lubricipeda*, as they invariably came out before any wild ones were to be seen out-of-doors; otherwise I might have kept the strain longer; but they finally refused to pair, and the breed was lost. With these, as with the Lincolnshire race, some of my darkest specimens came from those that emerged in August, producing the partial second brood, notably the two specimens with dark thoraces and chequered fringes. These were the only two I bred of this form. I was not able to continue the race long enough to produce some of the darkest forms sometimes bred, with entirely black fringes; but I have had sufficient experience to show that with careful selection great results could be obtained. In one of my broods there was a curious instance of reversion. I had been pairing true *radiata* and the offspring all followed the parents with the exception of three specimens, which produced three of the finest *fasciata* I have. I was at no time able to get a pairing of *fasciata*. With my experience of the London form of *S. lubricipeda*, which has extended for a good many years, I have never seen anything that could be called really an aberration, and the three specimens labelled London district are the most strongly marked I have ever taken, all inclining rather towards *fasciata* than anything else. I have also bred the species from Southend, and this brood produced no dark forms whatever, and the only specimen at all remarkable is an almost spotless one, the hindwings being quite free from spots. There are a few more specimens worthy of note and these came from the north-west of Ireland. They are not at all strongly marked, and the male is rather yellow. My series, however, is a very short one, but I am told in a long series the yellowness of the males is very striking.

I believe there are still some entomologists that hold the opinion

that *radiata* is a distinct species, and they support their views by instancing the fact that *radiata* is double-brooded, whereas *S. lubricipeda* is not, but I think the fact of having bred a second brood of *S. lubricipeda* from Lincolnshire, should go far to dispel these views. Certainly my Lincolnshire larvæ produced *radiata*, but only in a small minority, by far the greater number bred being typical. I have no direct evidence of *S. lubricipeda* being double-brooded in a wild state, although I took a larva as late as November 9th, 1879, and the perfect insect as late as July 15th, 1898, but both those seasons were noted for the late emergence of insects generally, and probably in each case they were retarded owing to the season.

There is another point of speculation which has been raised, and that is the reason why *radiata* has only occurred on the Lincolnshire coast and in Yorkshire, and a suggestion has been made with some grounds of plausibility, *viz.*, that specimens of *radiata* may have migrated from Heligoland, where *radiata* is said to be the type, to the nearest point on our shores, and that heredity still evinces itself. My own opinion would rather be that the climatic influence that produces *radiata* in Heligoland is in some degree the same that we find in our north-eastern counties. One of the earliest records of *radiata* in Lincolnshire that I am able to find, was as far back as 1837, the specimens were taken by Mr. Mossop, and I believe in very much the same locality as the most recent specimens have been found, and it would appear that any hereditary influence would become lost if climatic influence did not in itself produce the form.

Before concluding I must thank those gentlemen who have so promptly furnished any information I have asked for, and my thanks are particularly due to Mr. Massey, who specially brought up his cabinet drawer from Manchester, in order that I might the better illustrate my paper, and without which my exhibit would not have been nearly so complete.

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## POISONOUS PLANTS IN RELATION TO MEDICAL JURISPRUDENCE.

(Read March 7th, 1899, by FRANK BOUSKELL, F.E.S., F.R.H.S., &c., Deputy Coroner for South Leicestershire).

When we consider the number of poisonous plants there are, it is rather remarkable, how few have been used for purely criminal purposes; but on the other hand, a much larger number of plants have been the subject of Coroners' inquiries, through having been administered or taken by mistake, or by pure accident.

In considering the question perhaps it would be as well to divide the cases to which we shall refer under three heads:

- (1) Those plants which have been used for criminal purposes.
- (2) Plants which have been used by mistake for culinary or medicinal purposes.

(3) Plants taken by children and others by accident (such as attractive berries).

With regard to the second and third classes we are afraid a very large number of cases of loss of life and serious illness are due to either gross ignorance or culpable carelessness, which a slight knowledge of our common poisonous plants might have averted.

Let us consider what a poison is; of course, we all know, but cannot define it. There are many definitions, but the following will probably answer our purpose: "A poison is any substance or matter, which, when applied to the body outwardly or in any way introduced into it without acting mechanically, but by its own inherent qualities can destroy life" (a). This is a medical definition, but the law takes no notice whether a substance acts mechanically or chemically, it is sufficient so far as the responsibility of the person administering it is concerned, that it is capable of destroying life or injuring health.

The wording of section 11 of the Criminal Law Consolidation Act, 1861 (b), is very clear on this point, and prevents technical objections being raised. It runs "whosoever shall administer or cause to be administered, or to be taken by any person any *poison* or *other* destructive *thing*, &c." This covers anything which might have injurious effects whether acting chemically or mechanically.

For our purpose then we will take the broad view and include any plants which may act mechanically.

In considering the various plants under the above heads, owing to their number, our notes must of necessity be brief.

#### PLANTS USED FOR CRIMINAL PURPOSES.

The first to notice is one of our deadly poisons, found in most gardens, the aconite or monkshood (*Aconitum napellus*). This plant has been the agent employed in several murders. The first case recorded is from Ireland (c). The aconite was supposed to have been mixed with some greens by the prisoner, but no traces of the plant were discovered, and it was only by the closest analysis of symptoms and post mortem appearances that the charge was sustained. The medical evidence proved only too true, for the prisoner, after conviction, confessed that the powdered aconite root had been mixed with pepper and sprinkled on the greens.

Aconitine, the alkaloid of the plant, was the agent employed in the celebrated Lamson case (d). There Dr. Lamson was only convicted of the murder of his brother-in-law after a most lengthy trial and numerous experiments on animals by the medical experts.

Laburnum (*Cytisus laburnum*) was the subject of a manslaughter trial at Inverness (e). Here a youth, by way of a practical joke, put some laburnum bark into his fellow servant's broth and unfortunately killed him.

The Water Parsnip or Hemlock Water Dropwort (*Oenanthe crocata*) was used in France for criminal purposes by mixing slices of the root

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(a) Guy and Ferrier, For. Med.

(b) 24 and 25 Vict., c. 100, Sec. 11.

(c) R. v. McKoukey, Monaghan Lent Ass., 1841.

(d) R. v. Lamson, C.C.C., March, 1882.

(e) Ed. Med. S. J., October, 1843.

in soup. The objectionable taste caused the frustration of the intended murder. The prisoner was convicted of the attempt (a).

The Common Laurel (*Prunus lauro-cerasus*) was the subject of a murder trial in 1781 (b). In that case the prisoner substituted two ounces of laurel water for medicine, which was equal to nearly  $2\frac{1}{2}$  grains of pure prussic acid. As might be expected the patient died within half an hour of taking the draught.

The Common Spotted Hemlock (*Conium maculatum*) was used at Ipswich in a murder case (c), the prisoner, however, was acquitted for want of evidence. It was also used in a case at Dessau (d).

The Deadly Nightshade or Belladonna (*Atropa belladonna*). The alkaloid of this plant atropine has been used in two criminal cases, in neither of which was a conviction sustained (e).

Tobacco (*Nicotiana tabacum*) and the other cultivated species and varieties, *N. affinis*, &c., have been used for many criminal purposes, drugging liquors, &c.; and in Belgium nicotine was the subject of a murder trial (f). The residue left in pipes is a very strong poison, a child has been killed by sucking an old pipe, yet we have found in the country that it is a common practice to give children pipes to play with. A small portion of nicotine out of a pipe will kill a snake in about 30 seconds. We have tried it on adders in the New Forest, so you can imagine children not doing well on it.

The Thorn Apple (*Datura stramonium*) and other allied species are favourite poisons in the east, the Indian Thugs are specially partial to it, and not long ago it was used extensively in Germany and Paris to cause loss of consciousness preparatory to the commission of various crimes. The flowers of some species will produce faintness, especially in a small room, but the heavy scent might be a warning. A case of *Datura* poisoning is recorded from Osnabruck (g).

A number of plants have been used for improper purposes, and have so become the subject of criminal proceedings, of these we will mention a few.

Yew (*Taxus baccata*) has been used on several occasions, the alkaloid taxine being a severe irritant. Animals have also been poisoned by it, owners of gardens with yew-trees overhanging fields should be careful, for he who plants a dangerous thing within reach of his neighbour's cattle is liable for any damage ensuing (h).

Rue (*Ruta graveolens*) has also been used and is frequently employed in France (i).

Ergot of Rye (*Claviceps purpurea*). This fungus which appears on the rye in damp seasons is well known for its use for criminal purposes, many cases are recorded (j).

(a) Gaz. Méd., January 3rd, 1846.

(b) R. v. Donellan, Taylor Poisons, 717.

(c) R. v. Bowyer, Ipswich Sum. Ass., 1848.

(d) Guy and Ferrier, 582.

(e) R. v. Sprague, Exeter Aut. Ass., 1848. R. v. Stoe'c, Nanchester Lent. Ass., 1872.

(f) Ann. d' Hyg., 1851, vol. 2, p. 187.

(g) Taylor Poisons, 785. Christison, 841.

(h) Crowhurst v. Amersham Burial Board. 4 Ex., D. 5.

(i) Taylor Poisons, 783.

(j) R. v. Calder, Exeter Lent. Ass., 1844. R. v. Baddeley, C.C.C., July, 1877.



Sain ( *Juniperus sabina* ) has also been used for the same purposes ( *a* ).

Pennyroyal ( *Mentha pulegium* ). This innocent herb was used in one case, but it is doubtful whether it really has any injurious properties ( *b* ).

Tansy ( *Tanacetum vulgare* ). This plant has been used in the United States, in several cases with fatal results, many other plants and herbs have been used improperly, both Digitalis and Belladonna, and according to Professor Tidy the following must be looked upon with suspicion: hellebore, *Actea racemosa*, *Liquum vitæ*, tansy, wormwood and mugwort ( *Artemisia vulgaris* ) ( *c* ).

The Foxglove ( *Digitalis purpurea* ) has been the subject of several manslaughter cases when given by quacks. From these cases it will be seen that upwards of twenty plants have been used for criminal purposes. Doubtless many poisons are used in India and the East which are almost impossible to discover and hence a number of crimes pass unpunished. Possibly cases pass undetected here, but analysis and experiments with animals, as in the Lamson case, must act as a deterrent. Great strides have been made in this direction since Palmer was convicted after a lengthy and sensational trial of poisoning with strychnine, but on the other hand, many supposed criminals have been acquitted for want of sufficient evidence. Many vegetable poisons are most difficult to detect, some being almost impossible to find out, to wit, some of those used by the Jujin men on the West Coast of Africa, but in nearly all cases the most careful and delicate analysis is necessary, and even where the poison has not been detected, experiments on animals, which produced the symptoms of the poison suspected, have led to convictions. Of all cases of murder the law considers that by poison the most detestable, because it can, of all others, be least prevented by manhood or forethought. It is a deliberate act necessarily implying malice, however great the provocation may have been. Luckily the percentage of murders by poisoning, is very small, only about 5% we fancy.

#### PLANTS WHICH HAVE BEEN USED BY MISTAKE FOR CULINARY OR MEDICINAL PURPOSES.

This class is rather a large one, and when we look at the large number of plants which have caused fatal results through gross ignorance and carelessness one wonders that in these days of education it should be possible for such cases to occur.

Lately we have had occasion to visit a good many of our local schools, both National and Board; we find on the walls excellent plates of British birds, and others showing the cocoa and other useful plants, but never have we met with one showing common poisonous plants to be avoided. Perhaps there may be such, but at any rate from enquiries we have made they are not in general use ( *d* ). If the Board of Education would forego a few yards of red tape and cause a little of

( *a* ) R. v. Phillips, C.C.C., February, 1885. R. v. Pascoe, Cornwall Lent. Ass., 1852. R. v. Moore, Northern Circuit, December, 1853.

( *b* ) R. v. Wallis, 1871. R. v. Collins, Chelmsford, Aut. Ass., 1820.

( *c* ) Tidy Leg. Med., p. ii., p. 160.

( *d* ) Since this was written we have come across *one* chart of Poisonous Plants, that in a town school.

this useful branch of botany to be taught instead of many less useful subjects, it might be a means of preventing such frequent occurrence of these distressing cases which so often form the subject of a Coroner's inquiry.

Aconite (*Aconitum napellus*) or Monkshood, is responsible for many deaths. The root has been served up for horseradish, notwithstanding its disagreeable odour, which is most unlike the pungent mustardy smell of the latter. The leaves have been eaten for parsley, but how on earth that mistake arose it is difficult to conceive. A decoction has been taken by mistake for a cordial, and also been administered accidentally for medicine. Anyone can distinguish the root, it is conical with a number of conical fibres, and it is not unusual to find one or two pear-shaped tubers attached by narrow necks to the upper part of the root. The root of horseradish should be familiar to all, the difference in colour is quite enough to distinguish it, aconite being nut-brown, and horseradish buff colour, to say nothing of the smell before alluded to. The Bhils of the Himalayas use a species of aconite (*A. ferox*) to poison their arrows and spear-heads, whether game killed in that way would have any ill-effects, we cannot say, anyhow, it would be in a very diluted form.

Henlock (*Conium maculatum*) has been served in soup and taken in mistake for parsley, with fatal results, and recently the seeds have been used in mistake for celery seed, and also for aniseed.

The Water Hemlock (*Cicuta virosa*). The roots have been served as parsnips, the leaves for celery. It has been described as by far the most active of our poisonous plants, and is considered to have supplied the far famed Athenian poison (*a*). It is very dangerous for cattle, and in some localities it is known as cowbane.

The Water Parsnip or Water Dropwort (*Oenanthe phoellandrium*). The roots have been taken as parsnips, causing death.

The Narrow Leaved Water Parsnip (*Sium angustifolium*) is common in brooks in the south, and the leaves have been taken in mistake for watercress, with fatal results. The terminal leaflet of watercress is larger than any of the others, whilst in the water parsnip it is smaller. This would prevent mistakes if generally known.

The Fool's Parsley (*Aethusa cynapium*) has been eaten for parsley, the roots for young turnips. The leaves are not unlike badly grown parsley, but finer and of a darker colour, it can easily be distinguished by the beard or three long pendulous leaves of the involucre under the flower, and in its earlier stages by the pungent odour of the leaves when rubbed.

The Black Hellebore or Christmas Rose (*Helleborus niger*) belongs to a poisonous genus, its roots have been taken by mistake for rhubarb, and quacks or herbalists have given it with fatal results.

The Stinking Hellebore (*H. foetidus*) and white Hellebore (*Veratrum album*) have both caused death through mistake.

Henbane (*Hyoscyamus niger*) is a dangerous plant, its leaves and roots have been cooked as articles of diet with disastrous results.

The Potato (*Solanum tuberosum*), generally looked upon as the most useful and innocent of plants, has on occasion belied its character.

(a) Stephenson and Churchill, Med. Bot., vol. ii., p. 89.

The green berries have proved fatal, and tubers grown exposed to the air have caused illness, and undoubtedly are unwholesome.

The Common Nightshade (*S. dulcamara*), one of the nearest allies to the potato, has been taken by mistake. Its berries are very poisonous, the black berries of *S. nigra* are still worse, and the whole plant is poisonous.

Foxglove (*Digitalis purpurea*) and other introduced species are all bad. Herbalists have dabbled with this plant to the cost of their credulous patients.

The Meadow Saffron or Autumnal Crocus (*Colchicum autumnalis*), a pretty but dangerous plant, is found in bloom in our meadows in September and October. The bulbs and spring shoots have been eaten by mistake for onions, the leaves and decoctions of the flowers have caused death.

The Caper Spurge (*Euphorbia lathyris*) is exceedingly dangerous in the fresh state, but when pickled is used as a substitute for capers, although it is questionable whether it is a wholesome article of diet.

Dog's Mercury (*Mercurialis perennis*) has been used fatally as a pot herb.

The Common Sorrel (*Rumex acetosa*), a favourite addition to salads, sauces, &c., on the continent, whilst quite wholesome in moderation, has, on account of the large quantity of binxolate of potash it contains, caused serious illness when taken in excess.

The Common Elder (*Sambucus nigra*). Who has not heard of (or perhaps felt) the effects of elder wine for the head? Elder-flower water in some villages is supposed to be highly beneficial to the complexion, at the same time an infusion of the berries without fermentation is reported to have caused serious illness, although, as far as we are aware, when ripe they contain no noxious properties. The leaves and flowers are irritants, and have caused very severe illness (a). A case ended fatally through taking the sap from the roots (b).

The Dwarf Elder (*S. ebulus*) has caused death.

The Great Water Parsnip (*Sium latifolium*) has been eaten in mistake for watercress, and caused instant death.

The Common Laurel (*P. lauro-cerasus*) before referred to, has added many cases to the accidental list, the leaves often used in custard, when overdone by ignorant cooks have caused illness, whilst the fruit and decoctions of the leaves have caused death. Entomologists know how powerful the leaves are, especially the young growth which contains a large amount of prussic acid. Another plant with the same active principle is the peach. Christison gives two instances of poisoning by the flowers, in both cases they were taken for medicinal purposes, the kernels of course contain a quantity of prussic acid, and if eaten in excess might very easily prove fatal.

Cherry Kernels (*Prunus avium*) when eaten in quantities have also proved fatal.

The Celandine (*Chelidonium majus*) according to Stephenson and Churchill, has caused many deaths.

The Sweet Violet (*Viola odorata*) contains a poisonous substance with emetic properties. Injudicious use has caused illness.

(a) Ed. Med. and Sur. Jour., xxxiii., 73.

(b) Med. Gaz., xxxv., 96.

Poppies, white, red and yellow all contain poisonous properties. The heads of the white poppy grown here contain meconate of morphia, and numerous cases of poisoning have occurred by the use of syrup of poppies, many children having lost their lives through its use. When a child is teething, in some districts it is a common practice to give this (or Godfrey's cordial, which is worse, as it contains more morphia); a few convictions for manslaughter might check it. In one case two poppy heads were boiled in a quarter of a pint of milk, two small spoonfuls of this was given to a child, and it was quiet for ever. In another case two tea spoons of a decoction from one poppy head was given by a nurse to quiet a child. The child died the next day.

The Ranunculus family mostly contain acrid and noxious properties. The meadow crowfoot (*R. acris*) has caused death.

Black bryony (*Tamus communis*). The roots contain an irritant principle bryonine. In several cases where prescribed medicinally it has ended fatally.

The Thorn Apple (*Datura stramonium*) has been taken accidentally as well as criminally. An infusion of the leaves has been taken in error for Senna tea, and also for horehound, with fatal results. It has also been added to salads. The alkaloid is daturia.

Hedge Hyssop (*Gratiola officinalis*) has been given by quacks, causing death. The poisonous principle is known as gratioline.

MILK.—Another point which may be here considered is that of cattle feeding on certain plants, and their milk thereby becoming poisonous. The hedge Hyssop (*G. officinalis*), several Spurges (*Euphorbiæ*) are supposed to have caused this, and according to Taylor it is now generally admitted that milk may be so poisoned. There can be no doubt that when cows feed on garlic, wormwood, sow-thistle, and even on cabbage, the taste of the milk or butter is affected (how, we will leave to recent research in bacteria and buttermaking to explain). A case is reported from Aurillac, in France, where sixteen persons were seized with violent sickness after drinking the milk of a goat. It was never discovered what had caused the poisonous action. There was a quantity of *Euphorbia esula* growing on the pasture, and it was surmised that the goat had been eating this plant.

POISONED FLESH.—Some cases of poisoned flesh are recorded in North America. Pheasants which had been feeding on the buds of *Calnia latifolia* have caused severe illness (a). The flesh of hares which have fed on *Rhododendron chrysanthemum* is considered dangerous. We came across a case under this head. In the severe winter of 1895 a hare was sent to some people. The whole family who partook of it became severely ill, and mind it was quite fresh—no question of ptomaine poisoning arising. We should say that in all probability that hare had been indulging in some poisonous garden-plant. In France, snails which had fed on *Coriaria myrifolia* poisoned a whole family (b). It is also known that honey from bees fed on rhododendron, calnia, azalea, datura and other plants, acts as a poison, causing severe illness (c).

(a) Becks. Med. Jur., 854.

(b) Gaz. Méd., Oct., 1842.

(c) Taylor Poisons, 166.

POISONED BREAD.—Bread has been poisoned by:—(1) The introduction of the grain of our only poisonous grass, darnel (*Lolium temulentum*). (2) Rye bread on the continent, by the introduction of the fungus ergot of rye (*Secale cornutum*), which develops on grain grown in wet seasons. (3) The flower from seeds of *Lathyrus cicera* and *Errum ervilia* (bitter vetch) in some places added to bread; where more than one-twelfth part of it is used, it becomes highly dangerous. (4) Mould. Sometimes mould grows spontaneously on bread (*Penicillium roseum* and *P. glaucum*), the former being a red and the latter a green mould. Such bread, according to Taylor, is highly dangerous, and may actually cause death, the red forms being the worst.

*Fungi*.—Everyone or nearly everyone eats mushrooms—mushrooms being poisonous must be referred to—we do not mean to say that the toothsome morsels one buys are bad, but that they may be for all the average person is able to tell us. In a paper like this there is only room to refer to a few species which have caused death or serious results.

The Common Mushroom (*Agaricus campestris*) when decayed has caused poisoning, and in one case a woman died within twenty hours after eating them.

The Morel (*Herella esculenta*) has caused serious illness, a case is recorded where six persons were poisoned by partaking of them.

The Yellow Coloured (*Amanita citrina*) has also caused death. Most fungi growing under trees are dangerous, and a case is mentioned of a boy eating two fungi (sp.?) from under a tree and dying within 44 hours. *A. pantharina* and *A. muscaria* have both caused death and serious illness. *Agaricus phalloides*, which has no unpleasant smell when fresh, is one of the most dangerous. The common truffle (*Morchella esculenta*), so often found in turkeys and other like places, has given rise to severe symptoms of irritant poisoning.

It is a curious fact that the poisonous properties of mushrooms vary with climate, and probably with the season of the year when gathered. Some persons also are liable to be seriously affected, even by species generally regarded as wholesome (just as shell-fish affect persons differently). Our common mushroom is regarded as poisonous in Italy, whilst many of our poisonous species are eaten with relish in Russia. According to Guy and Ferrier, there are few, if any, edible fungi which ordinary people can be trusted to distinguish from poisonous ones. Even when two kinds are contrasted in plates faithfully drawn and coloured, some care is needed to distinguish one or two species from others which resemble them. Nor can the general rules which have been laid down by our worthy grandmothers for the detection of bad species be relied upon. Their silver spoons were (and are) all very well on a table, but quite useless as a test. Colour is quite indecisive, and some of the most dangerous are void of any unpleasant smell when fresh, though the most wholesome may be offensive when old. We shall be on the safe side, however, in rejecting all that have an offensive or repulsive odour and those which present a bitter taste, burning and parching of the throat, those, too, which have a livid hue and assume various colours when broken or bruised. Experience is the only safe test, and no one should try species incautiously; with whose character they are not thoroughly

acquainted. For persons with only a slight knowledge of fungi to try new species is hardly worth the danger. Dr. Cooke's popular work on fungi will help us to distinguish many, but these remarks are intended only for those who have no special botanical knowledge.

PLANTS WHICH HAVE BEEN EATEN BY CHILDREN BY ACCIDENT.

As several cases quite recently have come under our personal view in this division, we must briefly mention a few dangerous plants.

Yew (*Taxus baccata*). A most attractive and dangerous plant, which is accountable for many victims. The red covering of the berry is harmless, but the kernel or seed is very poisonous. A fatal case occurred at Lubbenham, Leicestershire, in 1892, of children eating the young shoots in the spring.

Laburnum (*Cytisus laburnum*). Both seeds, flower and bark have caused fatal results, children seem specially attracted by the shining vetch like seeds. We ourself have made children throw the flowers out of their mouths.

The Bryony (*Bryonia dioica*). The red berries, in the autumn, of this plant have been taken by children, red seems to have a fatal attraction, no warning colour for them.

The Spindle Tree (*Euonymus europaeus*), from which the gypsies make their bunches of wooden skewers, is another handsome shrub with large bunches of bright crimson berries, these are decidedly dangerous.

The Holly (*Ilex aquifolium*). The berries are dangerous, and a case of serious illness is recorded through eating them.

The Guelder Rose or Snowball Tree (*Viburnum opulus*). The red berries are dangerous, a fatal case is recorded by Stevenson.

The Privet (*Ligustrum vulgare*). The black berries of the autumn have killed children, and the shoots are exceedingly dangerous.

Common Nightshade (*Solanum dulcamara*) before mentioned, the red berries have poisoned children.

The Mezerion or Daphne (*Daphne mezereum*), the earliest flowering of our garden shrubs, pink blooms appearing before the leaves, the red berries are most dangerous, many cases of children taking them have occurred.

The Deadly Nightshade (*Atropa belladonna*). The luscious-looking berries and flowers have caused several deaths, fortunately this plant is by no means generally common, although on the Cotswolds and in Hertfordshire it is not scarce in places. The berries have been sold in London streets for fruit, and, as might be expected, killed the children eating them.

Herb Paris (*Paris quadrifolia*) a common plant in some woods, Stephenson and Churchill record a case of a child being killed through eating the berries.

The Mountain Ash (*Sorbus aucuparia*) a curious case occurred at Oadby, Leicestershire, in July, 1893. A child aged five swallowed a lot of the berries, and subsequently died. At the inquest the medical evidence was to the effect that death was caused through irritation caused by eating the berries followed by convulsions. The seeds are very rough and set up inflammation, death ensued from the mechanical action, and it was given in evidence that the berries are not poisonous. Everyone knows that the bark, roots, flowers and young leaf-buds of

this tree are poisonous, and contain prussic acid, if anyone doubts let them crush a little bark, the smell is nearly as strong as laurel, it generally follows in similar cases that the fruit or rather the seed, or kernel, exclusive of pulp, contains the poison in a concentrated form, hence we may take it that mountain-ash berries are poisonous from a chemical definition point of view.

The Petty and other Spurges (*Euphorbia peplus*, *E. helioscopia* and *E. amygdaloides*) have all been eaten by children, and in some cases death has ensued.

Lords and Ladies Arum (*Arum maculatum*), the commonest of hedgerow plants. Flowers, leaves and berries have all been eaten by children, several fatal cases are recorded. Amongst the plants which we have before mentioned, which have also unfortunately poisoned children are Wood Sorrel (*Oxalis acetosa*), *Cicuta virosa*, *Oenanthe crocata*, *Datura stramonium* and *Sium latifolium*. Only this last summer we saw a boy of about six with a flower stem of this plant in his mouth, we of course made him discard it, and frightened his companions well. In conclusion it might not be out of place to mention a few noxious plants to be barred, which might cause illness or death, if they have not already done so. It should be understood that the plants we have mentioned are some of our worst examples, but in a paper like this, it is impossible to give every plant.

#### PLANTS TO BE AVOIDED.

The Crowfoot family, except *R. auricomus*. The juices and bruised leaves of *R. sceleratus*, *R. bulbosus* and *R. acris* contain irritant properties, the leaves of *R. acris* will blister the hand if crushed. The Anemone (*A. nemorosa*, *A. pulsatilla*, *A. pratensis*, &c.), possess poisonous properties. The Wild Clematis or Traveller's Joy (*Clematis vitalba*) is more or less poisonous. The Marsh Marigold (*Caltha palustris*) may in certain localities contain poisonous qualities, but in this country they are of a mild character. The Yellow Stonecrop (*Sedum acre*) contains in its fleshy succulent leaves irritant properties. The Meadow Rue (*Thalictrum flavum*) is certainly poisonous, so is the Purgine Flax (*Linum catharticum*), which should never be taken by people who are not properly acquainted with its properties. The Horseradish (*Cochlearia armoracea*) contains irritant properties, and Wild Celery (*Apium graveolens*) is more or less poisonous, the blanching in cultivation deprives the plant of its injurious properties. The Wood Sanicle (*Sanicula europaea*) contains similar properties. The Wild Lettuce (*Lactuca virosa*) contains highly dangerous qualities. The Bindweed (*Convolvulus sepium*) contains in its roots and leaves a poisonous principle. The Bluebell (*Hyacinthus non-scriptus*) contains noxious properties, as do the Lent Lily (*Narcissus pseudo-narcissus*) and the numerous cultivated varieties. Delphinium or Larkspur, of various species, are decidedly dangerous. The Cyclamen (*Cyclamen europaeum*), the Fritillary or Crown Imperial (*Fritillaria imperialis*), common in all old fashioned gardens is bad. The Plumbago (*Plumbago europaea*) generally seen in greenhouses, has dangerous properties. The Rhododendron (*R. chrysanthemum*) is well known for its poisonous properties. Lobelia is another dangerous genus. The Soapwort (*Saponaria officinalis*), a common garden plant, Pink Root (*Spigelia marylandica* and *S. californica*) are both poisonous. The Meadow

Pimpernel (*Anagallis arvensis*), Wild Chervil (*Chacrophyllum sylvestre*), Mountain laurel (*Cornia latifolia*), and very many other plants, are dangerous.

In conclusion we must admit it is somewhat of a large subject to treat in a small paper with any success, and we can only say that if any of the facts we have recorded lead indirectly to a greater interest being taken in our poisonous plants, we shall have been amply repaid for our labour.

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## THE LIFE-HISTORY OF OPORABIA (EPIRRITA) AUTUMNATA, Bkh.

(Read March 21st, 1899, by LOUIS B. PROUT, F.E.S.).

The notes which I propose, under the above title, to bring before this Society this evening, may be regarded as supplementary to the general paper on "The Genus Oporabia," which I read here on May 4th, 1897, and of which the more important part was published in the *Entom. Record*, ix., pp. 247, 282, 315, readily accessible to our members.\*

1. In *Entom.* xxx., p. 234 (Sept., 1897), Mr. Kane records what is obviously the true *autumnata*, Bkh., under the name *autumnaria*, Gn., as occurring near Belfast.

2. In *Ent. Rec.*, x., p. 93 (April, 1898) I wrote some critical notes on the synonymy, the gist of which was that *autumnata*, Bkh. = *autumnaria*, Weav. = *addendaria*, White = *approximaria*, Weav., and that the specific distinctness herefrom of *autumnata*, Gn., no. 1334, pl. 18, fig. 7, and of *jiligrammaria*, H.S., still remained doubtful.

The life-history which I have worked out does not prove *Epirrita autumnata* to be a species absolutely distinct from *E. jiligrammaria*; probably the two stand in just about the same relationship as do many of our other most puzzling pairs of forms, e.g., *Anthrocera trifolii* and *palustris*, *Lasiocampa quercus* and *callunae*, *Tephrosia bistortata* and *crepuscularia*, &c.; that is to say, they are differentiated by localities, periods, food-plants, markings, &c., but not yet by important structural characters.

Apart, however, from the extreme *jiligrammaria* development, the species before us appears to be rather liable to form local races, and as such the *approximaria* of Weaver, the *autumnata* of Guenée (*guenéeata*, mihi) and perhaps also *addendaria*, B. White, may probably be regarded; in any case, I have now full confidence in referring them all to this species, and (without the minute varietal separations) I have given the synonymy in *Entom.*, xxxiii., p. 53; I shall hope to work out the details of the variation on some future occasion.

It is hard to give an adequate description of this infinitely variable

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\* Since writing this I have added another lengthy contribution, in *Entom.* xxxiii., pp. 53-61, pl. i-ii (March, 1900).



species, and yet it is at present so imperfectly known that I feel I must not pass by this part of my subject. Westwood's figure in his supplement to Wood's *Index Entomologicus*, and still more Mr. Clark's plate (pl. iii.), in *Ent. Rec.*, vol. vii.,\* will, however, give a better idea of the insect than any lengthy description; Newman's second figure (*Brit. Moths*, p. 108) also well represents the pale typical form, though the basal and the elbowed line are normally somewhat more strongly angulated. Beyond these indications, the type description which I have quoted from Borkhausen (*Ent. Rec.*, x., p. 93), and the notes which I gave in my earlier paper (*Ent. Rec.*, ix., pp. 315-316), there is perhaps little to add; but the collective result of these notes and quotations, digested by myself and amended or amplified by my own personal observations, would be somewhat as follows:

SIZE.—♂ 32mm.-42mm.; ♀ 29mm.-39mm. (the smaller ones mostly bred specimens, hence, perhaps dwarfed); therefore larger than *piligrammaria*, quite equal in size with *dilutata*: like the latter, it varies much in expanse, but on the whole, the ♀s are less *markedly* smaller than the ♂s, than is the case with *dilutata*.

SHAPE.—Very variable, but the wings generally broader than in *piligrammaria*, outer margin of forewings slightly more concave on its lower half than in *dilutata*, apex consequently appearing somewhat more produced. Similar features generally observable on hindwings. Perhaps also the costa of the forewings is a trifle straighter on the average than in *dilutata*, but this is far too inconstant to be of any real value.

ANTENNÆ.—Finer in the ♂ than those of *dilutata*, the members being less swollen anteriorly.

COLOUR.—Varies from white to almost black, yet always of a different tone from the equally variable *dilutata*. Indeed the practised eye will differentiate the two species more readily by colour than in any other way. In *autumnata* the tone ranges from clear silvery to bluish or violet tinged, and even the blackest varieties show a strong gloss of purple-brown; in *dilutata*, on the other hand, the white or grey is of a dirtier tone, and its tendency is to yellowish or greenish, while the dark forms run towards dull smoke-colour and black. Moreover, *autumnata* is a more glossy species than *dilutata*, being very nearly (but perhaps not quite absolutely) as glossy as *piligrammaria*, with which latter the ground tone also is practically identical.

MARKINGS.—These need not be described in detail, as they are shared by the whole genus *Epirrita* (*Oporabia*). The most characteristic points are:

1. The angulation of the (generally strongly black) line bounding the basal area. This is often gently rounded in *dilutata*.

2. The angulation of the "elbowed line" near the costa. This is variable in exact degree, frequently almost amounting to a right angle; but on the whole, it is the most convenient marking for purposes of differentiation from *dilutata*, which very rarely has it angulated.

3. The general *directness* and freedom from zigzags in the course of the elbowed line from the angle down to the inner margin.

4. The strongly pronounced black marks (in most specimens) at the bifurcation of the strong central nervure (cubitus), and to some

\* See also Mr. Christy's series figured in *Entom.*, xxxiii., pl. i.

extent in other places on the principal nervures. These markings are very rarely *prominent* in *dilutata*, though they are often visible.

5. The generally small size of the central spot as compared with that of *dilutata*; yet the latter varies very much, and is extremely minute in one race which I have examined (var. *christyi*, mihi).

6. The direction of the transverse lines on the hindwings. These take a direction somewhat intermediate between that which is normal in typical *dilutata*, and that of typical *jiligranumaria*: in other words, they do not generally run quite parallel with the cilia, but are slightly nearer the margin at their extremities than in the middle.

Compared with *jiligranumaria*, I am quite unable to find any differences of real importance; generally, however, the markings of *jiligranumaria* are inclined to be darker, especially the pair of lines nearest the margin and the pair of lines on the hindwings, both of which are frequently accompanied, in the species last named, by a dark shade, often even resulting in the formation of a regular dark submarginal band or bar.

EARLY STAGES.—For an opportunity to breed this species from the egg I have to thank the kindness of my good friend Mr. Arthur Horne, F.E.S., of Aberdeen. On September 28th, 1897, he sent me a ♀ taken in his own district, and on October 25th, of the same year, two others, taken in Kincardineshire; all three, he tells me, were obtained in woods, amongst birch or fir, the food-plants which Guenée mentions on Doubleday's authority. A little further light on the early stages has also been obtained from Mr. J. E. R. Allen, of Bolton, a careful and accurate observer, to whom I am looking with confidence for some very useful work at this genus, as he is a well-known authority on the true *jiligranumaria* of Lancashire, and has now been fortunate enough to discover *autumnata* at Enniskillen. All my three females were in tolerably fresh condition when received, and each laid about 50 or 60 eggs; of course I cannot say, on such meagre data, that this is about the usual number, but I doubt whether the figure reached is ever extremely high, as the eggs are large in proportion to the size of the imago. One batch received from Mr. W. M. Christy, this autumn, numbers 57, others are smaller.

OVA.—These were laid either singly or more generally in clusters on the sides of the boxes in which the ♀s were enclosed, but especially in the small round holes which had been bored in the lids; occasionally in this position they were pressed so closely together as to be somewhat irregular in form. At the same time I fancy that this species is, on the whole, less keenly solicitous than *dilutata* to find crannies for the reception of its eggs, and it is quite possible that an investigation would prove the ovipositor to be less strongly developed. The ova of *autumnata* measure about .847mm.-.875mm. × .51mm. (length to breadth as 5 : 3), and are on the average a trifle larger than those of *dilutata*, but the latter show considerable variation in size. They (those of *autumnata*) are a pretty true oval, a large depression occupying a great part of the upper side (*i.e.*, that opposite the point of attachment). They are regularly pitted throughout, and thus present, roughly speaking, a uniform effect of hexagonal reticulation. They are considerably duller, and less highly polished, than those of *dilutata*, so much so that the two species can readily be distinguished with the naked eye; those of *dilutata*, moreover, are much less deeply

pitted. Those of *autumnata* are, on the other hand, indistinguishable from *jiligrammaria* (vide, *Ent. Rec.*, ix., p. 283; x., p. 95); on my first comparison of the two I fancied that *jiligrammaria* was rather duller and deader, the pittings rather less deep, or the ridges surrounding them less pronounced; but further and more exact comparisons did not confirm this impression. When first laid, the eggs of the present species are of a very pale, indefinite green colour, less bright and less shining than those of *dilutata*. After about three days they entirely lose the green tinge, which gives place to a very pale straw-colour; in another four days this changes again to a pale salmon-colour, which soon darkens slightly to the permanent winter shade. This varies a very little in different broods, but is always an opaque orange-red, duller and less polished than that of *dilutata* at the same period. The final colour change, on the development of the larva in the spring, takes place about nine to fourteen days before hatching, according to the weather. On one egg which I had under special observation, I noted as follows: February 15th, 1898, changed to red-purple; February 16th, nearly the final dark slate-colour; February 17th, final dark slate-colour; February 26th, somewhat lighter and more bluish, doubtless owing to the final separation of larva from contact with the egg-shell; February 27th, hatched. In this last stage, the egg is, as indicated above, bluish slate-colour; *dilutata* at the like period is of similar colour, but much more shining, and indeed almost metallic in appearance. The material on which my studies of the egg stage have been based up to the present time is as follows: *dilutata*, one batch from Epping Forest, one from Cheltenham, five from Mucking (Essex), one from Scarborough, one from Glasgow, three from Rannoch and one from Schwerin (Germany); *jiligrammaria*, one batch from Bolton and one from Huddersfield; *autumnata*, one batch from Aberdeen, two from Kincardine, four from Rannoch and one from Enniskillen. I have one other comparative note, but it is only founded on very partial observation; some of the eggs of *dilutata* from Mucking certainly changed from green to orange-red in only two or three days, and it is quite possible that it may prove that this colour change normally occurs more rapidly in this species than in *autumnata*, which seems to require about a week. The entire duration of the egg stage in *autumnata* certainly varies considerably, as is the case with nearly all hibernating ova. Eggs laid about September 28th, 1897, commenced hatching February 2nd, 1898, but the bulk appeared between February 13th and 28th, one of the batches of October 25th commenced hatching February 27th, and the last appeared on March 11th; the other commenced March 17th and continued till March 28th.

LARVA.—When first hatched the larvæ which I have examined are decidedly larger (as 5:4 or even 4:3) than those of *dilutata*, and possibly slightly darker, but entirely agree with those of *jiligrammaria*; in form, &c., as would be expected, all three are identical. The newly hatched *Epirrita* larva may be roughly described as follows: Head rounded, not large, surface granulated; black with a few scattered hairs of medium length; somewhat retractile within 1st thoracic segment; mouth parts yellow. Body not true cylindrical, the sectional form showing a slight protuberance on either side; skin appears granular; colour brown, varying somewhat with different

species, different broods, &c.; prothorax rather wider than remaining segments, scutellum rather large, plain, bearing four long hairs at anterior margin, subdorsal and lateral hairs on this segment large and prominent; remainder of body even width; division of segments distinct; anal claspers widely spread, hairs on anal segment more prominent than on the intermediate ones. Prolegs with a *circle* of hooks. Abdominal subsegments apparently four in number, the 1st very extended, ? subdivided. Tubercles not thoroughly studied; those on 8th abdominal are set four-square; there are three lateral tubercles, supra-, post-, and subspiracular, forming an irregular triangle. Spiracles appear somewhat raised.

The larvæ of *autumnata*, like those of *jiligrammaria*, soon settle down to feed, and are thereafter scarcely ever seen off their food-plant unless laid up for a moult; I mention this because it is in somewhat marked contrast to the habit of *dilatata*, which for some days after hatching are of a very restless and roving disposition, frequently being noticed right away from their food-plant, and escaping whenever they can find any possible point of egress. After feeding for two or three days the larvæ of all the species become lighter and more yellowish-brown, and by the end of the first week are dirty greenish-yellow or yellowish-green, varying somewhat *inter se*, and have about doubled their length. *Dilatata* are, however, much more liable to hang back and grow irregularly than their allies; during some cold weather in March-April, 1897, some of my *dilatata* hardly made any progress at all in a fortnight, while *jiligrammaria* kept at the same temperature went forward at an almost normal pace.

I have no very complete notes on the appearance of the larvæ at the first moult, which is reached in about five to eight days, according to the the temperature,\* the colour is as last described, with the head, scutellum and anal plate brown; I found no valid differential characters between the species in this skin.

In the second instar, the colour is greener, although rather a nondescript yellowish grey-green; tubercles minute, bristles very short and inconspicuous. At this stage it became easy to distinguish *dilatata* from its allies, as it was much yellower-green (though somewhat blue-green ventrally), a trifle stouter in proportion to the length, the brown head and anal plate lighter, and the prothoracic plate almost concolorous with the rest of the body, only very slightly tinged with brown posteriorly. I also here noticed a quite perceptible difference between *jiligrammaria* (two broods, Bolton) and *autumnata* (three broods, Aberdeen and Kincardine); and shall be greatly interested to see how far it holds constant. The day after the first moult *jiligrammaria* is yellowish, with yellower lateral line, and even the subdorsal distinctly traceable; *autumnata*, on the other hand, seems invariably of a more nondescript olivaceous shade, and markingless. After feeding in this skin both species tend to become gradually more and more green in colour; but *jiligrammaria* is the more decided green, with distinct yellow subdorsal and lateral lines (sometimes even quite prominent); *autumnata* is of a peculiar olivaceous green, or grey-green or even (in some specimens of one of the broods) grey, with hardly any green

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\* All my time indications must be taken with some caution, as my larvæ were not kept fully exposed to the weather.

tinge, and is indistinctly marked, the pale lateral line not being conspicuous, while the yellowish subdorsal, except in one single specimen, was wanting; *autumnata* also appeared much more shiny when full-grown in this skin. The dark parts on the other hand—*i.e.*, the head, prothoracic and anal plates, and small dark markings on the anal claspers—entirely agree with *jiligrammaria*, being the same shade of brown in both.

The time length of the second stadium varies from four to seven days, according to temperature.

In the third instar, the larva is at first golden yellow, but when the skin hardens it assumes some shade of green. At this stage I noted it as somewhat variable in colour, more so than *jiligrammaria*: individual examples were perplexingly like the last named, but on the average the *autumnata* were rather duller green; the pale subdorsal and supraspiracular lines, and the yellowish lateral stripe were now well discernible, yet on the whole hardly so strongly expressed as in *jiligrammaria*. I made no direct comparison in this instar with *dilutata*, being content with the general statement that it would be impossible to confound the two species. Of course, the differences between them are mainly the same as between *dilutata* and *jiligrammaria*, namely, that the former is practically unicolorous, generally of a bright apple-green, yellowish at the segment incisions, and with an *indistinctly* yellowish lateral line, and with the addition in a fair percentage of specimens of a purple dorsal line, of which there is no trace in its allies; moreover, *dilutata* appears somewhat more plump, and presents altogether a very different aspect, and its head, though lightish brown, is not without some tinge of green, and never such a dark brown as that of *autumnata* and *jiligrammaria*.

The duration of the third stadium was, in all the observed cases, only four or five days.

In the fourth instar, *autumnata* continues to be somewhat variable, some sharply marked examples being hardly distinguishable from *jiligrammaria*, but the bulk being of a duller green, decidedly less sharply marked, the lateral line less yellow, though not absolutely white, as in so many *dilutata* larvæ of this age; the subdorsal line also less yellow, and narrower than in *jiligrammaria*. I again noticed, as in the third instar, the entire difference of aspect between those two forms and *dilutata*; these differences being mainly of the same character as there noted, I need not recapitulate them.

The time occupied in the fourth instar seemed to vary much, namely from four to nine days; to which must be added two to three days required for the final moult; I think none of the preceding moults occupied more than a day.

In the fifth (final) instar, I made several interesting observations and comparisons. In its earlier days, many of the larvæ were of a bright goldy-green colour, which very occasionally appeared as a variety in *jiligrammaria*: the rest were of a rather bright apple green, and none showed the dark and rich greens which are so frequent in *jiligrammaria*: the yellow subdorsal line was narrower, the lateral stripe paler yellow, and not strikingly conspicuous, the band of dorsal colour beneath it, inclined to shade off gradually to the ventral colouring; the head was in almost all cases green, very rarely indeed with the lobes of the face brownish tinged, while a very good proportion

of *piligrammaria* (though not all) had the lobes more or less brown. At this period, therefore, the larvæ were still distinguishable from even the wholly green form of *dilutata*. But as they advanced towards full growth, they tended more and more to approach a uniform type of coloration, and that, curiously enough, was almost exactly that of *dilutata* in its green form, and, therefore, quite a contrast to full-fed *piligrammaria*. That is to say, the larvæ of *autumnata* (except a very small percentage of more strongly marked specimens) became, when full-grown, of a nearly unicolorous bright apple-green, the subdorsal lines and pale tubercular dots becoming very inconspicuous, and in many specimens even the lateral stripe also becoming so, except on the last few segments. At this stage it conforms to Guenée's description of the larva of his *autumnata* (var. *guenéata*), and if he studied only full-grown larvæ, and from but one locality and food-plant, he could easily have described the species as not varying at all. On two separate occasions I compared these full-fed *autumnata* with the green form of *dilutata* of the same age, and it would hardly be exaggerating to say that their general aspect was identical; *autumnata* appeared slightly the more yellowish-green, *dilutata* slightly the more bluish; in *autumnata* the pale subdorsal lines were still faintly traceable, in *dilutata* quite obsolete; in *autumnata* the pale trapezoidal spots were slightly more noticeable than in *dilutata*; in *autumnata* the minute spiracular dots were darker than in *dilutata*, though still by no means black; in *dilutata* they were red, extremely inconspicuous, and surrounded with a halo of yellow, which was not observable in *autumnata*; in both the broods compared, the head was green, the lateral line yellow, but in many *dilutata* the latter is white or nearly so—sometimes almost snowy. The general constancy of *autumnata* at this stage, compared with the enormous variability of *dilutata*, was very striking.

The larvæ went to earth in about six to nine days from the final moult; the whole larval period would thus reach from about 25 to 36 days, according to temperature and other circumstances; at least one larva, which was specially noticed, went down only 25 days after hatching, the dates being March 18th to April 12th, 1898.

At large, the larva of this species appears generally to be met with in May and June, though one record for July (Andersson, *Ent. Tidskr.*, v., p. 187) probably belongs here. Mr. Allen, at Enniskillen, took larvæ on April 28th, May 8th, 14th and 27th, 1898, two of which were full-fed on May 14th; some were still feeding on May 31st, but all the healthy ones had gone down by June 10th. *Dilutata* taken from hawthorn near by on May 14th and 19th had all gone down (except sickly ones) by the end of the month, and Mr. Allen writes (*in litt.*, November 11th, 1898) that "*autumnata* seems to be just a little later all through, than *dilutata*."

It may be well here to summarise the most important points in the above notes on the larvæ.

*E. autumnata* with *piligrammaria*. Never any very momentous differences. In the second instar, *autumnata* much less definite green than *piligrammaria*, more olivaceous, or even grey; in the fifth instar much more unicolorous than *piligrammaria*, generally lighter and brighter green, yellow longitudinal lines much more tending to obsolescence; no noteworthy difference in other stages. *Autumnata*

grows the larger, and perhaps feeds up a trifle the more rapidly; my records for the larval period of *jiligrammaria* range from about 38 to 50 days.

*E. autumnata* with *dilutata*. I emphatically repeat that it is impossible to confound these in second, third, and fourth instar. In second instar, *dilutata* is of somewhat different build, much yellow-green, the head, prothoracic and anal plates less brown, &c.; in third and fourth it lacks the yellow longitudinal lines of *autumnata*, is often more or less marked with purple or brick-red, colours which never appear in that species, and still differs in shape; indeed *autumnata* reminds me more in this respect of the genus *Operophthera* (*Cheimatobia*). In the fifth instar, on the other hand, the resemblance of the two becomes very striking, owing to the weakening off of the distinguishing longitudinal lines; it is, however, only a small percentage of *dilutata* which continue devoid of purple or red markings up to this period, and it is of course only the unicolorous green forms which can be confused with *autumnata*.

I take it that this approach of the adult larvæ may be referable to their agreement in habit, both being tree-feeding forms, and requiring similar protection; the more variegated aspect of *jiligrammaria* up to the last is, I presume, no disadvantage to it on its low growing food-plants, but as I have never seen it *in situ* I cannot do more than speculate on this subject. While on the subject of habits, I may mention that my *autumnata* larvæ were more restless under observation than *jiligrammaria*; and this also I should attribute to the tree-feeding habits of the former, which would perhaps have a better chance of escaping by dropping or retreating on the approach of enemies, while *jiligrammaria* might reasonably trust more to rigid immobility.

FOOD-PLANTS.—Birch and fir (Doubleday, *teste* Guenée), larch (in Switzerland—Püngeler *in litt.*), alder (Enniskillen—J. E. R. Allen), oak (Greening, *teste* Gregson), birch, sallow, alder, aspen (Sp.-Schneider). My larvæ were reared mainly on hawthorn, on which they thrive well; and they would probably eat the leaves of many other trees and shrubs. Nevertheless, there can be no doubt as to the predilection of the species for birch; Weaver, Logan, Gregson, &c., give this for Britain, Guenée for France (var. *guenéeata*), Borkhausen for Germany, and various Scandinavian authors for Norway and Sweden. In Norway it is sometimes so extremely abundant that it is ranked among the injurious insects, occasionally defoliating the birch woods, in which case, pressed by hunger, it is found feeding on anything, even *Aconitum* (Wocke, *Stett. Ent. Zeit.*, xxv., p. 189); and it is discussed at some length (under the name of *dilutata*) by Schöyen in the "Norske Forstforenings Aarbog" for 1891, and by Hagemann in his "Vore Norske Forstinsekter" in the same year: the larval descriptions and the material I have received from Prof. Aurivillius (*vide Ent. Rec.*, ix., 249; x., 95) prove that it is the present species with which they are dealing. Mr. J. E. R. Allen had sent me some interesting notes from Enniskillen: the larvæ which he obtained there last spring from hawthorn all without exception produced *dilutata*, while those from alder, only a few hundred yards away, all produced *autumnata*. He further noticed that a good percentage of the earlier *dilutata* larvæ he obtained were marked with red or purple, but all the later ones were without it, and he failed to distinguish them

from his alder larvæ (*autumnata*). It occurs to me as just possible that this was more than a mere coincidence, and that the red-marked larvæ are not so well adapted to the full summer dress of the hawthorn as to its early spring appearance. While I am on the subject of feeding, I may mention that I noticed *autumnata* occasionally casts its cast-off skin—a habit which, though frequent enough in certain families, is most unusual in the *Larentiidae*, so far as my experience extends.

**FURTHER LARVAL HABITS.**—In addition to the points incidentally noticed above, I may remark that I repeatedly observed in each of my three broods when in the fourth and fifth instars, but particularly the latter, a habit of striking round very petulantly at any object which was brought into contact with the tail; I did not notice this propensity in *jiliygrammaria*, but unfortunately the larvæ had all gone down before I had thought of experimenting upon them in this direction. As this movement was so constant, and so vigorous, I think it must certainly act defensively. It is worthy of remark that I never noticed *autumnata* eject the green defensive fluid with the use of which its congener *dilutata* is so lavish.\*

**PUPA.**—My notes on this stage are very few and meagre. Superficially examined, the *Epirrita* pupa does not present any striking characters to distinguish it from the bulk of subterranean Geometrid pupæ; it seems to come tolerably near that of *Operophthera* (*Cheimatobia*). The pupæ of all the species of *Epirrita* are enclosed in rather small compact earthen cocoons with a considerable admixture of silk, just beneath the surface of the earth. They are tolerably stout, but I fancy *dilutata* is stouter than its congeners. The species just named is somewhat variable in colour, generally red-brown (darker dorsally), but occasionally tinged with greenish on the wing-cases. But I believe that the pupæ of *jiliygrammaria* and *autumnata* are always easily distinguishable from it (though not from one another); they have the wing- and leg-cases, &c., dull green, the rest of the pupa more or less greenish light brown, darkening somewhat on dorsum and anus, especially the latter. Hübner's figures (*Larv. Geom.*, ii., *Fiquic.*, B. 1a-f) of the early stages appear to me undoubtedly to represent both species (*dilutata* and *autumnata*), though he calls them all *dilutata*; at any rate, figs. *a* and *b* will give an excellent idea of the larva (in its final stage, but before losing its strongly marked appearance) and pupa of *autumnata*; even before I had studied *autumnata* I made a note, on looking at these figures "some other species;" consequently I again consulted the plate on April 14th last (1898), and wrote "I find my suspicion confirmed," &c.; "*b*, the pupa quite agrees with mine of *autumnata* examined yesterday." On the other hand, the figures *c-f* are true *dilutata* larvæ and pupæ.

The duration of the pupal stage certainly varies considerably in different seasons, different individuals, &c., as will clearly appear from a study of such references as Mr. Clark's in *Ent. Rev.*, vii., p. 289. Each of my own broods went to earth within quite a limited period, while the dates for emergence of the imagines as given below, show a pretty wide range. Pupation takes place within a moderately short time from the completion of the cocoon, yet not so rapidly as with the

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\* I have since seen this fluid used by *autumnata*, but only very rarely.



species which are to emerge in the summer ; I have no exact records, but believe the period is about a week.

IMAGO.—This has already been described above, and I am compelled to omit from this already lengthy paper, a discussion of its variation, and named forms. I have, therefore, only to deal with its time of appearance and its habits, and then to conclude with my notes on the distribution of the species.

TIME OF APPEARANCE.—The following dates deal with the appearance of *E. autumnata* in a state of nature: September-October (F. B. White, Sir T. Moncreiffe); late September-second week of November (Gregson); October 2nd, 1898 (Allen); September 25th-October 23rd, 1897 (Horne); end of September-early October (Christy—at Rannoch); November (Guenée); end of August-October (Aurivillius, Schöyen, &c.); September 13th-October (Sparre-Schneider); September 16th, 1890 (Bohatsch); October 24th, 1897 (Heyne).

In captivity, this species emerges very erratically, and over a considerable period of time ; and when the larvæ are forced at all, it will sometimes commence appearing very early. Three of my 1898 specimens (which, as I have already shown, were very forward in the larval state) took advantage of some cold weather in the beginning of July to put in an appearance ; unfortunately I was not expecting them, and cannot give the exact dates. I have, however, exact dates for all the other specimens I bred, and Mr. Allen has very obligingly furnished me with those of his Enniskillen examples. I give the following records: My Aberdeen brood, July (before the 10th)—August 26th ; one Kincardine brood, July (before the 14th)—October 3rd ; another Kincardine brood, August 1st-October 28th ; Mr. Allen's Enniskillen series, September 24th-November 6th ; Mr. Clark's Rannoch brood, 1895 (*Ent. Rec.*, vii., p. 289) August 5th-November 11th ; Schneider from Sydvaranger larvæ, 1893 (*Tromsö Mus. Aarsb.*, xv., p. 79), cir. August 20th-September 6th, as against cir. September 20th-October, in a state of nature. All my available records go to show that the emerging period of *dilutata* is, on the whole, more regular and less protracted.

HABITS.—Of these I know next to nothing. According to Weaver, the typical form rests on the branches of birch, while the var. *approximaria* is found in fir plantations, and often at rest upon the trunks. Some of my correspondents have obtained specimens by beating trees, and these specimens will presumably have been resting amongst the branches. Mr. Gregson used to find them on tree-trunks in Delamere Forest, and he has an interesting observation (*Zool.*, 1859, p. 6348) that “the habits of the October and November insects are so different that anyone can tell which species he is about to take: *O. dilutata* flies off the tree bole rapidly and generally upwards, *O. autumnata* is one of the most sluggish flyers; an old friend once observed to me ‘nay, do not hurry, *autumnata* will not go fast or far.’” Possibly, however, my friend Mr. Allen may have something to say as to the last part of this quotation ; I gather from one of his letters that he had at least one good chase after a specimen at Enniskillen.

DISTRIBUTION.—This is at present very imperfectly known, and I have had to work up my list almost exclusively from specimens I have myself seen ; the following includes all localities as yet known to me :

GREAT BRITAIN AND IRELAND ; SWANSEA (one specimen from Major Robertson),

Delamere Forest (Gregson, &c.), Liverpool (F. Birch), Carlisle (Hodgkinson), Glasgow (Dalglish), Rannoch (Weaver, Christy, &c.), Aberdeen (Horne, Cannon, Buchan, &c.), Kineardineshire (Horne), ?? Isle of Lewis (intermediate between *autumnata* and *filigrammaria*), Belfast (Kane, *Entom.*, xxx., p. 234), Enniskillen (Partridge, Brown, Allen).

FRANCE: Central France (Guenée), Chateaudun (Guenée), Pont de l'Arehe, Eure (Dupont), Chamounix (Linnean Society's collection), Cannes (Chapman).

SWITZERLAND: Val d'Anniviers (de Rougement), Zermatt (Püngeler).

GERMANY: Hanover (Hoffmann), Brunswick, Giessen, Leipsie (Heyne), Pomerania (Frey coll.), Aix-la-Chapelle, Dresden (Püngeler).

AUSTRIA: Gratz (Bohatsch), Schneeberg (Bohatsch), Buda-Pesth (Leech coll.).

NORWAY AND SWEDEN: Common, and apparently generally distributed, Stockholm, Smaland, Upland, Tromsö, &c.

RUSSIA: North Finland (received through Staudinger), St. Petersburg (Zeller coll., from Kolenati).

I consider also that it is this species rather than *dilutata* which extends through Labrador to the mainland of North America; in the National Collection there is in addition a short series of a very interesting *Epirrita* (*Oporabia*) from Esquimalt, Vancouver Island, which is either an extreme variety of *autumnata* or a related species, while *O. japonaria*, Lecch, *Entom. Suppl.*, 1891, p. 48, from Japan, is also nearer to *autumnata* than to *dilutata*.

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## NOTES ON EUPITHECIA CORONATA, Hb.

(Read November 7th, 1899, by LOUIS B. PROUT, F.E.S.).

I do not suppose there can be any doubt as to the Eupitheciid affinities of this species; but it is by no means certain that it is absolutely congeneric with the majority of the Eupithecias. Hübner in his *Verzeichniss* subdivides the pugs into a number of genera, most of which have not been accepted; but among them is *Chloroclystis*, erected for the three green species known to him—*coronata*, *rectangulata* and *debiliata*. To these would now of course be added the recently discovered *chlorata* of Mabille—by the bye, when are we going to turn this up in Britain? I believe it is a blackthorn feeder. Meyrick in his *Handbook* follows Hübner with respect to this genus, its differential character being that nervure 11 of the forewings runs into, or anastomoses with 12. Tutt, in his *British Moths* likewise accepts this genus. But I must confess that I am not wholly satisfied with this arrangement; despite the superficial resemblance of *coronata* to *rectangulata*, which has led Gumpfenberg to sink the former as "*rectangulata* var. *coronata*" [! !], I feel some hesitancy in uniting them in the same genus, though unfortunately I have not sufficient acquaintance with the early stages to be able to suggest any definite re-arrangement. The following points appear to me to be worthy of consideration:

1. The shape of the wings is different in *coronata*, the forewings being very broad, and the hindwings rather small; and correlated with

this is a somewhat different resting posture from that assumed by the rest of the *Eupithecias*, the forewings being somewhat thrown back over the hindwings, more as in so many of the "Carpets," instead of being placed forward, and exposing the hindwings in the characteristic "Pug" attitude. *Rectangulata* on the other hand, has always struck me as being perfectly typical in these respects.

2. The larva, the Rev. H. Harper Crewe says, is "somewhat different in gait and shape from those of all the other *Eupitheciae*, and resembles that of *Hibernia rupicaprariva*." The difference has not struck me as very marked, but I am not nearly so great an authority on Pug larvæ as Mr. Crewe, and have no doubt he is quite right.

3. *Coronata*, unlike the other green species, passes the winter in the pupal state or at any rate within the pupal shell. This alone would not amount to much, as some very close allies are differentiated largely by the hibernating period—*e.g.*, *Cidaria truncata* and *immanata*: nor does it serve to separate *coronata* from the bulk of the genus. But it is certainly worthy of mention, as there are very many genera in which the hibernating stage is constant throughout.

I should like to call attention also to the peculiar pale discoloured-looking patch which is liable to occur at the inner angle and along a good part of the inner margin of *coronata*; I have never seen any tendency corresponding with this in its supposed allies. It is not nearly so variable a species as are they both, indeed I should consider it a very constant one except in size, though some specimens are rather more strongly dark-marked than others. It seems a rather active little species, and most of the specimens I have beaten by day have been in a highly disreputable condition; I have occasionally picked up good ones, presumably recently-emerged, on tree-trunks, palings and walls.

The larva, as Crewe has said, is extremely variable in colour, and I am only just learning to recognise it. It seems to be a very general feeder, though there is little doubt that *Clematis vitalba* is its most favoured pabulum. In addition, Crewe gives *Eupatorium*, *Solidago* and *Angelica*, of which I have personally verified the first-named; it occurs regularly on *Eupatorium* in one spot at Sandown, though rather sparingly. I can add one or two other food-plants from personal knowledge, besides the *Atriplex* given by Merian (*Der Ruysen Bejin*, published about 1678). A larva found feeding on bramble flowers on August 12th, 1897, yielded a specimen of this species on April 28th, 1898; and, more curiously, I beat a larva from hawthorn, on which there were certainly no flowers, and I think no fruit, on August 20th, 1890, and fed it up on hawthorn leaves, obtaining a crippled imago on May 2nd, 1891. I also once beat a larva which I believed was this species from willow; but I failed to rear it, and as it was several years ago I may have been mistaken as to its identity.

*Eupithecia coronata* has regularly at least two broods in the year, one in April and May and another in July and August; but one not infrequently gets a partial third emergence in September and October. I am almost certain that those which hibernate in the pupal shell do so fully developed like the *Tæniocampids*; but such a large number of those which develop in the autumn turn out to be *dead* by the spring, that it may possibly only be these which have misled me, and I should be glad to have the question more fully investigated. The

few which escape the winter emerge in April or very early May. This summer I had one case of almost phenomenally rapid transformation, which is certainly worth putting on record. A female captured at Torquay on July 28th, this summer, laid eggs the next day. These hatched in four days, namely, on August 2nd, and the larvæ were fed on flowers of clematis. The three moults of the most forward specimens took place on August 5th (three days), August 8th (six days) and August 11th (nine days), and on August 16th—fourteen days from hatching, and five from final moult—they began going to earth. One imago emerged on August 30th, only 32 days from the deposition of the egg, and the rest of the pupæ developed about the same time; but no more imagines have appeared, and I am afraid the pupæ have now dried up. The larvæ are extremely easy to breed, and if the correct method of managing the pupæ can be found, it would be recommendable to breed it largely from the egg; beaten larvæ, so far as my experience goes, are somewhat liable to be ichneumonated, but I am unable to give the name or names of the species (singular or plural) which attack them.

#### VARIATION in BROODS of *AXYLIA PUTRIS*, *CUCULLIA UMBRATICA*, *SPILOSOMA URTICAE* and *MALACOSOMA CASTRENSIS*.

(Read November 7th, 1899, by A. BACOT).

*AXYLIA PUTRIS*.—These were reared from ova laid by a female captured in June, 1898, at Waxham, Norfolk. The larvæ were fed on hop. Ninety-seven specimens emerged during the past summer (1899), mostly during June. The sex of these insects is rather difficult to determine, but after some little trouble I made out the respective numbers as follows:—50 males = 52%, 47 females = 48%. Two specimens are crippled, both are males. The variation of coloration and marking is exceedingly slight, and seems to consist only of minute difference of darker or lighter shading on the forewings. The variation as regards size is also of little moment. Only two specimens are worthy of note, one male and one female, both are deficient in respect of the darker shading of the wings, the female being rather the paler of the two. Both are smaller than the majority of the brood, which suggests that this variation is due to malnutrition.

*CUCULLIA UMBRATICA*.—This is a much smaller brood. Considerable mortality occurred during the larval period, and among the pupæ also, unless a considerable number are passing a second winter in this stage. Out of some 30 to 35 specimens bred 27 are available for examination, the remainder having either escaped or been ruined in breeding operations. Ten out of the 27 are males (= 37%), and 17 females (= 63%), in addition there is one cripple, of which I am unable to determine the sex. There is a well marked sexual dimorphism in this brood as regards the colour of the hindwings, and a less constant difference in the

shading of the forewings, the females being darker than the males. Like the brood of *Acyilia putris* the differences of individual pattern and coloration are insufficient to enable me to classify them.

*MALACOSOMA CASTRENSIS*.—On Whit-Sunday, 1899, I took a web containing young larvæ of this species near Port Victoria. Judging by their size they had only recently emerged from the eggs. The web or nest was more or less spherical in shape, about one inch or less in diameter, not unlike a nest of young spiders in general appearance. There can be no doubt but that all the larvæ were the offspring of a single female. The larvæ were reared in a glass jar, at first on seawormwood (*Artemisia maritima*) and sea lavender (*Statice limonium*). After a week their food was gradually changed to sallow and knot-grass (*Polygonum ariculare*) on which they thrived surprisingly. In about fourteen or fifteen days they were transferred to a large gauze covered flower-pot, and when they outgrew this receptacle they were again transferred to a small wooden tub, gauze-covered, and with a layer of damp cocoanut fibre at the bottom. Both the pot and tub were kept in a well ventilated garden frame, in order that they might have the advantage of sun, warmth and fresh air, all of which I believe are essential to development. Their food, after the first ten days, was limited to sallow and knot-grass with an occasional supply of broad leaved plantain, and a soft grey-leaved willow when they exhausted my supplies of sallow. Very few, if any, deaths occurred during the larval period, and all, or nearly all, spun cocoons, using an ample supply of silk. Considerable mortality occurred during the pupal period, chiefly, so far as I could ascertain, from insufficient room. The limited size of their quarters not allowing them to scatter, they spun up in dense masses, with the result that many moths were unable to emerge from their cocoons at all. A few were hopelessly crippled, while in some cases the larvæ had failed to pupate successfully, owing to their cocoons being drawn out of shape by other larvæ spinning against them. In all, about 80 specimens emerged, some three or four escaping. The following notes refer to 77, 44 of which are females (=57%), and 33 are males (=43%). The range of variation as regards size is considerable, and in coloration it is very wide. Four males and three females are complete cripples, two males and three females have poorly-developed wings; this is especially noticeable as regards the hindwings of all three females, and one of the males. In the males, variation is from canary-yellow to dark umber on the forewings, intermediate shades being also present. The hindwings do not show anything like the same range of variation as the forewings. But all the pale forms have a tendency to develop remnants of a pale band on the hindwings, which is entirely absent on those of the dark forms. Fifteen specimens (=46%) are on what I should describe as the pale side of the line, and 11 (=33%) on the dark. One is of a unicolorous ochre, having the forewing markings nearly obsolete. The remainder are ill expanded or crippled. Of the females 24 (=60%) have well marked pale bands across the forewings, while in 16 (=40%) there is a more or less strongly marked tendency for this character to be obsolete; most of the latter are dark forms, while with the 60% of banded there is a gradual and well balanced gradation from dark to pale ground colour. The ill-banded, suffused dark forms, show little or no trace of any hindwing band, but the well banded generally show some traces of this character.

*SPILOSOMA URTICAE*.—A series of 86 specimens were reared from ova laid by a female captured in June, 1898, at the Norfolk Broads. The larvæ were fed on various garden weeds, chiefly plantains. My brood is very variable, both as regards number and strength of the spots. I have not had much experience with this species previously, but am told that these specimens show a much greater amount of spotting than is usually the case with *S. urticae*. Owing to the simplicity of its pattern and coloration, this species is admirably suited for working out variation in detail, and my notes are more extended than with the previous species.

I have divided the spots on the forewings into three groups for convenience in classifying: basal, central and marginal. It is necessary to state that the actual basal spot itself I have left out of account altogether, because it is so frequently obscured by the long hairs of the thorax. When any doubt existed as to a spot being present or absent I examined the specimen with a powerful hand lens, and have counted even a single black scale as a spot. Fifty are males = 60%, 34 females = 40%.

*Hindwings*: 64% of the males and 35% of the females have no central spot = 52% of the whole brood. Only 6% have marginal spots on the hindwings, and all of these are males.

*Forewings*: The central group of spots is the most constant, all the specimens, both males and females, having one or more spots belonging to the group. Of the marginal group, 98% of the males, and 94% of the females = 96% of the brood show traces of this group. Of the basal group, 62% of the males and 53% of the females = 58% of the brood show at least traces.

17% of the brood have 5 or less than 5 spots on the forewings, 8% of the males and 29% of the females.

83% of the brood have more than 5 spots on the forewings, 92% of the males and 71% of the females.

46% of the brood have more than 10 spots on the forewings, 48% of the males and 29% of the females.

14% of the brood have more than 15 spots on the forewings, 12% of the males and 18% of the females.

4% of the brood have more than 20 spots on the forewings, 2% of the males and 6% of the females.

Thirty-six per cent of the entire brood (32% of the males and 41% of the females) are asymmetrical as regards the actual number of spots on the forewings. In making this calculation I have allowed a single black scale on one wing to balance a spot composed of several black scales on the other. If the *size* of the spots were taken into account, a very much larger proportion would be counted as asymmetrical.

One female has the forewing marginal group of spots on the left hand side, while another female has this group on the right wing only. Three males have the central spot of the hindwings on the right hand wing only. One male has this spot much darker on the right than the left wing, while three males show this spot on the underside of wings only. Of three females, two show the central spot of the hindwing on the underside of the left wing only. Five females show the central spot of the hindwings on the underside only. One female shows the central spot of the hindwings on the underside only, but that on the left wing is very much larger than that on the right. The central spot of the hindwings is, I believe, a tolerably constant feature in the allied *S. menthastri*, but unfortunately I have not a large enough

series to be very sure of this. It is noticeable what a much larger proportion of the males than of the females have lost this spot, and it is also apparent that the spots are generally smaller on the males than the females. The large amount of variation and asymmetry in the spotting, points, I think, to the rather unusual strength of this feature in the brood being an atavistic character, and further to the probability of the spots in *S. urticae* being a survival of no present use, if not actually harmful to the species.

GENERAL REMARKS.—The wide range of variation in the broods of *M. castrensis* and *S. urticae* is in marked contrast to the constancy of the specimens in those of *A. putris* and *C. umbratica*. From the standpoint of natural selection, this variation suggests a great difference in the habits and methods of protection between the former and the latter. *A. putris* and *C. umbratica* are doubtless protected by very specialised development of coloration and pattern; that of the former giving it a wonderful resemblance to a dead and broken twig. In captivity it folds its wings closely against its body after the fashion of *Phalera bucephala*. I have never found it resting under natural conditions, but should expect it to rest in the lower portion of a hedge-row or under bushes where dried and broken twigs are plentiful.

*C. umbratica* presents a beautiful example of protective coloration when resting on unpainted wood work, such as a split oak fence or a gate post, but it seems hardly likely that its scheme of coloration was evolved since these comparatively modern resting-places have been available. Probably its natural resting-place would be the dead and dried stems of burdocks, mulleins, thistles, &c., on which it would be equally well if not more perfectly protected.

The imaginal life of *M. castrensis* would seem to consist only of pairing and oviposition, and under normal conditions is probably not prolonged for more than three or four days, so that its need of protective coloration is certainly less than with the above mentioned Noctuid moths. Its habits (in captivity) suggest that it hides low down among the herbage, or perhaps the drift rubbish of the saltings. In any case its resting-places are likely to be varied and the range of coloration in individuals would give the species as a whole, a better chance of escape. In captivity, when resting on the dried sallow and willow leaves, among which the cocoons were spun, it was very far from being a conspicuous object.

As to *S. urticae* I am not aware of its resting-habits. The coloration of the allied *S. menthastri* and its freely exposed resting-places, suggest that it is a nauseous species, as I believe a good many of the Arctiids are, but the tendency of development in *S. urticae* towards pure white, suggests that it may obtain some sort of protection by its resemblance to a feather, for although many fen and marsh species are protected by their pale coloration, the white of *S. urticae* is too aggressively pure to warrant the assumption that it could pass unnoticed among even such pallid surroundings as withered reeds. On the other hand, the white coloration of this moth may still have a warning significance to bats and night-flying birds. The white Liparids, *Porthesia chrysoorrhoea* and *similis* are, in all probability, protected by the irritating larval hairs which become entangled in the anal tuft on emergence, while *Leucoma salicis* is able to exude a bright green nauseous (?) fluid from two orifices in the thorax.

SPILOSOMA URTICAE, NUMBER AND GROUPING OF SPOTS.

	HINDWINGS.				FOREWINGS.				NUMBER OF SPOTS ON FOREWINGS.												
	Central spot.		Marginal		Marginal		Central.		Basal.		5 or less.		Above 5		Above 10		Above 15		Above 20		
	Without.	With.	With.	Without.	With.	Without.	With.	Without.	With.	Without.	With.	Without.	With.	Without.	With.	Without.	With.	Without.	With.	Without.	
50 MALES.	26		25	1	26		14	12	3	23		7	1								
	18	3	18		18		14	4		18		15	4								1
<i>a</i> .....	3		3		3		2	1		3		1	1								
<i>c</i> .....	3		3		3		1	2		2		1	1								
Total .....	32	18	49	1	50		31	19	4	46		24	6								1
Percentages..	64	36	98	2	100		62	38	8	92		48	12								2
34 FEMALES.	3		3		3		3	3		3		2	1								
<i>a</i> 3.....	22		22		22		17	5		21		10	6								2
<i>b</i> 5.....	9	on underside only	7	2	9		1	8	7	2											
<i>c</i> 1.....																					
Total .....	12	22	32	2	34		18	16	10	24		10	6								2
Percentages..	35	65	94	6	100		53	47	29	71		29	18								6
TOTALS OF BOTH SEXES AND PERCENTAGES OF WHOLE BROODS.																					
Total .....	44	40	81	3	84		49	35	14	70		34	12								3
Percentages..	52	48	95	4	100		58	42	17	83		40	14								4

NOTE.—16 males and 14 females = 30 specimens are asymmetrical as regards the spots on forewings.



## SOME MARSH BEETLES OF THE LEA VALLEY.

(Read November 7th, 1899, by F. B. JENNINGS. F.E.S.).

I propose in this "communication" to try to convey to your minds, with as little technicality as possible, some pictures of beetles in their haunts as I find them in my collecting rambles in the above locality. The few beetles I have had time to put together for exhibition in connection therewith will no doubt, to lepidopterists, seem dingy objects enough, but, as I shall endeavour to show, the interest which attaches to them does not depend in any great degree upon their coloration.

Eastward of the railway line which traverses the southern portion of the Lea Valley, and lying between it and the range of low, undulating hills which forms its eastern border, is a long strip of flat, marshy ground, through which winds the river Lea, its tributaries and backwaters, and through which, between Broxbourne and Tottenham, runs the straight-cut line of the Lea canal. Besides the actual streams, numerous ditches intersect the marshy fields. In that particular part of this territory which I have in my mind we shall find, at the proper season, a wealth of vegetable life springing up. This is in the month of May, at which time the large golden cups and rounded shining leaves of the marsh marigold rise in little clumps above the level of the surrounding herbage, and the cowslips, and the buttercups, with a few straggling blossoms of the lesser celandine, all combine to make the low-lying fields a mass of yellow, when the pretty snow-white flowers of the stitchwort star the hedgerows, while the lavender blossoms and dark red leafshoots of the ground ivy present a beautiful contrast on those ditch-banks where lately the strange-looking flower spikes of the butter-bur, rising scarcely above the level of the surrounding soil, were almost the sole indications of the approaching spring. Now, too, the tall hawthorn hedges which separate the fields are one mass of pink and white, haunted by busy *Andrenae* and hovering Diptera.

In the ditches, the various sub-aquatic plants—the flags and rushes, the water speedwell, the tall valerian, the water-cress, and *Helosciadium*, are beginning to rise in that luxuriance which will eventually absorb the water through which they sprang, and choke up the dykes with their masses of greenery, while on their borders the umbel-like flower heads of the meadow-sweet, that most typical plant of the marshes, are getting ready to burst into blossom and disperse their delicate scent upon the breeze. Near by, in the river, the fish make joyous leaps into the glad sunlight, while to and fro amongst the adjacent willow branches flits the reed bunting, and a silent observer may watch, stealing along the ditch sides, the quiet little sedge-warbler. And amongst the vegetable luxuriance which clothes the fields at this season there exists an abundant insect fauna, one which is largely peculiar to this marshy habitat. In the beetle world this is especially so, and no section of the order Coleoptera is better represented here than that of the weevils. Some kinds there are which live upon the

aquatic plants themselves, and to which an occasional bath, when they drop from their food-plant at the approach of danger, seems to offer no inconvenience whatever. Such a species is *Hypera polluc.*, which, with its variety *alternans*, lives upon the cress-like Umbellifer known to botanists as *Helosciadum*. I have observed that these two forms, although apparently so very unlike, do, as a matter of fact, inter-copulate freely, and it seems extraordinary that they still maintain their distinctive coloration. They are confined to a space of a few yards in a single ditch, and the prettily striped form which our pioneer English coleopterist, Stevens, called *alternans*, in allusion to the alternating light and dark lines on the wing-cases, is, I am glad to say, as well represented numerically as its more sober relative, *H. polluc.* Out in the marsh, but seldom far from the side of the ditch, a few passes with the sweep net will often bring to light another species of *Hypera*, *H. suspiciosa*, which is very different in colour and shape from its relatives, being, at least in the female, more robust, and distinguishable otherwise by the characteristic white mark on the suture of the elytra (or wing-cases) below the centre. *H. variabilis*, a smaller species, but reminiscent at first sight of a battered *H. suspiciosa*, very occasionally puts in an appearance in the net, together with the pretty little velvety-green *H. nigrirostris*, which, however, is not such a favourite with me personally as it would be if its colouring-scales were less fugitive.

The group of weevils I have just mentioned are all of a fair size. But amongst the struggling mass of insects of all orders brought up by the net, we shall find numerous objects which at first sight appear to be merely little balls of dirt. Presently, however, these objects begin to move, out come three pairs of legs, a long slender snout emerges, and slowly and with dignity these little weevils of the genera *Ceuthorrhynchus* or *Ceuthorrhynchideus*, begin to move towards the margin of the net. Perchance in so doing they are upset by more active insects, if so, they immediately withdraw their legs and rostrum into the grooves fitted on the under-surface of the body to receive them, and again lie motionless for a while. By far the largest number of these weevils will be of a reddish or greenish-grey colour with a paler spot at the scutellum. This species is common all over the marsh, and its larva must either be attached to some very common plant, or, not improbably, feeds on several different plants. Besides this species, we shall very occasionally notice a jet black insect with a pure white roundish spot on the middle of each wing-case, and a narrow elongated one at the suture where the wing-cases join, this third spot being in a line with the other two, while at the base of the elytra is another less well defined spot. This pretty little species, which from its dark ground colour naturally shows up well against the white canvas of the net, rejoices in the name of *Ceuthorrhynchus asperifoliarum*, and takes its specific name from being attached chiefly to the rough leaved *Boraginaceae*. It is by no means confined to marshes, and I have taken it in Surrey from the viper's bugloss on a chalky hillside. Here in the marsh-fields, where I find it by no means common, I have beaten it from nettles in a dry ditch, and swept it in a damp hollow in close proximity to a watery ditch, where its food-plant may well have been the pretty little *Veronica anagallis*, the water speedwell. I once saw a specimen of *C. asperifoliarum* on a plant

which one would think most unsuited to it—the great strong rough-leaved comfrey. This is one of the plants given in the books as supporting *asperifoliarum*, and I was pleased to be able to verify what had seemed to me an unlikely connection. But to return once more to the net and its contents. If now we sweep yonder bed of shepherd's purse, a number of little dark blue atoms will in all probability be the result. These, though appreciably smaller than the two species already mentioned, still belong to the genus *Ceuthorrhynchus*, and are named *contractus*, in allusion to the habit, before referred to, which is common to them all. I take this little weevil from *Capsella bursa-pastoris* alone, in widely separated spots in the Valley. Yet a fourth species of *Ceuthorrhynchus* should be found in those damper spots where grows the pale-flowered *Cardamine pratensis*, the "milkmaids" of the country children. This, called *C. cochleariae* from its being also attached to the plant genus *Cochlearia*, is not unlike *C. contractus*, but is distinctly larger, and has a white spot at the scutellum. But the fifth, and the last of this genus, time permits me to mention, is to my mind the prettiest of them all. It is of the size of *asperifoliarum*, but instead of being black is thickly covered with greyish scales, and across the wing-cases runs a zigzag white line which has the appearance of a rough **W**, from which mark it takes the name *triangulum*. This weevil is one of my most recent discoveries in the Lea Valley, and at the same time one of the most unexpected. Fowler says it is found on sandy soil on the yarrow, *Achillaea millefolium*. It was first discovered in Britain by my friend Mr. E. A. Waterhouse, who took his specimens on the coast, and all but three of the ten localities given for it by Canon Fowler are also on or near the coast. Most of my specimens were obtained in an area, lying close to a ditch, where the numerous holes and general appearance of the soil betrayed its decidedly marshy character, even although it was dry at the time I visited it. In this spot there was no yarrow, but *Cardamine pratensis* was common.

Walking along by the sides of the ditches, one cannot help noticing how numerous are those curious plants the figworts. Where the herbage on the bank side is tall and dense they are frequently hidden away, and become short and stunted. But, placed in some favourable spot, the figwort ascends to a great height, and becomes, with its spikes of little, dark red, peculiarly shaped flowers, a very fine plant indeed! But these interesting plants have many enemies amongst insects, not the least of which are the gorgeous larvæ of the moth *Cucullia verbasci*, and of the wasp-mimicking the saw-fly, *Allantus scrophulariæ*. To the coleopterist, however, their most interesting guests are the beautiful weevils of the genus *Cionus*, of which in the Lea Valley we have four species, one of which unfortunately (*C. hortulanus*) was met with scantily in only one season, and has not been seen since. As at least one species of *Cionus* is common in most parts of the country, and all three stages can be observed on the same plant at the same time, it is hardly surprising that the life-history of the genus should be well known. *C. tuberosus* and *scrophulariæ*, the two larger species occurring with me, are of a fair size as weevils go, and are chiefly characterised by their ribbed elytra, clothed with beautiful velvety-black and bluish scales, flecked at the scutellum and near the apex with little white streaks, above each of which is a finely rounded velvety-black spot. They are much alike, and occurring together on the

same plant as they often do, might well be imagined by the uninitiated to be one species, or at most as sexes of the same form, but there is no doubt of their distinctness. *C. scrophulariae* has the thorax entirely covered with yellow-white pubescence; *tuberculosis* has the disc of the thorax bare, and the sides only clothed with darker yellowish scales. Sharing perhaps the same plant as these larger species, one may not infrequently discover a smaller snowy-white weevil, having velvety dark red markings, the chief of which are a large irregularly shaped blotch on the suture just below the scutellum, and near the apex of the suture, the same large circular spot which adorns the two other *Cioni*. This is *C. blattariae*. At a little distance this pretty species is curiously like a bird-dropping, and this likeness probably operates as a protection to it.

The larva of *Cionus*, which, with the pupa, may, as I have already mentioned, be found on the plant with the perfect insect, is a slimy creature which might perhaps by the casual observer be put down as a tiny slug. When the time arrives for the change to the next stage these larvæ envelop themselves in a glutinous secretion, within which, when formed into a sort of ball and hardened by exposure to the air, the change takes place. These pupæ may often be found congregated together on the leaves and flower-heads of the plants.

Away on the marsh beyond the river there runs from north to south a line of dwarf, bushy willows, with here and there a hawthorn intermixed. Another hedge, running at right angles up from the river, joins the first about midway down its length. At the corner where the hedges meet, the ground becomes slightly depressed, broken up, and pitted with irregular holes, and hereabouts grow numbers of peculiar-looking plants whose sheathed stems and needle-pointed branches are entirely destitute of leaves. These "horse-tails" (botanically the representatives of the genus *Equisetum*) have their especial beetle parasite, the weevil, *Gryppidius equiseti*, which, apparently in Britain, is attached to this group of plants alone. It is a rather large insect, with the body somewhat square in outline, black above, with the apical portion and sides of the elytra clothed with whitish scales, while, just above this apical white area, and at the shoulders also, are two little white spots; the rostrum is long, curved, and slender, with the antennæ (which, as in the majority of weevils, are elbowed or bent into two parts) rising from towards the apex. The "horse-tails" affected by *Gryppidius*, are, however, few and far between, as the insect is by no means common. When sweeping for it along the side of the willow-hedge I have not infrequently found in the net another much smaller and very differently shaped weevil. This, known to science as *Limnobaris t-album*, is cylindrical or barrel-shaped. I have been unable to trace it to any particular plant, but *Mecinus pyrauster*, an insect with much the facies of *Limnobaris*, and which occasionally turns up elsewhere on the marsh, lives upon the plantains, which, and more especially *Plantago lanceolata*, are spread abundantly over the fields.

I find it impossible to close this little sketch of our typical Lea Valley weevils without some reference to the first of that most interesting group of beetles I ever saw alive, namely, *Barynotus abserrus*. It was during the summer of 1894, at a time when the world of insects was to me a *terra incognita*, and I remember even

now what pleasure the sight of this—as it appeared to me then—extraordinary creature, afforded me as it moved slowly across the surface of a dock-leaf by the riverside. *Barynotus* has on this account always been a favourite of mine, and I have met with it several times since, although in the valley it is a scarce insect. It is dun in colour (a feature which probably protects it excellently, slow moving as it is, from any possible enemies), rather broadly oval in outline, with short, thick snout and short antennæ, and the elytra, especially towards the apex, clothed with stiffish bristles. In June of last year I had the pleasure of watching *Barynotus*—two of them—feeding on thistle plants in a ditch, and I noticed that one had already devoured quite an appreciable section of a leaf. That it feeds also on other plants seems fairly certain, as in the following August I grabbed up two individuals from roots of *Polygonum* in another part of the valley. For some time I supposed *Barynotus* to be exclusively a palustral insect, but this belief was rudely disturbed last spring, when I found a living specimen and the remains of other dead ones—of all places in world—on the top of a high chalk hill!

The group of coleoptera of which I have just been speaking, although so interesting, is not as a whole remarkable for brilliancy of colouring. But it must not be supposed that colour, and vivid colour, is lacking in the beetle life of the marshes. Onwards from the middle of May, the naturalist, wandering by the riverside, will begin to notice here and there some brightly tinted insects seated with closely clinging limbs on the wind-swept reeds. Not of one colour alone are they, some are deep blue, others rich crimson red, while others again are shining golden. True creatures of the summer and the sunlight are the *Donaciæ*, and true denizens are they of the fens and marshes. Many of the species are common, and their beauty appeals especially to the budding coleopterist, who in the dark and dreary days of winter, opens his boxes to gaze at the varied tints of these beetle treasures and recalls once more the sunny scenes amongst which he found them. *D. cricca* and its close ally *D. comari* are the species which vary most in colouring, and of each of these forms hardly two specimens can be found of exactly the same tint. Unlike the little coppery-red *D. semi-cuprea*, which in the Lea valley I find restricted with few exceptions to the reeds along the river's edge, or the duller narrow-bodied *D. linearis*, which confines itself to the waving sedges in a single ditch, *D. sericea*, though seldom straying far from the damper spots, wanders indifferently amongst the crowded vegetation of the ditch sides. A group of many-hued *D. sericea*, seen in the hot stillness of a summer noon sucking the sweetness from a bunch of the creamy blossoms of the meadow-sweet, is a beautiful sight, and one I have often witnessed.

Seven of the sixteen British *Donaciæ* are found in the Lea Valley, and of these I have already alluded to three. Jointly, their time of appearance extends from May to nearly the end of August, but most of those which appear in the first named month have vanished by the close of June. These at the beginning of July are succeeded by species of somewhat different habit from those which frequent the reed stems.

Let us pay a visit to one of these later species in its natural habitat. For this purpose we must seek the ancient bed of the river Lea, which, from its sinuous nature unsuitable for navigation, has here been left to gladden the heart of the naturalist and the admirer

of rustic scenery. In one spot wide and shallow, it ripples with little gurgles over the stones in channels divided by tiny islets, in which are numerous shoals of silvery minnows disporting themselves in the sunshine; in another, where an old wooden bridge enables the pedestrian to cross into the shady lane beyond, the water, though still delightfully clear, is deep and smooth, and here, where like aquatic streamers float the long submerged grasses, are many fish of large size lying close to the muddy bottom of the stream, while in a shallow pool beneath the bankside lies the wary jack—motionless, but alert. And in these opening days of July what a rich botanical treat awaits us in this rural spot! On yonder bank, rising conspicuously above those giant docks and comfrees, we see displayed the purple glories of the loosestrife, and near by, the similarly coloured but more retiring flower spikes of the marsh woundwort. Down here by the bridge the banks are golden with the blossoms of the introduced *Mimulus*, well established in this spot, where I have noticed it almost every summer since 1894. Up by the broad shallows, which in spring were white with the cups of the water *Ranunculus*, those islets are green with the many-branched *Alisma*. But more closely connected with our immediate purpose are these little groups of long-stemmed plants whose rounded leaves are floating just level with the surface of the water. Here, on the broad leaves of these water-lilies, are the *Donaciae*, sitting with antennæ erect like miniature deer, ready to take wing to some less accessible spot at the approach of danger. This species, *D. crassipes*, which is apparently confined in the Lea Valley to this one spot, is, with its broad flat wing-cases and long hind legs, one of the most conspicuous of those indigenous to our islands. I find it here in two well marked forms, one which has the elytra greenish-bronze, the other with them violaceous.

The *Donaciae* are members of a group called *Chrysomelidae*, or popularly, "Golden Apple Beetles." Several of the smaller representatives of this group are inhabitants of the ditches and their borders. Among the myriad insects swept up by the net in May, are the small, convex, slaty-blue *Hydrothassa aucta*, whose wing-cases are bordered with yellow, and *H. marginella*, which closely resembles *aucta*, but has a yellow margin to the thorax, which in *aucta* is unicolorous. In May I often find *marginella* inside the buttercups, and in winter under the looser bark of the adjacent willows. In the ditches themselves, on the aquatic plants, occur my favourites, *Prasocuris juncei* and *phellandrii*, the former on the water speedwell, the latter without apparent preference for any special plant, although it is said to favour the umbellifer *Phellandrium*. Both are oblong in shape, and narrow; *P. juncei* is wholly dark blue, while *P. phellandrii* is marked with alternate black and yellow stripes, and has yellow borders to the thorax. If we shake the branches of those larger willows at the side of the field, out will fall numbers of shining golden drops, the destructive *Phyllotaenia vitellinae*. Here and there we pick out a dark blue specimen, while perhaps, if we are lucky, we may find the exquisite little *Crepidodera aurata*, with its bright crimson thorax and golden green elytra, a species not at all common here.

The beetles I have alluded to in this short paper constitute only a very small portion of those actually to be met with in the Lea Valley, but the limit of time to which I am tied prevents me from enlarging

upon the others as I should like to have done, and, in concluding, may I urge upon you very briefly the need for a wider study of natural history by each individual? The specialist who is content to limit his knowledge of Nature's works solely to one narrow branch of them, cannot, to my mind, be called a naturalist in the true sense of the word. Specialism is undoubtedly necessary, but it can be carried too far. The ideal naturalist, I think, should possess at least a rudimentary knowledge of every department of zoology and botany, in addition to devoting his special attention to one of them. Nature is an entity, and I feel strongly that if her student is to drink her deepest delights, and to appreciate to the full the charm of the association of animals and plants, it is as an entity that he must study her.

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#### ERRATA.

Page 3, line 3, for "*Pyrrocoris*" read "*Pyrhocoris*."

Page 3, line 30, for "*mouus*" read "*turnus*."

Page 3, line 32, for "*eurythrus*" read "*eurytus*."

Page 3, line 32, for "*arthenis*" read "*artemis*."

Page 5, line 4, for "*chorinnacus*" read "*chorineus*."

Page 8, line 30, for "*Tropicoris*" read "*Tropicornis*."

Page 9, line 33, for "*Tortricoides*" read "*Tortricodes*."

Page 11, line 30, for "*picipennis*" read "*picipennis*."

Page 13, line 30, for "having been pronounced" read "had been pronounced."

Page 37, following line 2, add: "Old potatoes late in the season contain more Solanine than usual; in Germany a number of soldiers became seriously ill last year through eating them."

Page 42, line 2, for "*Camia*" read "*Calmia*."

Page 60, line 10, for "*Stevens*" read "*Stephens*."

Page 61, line 24, for "*Achillaea*" read "*Achillea*."

Page 61, line 14 from bottom, for "wasp-mimicking the saw-fly" read "wasp-mimicking saw-fly."

# THE FAUNA OF THE LONDON DISTRICT.

## LEPIDOPTERA.

Compiled by DR. F. J. BUCKELL, M.B.; Edited, with the additions subsequent to 1893, by LOUIS B. PROUT, F.E.S.

(Continued from *Transactions*, Vol. VIII., 1898.)

Since the publication of the first part of this catalogue, I have had to thank several friends for contributing further lists of their captures, or isolated notes. The following abbreviations will be met with in the present part, in addition to those previously explained :

- Bell = S. J. Bell. Tooting Common and immediate neighbourhood.  
 Bell—C. = T. H. Clarke *teste* Bell; Bell—M. = H. H. May *teste* Bell; Bell—R. = F. J. Robinson *teste* Bell; Bell—S. = L. Short *teste* Bell. All included in Mr. Bell's Tooting list.  
 Bi. = C. A. Bird, Hammersmith within the last nine years, mostly in own garden.  
 C. = F. M. B. Carr. Lee, &c.  
 E. N. = Essex Naturalist.  
 Jo. = A. H. Jones. Eltham, &c.  
 Ma. = H. H. May. Wimbledon, Noctuae.  
 Mn. = C. Murray. Stratford, chiefly at light.  
 T. = J. W. Tutt. South-east district, &c.

I have also received a good number of supplementary records for the species in part I, but I propose to hold these over for another year, in order to publish the supplement all together; I know from bitter experience the inconvenience of having to wade through a long series of petty annual supplements in order to find a record which is wanted.

My revision of the generic nomenclature has, as I expected, been the subject of some criticism, and I am afraid the present instalment of our list will show at least as great deviations from "South's List" as the preceding; I have to a large extent followed corrections proposed by Prof. Grote in his various papers on the Noctuid family, and in these and all cases I have endeavoured to abide by the accepted rules of zoological nomenclature and to follow them to their logical conclusions, so that I trust the names employed, some of which at present sound so unfamiliar, will soon gain the recognition to which they are legally entitled.

LOUIS B. PROUT.

London, April 7th, 1900.

172.—*Ochria ochracea*, Hb. 1. Isle of Dogs, 15 in 1892 (Wy.); Hackney Marshes (Cl.); Clapton, p. in burdocks and thistles (Ss.);



- Lea Valley, p. (Ba., N.); Tottenham, at light (Be.); Woodford (Ent., xix., 67); Stratford (Mu.). II. Locally common (F.); Greenwich and Plumstead marshes (T.); Brockley (E.R., i., 349); Dulwich (E.R., ii., 140). III. Tooting (Ma.); Barnes (Ta.); Wandsworth (Ent., xxi., 58); Bedford Park (Ent., xxiv., 139); Wimbledon (Ma.). IV. Hampstead (Ent., xxi., 112); Highgate Woods (So.); Finsbury Park\* (Ent., xxvi., 51).
- 173.—*Gortyna nictitans*, Bork. I. Walthamstow, n.c. (J., Bu.); Hale End (Bt., Ss.); Woodford (Ent., xix., 67); Forest Gate (M.). II. c. (F.); Westcombe Park (T.); Brockley (E.R., i., 349); Dulwich (W.); Croydon, c. (Sh.); Chislehurst (Ent., xvii., 233); Streatham (Fo.). III. Wimbledon Common (Ta., Ent., xxii., 151, &c.); Chiswick, "common at sugar, the form with orange reniform also taken" (Si.); Tooting, rather scarce (Bell). IV. Ealing (Fe.); Hampstead Heath (So.); Highgate Woods (So.); Muswell Hill (Bu.).
- 174.—*G. micacca*, Esp. Nearly everywhere whence reports have been received. The only curious exception which I notice is Wimbledon Common; surely it must occur there?
- 175.—*Axyllia putris*, L. I. Nearly everywhere. II. n.r. (F.); Lee, one in 1896 (C.); Dulwich (E.R., ii., 140); Westcombe Park (T.); Croydon (H.). III. Tooting, rather scarce (Bell—R.); Wimbledon Common, "at bramble" (Bu.); Chiswick, f.c. (Si.); Hammersmith (Ta.). IV. Canonbury, Islington and Highbury, at dusk (Bu.); Hampstead (So.); Highgate (So.).
- 176.—*Xylena rurea*, Fb. I. Hagger Lane Forest (Bu.); Hale End, "hovers at dusk round bushes and at sugar" (N.); Larks Wood (Ba.); Chingford (Be.). II. c. (F.); Dulwich (E.R., ii., 140). III. Chelsea (Ent., xxiv., 222); Tooting, r. (Bell, May); Wimbledon Common (D., Ma.). IV. Hendon (So.); Highgate, "common on palings" (Bu.); Highgate Woods (E.R., i., 159, So.); Hampstead Heath (So.); Wood Green (Bu.). *ab. alopecurus*, Auct. I. Hale End (P.). IV. Highgate (Bu.). [Probably everywhere with the type, but the records do not indicate it.—L.B.P.]
- 177.—*X. lithoxylla*, Fb. Everywhere except the heart of London.
- 178.—*X. sublustris*, Esp. II. Shirley\* (Sh.).
- 179.—*X. monoglypha*, Hfn. Common everywhere.
- 180.—*X. hepatica*, L. I. Hale End (Bt., J., &c.); Chingford (Be.); Hackney Marshes (Cl.). II. c. (F.); Dulwich (W.). III. Wimbledon Common (Ta., Ma.); Chiswick (Ent., xix., 134); Kingston (K.). IV. Highgate (E.R., ii., 168, So.); Hampstead Heath (So.).
- 181.—*X. scolopacina*, Esp. II. Shirley\* (Sh.); Dulwich (B.). IV. Highgate Woods, c. (So., Cl., &c.).
- 182.—*Dipterygia scabriuscula*, L. Apparently quite generally distributed in the suburbs, often common. In London, it has been recorded for S. Hackney (Se.); Regent's Park (Ent., xxiv., 140); Hamilton Terrace, N.W.\* (Ent., xxxii., 237).
- 183.—*Laphygma crigua*, Hb. II. "Scarce" (F.); Greenwich\* (Tutt, Ent., xvii., 234); \*(Tugwell, Ent., xvii., 235).
- 184.—*Neuria reticulata*, Vill. II. Croydon (H.).
- 185.—*Heliophobus popularis*, Fb. I. General. II. n.c. (F., Sh., &c.). III. Tooting, f.c. (Bell—M.); Barnes (Bu., P.); Wimbledon

- (Bu.). IV. General. Most of the records indicate the special partiality of the species for light.
- 186.—*Cerapteryx graminis*, L. I. Woodford\* (Ent., xix., 67); Forest Gate (M.); Stratford (Mu.). II. Scarce (F.); Bromley (Ent., xviii., 20). III. Wimbledon\* (Bu.). IV. Clerkenwell, in a shop window\* (Bl.); Hampstead Heath\* (Bu.).
- 187.—*Thalpophila matura*, Hfn. I. Chingford (Be.); Hale End\* (N.); Forest Gate (M.). II. n.r. (F.); Herne Hill, f.c. at light (C.); Bromley\* (Ent., xvii., 279); Dulwich (E.R., ii., 140, W.); Greenwich marshes (T.); Croydon, n.e. (Sh.). III. Tooting, r. (Bell—C.); Wimbledon (Ent., xxii., 150, Bu.); Petersham, at light (A.). IV. Winchmore Hill\* (Ba.); Highgate, 3 (L.).
- 188.—*Luperina testacea*, Hb. Common almost everywhere, including Clapton (N., Ba., Bt., Ss.); Hackney Marshes (Cl.); Isle of Dogs (Wy.); Finsbury Park (Ba.); Greenwich dist. (T.), &c.
- 189.—*Tholera cespitis*, Fb. I. Wanstead (Cl.); Forest Gate (M.). II. r. (F.); Eltham, occasionally at light (Jo.). III. Streatham (Fo.); Barnes (Ta.); Richmond, c. (K.). IV. Hampstead Heath (So.).
- 190.—*Hama abjecta*, Hb. I. Clapton\*, at sugar on willow tree at bottom of Spring Hill, Clapton, close to the River Lea (F. J. Hanbury). II. Greenwich and Plumstead marshes (T.).
- 191.—*H. sordida*, Bork. I. Walthamstow, n.e. (J., Bu.); Hale End (N., P.); Chingford (Be.); Woodford (Ent., xix., 67). II. c. (F.); Croydon, c. (Sh.). III. Hammersmith (Bi.). IV. Highgate, on palings (Bu.).
- 192.—*Barathra brassicae*, L. Common everywhere.
- 193.—*B. persicariae*, L. Common everywhere.
- 194.—*Apamea basilinea*, Fb. Everywhere, except in the heart of London. Mostly common, but I have only met with very few at Dalston, and Sieh says "occasionally" for Chiswick.
- 195.—*A. gemina*, Hb. I. c. II. c. (F.); S. London (Ent., xvii., 90); Greenwich dist. (T.); Dulwich (E.R., ii., 140). III. Tooting (Bell—M.); Wimbledon (D., Ta.); Chiswick\* (Si.). IV. Highgate and Hampstead (So.).
- 196.—*A. unanimitis*, Tr. I. Chingford (Be.); Hale End (N., P.); Lea Bridge Road (Bl.); Clapton (P.); Forest Gate (N.). II. r. (F.); Greenwich and Plumstead marshes, Westcombe Park (T.); Croydon, n.e. (Sh.); Dulwich (W.). IV. Zoological Gardens (Bl.); Highgate (Bu., So.).
- 197.—*A. ophiogramma*, Esp. As this is notoriously a London species I quote our records in full. I. Tottenham (Be.); Stamford Hill (Ent., xxv., 65, Ba.); Clapton (Bt., N., F. J. Hanbury); Woodford (Ent., xix., 67); Leytonstone (Ent., xxv., 319); Hackney marshes (Cl.). II. n.r. (F.); S. London\* (Ent., xvii., 90); Lee\*, in 1896, none since, formerly abundant (C.); Eltham, f.c. in gardens (Jo.); Brockley (E.R., i., 349); Dulwich (E.R., ii., 140); Forest Hill\* (Ss.); Westcombe Park (T.); Croydon, n.e. (Sh.). III. Streatham (Ent., xxiv., 223); Tooting (Bell—M.); Wimbledon (D.); Hammersmith (E.R., i., 116, Bi.); Chiswick (Ent., xix., 134). IV. Ealing (Fe.); Hampstead (Ent., xxiii., 346, So.); Highgate (Bu., So.); Southgate\* (Ba.); Bush Hill Park (Ent., xxv., 221); Canonbury (Bu.); Hornsey Rise (So.); North London (Sd.).

- 198.—*A. secalis*, Bjerk. (*didyma*, Esp.). Common everywhere, except in the heart of London.
- 199.—*Oligia strigilis*, Cl. Almost everywhere. As a contribution towards the question of London melanism I insert the following: I. Dalston, ab. *aethiops* only (P.); Clapton, "usually ab. *aethiops*" (Ba.); Walthamstow, "about 85%, ab. *aethiops*" (Ss.). II. Lee, "a perfect pest in garden, ab. *aethiops* almost without exception" (C.); Lewisham, Greenwich, Westcombe Park, almost entirely ab. *aethiops* (T.). III. Chiswick, "type and ab. *aethiops* common" (Si.). IV. Willesden, nearly all ab. *aethiops* (Ent., xxi., 60). See also Ent., xxi., 249; E.R., iv., 109.
- 200.—*O. fasciuncula*, Haw. I. Clapton (Bt., N.); Hale End, c. (J., N., &c.); Chingford (Be.); Woodford (Ent., xix., 67); Hackney marshes (Cl., P.); Forest Gate (M.). II. "Abundant" (F.); S. London (Ent., xvii., 90); Greenwich and Westcombe Park dists. (T.); Forest Hill (E.R., ii., 69); Dulwich (W.). III. Tooting, n.c. (Bell—M.); Wimbledon Common (D., Ma.); Hammersmith (Ta.); Chiswick\* (Si.). IV. Ealing (Fe.); Hendon (Ent., xxiv., 139); Hampstead Heath (So.); Highgate, at light (L.); Highgate Woods (E.R., i., 159, So.).
- 201.—*O. litorosa*, Haw. I. Chingford (Be.); Forest Gate (M.). II. n.r. (F.); S. London\* (Ent., xviii., 90); Dulwich (B.); Greenwich dist. (T.).
- 202.—*O. bicoloria*, Vill. Almost everywhere.
- 203.—*O. arcuosa*, Haw. I. Clapton marshes (Ba., P.); Hale End, c. at sugar (N.); Chingford (Be.); Woodford (Ent., xix., 67). II. Abundant (F.); Forest Hill (E.R., ii., 69); Dulwich (W.); Bromley (Ent., xviii., 20). III. Tooting, f.c. (Bell—M.—R.); Wimbledon Common (D., Bu., &c.). IV. Southall, v.c. on grass-stems (Ba.); Ealing (Fe.); Hampstead and Highgate (So.).
- 204.—*Meristis trigrammica*, Hfn. I. Hale End, c. (J., N., &c.); Woodford (Ent., xix., 67). II. c. (F.); Blackheath, Greenwich, Woolwich, Plumstead dists. (T.); Bromley (Ent., xvii., 278); Forest Hill (E.R., ii., 69); Dulwich (W.). III. Wimbledon Common (Ta., Bu., &c.). IV. Ealing (Fe.); Clerkenwell (Bl.); Highgate, at light (L.); Highgate Woods (E.R., i., 159, So.).
- 205.—*Stilbia anomala*, Hb. II. Croydon (Cl.).
- 206.—*Caradrina morphews*, Hfn. A very common London species, and quite generally distributed. Here at Dalston it is conspicuous on the wing at dusk, and comes freely to aphid-juice on goose-berry bushes, but does not seem very partial to sugar.—(L.B.P.).
- 207.—*C. alsines* (Brahm), Hb. I. Stamford Hill (Ba.); Hale End, c. (J.); Chingford (Be.); Woodford (Ent., xix., 67). II. v.c. (F.); Greenwich and Blackheath dists. (T.); Dulwich (Cox. teste B.). IV. "North London, common everywhere" (So.).
- 208.—*C. tararaci*, Hb. I. Hale End (Ss., P.); Chingford (Be.); Lea Valley (Bu.); Woodford (Ent., xviii., 74). II. v.c. (F.); Greenwich dist. (T.); Dulwich (W.); Bromley (Ent., xviii., 20). III. Barnes (Ta.); Tooting (May). IV. Ealing (Fe.); Hampstead (So.); Highgate, at light (Bu., L.); Muswell Hill (Bu.); Crouch End (Ent., xxvi., 50).

[*C. ambigua*, Fb. Mr. W. J. Kaye took a specimen in 1899,

- in his garden at Worcester Park, only just outside our district boundaries.]
- 209.—*C. quadripunctata*, Fb. Almost everywhere, including City (Cl.); Isle of Dogs (Wy.), &c.
- 210.—*Rusina tenebrosa*, Hb. I. Hale End, n.c. (J., Bt., &c.); Chingford (Be.); Woodford\* (Ent., xix., 67); Forest Gate (M.). II. c. (F.); Greenwich and Woolwich dists. (T.); Dulwich (W.). III. Tooting, r. (Bell—M.); Wimbledon Common (D., Ta., &c.); Barnes (Ta.). IV. Hampstead Heath (So.); Highgate Woods (Bu., Ss.).
- 211.—*Agrotis pta*, Hb. I. Hackney (Cl.); Clapton (Ss.); Tottenham (Be.); Hale End, n.c. (N., Ss., J.); Woodford (E.N., vii., 128); Stratford (Mu.); Forest Gate (M.). II. c. (F.); Greenwich marshes (T.); Croydon, n.c. (Sh.). III. Barnes (Ta.); Wimbledon (Ent., xxii., 151); Richmond Park (A.); Hammersmith (Bi.); Chiswick, f.c. at sugar (Si.); Tooting, f.c. (Bell—M.—R.). IV. Ealing (Fe.); Highgate, at light (L.); Highgate Woods (So.).
- 212.—*A. (Peridroma ?) ypsilon*, Rott. (*suifusa*, Hb.). I. Clapton (Bt.); Tottenham\* (Be.); Hale End (P.). II. n.r. (F.); Greenwich marshes (T.); Dulwich (W.). III. Tooting, n.c. (Bell—M.—R.); Wimbledon Common (Ta., Ma.); Barnes (Ta.); Chiswick, occasionally (Si.). IV. Ealing (Fe.); N. London, generally distributed (So.).
- 213.—*A. (Peridroma) saucia*, Hb. I. Cornhill, on a wall\* (Ent., xxvi., 51); Canonbury\* (Bu.); Isle of Dogs, c. (Wy.); Woodford, 4 in 1892 (E.N., vi., 208). II. Sometimes not rare (F., Jo.); Dulwich (W.); Lee, in 1898\* (C.). III. Tooting, r. (Bell—R.); Wimbledon Common (Ent., xxii., 151, P.); Hammersmith (Bi.). IV. Ealing (Fe.); Hampstead Heath\* (Bu.); Highgate Woods (So.).
- 214.—*A. septum*, Schiff. Common everywhere.
- 215.—*A. exclamatoris*, L. Common everywhere. Does not seem to be afraid of bricks and mortar, as we have records for Burlington Arcade\* (Si.); Gower Street (Bu.); Canonbury and Islington (Bu.); S. Hackney (Se.), &c.
- 216.—*A. corticea*, Hb. I. Woodford (E.N., vii., 128). II. n.r. (F.); Dulwich (W.). III. Tooting (Bell—M.—R.); Wimbledon Common (Ta.); Chelsea, at electric light (Ent., xxiv., 222). IV. Highgate Woods (So.).
- 217.—*A. nigricans*, L. Generally common. The records include City (Heasler); Isle of Dogs, v.c. (Wy.); Chelsea (Ent., xxiv., 221); Paddington (Ph.); Islington (Bu.), &c. Mr. Fenn indicates it as "locally abundant" in S.E. dist. "Have seen it in thousands in the market-gardens on Greenwich marshes" (T.).
- 218.—*A. tritici*, L. II. n.c. (F.); Plumstead marshes (Cl.); Lee, in 1899\* (C.); Croydon, n.c. (Sh.). III. Wimbledon Common (Taylor, *teste* P.). The var. *aquilina*, Hb., is recorded for S.E. dist., n.c. (F.), and Ealing (Fe.).
- 219.—*A. agathina*, Dup. II. On heaths, locally abundant in larval state (F.); Shirley, regularly, some years frequent (Sh.).
- 220.—*A. (Oxygia) obscura*, Brahm. IV. Ealing (Fe.).

- 221.—*Lycophotia strigula*, Thnb. II. Shirley, c. (Sh., F.). III. Wimbledon Common (Ma.) IV. Hampstead Heath (So.).
- 222.—*Amathes glaucosa*, Esp. I. Stratford (Mu.). II. Shirley, at heather bloom, r. (Sh.); Eltham\* (Jo.). III. Wimbledon Common (Ent., xxii., 151, Ta., &c.).
- 223.—*A. (E. carnis) augur*, Fb. Generally common.
- 224.—*A. (Ochropleura) plecta*, L. Generally common. Dr. Buckell has taken it at light on the Thames Embankment.
- 225.—*A. c-nigrum*, L. I. Hale End\* (N.); Lea Valley (Be.); Woodford (Ent., xix., 67); Stratford (Mu.). II. n.c. (F.); Greenwich dist. (T.); S. London (Ent., xvii., 90); Bromley (Ent., xvii., 279); Dulwich (E.R., ii., 140, W.). III. Tooting, r. (Bell, &c.); Wimbledon Common (Ent., xxii., 151, Ta., &c.); Hammersmith (Bi.); Chiswick, v.c. at sugar (Si.). IV. Ealing (Fe.); Highgate (Bu., So.); Hampstead Heath (So.).
- 226.—*A. ditrapezium*, Bork. III. Wimbledon Common (P., Ma., &c.). IV. Highgate Woods (E.R., i., 159); Hampstead Heath (So., P., &c.); 2 bred in 1895, 1 in 1896, 2 in 1897, 24 in 1898, 41 in 1899, none seen or heard of prior to 1895, notwithstanding diligent collecting of spring larvæ in the locality some 14 to 18 years ago, imago never seen on the heath, though collecting has been carried on there at the time when it was out (So., who adds "the last two years the spring noctua larvæ were abundant on Hampstead Heath").
- 227.—*A. triangulum*, Hfn. I. Hale End, c. (J., N., &c.); Chingford (Be.); Woodford\* (Ent., xix., 67). II. c. (F.); Greenwich dist. (T.); Bromley\* (Ent., xvi., 233); Dulwich (W.). III. Wimbledon Common (D., Ta., &c.). IV. N. London, common everywhere (So.).
- 228.—*A. stigmatica*, Hb. II. Sometimes common (F.); Croydon, r. (Sh.).
- 229.—*A. brunnea*, Fb. I. Hale End (N., P., Bt.); Chingford (Be.). II. c. (F.); Dulwich (W.). III. Wimbledon Common (D., Ta., &c.). IV. Hampstead Heath, l. (Ba., So.); Highgate Woods (E.R., i., 159, Ent., xxv., 65, &c.).
- 230.—*A. primulae*, Esp. (*festiva*, Hb.). A generally common species, but apparently avoiding the more central parts of London. The records are: I. Walthamstow (Bu.); Hale End, c. (J., Bt., &c.); Chingford (Be.); Woodford (Ent., xvii., 67). II. Abundant (F.); Greenwich and Woolwich dists. (T.); Bromley (Ent., xvii., 278); Sydenham (E.R., ii., 164); Dulwich (W.). III. Tooting, c. (Bell—M.); Wimbledon Common (D., Ta., &c.); Chiswick, n.c. (Si.). IV. Paddington (Ph.); Hampstead Heath, l. (Ba., So.); Highgate Woods, swarming (Bu., So.); Wood Green (Bu.).
- 231.—*A. rubi*, View. Recorded from nearly all the same localities as preceding, also: I. Thames Embankment, at electric light (Bu.); Dalston, one or two (P.); Stamford Hill\* (Ba.); Ponders End (Bu.); Forest Gate (M.). III. Tooting, r. (Bell, &c.); Wimbledon, n.c. (P., Ma.); Hammersmith (Ta.). IV. Ealing (Fe.); Islington, Highbury (Bu.); Muswell Hill (Bu.).
- 232.—*A. umbrosa*, Hb. I. Hale End\* (N.); Chingford (Be.). II. Formerly common (F.). III. Wimbledon Common (Ent., xxii.,

- 151); Barnes (Ta.); Chiswick, at sugar\* (Si.). IV. Hampstead Heath (So.); Hendon (So.).
- 233.—*A. baia*, Fb. I. Hale End, c. (J., N., Ss.); Chingford (Be.). II. c. (F.); Woolwich and Greenwich dists. (T.); Sydenham (E.R., ii., 164); Dulwich (Heasler, *teste* B.). III. Wimbledon Common (D., Bu., &c.); Chiswick, r. (Si.). IV. Hampstead Heath (So.); Highgate Woods (So.).
- 234.—*A. castanea*, Esp. II. Shirley, c., both type and ab. *neglecta*, Hb. (Sh., Cl., Jo.).
- 235.—*A. xanthographa*, Fb. Common everywhere, except in the heart of London.
- 236.—*Triphaena ianthina*, Esp. I. Stamford Hill (Ba.); Tottenham (Be.); Hale End, c. (J., N.); Woodford\* (Ent., xix., 67); Stratford (Mu.). II. c. (F., C., &c.). III. Tooting, r. (Bell—M.—R.); Wimbledon Common, l. on nettles (Ent., xxii., 151); Hounslow, usually abundant at sugar (Ent., xxi., 19); Chiswick, c., l. on young shoots of balsam poplar (Si.). IV. Ealing (Fe.); N. London (Sd.); Holloway\* (Bu.); Canonbury\* (Bu.); Hampstead (So., Bl.); Highgate (So., L.).
- 237.—*T. jimbriata*, Schreb. (*jimbria*, L.). I. Hale End, n.c. (J.); l. on sallows (N.); Woodford (E.R., i., 166); Isle of Dogs\* (Wy.). II. c. (F.); Eltham, l., f.c. in 1900 (Jo.); Brockley, l. (E.R., i., 349); Dulwich (E.R., ii., 140); Croydon (Ent., xiii., 221). III. Tooting, r. (Bell—R.); Wimbledon Common (Ent., xxii., 151, Bu., &c.). IV. Ealing (Fe.); Hampstead Heath (Ba., So.); Highgate (So.).
- 238.—*T. interjecta*, Hb. I. City\* (Heasler). II. n.c. (F.); Lee, in 1899\* (C.); Croydon, frequent (Sh.). III. Wimbledon Common, on the wing (A., Ent., xxii., 151); New Malden (Ent., xx., 64); Chiswick (Ent., xix., 134). IV. Hampstead Heath (So.).
- 239.—*T. orbona* (Hufn.), Rott. (*subsequa*, Auct.). Chelsea at electric light (Ent., xxiv., 222). [Has Mr. Stewart's record been authenticated? if not, I would venture to suspect some mistake in the determination.—L.B.P.]
- 240.—*T. subsequa*, Esp. (*comes*, Hb.). Common everywhere except in central London. It is unfortunate that, according to the law of priority, the commonly accepted names of this and the preceding species have to be reversed, as shown by Snellen as long ago as 1867.
- 241.—*T. pronuba*, L. Common everywhere, generally abundant. Probably as variable a series could be collected in a London garden as from localities scattered over the whole country.
- 242.—*Pyrophila pyramidea*, L. I. Larks Wood\* (Ba.); Hale End, n.c. (J., N., &c.); Hagger Lane Forest (Bu.); Stratford (Mu.); S. Hackney (Se.). II. c. (F.); Bromley (Ent., xvii., 279). III. Wimbledon Common (D., Bu., &c.). IV. Kensington Gardens, l.\* (Bu.); Hampstead Heath (So.).
- 243.—*P. tragopogonis*, L. Very generally distributed, though missing from central London. Recorded from Paddington (Ph.).
- 244.—*Naenia typica*, L. Common everywhere.
- 245.—*Mormo maura*, L. Generally distributed, but not recorded from nearer the City than S. Hackney (Se.).
- 246.—*Panolis griseo-variegata*, Goeze (*piniperda*, Panz.). I. Wood

- Street, Walthamstow, on a fence\* (Ss.). II. n.r. (F.); Shirley, c. (Cl., Sh.). IV. Highgate, 2 (So.).
- 247.—*Pachnobia rubricosa*, Fb. I. Hale End, n.e. (J., N.); Chingford (Be.); Woodford (Ent., xix., 67). II. Common in some seasons (F.); Sydenham (E.R., ii., 164); Croydon, c. (Sh.). III. Wimbledon Common (Ta., P., &c.); Chiswick, occasionally (Si.). IV. Hampstead, c. (So.); Highgate Woods (So.).
- 248.—*Graphiphora gothica*, L. Generally common, but no strictly urban records.
- 249.—*G. incerta*, Hfn. Almost everywhere, including Dalston (P.); Canonbury and Highbury (Bu.); Ladbroke Square (Ent., xx., 199), &c.
- 250.—*G. opima*, Hb. I. Wanstead (Cl., M.). Apparently only dark forms occur in this locality.
- 251.—*G. populi*, Ström. (*populeti*, Fb.). I. Wanstead (Cl.). II. Locally abundant (F.); Woolwich, Plumstead and Lee dists. (T.); Eltham, l., c. (Jo.); Sydenham\* (E.R., iii., 292); Shirley, r. (Sh.). III. Wimbledon (E.R., ix., 156, Ma.); Coombe Wood (K.).
- 252.—*G. cerasi*, Fb. (*stabilis*, View.). Common in the suburbs; Dr. Buckell records pupæ as near the City as Highbury.
- 253.—*G. gracilis*, Fb. I. Hale End (N., Ss.); Chingford (Be.). II. n.r. (F.); Eltham, l., v.e. one season in terminal shoots of sallow (Jo.); Dulwich (W.); Croydon, c. (Sh.). III. Wimbledon Common (Ent., xxii., 152, P., &c.); Tooting, c. (Bell, &c.); Chiswick, occasionally (Si.). IV. Ealing (Fe.); Hampstead Heath, c. (So.).
- 254.—*G. miniosa*, Fb. II. Scarce (F.); Shirley\* (Sh.). III. Wimbledon (S. J. Bell). IV. Ealing (Fe.).
- 255.—*G. munda*, Esp. II. c. (F.); Shirley, c. (Sh.). III. Kingston (K.); Wimbledon (Ma.); Tooting (Bell—M.).
- 256.—*G. pulverulenta*, Esp. I. Hale End, c. (J., N., &c.); Chingford (Be.); Hackney marshes (Cl.). II. Abundant (F.); Dulwich (E.R., ii., 140, W.). III. Wimbledon (D.); Richmond Park (A.). IV. Southall (Ba.); Ealing (Fe.); N. London, common everywhere (So.).
- 257.—*Dyschorista suspecta*, Hb. II. Locally common (F.); Dulwich, freely in 1895 (B.); Shirley, r. (Sh.). III. Wimbledon Common, at sugar (A.); Richmond Park\* (A.).
- 258.—*D. fissipuncta*, Haw. (*upsilon*, Bork.). Generally distributed, especially wherever there are willows; l. occasionally on poplar (L.B.P.).
- 259.—*Orthosia lota* (a), Cl. I. Hale End (P., Ss.); Chingford (Be.); Hackney marshes (Cl.). II. c. (F.); Dulwich (E.R., ii., 140, W.); Greenwich Park (T.); Sydenham (E.R., ii., 164); Bromley (Ent., xvi., 19). III. Wimbledon, l. on blackthorn (Ent., xxii., 151); Barnes (Ta.); Chiswick, c. at ivy (Si.). IV. Ealing (Fe.); Harrow (Ent., xxiv., 156); N. London, generally distributed (So.). I have never seen the red form—*ab. rufa*, Tutt, from the London district.—L.B.P.

(a) Unfortunately this genus will require to be re-named, as Curtis, in 1828, selected *instabilis* (*incerta*, Hfn.) for the type of *Orthosia*.

- 260.—*O. macilenta*, Hb. II. n.r. (F.). IV. Ealing (Fe.); Highgate (So.); Winchmore Hill (Ba.).
- 261.—*Agrochola helvola*, L. (*rutina*, L.). II. c. (F.). III. Wimbledon Common (Ta.).
- 262.—*A. pistacina*, Fb. Nearly everywhere, excepting the central parts.
- 263.—*A. lunosa*, Haw. The same may be said of this species.
- 264.—*A. litura*, L. II. c. (F.); Sydenham (E.R., ii., 164). III. Wimbledon Common (D., Ta., &c.); Chiswick, abundant, 1. common on flowers of sorrel (Si.); Hammersmith (Bi.). IV. Ealing (Fe.); Highgate Woods (Bu.); Winchmore Hill (Ba., P., &c.).
- 265.—*Gilaca raccinii*, L. Common everywhere in the suburbs.
- 266.—*G. ligula*, Esp. (*spallica*, Haw., *nee* Hb.). I. Hale End, c. (Ss., Ba.); Chingford (Ba.); Hackney Marshes (Cl.). II. c. (F.); Dulwich (E.R., ii., 140); Sydenham (E.R., ii., 164); Bromley (Ent., xvi., 19). III. Wimbledon (Ma.). IV. Ealing (Fe.); Highgate (So.); Muswell Hill (So.); Palmer's Green, Winchmore Hill and Southgate (Ba.).
- 267.—*Eupsilia satellitia*, L. I. Hale End (N., Ss., Ba.); Chingford (Be.); Hackney Marshes (Cl.). II. c. (F.); Sydenham (E.R., ii., 164); Dulwich (W.). III. Tooting, r. (Bell—R.); Wimbledon Common (D., Ma.); Hammersmith (Bi.). IV. Ealing (Fe.); Highgate Woods (So.); Crouch Hill\* (Ent., xxv., 65); Muswell Hill (Ba.); Winchmore Hill (Ba., P., &c.).
- 268.—*Jodia crocago*, Fb. II. n.c. (F.); Eltham, sparingly (Jo.); Dulwich\* (W.).
- 269.—*Tiliacca citrago*, L. I. Hale End (J., P.); Buckhurst Hill, 1890 (E.N., v., 162); Wanstead Flats (Cl.). II. c. (F.); Eltham, l., c. (Jo.). III. Tooting, r. (Bell, Bell—R.); Barnes (Ta.); Chiswick, occasionally (Si.). IV. The records for this district, and for the S.E., indicate a wide distribution.
- 270.—*Tiliacca (?) aurago*, Fb. II. Local and scarce (F.).
- 271.—*Citria icteritia*, Hufn. (*fulrago*, L.). II. c. (F.); Croydon, c. (Sh.). III. Tooting, r. (Bell—R.); Wimbledon Common (D., Ta., &c.); Hammersmith (Ta.). IV. Ealing (Fe.); Hampstead and Highgate (So.).
- 272.—*C. lutea*, Ström. (*flavago*, Fb.). I. Forest Gate (M.). II. c. (F.); Woolwich dist. (T.); Bromley\* (Ent., xvii., 279); Dulwich (E.R., ii., 140, W.); Shirley, c. (Sh.). III. Tooting, r. (Bell—R.); Wimbledon Common (Ta., Ent., xxii., 151, &c.); Barnes (Ta.). IV. Hampstead and Highgate (So.); Muswell Hill\* (Bu.).
- 273.—*Mellinia gilvago*, Esp. I. St. James' Street, Walthamstow, 18/10/90\* (N.). IV. Highgate 8/9/93\* (Bu.); Winchmore Hill (Ba.).
- 273A.—*M. ocellaris*, Bork. II. Dulwich, 3/10/94\* (Ent., xxvii., 132). III. Wimbledon, at sugar, 27/9/93\* (E. H. Taylor); October 1894\* (Ent. Mo. Mag., xxxi., 50); Twickenham (Ent. Mo. Mag., xxx., 161).
- 274.—*M. circellaris*, Hfn. I. Hale End (N.); Chingford (Be.). II. c. (F.); S. London (Ent., xvii., 90); Sydenham (E.R., ii., 164); Dulwich (B.). III. Tooting, c. (Bell, &c.); Wimbledon Common (Ta., Ma.); Chiswick, abundant (Si.); Hammersmith (Bi.).



- IV. Ealing (Fe.); Hampstead and Highgate (So.); Palmers Green (Ba.).
- 275.—*Cirrhoedia scampelina*, Hb. I. Stratford, at light (Mu.). II. n.c. (F.); Charlton,\* on lamp (Jo.); Bromley\* (Ent., xvi., 19). IV. Acton, at light\* (Ent., xxi., 276).
- 276.—*Ipimorpha notacula*, Fb. (*subtusa*, Fb.). For this species we have a large number of single records, and probably if it were systematically worked for, it might be described as "generally common." But as matters stand, it seems needful to give the full list. I. Dalston, l.\* (P.); Hackney Downs, l.\* (Tr.); Stamford Hill, l.\* (Ba.); Walthamstow\* (Bu.); Woodford\* (Ent., xix., 67). II. c. (F.); Westcombe Park (T.); Eltham, l. very abundant (Jo.); S. London (Ent., xvii., 90); Bromley (Ent., xvii., 279); Dulwich\* (W.); Croydon, r. (Sh.). III. Wimbledon (D.); Kingston Vale\* (Ent., xxii., 151); Ham Common (A.); Chiswick, at sugar\* (Si.). IV. Highgate (Bu., So.).
- 277.—*I. retusa*, L. I. Walthamstow\* (J.); Ponders End, at light\* (Bu.). II. Rare, formerly common (F.); Eltham, "abundant one season, bred 100 from terminal shoots of willow" (Jo.).
- 278.—*Dicycla oo*, L. I. Walthamstow, r. (J.); Hale End (Bt., N., &c.); Chingford (Be.). II. Occasionally (F.); Bromley (Ent., xvi., 19); Woolwich Common\*, at rest on oak (Jo.). IV. Highgate Woods\* (So.).
- 279.—*Cosmia trapezina*, L. Nearly everywhere outside the four-mile radius, including Isle of Dogs, n.c. (Wy.). Within the radius our only record is Dalston, 2 or 3, l. once on rose in garden (P.).
- 280.—*C. pyralina*, View. III. Kingston Hill\* (K.). IV. Ealing (Fe.) Mr. W. J. Kaye has also taken it at Worcester Park, just outside our district boundaries.
- 281.—*C. diffinis*, L. I. Hale End, c. (J., N.); Chingford (Be.); Woodford (E.N., vii., 128). II. n.r. (F.); Eltham, n.r. (Jo.); Dulwich (E.R., ii., 140); Sydenham (E.R., ii., 164); Croydon, frequent (Sh., Ent., xiii., 221). III. Tooting, r. (Bell—S.); Wimbledon (Ent., xxii., 151); Richmond Park\* (A.); Roehampton (Bu.); Hammersmith (Bi.). IV. Ealing (Fe.); Hampstead (So.); Highgate (So.).
- 282.—*C. affinis*, L. Nearly the same localities as *C. diffinis*; also Stratford (Mu.); Bromley (Ent., xvii., 279); Isleworth (Ent., xxiv., 156); Chiswick (Ent., xix., 134); Southall (Ba.).
- 283.—*Eremobia ochroleuca*, Esp. I. Victoria Park (Cl.). II. Croydon, r. (Sh.).
- 284.—*Halena conspersa*, Esp. (*nana*, Rott.). II. n.c. (F.); Croydon, c. on fences (Sh., Cl.).
- 285.—*H. bicurris*, Hfn. (*capsincola*, Hb.). I. Dalston (P.); Clapton (N.); Stamford Hill (Ba.); Woodford (Ent., xix., 67); Stratford (Mu.). II. c. (F.); Greenwich dist., in gardens on sweet-william (T.); Lee (C.); Dulwich (E.R., ii., 140). III. Tooting (Bell—R.); Hammersmith (Bi.); Chiswick, at blossoms on red lychnis and soapwort, l. on lychnis, c. (Si.). IV. Generally distributed (So., Sd.).
- 286.—*H. cucubali*, Fuess. I. Tottenham (Bt.); Woodford\* (Ent., xix., 67). II. n.c. (F.); Greenwich, at sugar (T.); Dulwich (W., B.); Croydon, c. (Sh.). III. Hammersmith (Bi.); Chis-

- wick (Ent., xxxii., 258). IV. Brunswick Square, W.C., 12/6/99\* (Meldola); Ealing (Fe.).
- 287.—*H. carpophaga*, Bork. I. Wood Street, Walthamstow, on waterworks paling\* (Bu.); Hackney marshes (Cl.). II. Croydon, c. (Sh.). III. Tooting, r. (Bell—R.). [*H. capsophila*, Dup. Mr. Woolley's record in Ent., xxv., 191, is obviously erroneous, and is not repeated in his later list for Isle of Dogs.]
- 288.—*Hecatera chrysozona*, Bork. I. Stratford (Cl.).
- 289.—*H. serena*, Fb. Records show a very general distribution round London, though it is only given as "common" in the S.E., and seems to be absent from the Hampstead and Highgate district, which has been so thoroughly worked by our Society. Surely the food-plant (*Crepis*) must occur there? Last summer (1899) Mr. Hanbury took a specimen hovering over flowers in his garden at Clapton.
- 290.—*Polia chi*, L. II. Brockley, one or two (E.R., i., 349). Mr. Turner (*in litt.*) says, this "was only a chance capture;" probably escape from breeding.
- 291.—*P. flavicincta*, Fb. I. Woodford (Cl.). II. n.c. (F.). III. Kingston, c. (K.); Richmond, on the railway bridge (A.); Bedford Park (Ent., xxiv., 139). IV. Ealing (Fe., Bu.); Southall (Ba.).
- 292.—*Dasyptolia templi*, Thnb. I. Stratford, at light (Mu.). IV. Ealing (Fe.).
- 293.—*Aporophyla lutulenta*, Bork. II. Scarce (F.).
- 294.—*Cleoceris riminalis*, Fb. II. c. (F.); Dulwich (W., Cox, *teste* B.); Croydon, l. on sallow, c. (Sh., H., Cl.). IV. Hampstead Heath (So.).
- 295.—*Miselia ocyacanthar*, L. Almost everywhere, excepting the more central parts. Ab. *capucina*, Mill. very frequent.
- 296.—*Dichonia aprilina*, L. II. Scarce (F.).
- 297.—*Euplexia lucipara*, L. Common everywhere, mostly abundant.
- 298.—*Phlogophora meticulosa*, L. Everywhere, mostly common; but seems less of a pest round London than in many parts of the country.
- 299.—*Enrosia ocellata*, L. II. Lee, a few (F.). III. Wimbledon (Ent., xiv., 258).
- 300.—*Aplecta nebulosa*, Hfn. I. Hale End, c. (J., Bt., &c.); Larks Wood, l. on sallow\* (Ba.); Hagger Lane Forest (Bu.); Lea Bridge Road (Bl.). II. c. (F.); Woolwich dist. (T.); Dulwich (W.). III. Wimbledon Common (D., Ta.). IV. Hampstead (Ent., xxiv., 139); Highgate Woods, abundant (Bu., So.). The London forms of this species show a decided melanochroic tendency.—L.B.P.
- 301.—*A. tineta*, Brahm. II. Croydon, l. on birch, c. some years (Sh.). IV. Wimbledon Common (A., Ma., &c.).
- 302.—*A. advena*, Fb. II. Occasionally (F.); Eltham, r. (Jo.); Croydon (H.).
- 303.—*Mamestra adusta*, Esp. I. Hale End, r. (P.).  
[*M. protea*, Bork. *vide* No. 312.]
- 304.—*M. dentina*, Esp. (*?' nana*, Hfn.). I. Hale End (Tr., P.); Ponders End (Bu.); Forest Gate (M.). II. c. (F.); Greenwich, Woolwich dists. (T.); Sydenham (E.R., ii., 164); Shirley\* (J.).

- III. Barnes (Ta.); Wimbledon (Ent., xxii., 151); Chelsea (Ent., xxiv., 221). IV. Highgate Woods (So.); Southgate\* (Ba.).
- 305.—*M. trifolii*, Rott. Everywhere, except in the very heart of London, abundant in many parts.
- 306.—*M. dissimilis*, Knoch. I. Hackney Marshes (Cl.).
- 307.—*M. oleracea*, L. Common everywhere.
- 308.—*M. pisi*, L. Very generally distributed, often common (*e.g.*, Ent., xxxiii., 259); scarce at Dulwich (B.); not recorded within the four-mile radius. In addition to the favourite food-plants, broom and bracken, larvæ have been taken on *Chenopodium* at Stamford Hill (Ba.) and Harringay (Bu.).
- 309.—*M. thalassina*, Rott. I. Walthamstow, n.c. (Jackson); Hale End (N., P.); Woodford (Ent., xix., 67). II. n.c. (F.); Dulwich (W.). III. Wimbledon (Ma.); Richmond Park (A.); Hammersmith (Bi.). IV. Myddelton Square\* (Hodges); Highgate, at light (Ent., xxvi., 49, L.); Highgate Woods, c. (So., E.R., i., 160).
- 310.—*M. contigua*, Vill. II. Croydon (Cl.); Eltham, occasionally at sugar (Jo.).
- 311.—*M. genistæ*, Bork. I. Hale End\* (N.); Forest Gate (M.). II. n.c. (F.); Dulwich (W.). III. Richmond Park (A.); Wimbledon (Ma.); Kingston Hill (K.). IV. Hornsey Rise (So.); Highgate\* (Bu.); Muswell Hill (So.).
- 312.—*Dryobota protea*, Bork. I. Hale End (N.). II. Sometimes common (F.). III. Tooting (Bell—R.); Wimbledon Common (Ent., xxii., 151, Ta.); Barnes (Ta.). IV. Highgate and Muswell Hill (So.); Winchmore Hill (Ba.).
- 313.—*Xylocampa arcata*, Esp. Of fairly general occurrence in the more rural parts. Dr. Buckell records one on an elm trunk in Regent's Park.
- 314.—*Calocampa retusta*, Hb. II. Sydenham (E.R., ii., 164). III. Wimbledon Common (Ent., xxii., 151); Tooting, r. (Bell—R.).
- 315.—*C. exoleta*, L. I. Tottenham\* (Ba.). II. Sydenham (E.R., ii., 164). IV. Southgate\* (Ba.).
- 316.—*Lithophane ornithopus*, Rott. III. Hammersmith (Ent., xxiv., 281).
- 317.—*L. semibrunnea*, Haw. I. Hackney marshes (Cl.).
- 318.—*Brachionycha sphinx*, Hfn. II. Scarce (F.).
- 319.—*Cucullia verbasci*, L. II. n.c. (F.); Eltham, l. on mullein in garden (Jo.); Plumstead marshes (Cl.); Croydon, l. c. (Sh.).
- 320.—*C. asteris*, Schiff. II. Croydon, l., not uncommon some years (Sh.); Shooters Hill Wood, l. not uncommon (Jo.).
- 321.—*C. chamomillæ*, Schiff. I. Hale End (Tr.); Hackney marshes (Cl.). II. Eltham, l. c. (F., Jo.); Blackheath dist. (T.); Forest Hill\* (E.R., ii., 69). III. Wimbledon (Taylor, *teste* P.); Chiswick (Ent., xix., 34, xxxii., 20). IV. Hampstead Heath\* (So.).
- 322.—*C. umbratica*, L. I. Clapton, in garden\* (N.); Hale End (P.); "used to be common over honeysuckle in garden" (E.N., v., 164). II. n.c. (F.); Lee, 1899\* (C.); Grove Park, 1897\* (C.); Forest Hill\* (E.R., ii., 69); Dulwich (E.R., ii., 140); Croydon, frequent (Sh.). III. Hammersmith (Bi.); Chiswick, n.c. (Si.).

- IV. Highgate, at light (Ent., xxvi., 49, L.); Highgate Woods (So.); Hampstead Heath (So.).
- 323.—*Scoliopteryx libatrix*, L. Generally distributed, including Stratford (Mu.); Ladbroke Square (Ent., xx., 200), &c. L. at Chiswick on willow and balsam poplar (Ent., xxxiii., 130).
- 324.—*Habrostola tripartita*, Hfn. I. Hale End, c. (J.); Hackney Marshes (Cl.); Forest Gate (M.). II. Scarce (F.); Brockley, a few (E.R., i., 349). IV. Ladbroke Square (Ent., xx., 200); Ealing (Fe.); N. London (Sd.).
- 325.—*H. triplasia*, L. Much more general in the London district than the preceding; as against only 8 records for *H. tripartita*, we have 22 for *triplasia*, including: Dalston (P.); Clapton, n.e. (N., Ba.); Lee, formerly common, none since 1897 (C.); Canonbury and Highbury (Bu.); N. London, generally distributed (So., Sd.).
- 326.—*Plusia (Chrysoptera) moneta*, Fb. This recent interesting addition to our fauna has already several times been taken round London. I. Woodford 2/6, 93\* (Oldham); Ent., xxvi., 254, E.N., vii., 107 and 127. II. Bromley (Ent., xxix., 263); Croydon\* (Ent., xxviii., 311). III. Sutton\* (Ent., xxix., 263); Hammersmith\* (Ent., xxxii., 212).
- 327.—*Plusia chrysitis*, L. Nearly everywhere outside London. We have no records for Wimbledon, Richmond, &c., but this is probably a mere oversight. Writing of Lee and Grove Park, Mr. Carr says, "another common moth which has dropped off during the last two seasons." Dr. Sequeira has taken it in his garden at S. Hackney, and Dr. Phillips at Paddington.
- 328.—*P. iota*, L. I. Stamford Hill\* (Ba.); Hale End (Bt., Ss.); Chingford (Be.); Woodford (Ent., xix., 67). II. n.e. (F.); Brockley (E.R., i., 349); Croydon, frequent (Sh.). IV. Ealing (Fe.); Hendon (So.); Highgate (So.); Southgate, occasionally at light (Ba.).
- 329.—*P. pulchrina*, Haw. III. Chiswick\* (Si.). IV. Highgate Woods (So.); Crouch Hill (Ent., xxv., 65).
- 330.—*P. gamma*, L. Everywhere, though only occasionally wandering into the central parts of London.
- 331.—*P. interrogationis*, L. Ealing (Fe.). [Surely an escape?—L.B.P.]
- 332.—*Anarta myrtilli*, L. II. n.r. (F.); Abbey Wood (W.); Shirley, c. (Sh., W., Cl., &c.).
- 333.—*Panemeria tenebrata*, Scop. I. Walthamstow (E.R., i., 132); Hale End, n.r. (N., Tr., &c.). II. Locally abundant (F.); Dulwich (W.). III. Streatham (Fo.); Wimbledon Common (Ent., xxii., 151, A.). IV. N. London (Sd.); Southall, common, but local (Ba.); Ealing (Fe.); Willesden (E.R., ii., 291); Harrow (D.); Mill Hill, c. (R. E. James).
- 334.—*Heliothis peltigera*, Schiff. I. Clapton, in garden\* (N.). II. Sydenham\* (E.R., ii., 164).
- 335.—*Erotyle trabecalis*, Scop. I. Hackney marshes (Cl.).
- 336.—*Tarache luctuosa*, Esp. II. Lee\* (F.); Croydon, r. (Sh., Cl.).
- 337.—*Hapalotis fasciana*, L. I. Wanstead Flats (Cl.). II. Forest Hill, 24/7/86\* (E.R., ii., 69). III. Richmond Park, 3 or 4 on tree-trunks, 28/7/81 (Bu.). IV. Highgate Woods (So.).

- 338.—*Euclidia mi*, Cl. I. Hale End, c. (N., Ss., &c.). II. n.c. (F.); Abbey Wood (W.); Dulwich (W.); Croydon (H.). III. Wimbledon Common (Ta., A., &c.); Hammersmith (D.). IV. Southall (Ba.); Willesden (E.R., ii., 291).
- 339.—*E. glyphica*, L. II. Croydon (H.). IV. Southall (Ba.).
- 340.—*Catocala frarini*, L. I. Stamford Hill\* (Goymour). III. Sutton, 18/9/87\* (Ent., xx., 325). IV. Hyde Park, 9/9/85\* (Ent., xviii., 318).
- 341.—*C. nupta*, L. Everywhere except in the heart of London, generally common, abnormally so last autumn (1899). Out as early as July 7th in 1893 (E.N., vii., 128).
- 342.—*C. sponsa*, L. II. Blackheath, 1/9/87\* (Ent., xx., 306); Croydon\* (H.).
- 343.—*Parascotia fuliginaria*, L. I. Upper Thames Street (Ent., xiv., 179, 228). II. Bermondsey (Ent., xiv., 212); Lewisham Ent., xiv., 212, 228).
- 344.—*Ricula sericealis*, Scop. II. Croydon, r. (Sh.).
- 345.—*Paracolar griscealis*, Hb. I. Clapton, c. (N.); all parts of Epping Forest, &c., various recorders. II. c. (F.); Forest Hill\* (E.R., ii., 69); Dulwich (B.); Croydon, c. (Sh.). III. Richmond Park (A.). IV. Highgate (Bu., So., &c.); Southgate (Ba.).
- 346.—*Zanclognatha tarsipennalis*, Tr. The same distribution as the preceding, with the following additions: I. Dalston (P.); Stamford Hill (Ba.). II. Sydenham (E.R., ii., 164). III. Wimbledon (Bu.). Rarer at Croydon than *griscealis* (Sh.).
- 347.—*Polyponon barbalis*, Cl. II. Sydenham (E.R., ii., 164). IV. Highgate Woods (So.).
- 348.—*Hypena rostralis*, L. I. Generally distributed. II. Common (F., &c.); Westcombe Park (T.). III. Bedford Park (Ent., xxiv., 281); Isleworth (Ent., xxiv., 281). IV. Common everywhere (So.).
- 349.—*H. proboscidalis*, L. I. Hagger Lane Forest (Cl., Bu.); Hale End, c. (N., P.); Chingford (Be.). II. c. (F.); Dulwich (E.R., ii., 140); Sydenham (E.R., ii., 164). III. Wimbledon (Bu.). IV. Common everywhere (So.).
- 350.—*Hypenodes taenialis*, Hb. (*albistrigalis*, Haw.). II. n.r. (F.). IV. Highgate Woods, r. (So.).
- 351.—*H. costastrigalis*, St. II. n.r. (F.); Shirley, r. (Sh.).
- 352.—*Brepbos parthenias*, L. II. n.c. (F.); Croydon, c. among birch (Sh.). III. Wimbledon Common (Ma.).
- 353.—*Lars sambucaria*, L. Common in all the suburbs.
- 354.—*Euchlaena apiciaria*, Schiff. I. Tottenham\* (Ss.); Buckhurst Hill, 1890 (E.N., v., 164). II. n.r. (F.); Bromley\* (Walthamstow); Beckenham\* at light, October 2nd (Bu.); Dulwich (W.). III. Wimbledon Common (Ta., Whittle). IV. Southall\* at light (Ba.); Highgate Woods (So.).
- 355.—*Cepphis adrearia*, Hb. IV. Ealing (Fe.).
- 356.—*Opisthograptis luteolata*, L. Common everywhere except in the very heart of London.
- 357.—*Pseudopanthera macularia*, L. I. Hackney\* (Cl.). II. c. (F.); Croydon (H.); Shirley, c. (Sh.). III. Wimbledon Common (A.). IV. Ealing (Fe.).

- 358.—*Angerona prunaria*, L. I. Hagger Lane Forest (Bu., Cl.); Hale End, c. (J., N., &c.); Chingford (Be.). III. Wandsworth\* (Ent., xxxii., 212); Wimbledon Common (Ent., xxii., 151).
- 359.—*Eudalimia margaritata*, L. I. Walthamstow, c. (J.); Hagger Lane Forest (Bu., Cl.); Hale End, c. (N., Bt., &c.); Woodford, at light (Ent., xix., 67). II. n.r. (F.); Dulwich (W.). III. Tooting, rather rare (B.); Wimbledon Common (D., Ta.); Richmond Park (Bu.); Hounslow (Ent., xxi., 19); Chiswick (Ent., xxv., 115). IV. Ealing (Fe.); Highgate (Bu., So., L.); Southgate (Ba.).
- 360.—*Hylaca prosapiaria*, L. II. n.e. (F.); Croydon (Cl.); Shirley, c. (Sh.). III. Roehampton,\* on a fence (Bu.).
- 361.—*Plagodis dolabraria*, L. I. Hagger Lane Forest (Bu., Cl.). II. "Formerly occurred, now extinct" (F.); Greenwich Park,\* on tree-trunk (Bu.). III. Richmond Park (Bu., Si., A.); Ham Common (A.). IV. Clerkenwell,\* on a door post (Bl.); Hampstead (Hollis); Highgate Woods (So.).
- 362.—*Hygrochroa syringaria*, L. I. Hagger Lane Forest (Cl., Bu.); Hale End, occasional (N., P.); Chingford (Be.); Woodford (Ent., xix., 67). II. Occasional (F.); Bromley (Ent., xvi., 19); Dulwich (W.). III. Wimbledon Common (Ent., xxii., 151); Ham Common (A.); Hounslow (Ent., xxi., 19). IV. Ealing (Fe.); Hendon (So.); Highgate Woods (So.); Southgate, at light (Ba.).
- 363.—*Entrapla bilunaria*, F.sp. I. Records show it common throughout the Epping Forest district: Dr. Sequeira has taken it at S. Hackney. II. c. (F.); Croydon (H.); Forest Hill, f.c. (E.R., ii., 69); Dulwich (W.); Grove Park, 1896 (C.). III. Wimbledon Common (D., Ta.); Richmond (Sd.). IV. "Common everywhere" (So.).
- 364.—*E. lunaria*, Schiff. I. Tottenham (Be.); Woodford (P.); Stratford (Mu.). II. Occasional (F.); Forest Hill\* (E.R., ii., 69). III. Kingston Hill (K.). IV. Southall,\* on a fence (Ba.); Highgate Woods (So.); Wood Green (E.R., iv., 66).
- 365.—*E. tetralunaria*, Hfm. I. Hagger Lane Forest (Cl.). II. Occasionally (F.).
- 366.—*Gomodontis bidentata*, Cl. I. Walthamstow, n.e. (J.); Highams Park (Ba., P.); Hale End (Ss., Tr.); Woodford (Ent., xix., 67); Stratford (Mu.). II. c. (F.); Croydon (H.); Forest Hill\* (E.R., ii., 69); Sydenham (E.R., ii., 164). III. Petersham, at light (A.); Chiswick\* (Si.). IV. "Generally distributed" (So.); Hampstead Heath\* (Bu.); Crouch Hill (Ent., xxv., 65); Highgate (Hollis, L.); Muswell Hill, at light (Bu.); Finchley (Bu.).
- 367.—*Eusarca clingularia*, L. Almost everywhere, including Dalston (P.); S. Hackney (Se.); Lee, l. abundant on plum in the garden (C.); Islington (Bu.); Paddington (P.).
- 368.—*Ennomos autumnaria*, Wrbg. Holborn Viaduct Station\* (E.R., iii., 301).
- 369.—*E. alniaria*, L. We have a long list of localities for this species, covering most of the suburbs, but not the heart of the City: for the south-west division our only records are: Tooting, scarce (Bell, Bell—M.); Wimbledon Common (Ent., xxii., 151); Barnes Common (D., Ta.).



3 AUG 1900



# 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, complete sets of the "Zoologist" (1843-1897), "Entomologist" (Vols. 1-32), "Entomologist's Monthly Magazine" (Vols. 1-35), and the "Entomologist's Record and Journal of Variation" (Vols. 1-10). 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, 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, both being purposely kept low in order that all may avail themselves of the benefits the Society offers. 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 either of the Hon. Secretaries.









