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**THE
BULLETIN OF
THE AMATEUR
ENTOMOLOGISTS'
SOCIETY**

Edited by
BRIAN O. C. GARDINER, F.R.E.S.

Index compiled by
PAUL SOKOLOFF

The Amateur Entomologists' Society
355 Hounslow Road, Hanworth, Feltham, Middlesex

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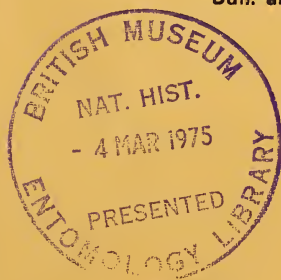


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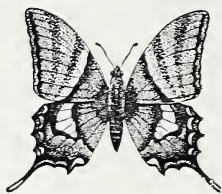
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EDITORIAL

Entomology is a science where it has often been said that the Amateur is on an equal footing to the Professional. Or is he? Well it all depends on your definition of "Professional". Originally all Entomologists were Amateurs, in that they earned their living by other means and studied insects as a hobby. Then came the paid Professional collector, followed by the paid Professional investigator who studied insects in the sense of "Entomology", in that he primarily studied the insect, its physiology, or its behaviour, or its ecology. But, what today is the Professional Entomologist? In some cases of course he is still the old fashioned sort, paid to study insects. But I venture to suggest that threequarters of the "Professional Entomologists" today do not study them. In truth, they are Physiologists, Matrix Biologists, Chemists, Aerodynamicists. They do not study Entomology; they use insects (or parts of them) as being a useful and convenient experimental material with which to study some other aspect of Biological science. They go not out into the field with net, lamp, pooter and pillbox. Their insects are delivered to them bred according to exacting specifications. They have at their disposal large resources of help and equipment which no Amateur can even hope to match. But when it comes to observation and simple experimentation; to the study of life-histories; to the recording of distribution; to taxonomy of small groups; to photography; to the investigation of insects as insects then the Amateur is still on an equal footing to the Professional.

LICENCES NEEDED TO BREED PESTS

For nearly two centuries Entomologists have been breeding various foreign insects, some of which are a pest of economic importance in their country of origin. In other countries this has led to accidental escape and disaster, the most notable instance being the devastation caused in N. America by the escape a century ago of our now extinct Gypsy moth (*Lymantria dispar* L.). However, the incidental introduction by other means (ships, goods, aircraft) has far exceeded any occasional escape from an Entomologist's cage. So far as Great Britain is concerned, no major pest has ever been introduced accidentally by escaping from an Entomologist. Very determined efforts have been made in the past to reintroduce the Gypsy moth, as well as a number of other species. None of these has been successful.

Nevertheless the Government has now made certain regulations concerning the breeding of certain foreign insects and early last year I got in touch with the Ministry of Agriculture on the subject and duly received a reply from Mr. C. O. Piper, of the Plant Health Branch. Mr. Piper points out that the production of a list of doubtful species would be virtually impossible as "it would have to include every non-indigenous pest (harmful to British agriculture or horticulture) known to exist."

Enclosed with Mr. Piper's letter was a copy of the 'Destructive Pests and Diseases of Plants Order 1965', Section 3(i) of which "prohibits the entry into this country of all non-indigenous pests and diseases (as qualified)." Mr. Piper goes on to say that "One of the functions of this Order is to prohibit the importation of any foreign butterfly or moth that could become a minor pest of agricultural or horticultural crops in this country, through its escape or release into the wild." He adds: "Among the criteria used in determining the status of an insect are whether or not the butterfly or moth (or other insect) is (1) a pest in the country or countries in which it occurs, and (2) is within its known climatic range in the UK." Mr. Piper continues: "We would be pleased to advise whether or not restrictions apply to any exotic species that you or your members may like to import in the future."

His letter concludes with: "As a general guide, no restrictions apply to the species listed in the last few years by the various lepidopterist dealers, with the following exceptions:

<i>Imbrasia cytherea</i> Fab.	African
<i>Dryocampa rubicunda</i> Fab.	N. American
<i>Anisota virginiensis</i> Drury	"
<i>Manduca sexta</i> Johanns.	"
<i>M. quinquemaculata</i> Harr.	"
<i>Lapara bombycoides</i> Wkr.	"

In a later communication, Mr. Piper adds the North American Citheroniid, *Anisota senatoria* A. & S. to this short list, on the grounds that "it is a pest of oak which I am advised could well establish itself in the United Kingdom." Accordingly, the Ministry provided me with a licence which permitted the retention of the then livestock of this species (obtained from Imago Butterflies of Croydon) about which my enquiry to the Ministry was made—sadly, *senatoria* failed to reach first moult even on oak, despite its pestilent status! However, the licence is effective until 30th September, 1975 and thus allows for any future importation during the interim period.

Mr. Piper emphasises the need to inform collectors of the existence of his Ministry's regulations and recommends that we should seek the Ministry's advice before importing any insect in order that any necessary licence for importation and retention (and subsequent termination)

may be issued. It may be of help to those members who might be considering such a course of action to be acquainted with the typical conditions which are set down therein: I quote from the licence (No. HH 10149/148) mentioned above.

1. All insects imported and kept under the authority of this licence shall be kept only at the above address, and all necessary precautions shall be taken to prevent the escape of the insects out of doors.
2. No insects kept under the authority of this licence shall be removed from the above address, except with the written permission of the Ministry.
3. An authorised officer of the Ministry shall be allowed to inspect the conditions under which the insects are kept.
4. All insects imported and kept under the authority of this licence shall be destroyed when the work for which they are required is completed, and not later than the date of expiry of this licence, unless an extension is granted by the Ministry.
5. Unless previously revoked, this licence shall remain in force up to and including 30 September 1975 (i.e. for one year).

According to other information I have received from various sources, Termites require a licence and so, strange to relate, do two rare British moths, *Plusia ni* Hb. and *Spodoptera literosa* Haw.

One wonders as to the present status, pestilent or otherwise, of the two moths *Automeris io* Fab. (a proven pest in the States and a species cautioned against in the 1956 AES Handbook on Saturnids) and that British extinct species, the Gypsy moth.

Basically what all this means, and what the terms of the licence imply, is that, if in any doubt enquire and if necessary obtain a licence. It seems unlikely that a licence will be refused to any bona-fide Entomologist prepared to take reasonable precautions, but he does need to remember that the licensed species must not be distributed either as a free gift, exchange, or by way of trade, unless the recipient produces his own licence and the Ministry has given permission. It is to be hoped that in future dealers will indicate any species requiring a licence. All queries and applications should be made to the Ministry of Agriculture, Plant Health Branch.

D. J. Moon (3850)

[The above article is reprinted, with some additions and alterations, from the summer newsletter (1974) of the Exotic Entomology Group and our thanks are due to Mr. Moon for going into the matter which, like so many of our minor rules and regulations these days, have not been advertised or otherwise brought to the notice of those most likely to be affected by them.—Ed].

A.E.S. ANNUAL EXHIBITION 1974

Our meeting was held on Saturday 28th September and this was our sixth year at the Holland Park School, Kensington.

It would be difficult to overstate the advantages of this Centre, considering the ample space, modern facilities, good accessibility and ample parking areas. It was also the occasion to welcome back as Organiser Mr. B. F. Skinner who filled the position for many years when our venue was at the Hugh Myddelton Schools.

Despite a depressing month, the Exhibition day produced our traditional fine weather and once again we enjoyed a 'full house'. Not least among the attractions was the running buffet and the Society is indebted to Mrs. Hilliard and her ladies who provided a first class service. Among so many members who contributed to the success of the Exhibition, it seems invidious to single out names but mention must be made of Peter Cribb as general factotum, E. S. Bradford's sign writing and 'props', P. G. Taylor's surplus stall and Stephen Cribb at the door. Lastly we record our appreciation of the ready co-operation from the schoolkeeper and his staff without which our task would have been much harder.

Possibly the most pleasing factor was the marked increase in the number of personal exhibits, especially considering that 1974 was a particularly poor season. Junior members were well represented and after a close viewing by the President, two prizes were awarded, the first to Andrew Creber (4893 J) and the second to David Gardiner (4304 J). Details of their exhibits are given in the general list which follows. A highlight was the demonstration of setting micro-lepidoptera by Messrs. Emmet and Bradford. Each showed his personal techniques which should prove invaluable to the large appreciative audience.

A welcome trend was the increasing number of monochrome and coloured prints and colour slides, which apart from their intrinsic value, makes good sense at a time when conservation of our wild life is essential. Members will be aware that Mr. Plester is in the process of forming an A.E.S. Photographic Group and considering the increasing cost of film, an improved 'know-how' should cut down the wastage.

In compiling the following list of Exhibitors, I am grateful to the members who provided me with brief notes and apologise for any omissions which would be due solely to the very limited time, I had for listing items.

A.E.S. ACULEATA GROUP. A new Group formed to study Bees, Wasps and Ants. They showed examples of most of our social and solitary species as well as foreign aculeata: Also reconstructed nests and details of life cycles.

A.E.S. CONSERVATION GROUP. An illustrated plea for the preservation of biologically interesting 'wasteland areas'. The exhibit was presented

by D. Lonsdale (4137), the leader of this large and vigorous Group with assistance from E. S. Bradford (3068) and P. W. Cribb (2270). Also full details of projects.

A.E.S. EXOTIC ENTOMOLGY GROUP. D. J. Moon (3850) and members of the Group presented a fine display of the work being undertaken at the moment: notably with the larvae of the large exotic silkmoths.

A.E.S. INSECT BEHAVIOUR GROUP. K. W. Mardle (4668) showed full details of the Group including Insect photography, newsletters and report of a Field meeting. Also the life cycle of the Lesser fruit fly (*Drosophila melanogaster* Mg.) with a 4 inch long balsa wood model.

AFFLECK P. (5019). Insects of several orders. Conopidae, fairly small flies with a marked resemblance to solitary bees and wasps, Syrphidae, brightly coloured Hover flies with very good hovering ability, *Rothschildia orizaba* West., one of the giant South American desert silkmoths and also selected hawkmoths (Sphingidae).

BETTS C. R. (4976 J). A detailed survey of the insects of Dartford Heath. This comprised five cases of set insects with life histories and general comments, a scale map of the area with lists of species noted and specimens and observations on bee and wasp nests on the Heath.

BIOLOGICAL RESEARCH CENTRE, MONKS WOOD. Progress of National recording schemes, especially noting blank areas from which no records are received.

CLAPSON, B. (5077). Observations, illustrated with coloured slides, on the parasites of the Peacock butterfly (*Inachis io* L.).

COLLINS, T. A. (4228). A good collection of macro-lepidoptera from a suburban garden near Derby. No light-traps were used.

COSTER, W. L. Representative collection of British moths.

CREBER, A. D. (4893 J). Prize exhibit. Five models, each depicting a type locality for a specialised British butterfly, Silver-spotted skipper (*Hesperia comma* L.), Lulworth skipper (*Thymelicus acteon* Rot.), Adonis blue (*Lysandra bellargus* Rot.), Wood white (*Limenitis sinapis* L.) and Heath fritillary (*Mesoacidalia athalia* Rot.). Also photographs and an aberration of the Heath fritillary.

CRIBB, P. W. (2270). A large European exhibit. It included series of European and British butterflies illustrating forms and aberrations. Coleoptera taken in France by the late H. J. Cribb and a selection of Polish butterflies. British species included larvae of the Brimstone butterfly (*Gonepteryx rhamni* L.) with the parasitic wasp whose larva kills a high percentage of them in the second instar, pupating within the larval skin; races of Small mountain ringlet (*Erebia epiphron* Knoch.), aberrations of the Swallowtail butterfly (*Papilio machaon*

britannicus L.) bred from Norfolk stock and pupae of the Holly blue butterfly (*Celastrina argiolus* L.) which were unusually free of parasites, possibly a good sign for next season. Moths included a melanic Red underwing (*Catocala nupta* L.), taken in Middlesex.

ELSE, G. R. (3881). Anthophoridae (Bees) from various parts of the world including the Carpenter bees (Xylocopidae), which burrow in solid timber. Also illustrations of nesting habits.

EMMET, A. M., M.B.E. (1379). Two large cases of immaculately set British Nepticulidae. These are the so called Pygmy moths and the larvae, often legless, live inside leaves, producing typical mines. The moths are usually bright and metallic and the wing spans rarely exceed 7 mm.

GARDINER, B. O. C., F.R.E.S. (225). How the Bulletin is edited. A selection of manuscripts as received showing the good, needing little or no editorial correction, and the bad; complete rewriting required. Drawing particular attention to the need for wide margins and line spacing. Galley proofs showing correction instructions to printer.

GARDINER, C. J. (5249 J). Fully illustrated method of carding beetles (Coleoptera), for examination and display.

GARDINER, D. J. (4304 J). Prize exhibit. Home-made kit for blowing larvae and a range of preserved specimens, using this equipment. Also likely troubles to avoid.

GILL, N. (5059). Lepidoptera collected in Northern England and Scotland.

GOODBAN, B. S. (217). A very interesting exhibit of home-made breeding cages, setting boards and other equipment which the author has used successfully for many years. Very little of the material had to be bought.

GOSSLING, N. F. (5169). Representative collection of butterflies taken from the upper Alpine region of Liechtenstein during early July, 1974. Also a map to indicate principal areas where these species were found.

GREY, P. R. (3820). A selection of the butterflies seen around Cape Town, S. Africa, during a mid-summer visit from December to March. Despite the parched countryside, a wide variety was collected, notably Blues and Coppers (Lycaenidae). Of particular interest was the very common Christmas butterfly, (*Papilio demodocus* L.).

HANSON, M. (4637 J). An interesting comparison between the long list of butterflies recorded from Epping Forest in 1874 and the very few occurring there today. Apart from the countrywide decrease in our fauna, prevailing winds bring much of the pollution from London to this area.

HANSON, T. V. A collection of butterflies taken in Guyana (S. America). Lepidoptera are abundant in the Neotropical region with numerous

forms and the exclusive Morphidae, comprising many large brilliant metallic blue species.

HEATH, G. L. (4409). Comprehensive collection of live Praying mantids from the Congo; U.S.A.; South Africa; Malawi; Thailand; Japan and Brazil. Over 30 species have been obtained over the last six years although some would not breed in our unfavourable climate. Photographic records are kept of all species and living material has been sent to many Research Stations at home and abroad.

HECKFORD, R. J. Micro-lepidoptera of special interest from the Cornwall area. There is a wide scope for field work in the Section. In the case of the comparatively large Pyralids, of the 210 species in the British list, more than half have been recorded from Cornwall.

HILLIARD, R. D. (99). Type collection of British Pyralinae but excluding the better known Grass moths (*Crambinae*) and Plumes (*Pterophoridae*). Included was *Paracorsia repandalis* D. & S., a rare immigrant on the South coast, choosing Black mullein as its foodplant in this country.

HOPPER, R. J. (4848). Living specimens of many orders including spiders, millipedes, cockroaches, crickets and stick insects.

JAMES, R. J. (5005 J). The full life cycle of Bedstraw hawk (*Hyloicus galii* Rot.), aberrations and varieties of 5 common British butterflies and larvae of the Fox moth (*Macrothylacia rubi* L.) with useful observations on bringing this difficult species through the winter.

KERRY, J. C. (4711). A small display of eight Parnassiads (Apollo butterflies) with locality maps. It showed a striking similarity between Parnassid species of Europe and North America.

LONDON ZOOLOGICAL GARDENS. A selection of the fauna from the insect house at the London Zoo. Among the more striking species was the Blue land crab (*Gecarcinus lagostoma*) and some giant living beetles.

MARTIN, P. A. (5228). Moths collected at light traps in early August this year from sand dunes and marshes in Suffolk and Norfolk. Seventy-one species were recorded including Maple prominent (*Lophopteryx cucullina* Schiff.), a first record for the Suffolk area, Haworth's minor (*Celaena haworthii* Curt.), a very local species and the Gold spot (*Plusia gracilis* Lempke), the recently defined sub-species.

MCCORMICK, R. F. (3375) and PENNEY, C. (3880). Some of the more interesting moths recorded from a survey of Banstead Wood, Surrey. These included the Satin lute-string (*Tetheella fluctuosa* Hubn.), Banded hook-tip (*Drepana cultraria* Fab.), Reddish light arches (*Apamea sublustris* Esp.), Blotched emerald (*Comibaena pustulata* Hufn.), Dark umber (*Philereme transversata* Hufn.) and the Grass rivulet (*P. albulata* Schiff.).

PERRIE, W. R. J. (3955). Species of Charaxes butterflies (Nymphalidae)

caught in Rhodesia near the Mozambique border. The time of the year, September, is usually regarded as the poorest collecting month in Africa.

PLESTER, L. S. (2968). R. Muggleton (3474) staged a large exhibit from Mr. Plester advertising the proposed A.E.S. Photography Group. The main feature was a documentary on the Camberwell Beauty Butterfly (*Nymphalis antiopa* L.) in large monochrome prints.

PONS, M. A. S. (4376). Illustrated the trend to photographing specimens rather than making a type collection. Colour photographs of some British moths were shown.

REVELS, R. C. (3942). Bred aberrations of Chalkhill blue butterfly (*Lysandra coridon* Poda.), Ringlet (*Aphantopus hyperanthus* L.) and an extreme form of Meadow brown (*Maniola jurtina* L.), caught in the wild. Results of temperature experiments on Silver-washed fritillary (*Argynnis paphia* L.) which produced several of the named varieties and photographs of aberrations of some British butterflies.

ROCHE, J. (3096). Living early stages of microlepidoptera, easily obtained in autumn and winter. Also type specimens of the resultant moths.

ST. IVO SCHOOL. The Natural History Society, under the inspired leadership of Henry Berman, is always one of our show exhibits. As in past years, they contrived to set up a miniature zoo showing the large variety of living creatures bred by the scholars.

SKINNER, B. F. (2470). An extremely instructive exhibit, showing all the 14 species of Clearwings (Sesiidae) resident in the British Isles, together with sections of twigs and stumps showing signs of early stages and also photographs of typical habitats. Other interesting species taken and bred this year included larvae and imagines of the Bedstraw hawk (*Hyloicus galii* Rott.) which was recorded from many parts of the British Isles in 1973, The Great brocade (*Eurois occulta* L.) an obsolete female of the Vestal moth (*Rhodometra sacraria* L.), another occasional visitor to our shores and the green form of the Barred red (*Hylaea fasciaria* L.).

SMART, P. E. (2293). (*Saruman Butterflies*). A large net observation cage containing live exotic butterflies, currently being bred by them.

SMITH, T. (5728 J). A good selection of Hawk-moths, (Sphingidae) bred and caught this year.

SOKOLOFF, P. A. (4456). Micro-lepidoptera taken at M.V. light in N.W. Kent; examples of Death's-head hawk-moth (*Acherontia atropos* L.), the Triangle (*Heterogenea asella* D. & S.) and leaves of lilac containing larva, cocoons and parasites of *Caloptilia syringella* Fab.

TAYLOR, P. G. (350). Interesting varieties of three species of butterflies; Pearl bordered fritillary (*Boloria euphrosyne* L.), Peacock (*Inachis io* L.) and Large cabbage white (*Pieris brassicae* L.).

TOMLINSON, R. C. (3937). Moths of special interest collected in S. Essex. A specimen of *Semiothisa signaria* Hubn. was a new geometer to the British list.

TREMBATH, D. A. (3486). A collection of butterflies taken while on safari in Kenya, illustrating the rich fauna of this country.

TYLER, D. B. (3865). Three fine examples of the brick red aberration, *brunnea centripuncta* Tutt, of the Lime Hawkmoth (*Mimas tiliae* L.). The first specimen was obtained in the 3rd generation, (1972) from a wild pairing in 1969. From 1970, pairings were also obtained with wild stock, the same aberrations appearing in the F.2. generation.

WATKINSON, Dr. I. A. (3130). Emphasised the good results obtained from collecting catkins, especially from Sallow and Poplar species. He made a strong plea for more members to concentrate on the smaller moths (micro-lepidoptera) and showed leaves with typical mines of these species.

WHITBREAD, S. E. (4818). European lepidoptera from Pontresina and Zurich areas and British species obtained on the Kent coast.

WILLIAMS, P. (4965). Many interesting examples of aculeata. They included 18 species of bumble bees with 7 of their nests, a labelled map of the distribution of bumble bee and wasp nests in the Chislehurst, Kent area, 9 species of social wasps with 4 nests and 18 species of British damselflies, (Odonata).

R. D. Hilliard (99)

UNUSUAL PAIRING

I was most interested in P. A. Arak's report regarding a male Ringlet (*Aphantopus hyperanthus* L.), copulating with a female Meadow Brown (*Maniola jurtina* L.). My wife and I, along with a friend from Southampton witnessed the very same thing, also in the New Forest on July 29th, 1974. On this occasion the sexes were reversed but like the specimens seen by P. A. Arak, they were very worn and faded. Even though they were in such poor condition I immediately fitted extension tubes to my camera with the hope of obtaining a photographic record, but after several attempts to coax them into a suitable position for photography they parted. I managed to box the female Ringlet but she was in such a battered condition that I had very little hope that she would produce any eggs. However, after two days she did provide me with just nine and then succumbed. Sadly only one proved to be fertile and this hatched after 20 days. Unfortunately after a few days this tiny larva died so I shall never know what the result of this pairing might have been.

In view of these two sightings I wonder if it might be worth trying to pair up these two species in captivity.

G. E. Higgs (3608)

COLLECTING NOTES—COLEOPTERA

Now that winter is with us again beetles can easily be found in greater number than during the summer, providing of course suitable collecting methods are employed.

The most useful equipment for winter collecting consists of a polythene sheet, garden sieve, stout knife and a supply of large strong polythene or cloth bags to bring home rough sifted material. Flood refuse, grass tussocks, thick moss and piles of leaf litter or grass cuttings (if they have been in place since the autumn) should all be searched for beetles. Details of the methods may be found in the *Coleopterists Handbook*, and do not need to be repeated here.

Many species which can be found in hibernation are much harder to come by in the summer when they are more active, for instance *Lebia chlorocephala* Hoff. and the smaller Buprestids (*Trachys* and *Aphanisticus*) in grass tussocks. Because of their hibernation the beetles are very slow to move and can be easily tubed. However great care must be taken not to pass any over, and to minimise this risk, only a small amount of refuse should be sifted or pulled apart at one time.

It is well worth braving the cold and spending a few hours in a favourite collecting locality at this time of the year. It is surprising how many new finds can be made even in a place frequently visited during the warmer months. Last February I was lucky enough to capture a series of the extremely local *Stenus canescens* Rosenh. by pulling apart handfuls of wet reed refuse over the collecting sheet.

J. Cooter (3290)

FIRST VISIT TO THE U.S.A., 1974

This was my first visit to Nashville, Tennessee, U.S.A., and I was to stay with a friend, Lance Durden. I arrived on the 10th August to brilliant sunshine and the temperature in the nineties, and left four weeks later with it raining and in the fifties.

My first week was the most exciting and productive, especially now that I only photograph insects, having given up collecting specimens a year ago. My main interests lie with Butterflies and Moths (Lepidoptera) and Dragonflies (Odonata) although I photograph most insects. Nearly every specimen found was new and different.

Butterflies could be seen fluttering from flower to flower in the sun drenched glades and woodland areas, a multitude of living colour.

Most abundant in every location was the Tawny emperor (*Asterocampa clyton* Bois), which would settle on your sweat covered body and feed for as long as you would allow it. Also very abundant was the Hackberry butterfly (*Asterocampa celtis* Bois), which was found in most areas. The Buckeye (*Precis lavinia coenia* Hb), given its name because

of the two eye spots, one large and one small, on each fore and hind wing, is common and found mostly in the short vegetation and grassland. Two sulphurs, the Cloudless sulphur (*Phoebis sennae ebule* L.) and the Common sulphur (*Colias philodice* Godt.) could be seen in ones and twos nearly every day without difficulty. Two swallowtails were very common mostly over grassland and by a river bank. They were the beautiful yellow and black, Tiger Swallowtail (*Papilio glaucus* L.), and the equally beautiful blue and green Spicebush swallowtail (*Papilio troilus*, L.). A butterfly that was sometimes confused with the Spicebush in flight was the Red-spotted purple (*Limenitis arthemis astyanax* F.) which was also quite common over grassland and in woodland. Another butterfly of this size is the Monarch (*Danaus plexippus* L.) or Milkweed as it is known, as Milkweed (*Asclepias*) is one of its food plants.

Without doubt, this is the most well known North American butterfly, in and out of America, and could be seen in ones, twos and sometimes threes, most days.

The only white seen in the first week was our own European cabbage butterfly (*Pieris rapae* L.), which was seen often. Also seen were a few of the following: Phaon crescent (*Phyciodes phaon* Edw.), Harris checkerspot (*Melitae harrisi* Scd.), Snout butterfly (*Libythea bachmani* Kirtl.) and the Hop merchant (*Polygonia comma* Harr.). Also seen were many swift flying Skippers, notably the handsome Silver-spotted skipper (*Epargyreus clarus* Cr.).

Every few paces something new and interesting was found, a whirling, clicking sound by your feet would be one of the many species of cicada flying up to the safety of a nearby tree.

The second week saw again the insects of the week before. A magnificent large, fast-flying butterfly was the Giant swallowtail (*Papilio cresphontes* Cr.). Another white was found flying erratically over the tall grasses. This was the lovely Checkered white (*Pieris protodice* Bsd.), something like our own Marbled white (*Melanargia galathea* L.). A few of the following were also seen: Question mark (*Polygonia interrogationis* F.), Harvester (*Feriseca tarquinius* F.) and another of the Pieridae, the Alfalfa butterfly (*Colias eurytheme* Bsd.). Found often and in large numbers was the Carolina satyr, (*Euptychia hermes sosybia* F.).

Around the middle of the week, we ventured into a different area for specimens. While strolling along, we came across what we thought was an oddly coloured Carolina satyr in flight, being nearly the same size. On capturing the specimen it was found to be the beautiful Dorcas copper (*Lycaena dorcas kirby* Drc.).

Trying to get Skippers on film is no easy task, as they are nervous and fly off with speed when approached, but by the end of the week,

two more were recorded on film, the Dotted Skipper (*Hesperia attalus* Edw.) and the Wild indigo dusky wing (*Erynnis baptisiae* Scud.).

On one of our visits to some nearby woods, we found five well camouflaged Underwings (Catocalids) resting on some tree trunks, one of which with some effort and hard running, we managed to catch. It was *Catocala lacrymosa* Scud.

Week three found a few more new species, although not all were completely new.

One morning, we decided to walk down the banks of a stream and cross it as many times as possible by the somewhat unsafe stepping stones. With the sound of running water in the background and the sun beating down, it turned out to be our best day weather-wise, the temperature reaching around 96 in the afternoon. By the water, turtles sunbathed, dragonflies hovered overhead, and fish lay in the shallow water. Here we found a Red admiral (*Vanessa atalanta* L.) or should I say he found us, landing on my friend's back.

The Skippers were plentiful but hard to identify in the field, being so alike in size, colour and markings, but I think we found another, the Arogos skipper (*Atrytone arogos* Bois.).

My fourth week was split into two parts. For the first part the sun was shining all day long, but in the second half of the week, the rains came and the temperature dropped to the fifties. Autumn had arrived!

The first part of the week found single specimens of three more species of butterfly. The beautiful flame red, Goatweed butterfly (*Anaea andria* Scudd.) which is really wonderful; North America's most common Hairstreak in this area, the Gray hairstreak (*Strymon millemus* Hb.) and a blue with tails about 5mm in length, the Eastern tailed blue (*Everes comyntas* Godt.).

Several woods were visited during the remainder of the week. When not dodging raindrops and spiders' webs, we managed to find two Hawks, the quite common *Isogramma hageni* Grt. and the small but lovely *Darapsa myron* Cr., plus a few more Catocalids. This brought to a close my stay in Nashville and I stepped on to the plane leaving behind a slight drizzle.

My friend also runs a M.V. trap in his garden, but he is only just getting used to identifying the moths with any ease. He has caught however, eight different species of Silkmoth, the most common being the Imperial Silkmoth (*Basilona imperialis* Dru.) eleven species of Hawk, *I. hageni* being common. Best of all, nineteen species of Catocalid, of which there are over one hundred species in North America. His average catch per night during my stay was three hundred.

The insects and other wildlife seen on my visit were magnificent and it made this my best holiday of my Natural History Career.

D. J. Wimblett (4581)

GRENOBLE, DIGNE AND LIGURIA, AUGUST-SEPTEMBER, 1974

Above Grenoble the hills were baking under a sun that had been shining so steadily this particular summer the term 'drought' was on everybody's lips. The parched meadows were pimped by hayricks built around long poles. Field crickets (*Gryllus campestris* L.) with shiny dark brown bodies passed nimbly by in the four inch high hay stubble that had by now turned straw yellow in hue. The air beneath the hazy blue sky throbbed with grasshopper voices.

The monotony of the heat-beaten meadows was relieved by yellow blobs that were Composite inflorescences and white blobs that belonged to Umbellifers. At the corners of fields Traveller's Joy (*Clematis vitalba* L.) with bearded seeds draped the bushes, and where its twining stems left a passage for the collector, thorny wild roses officiously blocked the way. But there were very few fences, so that you could scramble up from the road, if you had the energy, to net whatever came flitting across the hay stubble.

Most prominent butterfly of all was *Minois dryas* Scop., which gathered in select groups over tough-looking grasses or sedges at field borders and often came flitting out suddenly, murky brown and bat-like, to catch you off guard. Most spectacular was the 'Great banded grayling' (*Brintesia circe* Fab.), spectacular because it was big and rare and because of the way it flitted nonchalantly around your head half a dozen times before tiring of the unequal sport and flapping away, leaving the air hissing through your kite-net and disgusting words hissing from your lips.

Where you sat with Bonbel cheese and a bottle of red wine, second-brood Chalkhill blues (*Lysandra coridon* Poda) would suddenly crystallize out of the landscape, twinkling together and then retiring to some nearby perch to sit rubbing their wings together in glee. Before very long a "Yellow" (*Colias* sp.) would put in an appearance, dashing frantically across a hundred metres of field, pausing to sniff at a straggling lucerne plant, and then rushing off again. They were like short sequences spliced into the general film of mountain meadow life. The quaint fritillary *Clossiana dia* L. appearing for the second time that summer, graced a productive little lucerne field, while above brilliant reddish-brown *Melitaea didyma* Esp. males zoomed low over the stubble and were occasionally dive-bombed by the big High brown fritillaries (*Fabriciana adippe* Schiff.) which searched for violets in the dry fields and went away disappointed.

After four days camped in the Municipal camping site right in the middle of Grenoble itself, we paid our dues and when we left they forgot to say goodbye and wish us a pleasant journey.

Loaded up, we wound our way down towards Digne along a road with

a surface resembling that of corrugated cardboard, except that the latter is easier to drive on because it is more regular, the mountains shrank in size, turning spectacularly reddish, while a slate-grey river meandered its way down the valley towards Sisteron, so that the whole scene resembled a colour transparency incompletely developed. Bushes with browned leaves drooped wearily under the heavy sun, oak trees seemingly hung with pieces of nicely done toast waited patiently for water, and the garages were full of dead Citroen's.

At Digne we pitched our tent in the Municipal camping ground about ten feet from where David Gadd and myself had slept for four nights on the Corsica run in 1962. The camp had changed but little in the intervening period and the surly camp guardian not an iota. It was with relish that we accorded him now the nickname of "Jasper Le Fat". When we left he forgot to say goodbye and wish us a pleasant journey, too. But we had some good collecting near Digne and, obese though he be, the guardian of the campsite disappears in retrospect behind a pageant of gaily-coloured wings and painted lizards.

The mountains were slowly turning into scree of grey shale whose sole ambition seemed to be to knock off its surplus inches. When you set foot upon it, it would rattle gleefully away downhill, flinging itself with vigour at specimens of that attractive grasshopper, *Oedipoda coeruleascens* L., which until the moment of unexpected onslaught, had been sitting on the shale further down, camouflaged to perfection. I have never seen a grasshopper that is as difficult to spot against its surroundings. Disturbed, it would shoot up suddenly, sometimes in the company of its 'harem', each individual of which dwarfed it comfortably, and there would be a spectacular array of bright blue hindwings splashed against the dried-up grass tussocks, before the whole mischievous bunch suddenly splattered to earth, leaving you reaching for the wine bottle in search of solace.

The most productive place was a small stream bed that flowed through a miniscule copse near the village of Le Mousteiret. A veritable garden of Hemp agrimony (*Eupatorium cannabinum* L.) fetched butterflies and day-flying moths out of a landscape that looked as though the Good Lord had given it over to grasshoppers as it was too dry for anything else. The purple-pink flowers were a pulsating mass of wings in various stages of wear. Silver-washed fritillaries (*Argynnis paphia* L.) zoomed aggressively, but carelessly, about, disturbing the smaller fry. Jersey tigermoths (*Euplagia quadripunctaria* Poda.), those brightest and biggest of the day-flying moths, fed greedily and then skipped away like something tropical. It was almost impossible to net an insect alone. With each swipe a virtual micro-habitat of winged creatures disappeared into the net bag, forming a throbbing ball of jostling, flapping revellers with their probosci still unfurled and their nectar-bleary compound eyes rapidly becoming

coated with the detached scales of their neighbours.

Up on the mountains it was a jumble of scrub oak, evergreen oaks, juniper, thorny, aromatic bushes, sloe, and the odd Bladder senna (*Colutea arborescens* L.) A white-flowered, thin-stemmed, spreading type of *Scabiosa* provided sustenance to the many "Browns" that inhabited these shaly areas, but lavender was so rare you would not have known, if it had not been advertised everywhere, that Digne is the centre of the world's lavender industry. The Autumn ringlet (*Erebia neoridas* Bdv.) kept itself to quiet little backwaters among the dense scrub that festooned the valley streams, bobbing and basking about the flat stones which paddled their feet in the clear water. Millipedes twice the length of their British relatives openly puzzled over the minutae adhering to shady rocks and the stones of bridges spanning streams.

The Clue de Barles, whilst not of entomological interest, is a short but incredibly spectacular gorge that I would urge any traveller in that area to go and have a look at.

On the 26th of August we uprooted ourselves and sped down to 'The Med' in a state of excitement, leaving a trail of rubber from the front two tyres because the toe-in angle on the Fiat was all askew. Provence took our breath away, built of limestone, pale yellowish-orange in colour, its strata thrust distinctly out for all to see, and left us in no doubt about why A. N. Brangham gave it such meticulous attention in "The Naturalist's Riviera". The area around Grasse is of outstanding beauty.

Nice gave us the voices of Cicadas perched high up in trees, and our first views of the beetroot-red blooms of Bougainvillea, the white, pink or wine-red flowers of that shrub which sets the entomological heart wildly beating, the Oleander, and the jazzy registration plates of cars from Monaco. On the Italian border a Frenchwoman returning home suddenly shouted "Papillons!", to which an inert Italian customs official reacted by craning his neck towards the junk occupying the rear seat of our car. Thoroughly fed-up with the French, I eased the car into gear and we pulled quietly away as the customs officer opened his mouth to say something about our bevy of Jersey tigermoths galavantiing about in a hanging cage over the back seat. Mercifully we entered the Riviera dei fiori unaccompanied by machine-gun fire.

Happily landed at Vallecrossia camping ground, abutting on the sea, we spent the subsequent seven days grubbing about in dried-up river bottoms, on mountain slopes and rubbish heaps, with a day off (a Sunday) spent visiting the Menton botanical gardens and Monte Carlo (Monaco) zoo. At the latter establishment it cost me an extra franc because I had a camera with me and wanted to take pictures. There was a notice conveniently displayed outside warning against theft of valuables from parked vehicles, so I was unable to refuse to pay up and throw the Olympus into our car. However, I still feel that this is extortion on the part of the zoo authorities.

Butterflies were not plentiful in the area, the sole exception being the dried-up river bed at Marina di Andora where my wife and I collected in July, 1972 (see ref.). Here the chief source of attraction were the purple, very Buddleia-like blooms of the Chaste tree (*Vitex agnus-castus* L.) which gave off a pleasant scent. Big *Xylocopa* bees buzzed about their business in their metallic-blue overalls, wall lizards (*Lacerta muralis* L.) beat a shy retreat at our approach, lonely Cicadas zithered for wives high up in old trees. As you walked, huge frogs leapt off the stones to splash down in the few remaining pools in which scum and yellow-green tangles of algae bubbled blissfully together. My biggest captures with a kite-net were a pair of these enormous frogs (fully nine inches from hindfoot to nose) and two snakes that I managed to net from river pools. That I did not also catch poliomyelitis, hydrophobia (my grandmother's favourite for such situations) or similar exotic diseases may be attributed to the liberal quantities of red wine (try Lambrusco amabile) with which I conscientiously dosed myself. My net, needless to say, was no longer allowed anywhere near the tent, so strongly did it resemble the more pungent varieties of manure heap.

Under the vegetation hanging down into the water lurked the relatively gigantic Great silver water-beetle, (*Hydrophilous piceus* L.) The gleaming metallic blue males of an *Agrion* damselfly flitted in the head-high vegetation between spars of smooth pebbles, and its brown-winged females perched demurely, waiting to be courted.

In this same richly endowed place I saw that lone piece of Africa, the *Charaxes jasius* L. that I had not seen on the wing since 1962 in Corsica.

A parking spot alongside the Nice-Genova autostrada (the so-called Autostrada dei fiori) was a highly productive place for mantids (*Mantis religiosa* L.) and the impressive White-faced bush cricket (*Decticus albifrons* Fab.). Unfortunately, like every other open space in northern Italy, this was also a depository for all the sordid leavings of the human race, among which one was obliged to pick one's way, fearful of the consequences of missing a nimble insect and fastening on to something less savoury.

As reality inevitably caught up with us, we turned our backs on the fascinations of the Alpi Maritimi on September 4th and wound our way home through the green Roya valley (partly in France), through the Saint Bernard tunnel and up Europe, back into Finland and the wettest summer for countless decades. At the camp site people had wished us goodbye and a pleasant journey for approximately three hours, working shifts as you might say. At last we had gulped down cups of their sweet black coffee and succeeded in friendlily shaking them off.

However, I like to think that the spiritual end to the trip came as I was confronted by an Italian customs official in the Saint Bernard tunnel. Having ascertained that I understood a modicum of Italian, he gravely

enquired whether we were exporting anything from Italy. "Vino", I said instantly. He roared with laughter. "Va bene!" he said, and we pulled away, leaving once again a piece of our hearts in Italy and a small piece of it in a biscuit tin on the back seat.

Leigh Plester (2968)

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REARING EREBIA EPIPHRON (KNOCH)

This species has always had a reputation for being difficult to rear, so it was quite a challenge. The main problem appeared to be its requirement of a relatively constant humidity, assuming that the larvae does in fact over-winter under snow cover.

As an experiment I decided to try some larvae indoors in an attempt to 'force' the larvae, also to take some slides of the early stages. The ova were obtained fairly easily from three female adults captured in the Lake District; the ova were laid quite freely on grass stems and the sides of the pill-box.

When first laid they were cream coloured and as hatching approached they gradually took on their brownish-pink colouration. Eventually the whole egg took on a black colouration as the chitin became translucent and the young larvae could be seen through the shell. The whole process from oviposition to hatching took about 15 days.

Upon hatching the young larvae commenced feeding at once, feeding upon the cuticle of grass blades; no food preference was noticed; grasses accepted included: Couch grass (*Agropyrum repens*) Mat grass (*Nardus stricta*), Annual meadow grass (*Poa annua*), and Cock's-foot grass (*Dactylis glomerata*).

The larvae which were to be kept indoors were put on a planted sod of 'grass', and placed in a window sill facing east. The pot was kept on the dry side, so as to cut down on mould, a common failure in stagnant conditions. They were then left to their own devices, feeding mainly at night, although seen to feed during daytime as well. On September 14th 1973 there were 2 larvae on the potted plant and they did not feed much after late October. They were just left close to a window in a cool room, so that they would hibernate.

On this date outdoors there were 16 larvae on a pot of Matgrass, these were left fully exposed to the elements.

The first signs of activity were noted indoors on January 19th, 1974 when the larvae were seen to walk around the pot, the air temperature was 15°C. At this time the pot was quite dry and the grass sod dead, so a new pot was used as from January 20th, 1974. The activity was then

very sporadic until February, when they went back into a resting state, except on exceptionally warm days, possibly due to cold dry weather.

Outdoors the first signs were on February 23rd when 5 larvae were noted sitting on grass blades after crawling out of the grass tussocks. This day was the first really sunny day of the year. One larva was seen to cast its skin on March 16th possibly it's last.

The larvae indoors did quite well until it came to casting their skins, when they both died, possibly due to dryness.

The first larva pupated outdoors on April 9th; it merely crawled into the stems at the base of the grass and formed a chrysalis in a rough hollow. The pupa is light green at first changing to darker green with brown stripes along the wing cases.

The adult eventually emerged on May 3rd; four others emerged over the next month. All were slightly smaller than normal possibly due to a shorter period of growth, even though this growth period was probably more concentrated than in the wild.

A careful note was kept on the air temperature which created activity in the larvae, and indoors this temperature occurred around 13°C. obviously the winter in question was a mild one by anyone's standards; thus it may be low temperatures that cause failure to overwinter them! For, under a snow cover the larvae would not be subject to the sub-zero temperatures which are present at the altitudes at which they live in the Lake District and Scotland.

Now that the species has been reared I hope to go on and rear enough to make a cross between the Lake District 'race' and the Scottish one, and so obtain some intermediate forms.

K. Porter (4505).

MY FIRST REGALIS

In mid August 1973, my wife, six month old daughter and myself, drove south to Gatlinburg, Tennessee where for some time I had wanted to visit The Great Smokey Mountain National Park.

On the way down I hadn't really made any great effort to collect, but did happen on a small colony of half-grown *Automeris io* (Fab) larvae in Virginia, but that was about all of note. We reached Gatlinburg in the late afternoon. After a cool night, we made an early start. We selected a 'motor nature trail', which is really a scenic road bordered with trees, with a 10 m.p.h. speed limit. We stopped at an historic mill, the path to which led through the forest. Although I kept looking, I only found a couple of Tussock larvae (*Lymantriidae*). The day had turned out beautiful, about 80°F and sunny. We drove on, making frequent stops to prevent my Plymouth from overheating. We were nearing the end of the trail, when my wife became wildly excited. I stopped the car, and, not

more than five feet away, on two legs, stood a young black bear. We were ready to move out when I saw it. The outline that I had studied time and again in the text books. It was about ten feet from the ground. With the same feeling I had when I caught my first Hawk moth long ago in Devon, I pulled the branch down and caught my first *Regalis* (*Citheronia regalis* (Fab)). He was about three inches long, and had not, as yet attained his mature colour. I put him in a large jar. Although I found other 'good things' in Tennessee my *Regalis* remained by prize, along with the three others I found there. I raised them back in Michigan, along with a dozen I had purchased as ova. They were easy to rear on Sumac or Walnut, and the mature larva is well worth the effort, one keeps thinking that they must be fully grown, but they just keep on growing! When full grown they were not quite as bulky as some *Eacles imperialis* (Druce) I had, but they were far more spectacular.

Chris A. Young (5236)

DISUSED MINES AND ENTOMOLOGY

Being both amateur Entomologists and amateur Minerologists, Devon and Cornwall provide us with a suitable outlet for our energies in both fields, from Easter through to late October, and we have come up with some interesting pointers, namely:

1) A greater variety of Entomological specimens can be obtained from the areas covered by disused mine workings and dumps, than in the sur-

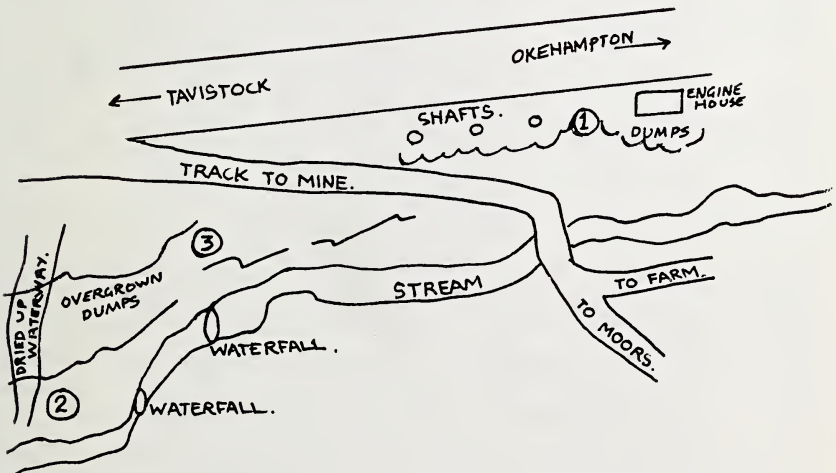


Fig. 1. Sketch of area around mine Wheal Betsy.

1) Area virtually inhabited by Graylings. No other Lepidoptera found, but some Coleoptera. 2) Many butterflies and Dragonflies of several different species. Some Coleoptera. 3) Mainly Small copper butterflies and a general mixture of other insect orders.

rounding countryside. The mine called Wheal Betsy is a very good example of this. (Fig. 1).

2) The number of orders represented was surprisingly high.

3) This proved true on virtually every mineral site visited, and was much more pronounced inland than on the coastal mining areas.

This could be put down to the fact that the old mining areas are more or less left wild, but at the mine Wheal Phoenix (Minions, Cornwall), wild ground, away from the mining areas, proved barren, although ground conditions and vegetation were similar.

Let us now consider the area around the mine workings of Wheal Betsy; these are shown in the accompanying illustration.

The following is a list of the butterflies we found, mainly during July and August:

<i>Aglais urticae</i> L.	Small tortoiseshell	very common areas 2 & 3
<i>Inachis io</i> L.	Peacock	several, mainly near shafts & area 2
<i>Vanessa atalanta</i> L.	Red admirals	two taken area 2
<i>V. cardui</i> L.	Painted lady	one taken area 2
<i>Gonepteryx rhamni</i> L.	Brimstone	one taken area 2
<i>Colias crocea</i> Geoff.	Clouded yellow	one taken area 2
<i>Pieris brassicae</i> L.	Large white	five taken area 2
<i>P. rapae</i> L.	Small white	ten taken area 2
<i>P. napi</i> L.	Green-veined white	four taken area 2
<i>Lycaena phlaeas</i> L.	Small copper	common areas 2 & 3
<i>ab/coerule punctata</i>		six taken area 3
<i>Polymnatus icarus</i> Rott.	Common Blue	few area 2 & 3
<i>Eumenis semele</i> L.	Grayling	very common area 1. Some in 2 & 3
<i>Pararge aegeria</i> L.	Speckled Wood	few
<i>Maniola jurtina</i> L.	Meadow Brown	few
<i>Aphantopus hyperantus</i> L.	Ringlet	few areas 2 & 3
<i>Coenonympha pamphilus</i> L.	Small Heath	few

During an earlier visit Green hairstreaks (*Callophrys rubi* L.) were spotted. Larvae of Emperor moth, Drinker moth, Oak eggar and Small elephant hawk were collected here but most were parasitised and died soon after capture. Several types of Dung beetles were found including Minator (*Typhaeus typhoeus* L.) and Common dor (*Geotrupes stercorarius* L.) with an occasional Violet ground beetle (*Carabus violaceus* L.)

The vegetation of the area is mainly Gorse, Heather, Bracken, Coarse grass and Reeds. Some Bogcotton and Bramble, Bedstraw, Oak, Ash, Beech and Hawthorn Trees. The area on the far side of the farm track proved very barren and the far side of the main road was also barren. The ground varies from open rubble heaps to marsh and open moorland.

M. Spencer (5212) R. Jackson (5213J)

DORCUS PARALLELPEDUS (L.)

This handsome beetle has the vernacular name of the lesser stag beetle. It is one of the three native members of the Lucanid family and one of the largest Yorkshire beetles. It is found on the Wolds in dead ash and beech trees, where both larvae and imagines tunnel into the wood, thus proving useful by breaking down unwanted dead wood. I have found them in May and September, but failed to do so in March in the same habitat, possibly due to hibernation.

The male (see Fig. 2) has better developed mandibles than the female. The latter has straighter mandibles and the projecting pegs of the males are present as mere bumps. The female is also generally the smaller.

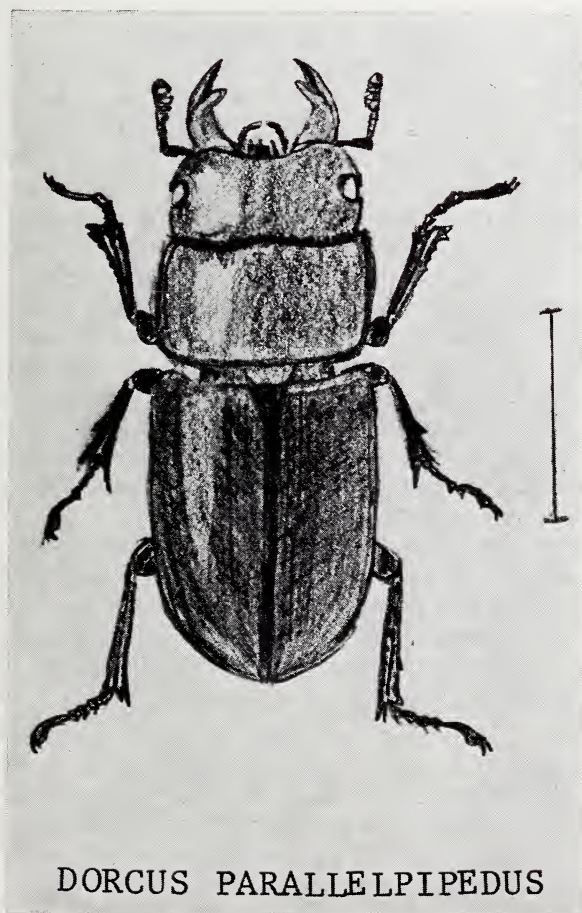


Fig. 2. Male specimen. (R. D. C. Scribet)

A fellow coleopterist has kept these beetles successfully and I plan to try my hand also. They are fascinating insects and obligingly surface from the wood at dusk each evening, even if a light is on in the same room. They move rather slowly, probably due to the relative heaviness of their cuticle and thus 'play dead' if picked up.

R. D. Cawkwell (5076)

BRITISH BUTTERFLIES AND THE CLIMATE

I enjoyed K. J. Willmott's article 'A Decade with Butterflies' (*Bull. amat. Ent. soc.* 33: 97-100), and endorse his condemnation of the killing of our rarer butterflies. However, I think there is no harm in recognising that the loss we are experiencing of some species of butterfly in Britain is most probably due to climatic factors. The final extinction of a species in this country may only be hastened by over-collecting.

Recent studies of satellite photographs of the North Polar regions show that average snow and ice cover of the Northern hemisphere increased by nearly 12 per cent in 1971, and since 1971 snow and ice cover around the polar cap seems to have fluctuated about a new mean of 37 million square km as opposed to 33 million square km before 1971.

This is not to say that an ice age is approaching, but there does seem to be a connection with our weather, due to alteration in the global heat balance.

Thus butterfly species which are, in Great Britain, on the edge of their climatic range, are having their range reduced into the continental mass, and it would seem that with several species we are seeing a few 'pockets' of the butterflies hanging on in favourable corners of this country. They may then become extinct here, or, if the weather should become more favourable again, they may extend their ranges. Have a glance at the European distribution maps of the species listed by Mr. Willmott as needing protection from collecting.

Certainly we should protect these species with all vigour, to maintain them with us as long as possible, and maybe succeed in preserving them until the climate allows them to extend their range again. It is relevant that efforts to re-introduce species into areas from which they have disappeared usually end in failure, the prime reason for the disappearance not having been understood.

Geoffrey Sell (5336)

INSECT ASIDES

The three entomologists who leave with the Zaire River Expedition for darkest Africa in October will be trapping insects by electrocuting them, injecting them, shooting them down with shotguns, luring them on to sticky flypaper, and snatching them up with a pair of tongs made from two tea-strainers bought in darkest Leeds for 10p each.

The three scientists, all from the Department of Pure and Applied Zoology at Leeds University, are Dr. Stephen Sutton, Mr. Peter Hudson, and Mr. Stuart Gelder. Yesterday they showed to the press the equipment they will use while collecting insects in the tropical rain forest.

British jungle exploration has come a long way—if one ignores the 10p teastrainers—from those stories about pith-helmeted pioneers with names like Carruthers and Carstairs who staggered through steaming jungle, saying things like: “Gad, Carruthers, these mosquitoes are driving me mad”. Our three latter-day heroes will repel mosquitoes by holding forth a device called the “Moziquit”. This gives out a continuous high-pitched whine that is said to sound to a mosquito like the lower frequency of the noise made by a bat while out hunting mosquitoes.

The scientists will have to hoist traps high into the canopy of the rain forest to capture insects never before seen by groundlings such as Man. But first they will have to climb the trees, up to 120 ft high. If a native cannot be found to do this, they will do it themselves, screwing coach bolts into the tree trunk as pitons every few feet. When the traps have been hoisted up, the climber will use ropes to abseil down.

These traps vary from the simple to the sophisticated, from a trap fitted with flypaper to an ultra-violet light tube surrounded by two circular shields of mesh, one of them electrified. There is a gap of only a quarter of an inch between the two shields. When the insect attracted by the ultra-violet light, flies through the wider outer mesh into the quarter inch gap it touches the electrified and earthed shields while fluttering and is electrocuted.

Large insects flying around tree-tops towering above the rain forest canopy will be brought down by shotguns firing .22 cartridges charged with a kind of micro buckshot.

All in all, there seems to be no way in which an insect can escape from the three scientists. They will be hoisting yet another type of trap for flying insects, a dome-shaped tent which exploits the instinctive reaction of an insect to fly upwards when it hits a barrier. Insects hitting a panel dangling below the tent will fly up into the dome, where they will be anaesthetised by fumes being given off by a killing bottle.

Low-flying insects will be attracted by a powerful mercury vapour bulb shining on to a sheet. Insects landing on the sheet will be snatched off with the tea-strainer tongs. These will be particularly useful in restraining such insects as the rhinoceros beetle, which is as big as a starling, while one of the entomologists subdues it with a quick hypodermic injection of ethyl acetate.

Michael Parkin

The above interesting account of how the present-day professional Entomologist operates is reprinted, by kind permission of the Editor, from ‘The Guardian’ of Friday, October 20th 1974.—Ed.

MOON MOTHS

Some of the most beautiful moths in the world can be included under the heading Moon Moths. The name is certainly appropriate as many of the species have that delicate pale green and white colouring associated with our 'Lady of the Night' and in addition the ocellus or eye of the forewing and hindwing has the appearance of the partially formed moon shape. Some of these lovely moths are bred regularly in captivity while others are still comparatively unknown and very difficult in their early stages. Nearly all are distinguished by the long tails attached to the hind wings which are generally folded across one another when at rest, when the forewings are folded down over the hind wings, flat.

For the present it is intended to include the Genera, *Actias*, *Argema* and *Graellsia*. These moths may be found distributed right round the globe. As with many other species the 'experts appear to disagree over the number of species known. Ferguson (1972) states that there are only two possible species in America, Canada and Mexico while the others may be found in Asia, Africa, and Southern Europe (*Graellsia*). Meanwhile Joseph Moucha (1962) tells us that *Actias* consists of 4 spp. in America, 12 in Palearctic regions, 4 in India and 3 in Africa. As far as we can ascertain from literature available the following species and sub-species are known:-

ACTIAS

- A. artemis* Brem. (Japanese moon moth)
A. artemis s. s. aliena But.
A. luna (American moon moths)
A. truncatipennis (Mexican moon moth)
A. selene Hb. (Indian moon moth)
A. selene ningpoana Feld. (Hong Kong moon moth)
A. selene s. s. gnoma Butl.
A. selene s.s. calandra Jordan (East Indies)
A. dubernardi Ob.
A. felicitis Ob.
A. heterogyna Mell.
A. maenas Doubl. (incl races *ignescens* Moore *latona* van Eecke and *isis* South.

A. rhodopneuma Rob.

A. sinensis Wlk.

ARGEMA

- A. mittrei* G.-M. (Tailed comet moth)
A. mimosae Bois. (Lesser tailed comet moth)
A. besanti Rebel (Dwarf tailed comet moth)
A. kuhnei Bouv.
A. bouvieri Ghesq.

GRAELLSIA

- G. isabellae* Graells.
G. isabellae s.s. galliaegloria Ob.

Breeding moon moths has always been the great, if not the greatest thrill to the Silkmoth enthusiast. The sight of a newly emerged Indian moon moth defies description while the Madagascar tailed comet moth

A. mitrei is considered by many to be the most beautiful moth in the world. *A. selene* the Indian moon moth is probably one of the easier Saturnids to rear. The author has recently reared a variety as yet unnamed from apparently normal parents. Normal *A. selene* larvae are red with a black saddle in 1st instar, red with black dots in 2nd instar and then bright green with black tipped orange tubercles. In the "golden" variety, as I call it, the larvae are different; in 1st instar the red colouring shows some yellow pigment; 2nd instar is normal, but from 3rd to 5th instar the background colour is yellow. The larvae are more delicate than normal *A. selene* and any information as to whether they are a sub-species or genetic recessive would be welcome. They were reared on Plum and were somewhat smaller than the original brood. The golden variety have also been crossed with normal coloured *A. selene* and produced a proportion of golden larvae. These unfortunately have not survived and it only needs to be pointed out that the adult wing colour is also golden. A few hybrids of gold male with green female were distributed and anyone who has any of these should consider them an interesting new colour variety and the author would be very pleased to hear from them. *A. selene* is usually multiple brooded and if *Rhododendron ponticum* is used as food plants during the winter months together with at least a 16 hour photoperiod they should be capable of carrying through in about 8-12 weeks. High humidity and 70°-80°F are also desirable. *A. selene* pupates by sowing together a few leaves on a stem of the food plant and spinning a fairly thin papery cocoon. The pupa is a bright dark chestnut colour and very active if touched. Warmth and humidity will trigger early emergence of the imago providing larvae have had enough light. They must be allowed to climb well clear of the cage floor for perfect development of the tails. Pairing is around midnight in warm airy conditions and the coupled moths part usually in the morning but may stay together until evening of the next day.

The female lays about 200 good sized eggs which are white, heavily marked with walnut brown. These hatch in about 14 days at 75°F.

There are a number of subspecies of *A. selene* including *A.s. ningpoana* which appears similar to *selene* in many ways but with no rose colour in the tails of the female moth while the male is more yellow-green. The larvae are said to accept *Quercus ilex* (Evergreen oak) and in 2nd instar are naples yellow, later assuming green colouring as in true *selene*. As this sub-species comes from Hong Kong it naturally needs plenty of warmth and humidity.

A. artemis the Japanese moon moth is found in Amurland besides Japan, this moth is slightly smaller than *A. selene* (about 10 cm) but very similar in colour and with tails considerably shortened to mere hooks in the female. The submarginal line may be seen quite clearly on the forewings. Imago emerges June and July and appears to be single

brooded. Ova dark flattened spheres, medium sized laid in clusters. Larvae almost identical to *selene* but pale green and smaller. Said to accept Walnut, Oak, Beech, Cherry and Hickory. Requires less warmth and moisture than the foregoing species. Cocoon papery and pendant, wrapped in leaf of foodplant. *A. maenas*. This lovely moon moth departs from the green colouring and is basically yellow with brown markings with a span of 115 mm; the tails make the moth appear larger than it actually is. The species is endemic to S. E. Asia and appears to form a transition from *Actias* to *Argema*. This species is often referred to as a type species of *A. isis* which has much darker colouring than *maenas*, while the pattern of the hindwings also shows differentiation. No details of life history or food plants available. *A. luna* (syn *Tropaea luna*) The American moon moth. This lovely moon moth occurs from Nova Scotia in the North to Florida in the South but apparently does not cross the Great Plains to the West. It is the only species of *Actias* known to occur in North America so cannot be easily mistaken. There are a number of varieties such as *rubromargineta* and in the Southern half of its range *luna* is double brooded.

The spring form of the double brooded strain may be recognised from the dark purplish-red border to the outer margin of the wings which is only partially present in single brooded strains and less obvious in summer broods. Moths may be on the wing from February right through to October in Florida! In America this species produces typical dark brown mottled ova which may be laid on a variety of trees including White birch, Ironwood, Red oak, Elm, Aspen and Walnut to name but a few. English breeders would be advised that best results appear to be from Walnut although Birch may be successful. The larvae are reasonably hardy and may be sleeved outdoors, they certainly prefer cooler conditions than *selene* and full grown larvae are about two-thirds the size of *selene*. The cocoon is typical of *Actias*, being thin and papery, wrapped in foodplant leaf. Pairing is simple in cool conditions and a damp cloth over the cage helps.

ARGEMA

A. mittrei The Tailed comet moth is found in the southern end of Madagascar or Malagasy as it is now known. A freshly emerged moth hanging from its silver cocoon is a superb sight and even provides an exotic scent as it carries a scent of a bouistid fungus! For many years the desire of every collector, this species has now been bred in captivity and the larvae are known to accept *Rhus* (Villiard 1969). In nature the species is reported by Pinhey (1972) as feeding on species of *Eugenia* and *Weinmannia*. The ovum is very large, white and in warm conditions hatches in about 19 days. In its 1st instar the larva shows its affinity to *Actias* in being greenish-yellow with a chocolate brown saddle like *selene*. This saddle is lost in 3rd instar when the larva assumes a uniform green

colour with very pronounced segments and enlarged dorsal tubercles; head chestnut. In 1st instar the dorsal saddle shows a lovely copper colour in certain lights. The cocoon of *mittrei* is a beautiful silver mesh suspended on a long arm from a twig. Pairing is difficult. A fine illustration of the moth is given by Werner 1956.

A. mimosae The South African or Lesser tailed comet moth is much greener than *mittrei* and rather smaller. Its distribution is from Natal, North to S. Kenya, S. Congo and Mozambique. Bulawayo produces a form which is very green with brown antennae as opposed to the usual yellow-green. The ova are large pinkish white and laid immediately if not paired the first evening. Larvae feed mainly on *Selerocarya caffra* the Manila tree and Pinkey also mentions *Spirostachys africana* and *Commiphora mollis* as natural foodplants. In 1st instar larvae are rust red with black head and legs while in 5th instar they are uniform green with enlarged segments and narrow purple bands between segments; the tubercles long and green on each segment. Cocoon silver as in *mittrei*. Pairing uncertain and the female appears to call at dawn.

Argema kuhnei is found in N. Zambia and Katanga. The imago is orange-yellow with a grey costa and grey colouring in the long tails of the hind wings. The larvae are said to feed on *Monotes katangensis*. *Argema besanti* which comes from Kenya is said to be the loveliest of all the moon moths being pale emerald with a whitish body and reddish bands.

GRAELLSIA

G. isabellae is the only European moon moth and in many peoples opinion the most beautiful of all. It is only found in Spain and one mountainous region of S. France where it has been given the rank of a sub species—*G. galliaegloria*.

The Spanish species is found to the North and South-east of Madrid where at times it is quite common. The larvae feed mainly on *Pinus maritima* (Maritime pine), but will accept *P. sylvestrus*, our native Scots pine, quite satisfactorily.

Ova are laid in April, are large and taper at one end. They are rich green with darker markings later darkening.

Larvae first of all are slate brown like the pine stems but later look almost exactly like a pine cone in colour. Crotch (1956) gives a very good description. Rearing conditions should be warm but fairly dry to avoid fatalities and plenty of light is necessary. The cocoon is formed at the base of the tree and is red-brown. Imagos should normally emerge in April but if imported may be later.

As you will see from the above notes, moon moths are a *must* for any serious Silkmoth enthusiast and can give immense excitement! Try them!

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THE CAMBERWELL BEAUTY REPRIEVED

Members who read a previous article (*Bull. amat. Ent. Soc.* 31: 94-97) will recollect that I had started to stamp on larvae containers and was on the brink of being certified. For a couple of years after that I gave the Camberwell beauty (*Nymphalis antiopa* L.) a miss, and I confess that sight of a lone specimen way up in the Italian mountains in 1972 sent a shiver down my spine.

In 1974, as two of my 'dealer' friends were hard up for ova of the species and as I had just forked out over nine pounds for polythene and wood for constructing a greenhouse, I swallowed hard, built a cage big enough to accommodate a gestating mammoth and, armed with a car a net with an extra-long handle, and a wife, I proceeded to scour the countryside for the child of my nightmares.

The 'mammoth cage' measured about six feet long by six feet high by two feet wide and was of the light-weight type that necessitates calling in a bulldozer to shift it. It was partly covered with ordinary white curtain netting which, the summer being incredibly wet, became a camping ground for moulds of increasingly brazen character. The door, which measured about three feet square and was the sort of thing you can bruise your elbows on, was furnished with black mosquito netting that provided a first class view of the forest I planted inside. Incorporated in the design was an oddment of the sort of stiff netting people with sprained joints wrap round their softer bandages. As this remnant was by far the most expensive of the three types of covering materials used, eggs subsequently got spattered across it in minute groups so that it soon became possible to envisage it catching pike instead of keeping butterflies in. I eventually gave it a face-lift by gluing on patches over the holes I had been forced to cut in it.

The Camberwell beauty, like many other Finnish insects, is abundant in some years, very scarce in others. 1974 proved to be a year of abundance and I include a table of sightings over a four year period to substantiate this statement.

The large cage was supplied with willow saplings (*Salix caprea* L.), that were thin enough to bend over at the top and spread out across the netting, thus providing plenty of leaves and side-shoots for the butterflies

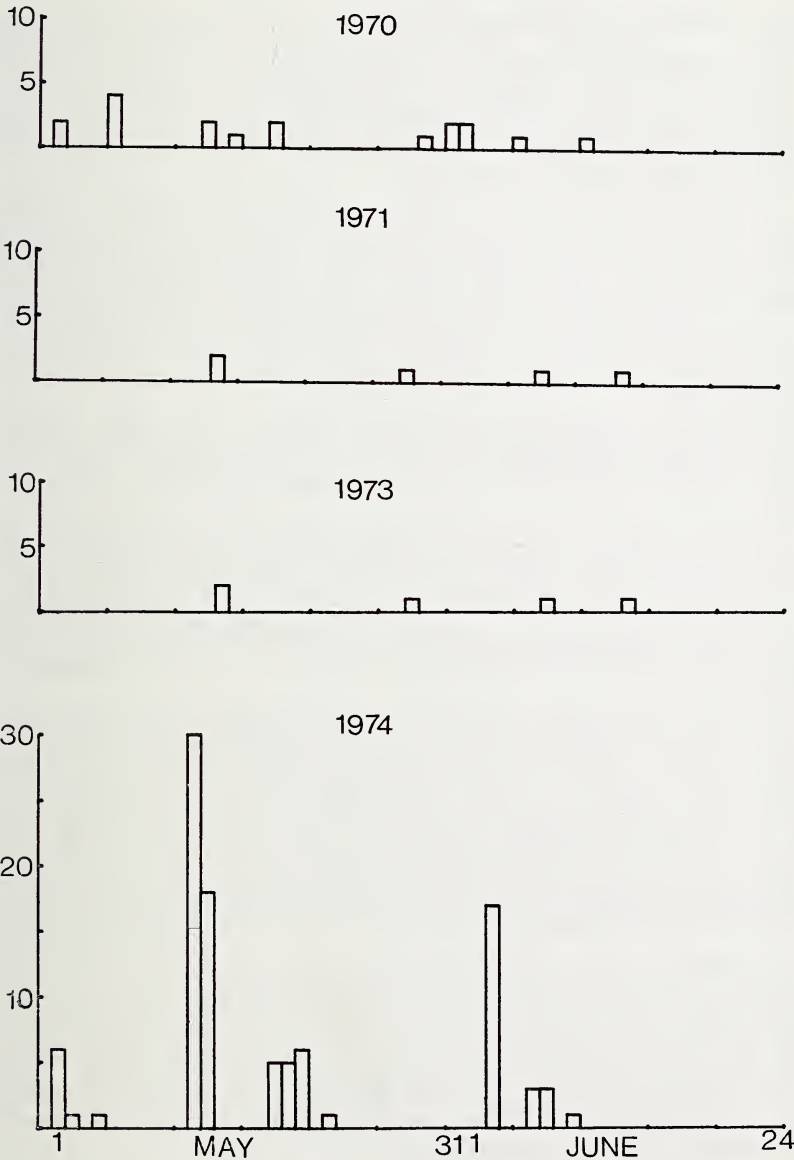


Fig. 3. Histogram comparing the sightings of individuals of the Camberwell beauty in southern Finland in four years out of a five year period.

to crawl about on. Roots and earth were wrapped in tough polythene sheeting, with a gap at the top for watering. As an extra precaution (or because of an inferiority complex acquired in 1970) a second cage was

built, this being of approximate dimensions: four feet high by two and a half feet long by two feet wide. It was fitted over a metal tub containing a willow bush that I 'sculptured', before the leaves came out, with a skill that would have made a Japanese Bonsai grower go olive-skinned with envy. Thermometers and one humidity meter were added in case a butterfly might one day turn broody.

All was thus nicely set up when the first wild victim was suddenly born down upon by a carload of people wielding black butterfly-nets. This occurred on April 28th, which was a gratifyingly early date on which to get the cage inhabited. My diary reminds me that the temperature in the first greenhouse (I subsequently built a second one in a sunnier spot) at 18.00 hrs on that date was 29°C. The nights, however, were still cool.

On May 1st I made the first few of a series of "juice pods" (see next Bulletin) and hung these in the cages, suitably charged with a weak honey solution. From them the first and later butterflies imbibed when active.

May 2nd found me furtively glancing about me before making a neat nick in the bark of a birch tree (*Betula verrucosa* Ehrh.) in an open part of the forest. Though transparent sap trickled out as soon as the knife went through the bark and though fermenting birch sap will bring in every Camberwell beauty for miles around, my score of dribblings attracted only ants.

On May 8th it rained, believe it or not for the first time in five weeks. After that, as I have already intimated, we paid for it. May 11th gave us sight of about 30 *N. antiopa*, which is far more than we had ever seen in one year, let alone one day. One specimen was already busily laying batches of eggs on a leafless willow bush and it was because of my wife's sharp eye that we not only captured butterfly and ova, but I also took the only photographs I have of the Camberwell beauty laying in the wild. Prints were later included in my exhibit at the 1974 annual exhibition.

Arriving home the same day in high spirits, we found that a captive female had also been busy and a neat ring of orange eggs encircled the main stem of the tubbed willow bush. Since it was clearly impossible to cut these away without embarking on a major logging operation, they were left, photographed one evening, and eventually spewed forth a horde of sprightly looking caterpillars that lived for over a fortnight on the then 'open' bush in the first greenhouse.

By the time we discovered the ova in the cage on May 8th the temperature had dropped to 14°C. and the humidity was 40 per cent R.H., but the female butterfly was still sitting by the eggs with wings outstretched, so laying may have commenced at somewhere around these values. The specimen we so rudely interrupted outdoors was ovipositing at 13-15°C. at 13.00 hrs in a breeze of moderate force. The same day we

released into the cages the 17 specimens we had managed to capture of the 30 or so seen.

At this point I was intrigued to know whether in fact all the hibernated adults were females. I even went so far as to collect up corpses as specimens threw up their feet in later weeks, but examination of these mouldering offerings proved unnecessary as a (live) pair mated later on. Smaller, thinner individuals gave up the ghost first, but whether these were puny males or females that had already ditched their eggs was a question I forgot to ask myself until "greenhouse ants" had filched the contents from their putrifying abdomena. I think I can now state emphatically that at least some males lived through until the following spring.

On May 9th by ranging over a large area of little touched country we managed to capture a further eight specimens. There was now a total of 30 in our cages, which was ample for study and the supply of some ova to dealers who were probably making bets as to whether I should make it this time. One specimen I took on May 9th was imbibing from a set of antique fox droppings. I know they were fox droppings because they somehow succeeded in joining the butterfly at the bottom of the net. Other individuals were captured either in flight or while basking on warm sandy or stony areas of the narrow forest roads. A few settled on the bright bark of birch trees.

By May 14th I had some idea of the conditions under which they would oviposit. This occurred at 22°C and 33 per cent R.H. in a couple of instances. There was, of course, no breeze in the greenhouses. During a brief sunny spell a batch was laid on May 15th, and here we have a general rule for many butterfly species: after a prolonged period of inactivity occasioned by dull weather, females will lay readily during the period immediately after the sun comes out. The same behaviour occurs when a "sun-lamp" or similar lamp of high ultra-violet light production is switched on after a dull period. It has also been noted by other investigators that 'stepping-up' the power of the lighting will cause butterflies to pair and lay.

Batches of ova appeared steadily from then on until the last week in June. Later ova were laid in small batches of 50-70, where the earlier ones had numbered anything up to 400 per batch. An individual on June 23rd laid at 26°C and I noticed that in general this later activity required a higher temperature than before. It is possible, however, that the butterflies had become used to a higher 'background illumination' and therefore required brighter, hotter sunlight in order for the laying threshold to be attained, much as with artificial lighting. In some final batches 90 per cent of the ova proved infertile.

A pair of individuals was noted *in cop* in the larger cage on June 7th at 13.00 hrs, at a temperature of 23°C and 58 per cent R.H. This occurred immediately prior to a thunderstorm, with a discernible through-draught in the now well-ventilated greenhouse.

By June 23rd only 12 adults remained and when many of these failed to lay, I let them out into the garden, whence two, doubtless remembering the good old times that had been had, reappeared in the nearest greenhouse and promptly went to sleep on a cross-strut!

The act of oviposition was interesting. A butterfly would move about the leaves, tapping with her shortened forelegs and making an audible clicking sound. Eventually, often after several starts, she would select a twig, investigating it very carefully with the tip of her abdomen—a part of her anatomy that must have the sensitivity of an elephant's trunk. After a pause of a minute or two the first egg would be glued in place. The next few ova would form the first, often oblique ring, and other ova would be laid in rows one against the other, the butterfly moving forwards or angling round the twig as necessary. While laying, its wings would be held horizontally, the antennae jutting up vertically from the head, close together, and thus at right angles to the spread wings. During pauses the wings would be held at rest over the insect's back.

The skill with which ova are fixed in place by this butterfly was beautifully demonstrated by the following event. On May 18th a large batch of ova had been deposited on a horizontal stem at the top of the large cage. On June 2nd a female butterfly laid a new batch right against the previous group, fitting each ova into place despite the fact that the final rows of the first group were irregularly placed. The difference between the two batches could clearly be seen because the first was now purplish, the second orange; but after all the larvae had emerged you could not tell from the empty egg shells where one batch had started and the other finished.

Finally I shall stick my neck out a little. I noted time and again that whereas a butterfly upon being released into a sunny cage would flap up and down the netting furiously, a day or so later it would have 'calmed down' and like the rest would be either sunning itself, gliding up and down, or imbibing from a liquid food source. Whilst all our training teaches us that insects never become "tame", it seems to me possible that some degree of learning takes place here. Would this not involve recognition of territory and objects within it, just as occurs in the wild among certain butterflies, the Camberwell beauty included, when a favourite basking place is returned to time and again?

Though there are still unanswered questions in spite of my efforts, at least I have at long last managed to rear *antiopa* from ovum to imago, and the species is now reprieved to such an extent that, were I to choose something from this world to take with me into the next, I think I'd plump for a sallow twig and a female Camberwell beauty about to lay her eggs.

Leigh Plester (2968)

[It is fairly well established that insects do indeed become "tame" after some time (perhaps several generations!) in captivity. I have seen the same thing happen to newly caged butterflies as Mr Plester describes in his penultimate paragraph—Ed.]

"ASIATIC"

"He's gone Asiatic." Many of my former acquaintances would assert, in dismay. Standing up to the bar, at the local saloon. Tossing back two ounces of 'Dougans-Dew-O'Kirk-in-the-Loch.' Or 'Old Mother-in-law.'

"Yeah, poor guy," says another, reaching across the alcohol stained bar to grasp a fresh pouring of suds, "I sailed with him, several trips, merchant." Downing his brew in one quick gulp he hangs his head and shakes it in bewilderment, muttering, "Can't understand it. What a waste."

The muscular, mustachioed man at the end of the bar swivels around on the padded stool that he has commandeered, faces the rest of the group and moans, thick tongued, "Butterflies! Beetles? Hell, I just don't believe it. I knew the guy when he was selling guns at the 'Traders', across the street."

"And before that he was managing a Sporting Goods store, in Los Angeles," exclaims an obvious golf addict. His golf glove, jammed into his hip pocket, still damp from the latest effort on the local links.

. . . . Ad infinitum. And so it goes.

You see, the circles in which I was prone to attach myself to considered collecting butterflies in the same category as croquet or even stooping so low as to drink sarsaparilla. Not the type of thing a virile, male chauvinist would be guilty of. We took great pride, and pain, to establish the fact that we were men. Not in the 'Caspar Milquetoast class by any reasoning.

Asiatic? Perhaps. After meeting and living amongst the Philipinos for several years I can truthfully state that I am 'Asiatic.' Utterly and completely!

If the term is meant to be deprecatory then there are quite a few people, I fear, who are in serious error. I believe it is an accolade. A badge of honour, to be Asiatic. If the Philipino is the slightest indication of the meaning of the word.

If chasing insects about with a butterfly net at the ready, is not deemed to be manly in some circles, I can draw but one conclusion; they do not realize what they are missing. I sincerely regret that I did not discover the pleasures associated with collecting insects decades ago. To those who know the enjoyment and satisfaction of collecting there is no need to go into redundant detail. Yes, I'm Asiatic, and an avowed bug hunter into the bargain.

So, how did I become so thoroughly converted to the pursuit of butterflies and beetles?

When first I saw the area in which I now reside, ninety per cent jungle, sparsely populated—Barrio Gaoa, Sitio Malingay, Municipality of Pagudpud, Province of Ilocos Norte, Republic of the Philippines—my initial thought, looking apprehensively at the seemingly impenetrable mass of verdure spread out around me, was "Who needs a jungle?" I

immediately ignored it. My attention, and interest, turned to something I understood. As well as a man can understand it. The sea. The South China sea. I swore, looking at the small bay in front of the house, that soon, quite soon, I would arrange to have a sailboat floating on its inviting surface. And that is where I would spend most of my time.

Distance and weather conspired to delay my search for a boat. Manila was some 575 kilometres away. The rainy season, which would make the provincial roads doubtful, or impossible for travel, was overdue. A providential circumstance, in view of my future attitude towards the jungle.

Casting about for something to keep me occupied and active I began to make daily excursions into the nearby jungle. Forests and trees have never been of any interest to me, except for the wood they produce for masts, spars and planking. After the first few tentative trips I found to my amazement, that I was enjoying it more each time. I suddenly had discovered a new world. I was becoming less anxious to procure that boat. I could not deny the fact that though I could never forgo my first love, sailboats, this, the jungle and its attendant challenges would serve as an admirable mistress. I realized that I would be spending more time away from the house, than in or around it, but not in the direction I had at first imagined.

Having become more or less familiar with the many trails made by the wild inhabitants of the region—wild pig, deer, monkeys and lizards—I became increasingly aware of the strange new sounds. What was once, in the early stages of my fascination, a babble of discordant noises was now becoming identifiable as individual voices of the hidden insects. A veritable jungle symphony.

Due to poor navigation, or night blindness, butterflies became my *forte*. One dark, moonless night, late, I had just dropped off to sleep. Suddenly I was awakened by the gentle jostling of my wife who had quickly placed her fingertips on my lips with a quiet plea, “Shh, I hear something.”

Forcing myself into full consciousness I gently removed her fingers from my lips and softly inquired, “What’s the trouble, Baby?”

“I hear a funny noise.” she whispered. Not fearfully. Curious.

“Bats,” I thought, “I’ll just have to get a screen for that door.”

It had happened before. A bat accidentally finding its way into our bedroom, causing us to dash about until we had succeeded in chasing it back through the open doorway. I lighted the Kerosene lamp at my side and searched about. No bat. I got up, lamp in hand and carefully scanned the room. I observed the culprit in the far corner, near the ceiling, resting. A huge white moth.

We captured it with an ancient base-ball cap. I instantly decided that I wished to preserve it. But how to go about it? I recalled, vaguely from

some long forgotten book that I had read, that one uses a pin with which to impale and kill the insect. Then by utilizing other pins the wings are spread and held in position. Until set. We did so. Pinning the unfortunate moth to the inside wall of a wardrobe. Sticking additional pins into its wings in what we determined was the correct position.

Alas! I was a bit disgruntled, the next morning, to find that the local ant colony was having a rousing picnic, at the expense of my moth. That was my first attempt. I was more determined, now, to become a serious collector.

Jenny, my wife, was due to travel to Manila, soon, I therefore advised her to search for a book containing the necessary, detailed information. She returned with the "How and Why Wonder Book of Butterflies and Moths". A publication for children, but it did contain the basic information I desired.

I sent off a letter to the Author of the book requesting additional and more precise intelligence. He referred my letter to Mr. Mark Roth, of the Smithsonian Institution, Washington D.C., U.S.A. Mr. Roth mailed to me a list of the various Entomological Societies. As a result I was able to acquire the detailed knowledge that I was seeking. My butterfly display is now something that I can be proud of. I went so far as to order a 'black-light' trap from the States. Now, not only will I spend most of the day in the jungle but part of the night, too.

Impulsively, I placed an ad in the "*Coleopterists' Bulletin*" advertising Philippine butterflies and beetles. As a result I have received requests, orders, from all parts of the globe. The letter that I cherish most is the one that arrived from your own Mr. Cribb. I would appreciate, someday, the fates willing, meeting this gentleman in person. Either in his bailiwick or mine. Matters not. Although, in spite of the fact that I have travelled the world over, several times, I have never set foot in England. My brother, on the other hand, Radio officer in the Merchant Marine, has visited and enjoyed your hospitable—he insists—country.

Many, many times in the jungle I lay my net aside and light up a cigarette, look about for a smooth rock and simply sit and take it all in. The dozens of butterflies—detached bits of rainbow—flitting about and soaring to the tops of trees. Then coming down to smooth, gentle landing on a brilliant jungle plant or flower. It's quite easy to forget that it's about time for dinner. Must be the 'Asiatic in me.'

A book, tight shut, is but a block of paper.

Chinese proverb

A narrow mind, is ignorance sublime.

Paraphrase

But, of course, I'm Asiatic. My thoughts expose me.

Leonard L. Lengyel

NOTES AND OBSERVATIONS

THEFT!—A few months ago a number of valuable Lepidoptera were stolen from the French National Museum's collection in Paris. They include specimens of great rarity often advertised by the trade at a price of £100 or more, so the thief knew his entomological values. In particular the following *Ornithoptera* were stolen:—

a male *Goliath procus*; a pair each of *Goliath joiceyi* and of *Goliath rothschildi*; a pair and an extra male of *O. paradisea*; also two examples of the Jamaican swallowtail, *Papilio homerus* and one male of *P. hahneli*. None of these could have been slipped into a pocket and the Director of the Museum, 45 bis, rue de Buffon, 75005, Paris, France would be glad of any information regarding the whereabouts of their stolen property.—
Editor.

WASPS ON HIGH.—On August 27, a bright sunny day, my family and I made the ascent of North Berwick Law, East Lothian. The climb was uneventful, insectwise, but no sooner did we arrive at the top, 612 feet above sea level and a good 500 feet higher than any other point for several miles, than we suddenly realised we were surrounded by large numbers of wasps. In particular we noticed a number of "balls" of wasps milling about on the ground. Each of these proved to be a female of *Dolichovespula sylvestris* Scop. surrounded by a number of males, one of whom was *in cop* with the female while all the others were obviously trying to get in on the act. Now while this balling effect of mating wasps has been recorded before, there was no sign of such mating down nearer sea level. Just the usual number of stray workers annoying the picnickers on the beach. It seems likely that the queens and the drones had in fact taken off from down below, found each other high in the air and then descended a comparatively short distance to the top of the Law. There is also the possibility that the thermals being warmer due to updraught around the Law had encouraged the wasps to congregate in this area.

It would have been interesting to have also had a look at the summits of Traprain Law and Bass rock, both some three to five miles away, and seen if they too had their quota of wasp mating balls on their summits.

Brian O. C. Gardiner (225).

COLLECT CATKINS THIS SPRING.—Fine bred specimens of four species of the Sallow moths can be obtained easily from catkins collected in the spring. The Sallow (*Xanthia icteritia* Huf.), Pink-barred Sallow (*X. togata* Esp.) and Red-line Quaker (*Agrochola lota* Clerk) being very common as small larvae on Sallow catkins, and Pale Lemon Sallow (*X. ocellaris* Bork.) can be bred in certain areas from freshly fallen Black poplar.

I. A. Watkinson (3130)

REED DAGGER IN KENT.—Last year I found the Reed dagger (*Simyra albovenosa* Goetz) very common in a particular locality in Kent, and, from two fertile females, succeeded in breeding the resultant larvae on an exotic grass, Nut Sedge.

I. A. Watkinson (3130)

BOOK REVIEWS

The World of Moths. By M. Dickens (photographs by Eric Storey). pp. 128 (including 103 colour photographs of set specimens). Published by Osprey Publishing Ltd. Price £2.25.

This is the second of what is intended to be a trilogy, the first being "The World of Butterflies" (1972) from the same source. The third is to be "How to Breed Butterflies and Moths". The text takes the form of an introduction outlining the life history of the Moths, their physiology, rearing them and an outline of the classification of Lepidoptera. This last follows the system of I. F. B. Common, an Australian entomologist, who lists 105 families amongst the group, telescoping several families previously accepted (e.g. the Nymphalidae embraces several families separated by most authors.)

This section is better written than in the previous volume and the short section on conservation is well balanced considering that Mr. Dickens runs the well-known Butterfly Farm.

The plates are of set insects and the notes below each are more in the tradition of "cigarette card" information. However they make a good introduction for those with a general entomological interest, with a mixture of British and exotic species. The 36 pictures of Saturniidae will please the members who breed Silk moths. An indication of further reading would have been useful and perhaps a mention of the Societies which cater for those interested in Lepidoptera.

The book should whet the interest of those not yet committed to this group and makes a welcome gift for the younger enthusiast. The price indicates the rise in printing costs as the first volume cost £1.95.

P.W.C.

Insect Physiology. By V. B. Wigglesworth. Published by Chapman and Hall, London. Seventh Edition 1974. pp. 166. Paperback Edition £1.65 (Hardback Edition £2.95).

This popular book now appears in its seventh revised edition as No. 22 in the Science Paperbacks Series, a series which includes *The Physiology of Insect Senses* by V. G. Dethier (No. 60) and other books on related biological subjects. In eleven well-planned chapters Professor Wigglesworth deals with the total physiology of insects in a survey which is comprehensive but at the same time intelligible to any reader with a rudimentary knowledge of biology. Twenty line sketches augment the

text and each chapter has a bibliography for those who wish to study in depth any of the matters dealt with in that chapter.

In the past entomologists have paid most attention to taxonomy and morphology but there is a more recent concern for the study of the structure and metabolism of insects and this has brought to light many exciting factors which make entomology the key to many biological problems. This booklet should encourage the amateur entomologist to widen the scope of his hobby and is an essential for those who have an interest in insect anatomy and its influence on behaviour. P.W.C.

BIOLOGICAL CONTROL BY NATURAL ENEMIES by Paul Debach. Published by Cambridge University Press. 323 pp illustrated by photographs and line drawings. Price £5.50.

The growing concern in the world over the use of toxic pesticides and the consequent damage caused to the environment emphasises the need for urgent research into other possible methods of pest control. Paul Debach, entomologist and a professor of Biological Control at the University of California, has written this important book pointing out that we should also be aware that these pesticides not only fail to destroy the pests but in the greater number of instances increase the populations attacked, not by any small margin but by factors of astronomic proportions. For example, the use of DDT in southern California caused an explosion of the Red Scale on citrus trees, the increase being a factor of 1,250 in one case as against untreated control. A whole series of field tests and cited cases authenticate the advantages gained by pests when pesticides are used and Professor Debach explains how the destruction of natural predators and parasites together with the emergence of resistant strains gives the pest a clear field to multiply. A survey of the natural enemies deals in detail with the insects that operate natural controls, the chief of which are included in the Hymenoptera and Coleoptera, those used most successfully to date by man in biological controls. Only brief mention is made of bird predation, pathogens and crop intensity and cultivation methods of control but a clear picture is given of how natural controls can stabilise pest populations while pesticides cause uncontrollable explosions. The reviewer has used the Ladybird beetle most successfully for years to control rose aphids in fairly large ornamental gardens and agriculturists and horticulturists will need to take note of this book and be prepared to change their attitudes and ways. There is an excellent bibliography and the book will be a text book for both plant grower and biologist concerned with pest control. It will give more power to the elbows of those who have been crying for so long in the wilderness for an abandonment of the use of toxic materials in an environment which we must share with friends as well as enemies. P.W.C.

REARING TWO MEXICAN SATURNIID LARVAE

The following article is about two more 'unusual' species of lepidoptera that I have been rearing, and was lucky enough to obtain from various parts of Mexico during 1974. All were from wild-caught female moths, which laid ova quickly sent me by air from the areas they were caught in.

Species number one was *Copaxa lavendera* West. of which I only received fifteen ova, which were pinkish white, and on reading the Silk-moth Rearer's Handbook, I read that only one person had ever succeeded in getting the larvae to start feeding in this country—all sorts of plants had been offered—so needless to say I expected my larvae to 'go the same way as the others' when they hatched.

After about a week some twelve of the ova hatched, so I put them in a small plastic box with some washed young oak leaves and hoped for the best: Next day, on looking in the box I was amazed and delighted to see that they had begun feeding on the oak! It should also be stated here that some heather was also put in the box, as it was mentioned in the handbook that they might possibly take to this foodplant, but in fact mine did not go near it, so it would seem that they do not in fact eat heather. From then on, the larvae grew quite quickly, and when about half grown changed to a pale green colour from creamy-brown. They were also covered with hairs of various lengths, some having 'knobs' on the end which were a beautiful mauve colour. By this time I had six larvae left, the others having died at various times perhaps through disease, or simply being the weak ones, but these six larvae eventually made a perforated type cocoon in the leaves and twigs.

I kept these larvae, throughout their lives, in a smallish plastic box about one foot long, by eight inches wide by four inches deep, at normal room temperature. The pupae are now overwintering, so a description of the moth, and pairings if I'm lucky enough to get any, will be in a further article, as I don't expect them to hatch until mid 1975.

Species number two was *Phricodia rosea* Sonth. This is another, even more unusual species, which I don't think has been obtained here before, and there is no information obtainable in 'The Handbook' about it.

I received the ova, (inside a quill, as were all the ova obtained in these articles) again from Mexico, however this species came from 6,300 feet up, according to sender, in a temperate highland of pine and oak forests. The sender also said that the ova were laid in two different colours, though there was no difference in the resulting moths!

I did in fact receive ova in two colours—pale green, and a white batch, however the pale green ova turned out to be infertile, so perhaps that is the answer?

The ova, which were quite smallish, hatched in a week or so, and

quickly started feeding on beech leaves, (as advised by sender) though they may eat other plants as well. They were gregarious, and divide themselves into groups on the leaves. The colour of the larvae was a dull brown, with thin white stripes from 'end to end', these stripes got slightly wider as the larvae grew, though in general the larvae stayed much the same colour throughout their lives. When about half grown, the larvae stopped their gregarious habit, and 'went their own way', each one feeding separately, and would quickly drop to the ground if the branch was tapped, rolling themselves into a ball, however they could also move at a great speed when they uncurled themselves after dropping to the ground, and the larvae were usually rather active, compared to the last species mentioned, which hardly moved at all!

The very noticeable 'thing' about this species is that they are covered with short spines, (like *Automeris io* Fab., only very short, some $\frac{1}{4}$ in. high). It was soon discovered however, that these spines gave quite a nasty 'sting' when touched, in spite of their small size, and they had the effect on me personally of sending a cold shiver up my spine when stung, for a short while! The effect however did not last very long, apart from a small rash where the spines touched the skin, similar again to most *Automeris* species.

The larvae finally reached a size of two to three inches, which was large considering the small size of the ova.

Having finished feeding, they 'walked about' the cages for a few days, so I put some of them in a plastic container with a lot of torn-up newspaper to see if that would satisfy them. There, some of the larvae went into the folds of the paper, and made a very flimsy cocoon—merely a few brown silk threads, but most simply went under the paper where they turned into dull brown pupae about 1 inch long.

It should be noted here that this species does best in a ventilated cage, (mine were in converted aquariums). Two lots of larvae were kept in plastic boxes where a considerable number died, and two lots were kept in the above mentioned cages—where not one larva died! So this more or less proves that they should not be kept in plastic boxes—except in the early stages, for they all started out in plastic boxes.

These pupae, like *C. lavendera* are now overwintering, and should hatch about June. Further details in next article about what the moth is like, and whether or not it does lay ova in two colours!

Wesley Caswell (3133)

TWO BRAZILIAN NYMPHALIDS

Historis odius orion, Fabr.

This is a shapely butterfly, brown-black in general colouring, its forewings set off strikingly with a wide orange-brown area. It has a robust

body and powerful wings. In flight—in keeping with its $4\frac{1}{2}$ inch span, and the shape of its curved and pointed wings—it is exceptionally swift and evasive; and it usually flies at a high level. Its habitat is over most of Brazil, and I have seen it at various altitudes up to about 3,500 feet, on the fringe of jungles and forests. It likes to rest on large trees—on the trunks, rather high up—where the heavy branches fork out. The trees selected are almost invariably those which exude a gummy sap, or whose fruit is at the over-ripe stage and dropping off. One of the trees it greatly favours is *Genipa americana*, L., the juice of whose fruit, the Jenipaps, ferments easily (and incidentally, in Alagoas and Pernambuco, is the basis of a strong liqueur). As this tree is not very common, *H. odius orion* may be looked for also on Jackfruit trees (*Artocarpus integrifolia*), Breadfruit trees (*Artocarpus incisa*), and Mango trees (*Mangifera indica*). On such trees it often sits with closed wings, for hours at a time, very difficult to spot unless seen in profile against the sky.

Where there is fallen fruit on the ground, this butterfly may be also found sipping their fermenting juices, and it is in this position that its capture is most feasible—if sufficient stealth is exercised in the approach!

Hypanartia lethe, Fabr.

This nymphalid is not very common. Small, with only a $1\frac{1}{2}$ -inch wing spread, very alert and evasive in flight, it is not easily captured. It flies at abruptly changing heights, and settles suddenly in the foliage of scrub or brush, or on the leaves of isolated trees—never in the tangled parts of woods or jungle.

I have come across this butterfly from the North-Eastern bulge of Brazil southwards to Rio de Janeiro, at altitudes varying from 50 to 4,000 feet. Once (in April, 1965) after recent rains had left the countryside green and fresh, on the Serra do Pico, in Minas Gerais I captured a pair which were frolicking around a gnarled tree in the cleft between the twin summits of the Itabirito Peak, at 3,500 ft. This mountain consists of compact hematite. The vegetation is composed chiefly of various bromeliads and ground orchids and shrubs—(all in flower on that April forenoon, and scenting the air with their delicate perfumes). Some twisted trees also grow there, rooted in the crevices, and the detritus at the lower levels.

The butterflies in evidence were not many—a few Catagrammas, Lycaenids and Hesperiidids—and, flitting jerkily about and settling on lichen covered twigs and bromeliads a few more *H. lethe*.

Though not strikingly beautiful, *H. lethe* is a handsome insect, its brown-orange basic colour being relieved with brown-black markings, on all the wings, but which are heavier near the tips of the forewings. And each hind wing is set off with a diminutive pointed tail, giving this butterfly a not unpleasing contour.

TYING OUT

Tying out is a frequently used method of 'assembling' on this side of the Atlantic. Collins and Weast (1961) refer to it extensively.

The method is simplicity itself. Lay a piece of cotton on a tablecloth, or any surface on which the moth can grip, coax the moth to walk half way over it, then pull both ends of the cotton up and tie the moth between the wings. The knot should be loose enough so that the moth is not in any way uncomfortable. After some practice, even the most 'ham fisted' Lepidopterist will be able to master the technique. I should know!

After a few attempts, one will become aware of suitable species. I have found that most Sphinghids will refuse any attempt at tying. However there will be many species that will be found suitable.

The '*Modus operandi*' is simplicity itself. At dusk the female should be placed on a bush or tree in a suitable locality, about three or four feet from the ground. The end of the cotton should be tied in such a way that the moth is free to find a suitable calling position, about two to three spare feet of cotton will be sufficient. It is important to pick a spot where the moth can regain her footing if she falls off the branch, in other words, don't tie her to the lowest branch, in which case she may be left dangling on the cotton in the event of an accident. If this method is carried out, the moth should have mated before morning. A disadvantage with this method is that, unless the species mate for an extended period, and you find them together, you can't be sure that she has mated. If you decide to check on her late at night, the use of a red filter or red paper on the flashlight, will prevent her from being disturbed.

There are many advantages to this method. First, and most important, it is not wasteful, one male mates, the others are still free; unlike the assembling cages using a funnel, where all the males called are caught. Second this method is easy, there is no need for special equipment. Third, it is convenient. If the female is well concealed, she can be left out the following day. You can drive to a suitable location and tie her, and come back the following evening to collect her.

This is one answer to pairing night flying Lepidoptera. It's not fool-proof or always successful, but it bears trying by individuals who breed native Lepidoptera. Finally, be sure that one knows the habits of the species being tied. Many females, for example, will not mate the first night after emergence.

Chris A. Young (5236)

REFERENCE

COLLINS, M. M. & WEAST, R. D. (1961). *Wild Silk Moths of the United States*. Collins Radio Co.

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The Editor is pleased to consider all notes and articles submitted. He particularly appreciates those that are typed but emphasises that this is not essential (unlike nearly all other Journals!). He would like to draw the attention of all contributors to a few simple rules, the following of which will greatly facilitate his editorial duties. These rules apply to both typed and hand-written articles.

They are :

1. Use as large a piece of paper as possible. Decimal A4 or old-fashioned Quarto or Foolscap are the most convenient.
2. Use only one side of the paper.
3. Leave wide (not less than 1 inch please) margins to both left and right of the writing.
4. The style of the Bulletin is to include the scientific name of an insect and the author who named it. Include these wherever possible, but if not known leave enough space for your Editor to fill in.
5. Always use double (or even treble) spacing when typing, and wide gaps between lines when writing by hand. This not only leaves ample space for editorial changes, when required, but also greatly facilitates the typesetting when the manuscript finally reaches our printer and so helps to both avoid mistakes and speed production which in turn helps to hold down ever increased printing costs.

Thank you one and all.

Brian O. C. Gardiner.

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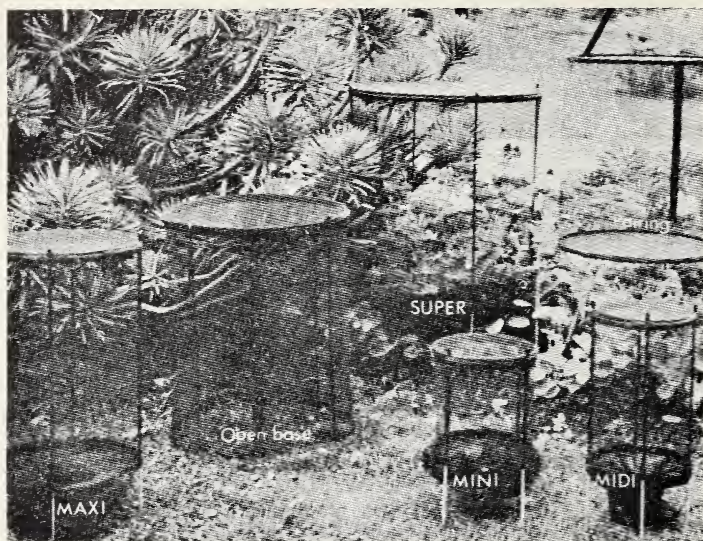
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EDITORIAL

IT IS NOT TOO SOON

By the time our August issue appears the Annual Exhibition is almost upon us and the main collecting, recording and photographic sessions of the summer are a thing of the past. Now, therefore, with this our May issue, would seem to be the time to remind members that it is already time to think about and start preparation on that exhibit which is going to be appreciated and enjoyed by our fellows in September.

IN LIGHTER VEIN

'Twas early in the rural month of May,
I viewed the fly that scarcely lives a day.
So near the margin of a rippling stream,
A ray of light elanced its transient beam;
Brought into animation, seemed to fly
As if 'twas revelling in ecstasy.
Now as the eve emerged her glimmering ray,
And your ephemera roved out to play,
At one consent and general introduction,
Commenced the game of animal production;
As each performed the object of its life,
Curtailed its pleasures and commenced its strife,
Each roving creature now grew faint and died,
Fell from its perch to feed the rippling tide.
O luckless creature! but few hours ago
Thy transient life began to ebb and flow;
Now thou art dead, and gone thy vast career,
Nor ever after canst on earth appear.
Thy perfect state, though lasting but a day,
Begot two other lives another way.
Thus in the larvae state it lives a year;
Next in the chrysalis its forms appear;
Lives twice as long as in the larvae state,
Unless some hungry bird should change its fate.

Josef Badcock

COLLECTING NOTES—MAY 1975

THE SMALLER MOTHS

I apologise to readers that pressure of work prevented me from contributing notes in this series for the February issue while those for August, 1974, although written, could not be published because of difficulty over the reproduction of the illustrations. The current notes concern the genus *Yponomeuta*, which, though it includes common and familiar species, nevertheless poses problems. These arise from the fact that larvae feeding on different food-plants produce imagines of distinct appearance, yet there are no detectable differences in their genitalia. Are they, then, species or biological races? What exactly is meant by a species? But here we are touching on questions of natural philosophy beyond the scope of workaday practical hints.

There is a common basic wing-pattern for the genus, consisting of white to grey forewings with longitudinal rows of black spots. The first of Mr. E. S. Bradford's drawings is of *Y. vigintipunctata* Retz. The grey ground-colour of the forewings and the black spot in the cilia below the apex readily distinguish this species; another, *Y. plumbella* D. & S., also has a dark spot near the apex, but it has a much paler ground-colour and a large and conspicuous additional black spot in the disc. It was illustrated and its life-history described in the Bulletin for May, 1974. *Y. vigintipunctata* is double-brooded, being on the wing in late April and May and again in August. Its larvae feed on orpine (*Sedum telephium*), a local plant which you may have difficulty in finding. In these circumstances a botanist or your county Naturalist's Trust may be able to help. The caterpillars are yellowish grey with black spots and are to be found from the end of June on into July and in the autumn. The moth is sometimes taken far from its foodplant. For example, I once took one in the middle of Wicken Fen, but later I noticed a cultivated variety of orpine in a local cottage garden and that may have been its pabulum.

Mr. Bradford's second drawing depicts *Y. padella* L., which is recognisable by its uniform grey colouration and lack of markings additional to the basic pattern. The third shows *Y. cagnagella* Hueb. which is larger and has the forewings and cilia white instead of grey. These are two examples from the complex I have mentioned. The full range of forms or species with their larval foodplants is as follows: *Y. padella* on hawthorn (*Crataegus oxyacantha*); *Y. malinellus* Zeller on apple (*Malus* spp.); *Y. cagnagella* on spindle (*Euonymus europaeus*); *Y. variabilis* Zeller on plum (*Prunus* spp.); and *Y. rorrella* Hueb. on white willow (*Salix alba*). All have black-spotted grey larvae which feed gregariously in a web. The options, then, are from one to five species and the extremes are to be found in Heslop (1964) who gives them as five species in his checklist but in his introduction to

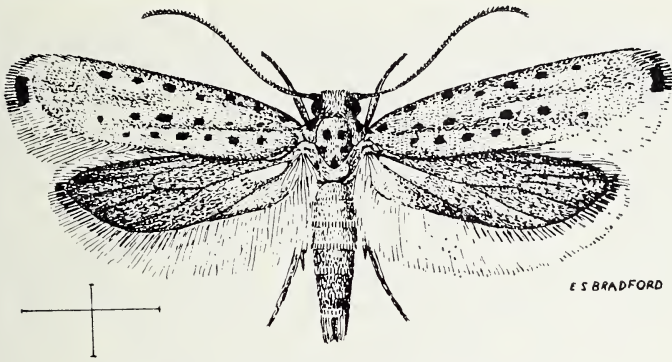


FIG. 1. YPONOMEUTA VIGINTIPUNCTATA

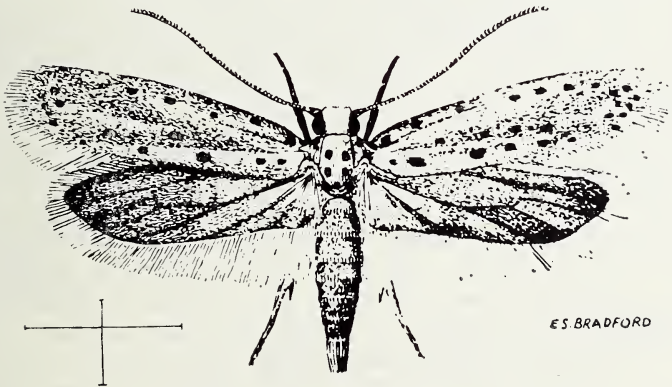


FIG. 2. YPONOMEUTA PADELLA

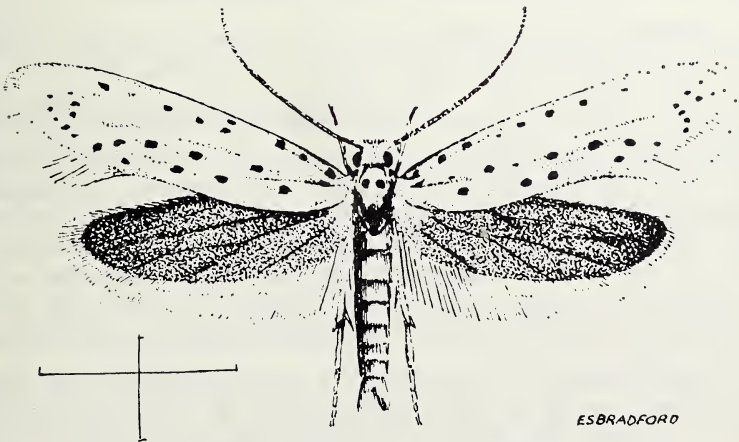


FIG. 3. YPONOMEUTA CAGNAGELLA

Part III quotes Dr. G. Friese, the well-known European entomologist, as considering that they are all biological races of *padella*. Our other authors take a middle course. Meyrick (1928), who was followed by Ford (1949), thinks there are three species, viz. *padella*, *cagnagella* and *rorrella*. The second edition of Kloet and Hincks (1972) offers us two firm species, *padella* and *rorrella*; two more are given doubtful specific status (*malinellus* and *cagnagella*), the alternative to specific rank being their synonymy with *padella*; while the fifth, *variabilis*, is sunk as synonymous with the already doubtful *cagnagella*. Here's a pretty kettle of fish! Yet the problem is one which AES members can help to solve by rearing larvae from the various foodplants and making detailed comparative observations of all their stages. I am sure the editor of the *Bulletin* will be pleased to publish your conclusions. Remember that negative evidence (i.e. that *no* differences were observable) is as important as positive. To start the ball rolling let me say that in July, 1973 I reared imagines from cultures found on hawthorn and blackthorn in the west of Ireland and could detect no differences at any stage. Larvae are easy to find in June or July on most of the foodplants but you may well have difficulty with *rorrella* on white willow; this species is normally very scarce and local, yet in some years and places it has occurred in myriads, defoliating the trees. Before we leave this group, let me say a word or two about the name *cagnagella*. That is how Hübner first spelt it in his *Sammlung Europäischer Schmetterlinge* of 1810-1813; later, in 1822, he emended the spelling to *cagnatella*; then, in 1833, the more erudite Treitsche altered it to the familiar and intelligible *cognatella*. But rules are rules, and we must use the earliest published form of the name, even if, as may well be the case in this instance, it perpetuates a misprint. Likewise, Hübner changed his *rorrella* of 1796 to *rorella* in 1822, but in this instance, too, the rules require us to abide by his etymological blunder.

To complete our consideration of the genus, two other species deserve mention. The first is the scarce *Y. irrorella* Hueb. (in this name, also dating from 1796, Hübner got his 'r's right). Like *cagnagella*, it feeds on spindle. I have only once seen this species and then its larvae were feeding on the same tree as *cagnagella*, the two species even getting into each other's webs. However, the pupation habits were different; the *cagnagella* larvae spun up inside the larval webs, making dense white cocoons, whereas the *irrorella* wandered off singly into the adjacent foliage and spun flimsy cocoons within which the pupae were clearly visible. The imago of *irrorella* has darker forewings than *cagnagella* and an even darker grey cloud in the disc.

The final species is *Y. euonymella* L. which feeds on bird cherry (*Prunus padus*)—what a mess these names are in: *Y. padella* does not feed on *P. padus* nor does *Y. euonymella* feed on *Euonymus*! Bird

cherry is found chiefly in Wales and the north of England, especially on limestone, and *euonymella* is consequently more prevalent in those parts; indeed, it can be locally abundant. The adult is coloured like *cagnagella* but is a little smaller and has more numerous and finer black dots. I have an anecdote to tell about this moth. In May, 1970, I was a member of an expedition to Dovedale in Derbyshire in quest of the related species *Euhyponomeuta stannella* Thun. In passing let me say that though we did not find *stannella* on that occasion, I have since heard that it continues to flourish in this its only known British locality. Though we missed *stannella* we did encounter *euonymella* and as the species was new to me I took a web of larvae. The spray of the foodplant which I brought home was soon exhausted and I was unable to locate bird cherry in Essex. So I tried my larvae on plum and to my relief they took to it readily. I then divided them into two batches, one of which I sleeved out on the plum tree. These refused to continue feeding and all of them died. I retained the other batch in the breeding box (a plastic sandwich container) and these went on eating the plum and in due course produced imagines, albeit rather undersized specimens. My explanation is that bird cherry is a highly aromatic tree and I did not clean out the old sprays from the breeding box. As long as the smell of bird cherry persisted, the larvae were stimulated to eat; deprived of that smell, like those on the plum tree, they opted for starvation and death. This lesson has a wider application than the case in question.

A. M. Emmet (1379)

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COLLECTING NOTES—COLEOPTERA

With the approach of spring more use can be made of the sweep net and beating tray. But before the vegetation gets too thick, it is good practice to make mental notes of places where any birds are nesting. Indeed it may be advisable to spend a fair time tracking down any nesting sites in bushes, and more especially hollow trees.

A wide variety of beetles may be found in bird nests but the nests should never be tampered with until the birds have left. Obviously poking around an occupied nest with one's pooter is not to be recommended as it may cause the birds to desert. Furthermore after the nest has served its purpose it will contain more beetles, they will be attracted to the general mess left by the birds; this is when the nest should be searched.

The larger birds, birds of prey especially, often leave more mess in and around their nests. Those with carcasses of small mammals and bones may attract certain Histerids and *Trox* species. Undoubtedly the richest fauna can be obtained from annually used sites in hollow trees—the peculiar habitat of the handsome *Quedius brevicornis* Thom. In addition to the beetles attracted to the nest, one may find species that live in the rotting hollow trees e.g. *Quedius ventralis* Ar.

The Coleopterist may find some nests in trees impossible to get at, usually because the entrance hole is too small for the hand. I would strongly advise one not to enlarge it in any way, because the birds will use the site again, Starlings often nest in old Woodpecker holes. Generally the tree will be in an advanced state of decay, so it will be only a matter of time before the tree becomes too unsound for the birds, or it may be blown down in a storm—this is the most acceptable time to examine such nests and the surrounding rotten wood. Handfuls of the material should be sifted over the collecting sheet.

It should always be remembered that birds rely on their sharp eyesight to find insects. Many of the coleopterous inhabitants of nest sights will remain perfectly still with legs drawn tight against the body for a long time. Then when the coast is clear will run off with great speed. Staphs especially may be mistaken for small fragments of twig.

Generally the nests of smaller birds—those made of grasses and leaves—such as Bluetit and Sparrow, contain a wealth of very active fleas. These very often transfer themselves to the Coleopterist, and can be rather irritating.

J. Cooter (3290)

NOTES AND OBSERVATIONS

PHILOSOMIA CYNTHIA DRU. IN CAMBRIDGE:—A week or so before Mrs. Wylie-Crocker found an *Antherea pernyi* G.M. in Cambridge (see *Bull. amat. Ent. Soc.* 33: 153). I found a larva of *P. cynthia*, about half-grown, on a small Privet bush in my garden, and this was also noted in the Cambridge Evening News. The larva was reared indoors and successfully pupated. It would appear there was an escape of more than one species of silk moth in Cambridge last year, the two localities are some two miles apart and it does seem very probable that my larva developed from an egg laid on the Privet bush.—T. P. Payne (4688).

LATE EMERGENCE OF A DRAGONFLY:—This dragonfly was reared from a juvenile nymph, captured in a metal water tank, in a wood near Bexley, Kent. The nymph was reared by me in an ordinary aquarium, along with other nymphs, who were all at later stages of development. There were eight nymphs collected, which were either male or female *Aeshna cyanea* Mull. (The Southern Aeshna), and 5 hatched out during the middle of August and 2 hatched towards the end of

August, 1974. All but 2 were released. The remaining one shed its skin in September and fed quite happily on earthworms up to the middle of November, when it ceased to feed and constantly sat on a log, near the surface of the water. This habit continued for three days. On the 14th of November the nymph climbed out of the water and sometime during the day the adult dragonfly hatched out. The adult survived for 4 days, living on flies found around the house. This emergence is some three months late and over a month after all the other dragonflies of this species had died off! There is only one explanation; I kept the aquarium in a conservatory, thus the nymph was under the impression it was still Summer, even though the water temperature was around 45° F! —C. R. Betts (4976J).

SOME OBSERVATIONS ON THE VARIATIONS OF *APHANTOPUS HYPERANTUS* L.:—In 1974 I made particular observation of the Ringlet within relative easy reach of my home. I estimate I netted and released approximately 500-600 specimens. I have taken seven specimens which range from *ab arete* Müller, *ab Caeca* Fuchs to near *ab obsoleta Tutt*. It would have been possible to take many more specimens. The most common was *ab caeca*, but *ab arete* were in sufficient number to wonder at the statement in the New South page 154 that “it has been stated that *ab arete* appears to be more common in the North than in the South”.

Only one specimen, a male, nearing the *ab lanceolata* Shipp was netted. Its condition was so poor that the insect was released.

It was noticeable that distribution of forms varied depending upon whether one was collecting in a wood area or in a more open meadow area. There was a greater preponderance of variety in the former areas. I would be interested to hear from any member who has had a similar experience.—G. D. Trebilcock (2976).

LARVAE ATTRACTED TO LIGHT:—During the month of January, 1975, I have found many larvae of several species of moth in and around my Actinic 5 moth trap. These include 8 Large Yellow Underwing (*Noctua pronuba* L.), two small unidentified Geometrid larvae and four unidentified Noctuid species. This seems rather unusual. I have taken into account that the larvae may be attracted to warmth given off by the trap, but as the mercury vapour tube only has a capacity of 6 amps this seems highly unlikely. I have only found the larvae while the trap is working and have conducted thorough searches of the surrounding area when the trap is switched off but have found nothing. All of the larvae found outside the trap were within a radius of about 1 metre, nothing being found outside this area.

During 1974, using the same trap I captured a full grown larvae of the Buff ermine (*Spilosoma lutea* Hufn.). A year previously, using a Robinson

pattern trap, as many as five or six larvae of the Swift family were found on several occasions, usually after heavy rain.

Has anyone else had any similar experiences and is there something in the attraction of light for larvae? I have also found in the trap, the larvae of a species of crane-fly.

If the larvae were preserved by having them blown, they would have to be labelled, "Caught in trap"!—A. Adams (5060).

A LATE BROOD OF THE SMALL TORTOISESHELL:—I think that the late summer of 1974 will go down as the worst in recent years for the butterfly population in Britain. It had been a cool but dry Spring and Summer and most early emerging species had been plentiful but at the end of August the weather broke up abruptly and there followed the wettest September for a century with low temperatures and it never recovered, October having several sharp frosts in the London area and torrential rains and very high winds. The autumn emergence of such species as *Lysandra bellargus* Rott. (late August) were apparently destroyed by the September weather and the Vanessids just did not happen. I saw a few *Polygonia c-album* L. and two or three *Aglais urticae* L. However on the morning before the Exhibition, 27th September, I found a nest of small *urticae* larvae near my bee hives and I brought them up to the Exhibition. Despite some night frosts they pupated on 14th October. Out of the twenty pupae, none of which produced parasites, only eight resulted in imagines, the rest going black and proving to be dead. The imagines would not feed and immediately took up hibernating positions in the cage where they now rest in the back of my garage. It will be of considerable interest to see if they get through the winter as this will be assessing the effect that the disastrous autumn has had on the whole butterfly population.—P. W. Cribb (2270).

LEPIDOPTERA DISTRIBUTION MAPS SCHEME

It is now some eight years since this scheme was launched and whilst considerable progress has been made much work remains to be done. The basis of the scheme is to compile lists of all the species of macro lepidoptera which occur in each of the 3650 10km squares of Great Britain and Ireland.

Whilst some records have been received from very many of these squares there are still some from which no records of any species have been received and many which are under-recorded. This is very evident from the provisional maps already published and the enclosed newsletter includes maps which show the actual 10 km squares from which records are most urgently needed.

In addition to providing information for the preparation of distribution maps of the British Isles this scheme feeds data into the European

Invertebrate Survey for the production of maps of all Europe. Also the records form part of the national biological data bank which provides information to the conservation bodies, and biologists carrying out research in a variety of fields. Safeguards are built into the system to prevent confidential data, especially on rare species, reaching unauthorised persons.

Amateur entomologists are vital to the success of this, and the other entomological schemes being organised, for without their help the field records cannot be obtained. If you are not already contributing and would like to do so full details of this and the other schemes are available from: —

Biological Records Centre
Institute of Terrestrial Ecology
Monks Wood Experimental Station
ABBOTS RIPTON
Huntingdon. PE17 2LS

J. Heath

COMPARATIVE RECORDING METHODS FOR MACROLEPIDOPTERA AT BURNLEY, LANCASHIRE, 1974

My intention in publishing this data is to illustrate the value of different collecting methods and to give members an insight into the various species that inhabit Burnley. I hope that this information will inspire other members to keep and compare records in this way and in turn to publish their results.

The Rothamsted light trap runs each day throughout the year but was not in operation until February 19th due to the power crisis. The trap uses a 200 Watt clear tungsten bulb. It is situated in an urban area with an outlet to the countryside twenty minutes walk away. It is in this area that I do my other collecting.

This small area of woodland consists mainly of Sycamore and Elm with scattered Hawthorn, Oak and Silver Birch.

I sugar here approximately five times per week and take the M.V. lamp out once or twice per week. The lamp runs off a twelve volt car battery and is used with a white sheet. I always use a vertical sheet at the back as I have found that some species, particularly *Campaea margaritata* L. prefer to sneak on and settle in the shadows or in the slight folds.

The final method I employ is that of touring the electric street lamps between the two sites. This is unreliable and the insects are difficult to catch. Usually there will be nothing on for fifteen minutes, then half a dozen will fly around at the same time. Just as you begin to move in the inevitable happens. A police car pulls up and you are asked to explain a net of immense length, a bag of Heinz baby food jars and the fact that it's two o'clock in the morning!

TABLE 1

Species	'Sugar'	Rothamsted Trap	M.V. lamp	Electric street lamps
<i>Laothoe populi</i> Linn.				+
<i>Deilephila elpenor</i> Linn.	+			+
<i>Pheosia tremula</i> Clerck.				+
<i>Pheosia gnoma</i> Fab.			+	
<i>Thyatira batis</i> Linn.	+			
<i>Graphiphora augur</i> Fab.	+	+	+	
<i>Diarsia mendica</i> Fab.		+	+	+
<i>Diarsia rubi</i> View.	+	+	+	
<i>Ochropleura plecta</i> Linn.		+	+	
<i>Paradiarsia glareosa</i> Esp.	+	+	+	
<i>Amathes baja</i> Schiff.	+	+	+	
<i>Euschesis janthina</i> Schiff.			+	
<i>Euschesis comes</i> Hübn.	+			
<i>Noctua pronuba</i> Linn.	+	+	+	+
<i>Naenia typica</i> Linn.	+	+		
<i>Mamestra brassicae</i> Linn.	+	+		
<i>Melanchra persicariae</i> Linn.		+		+
<i>Diataraxia oleracea</i> Linn.	+	+		
<i>Ceramica pisi</i> Linn.	+			
<i>Orthosia gothica</i> Linn.		+		
<i>Cerapteryx graminis</i> Linn.		+	+	+
<i>Leucania pallens</i> Linn.	+	+	+	+
<i>Leucania lythargyria</i> Esp.	+		+	
<i>Xylena vetusta</i> Hübn.	+			
<i>Allophyes oxyacanthae</i> Linn.	+			
<i>Antitype chi</i> Linn.	+			+
<i>Eupsilia transversa</i> Hufn.	+			
<i>Agrochola lota</i> Clerck.	+			
<i>Agrochola macilentata</i> Hübn.	+			
<i>Agrochola circumcellaris</i> Hufn.	+	+		
<i>Anchoscelis litura</i> Linn.	+	+	+	
<i>Citria lutea</i> Ström.	+			
<i>Cirrhia icteritia</i> Hufn.	+			
<i>Conistra vaccinii</i> Linn.	+			
<i>Conistra ligula</i> Esp.	+			
<i>Apatele psi</i> Linn.	+			+
<i>Apatele rumicis</i> Linn.	+			
<i>Amphipyra pyramidea</i> Linn.	+			
<i>Apamea lithoxylae</i> Schiff.	+			
<i>Apamea monoglypha</i> Hufn.	+	+	+	+
<i>Apamea crenata</i> Hufn.	+	+		
<i>Apamea sordens</i> Hufn.	+	+		
<i>Apamea remissa</i> Hübn.	+	+		+
<i>Apamea secalis</i> Linn.	+	+		
<i>Procus strigilis</i> Clerck.	+	+	+	+
<i>Procus latruncula</i> Schiff.	+			
<i>Procus fasciuncula</i> Haw.	+	+		
<i>Luperina testacea</i> Schiff.		+		+
<i>Euplexia lucipara</i> Linn.	+	+		

Species	'Sugar'	Rothamsted Trap	M.V. lamp	Electric street lamps
<i>Phlogophora meticulosa</i> Linn.	+			
<i>Petilampa minima</i> Haw.	+	+	+	
<i>Stilbia anomala</i> Haw.			+	
<i>Caradrina morpheus</i> Hufn.		+		
<i>Celaena haworthii</i> Curt.	+		+	
<i>Gortyna micacea</i> Esp.		+		
<i>Cosmia trapezina</i> Linn.	+		+	
<i>Plusia chrysitis</i> Linn.				+
<i>Plusia festucae</i> Linn.			+	
<i>Plusia puchrina</i> Hübn.		+	+	
<i>Plusia gamma</i> Linn.		+		
<i>Scoliopteryx libatrix</i> Linn.	+			
<i>Hypena proboscidalis</i> Linn.	+	+	+	
<i>Spilosoma lubricipeda</i> Linn.				
<i>Spilosoma lutea</i> Hufn.		+		
<i>Sterrha aversata</i> Linn.		+	+	+
<i>Xanthorhoë montanata</i> Schiff.		+	+	
<i>Xanthorhoë fluctuata</i> Linn.		+		
<i>Xanthorhoë designata</i> Hufn.			+	
<i>Perizoma alchemillata</i> Linn.			+	
<i>Perizoma flavofasciata</i> Thunb.			+	
<i>Lyncometra ocellata</i> Linn.			+	
<i>Ecliptopera silaceata</i> Schiff.		+		+
<i>Lygris pyraliata</i> Schiff.			+	
<i>Lygris populata</i> Linn.			+	+
<i>Cidaria fulvata</i> Forst.			+	
<i>Dysstroma truncata</i> Hufn.	+		+	
<i>Dysstroma citrata</i> Linn.		+	+	
<i>Thera variata</i> D. & S.				
<i>Hydriomena furcata</i> Thunb.			+	+
<i>Odezia atrata</i> Linn.				
<i>Oporinia dilutata</i> Schiff.			+	+
<i>Operophtera brumata</i> Linn.		+		
<i>Abraxas grossulariata</i> Linn.		+		
<i>Lomaspilis marginata</i> Linn.				
<i>Deilinia exanthemata</i> Scop.		+	+	
<i>Campaea margaritata</i> Linn.			+	
<i>Gonodontis bidentata</i> Clerck.		+		
<i>Colotois pennaria</i> Linn.				
<i>Crocallis elinguaris</i> Linn.		+	+	
<i>Ourapteryx sambucaria</i> Linn.				+
<i>Opisthograptis luteolata</i> Linn.		+	+	+
<i>Erannis aurantiaria</i> Jubn.				
<i>Erannis defoliaria</i> Clerck.				+
<i>Alcis repandata</i> Linn.	+	+	+	+
<i>Lithina chlorosata</i> Scop.				
<i>Hepialus humuli</i> Linn.		+		+
<i>Hepialus fusconebulosa</i> de Geer		+		
<i>Hepialus lupulina</i> Linn.		+		
<i>Hepialus hecta</i> Linn.				
<i>Amathes xanthographa</i> Schiff.	+	+	+	+
<i>Colostygia didymata</i> Linn.		+	+	

TABLE 2

Total different species	=	101
By Sugaring	=	48
By Rothamsted Light Trap	=	49
By M.V. Lamp	=	42
By Electric Street Lamps	=	26

Whilst no single method reflects the species of the area I feel that collectively they do.

The list of 101 species recorded during 1974 is shown in Table 1. Table 2 shows the relative number of species caught by each method.

I read with interest the article by P. M. Heath in the August Bulletin of 1974. Of the species mentioned by him there are only four that I have come across. These being *Hepialus humuli* L., *Paradiarsia glareosa* Esp., *Apamea aphigramma* Esp., and *Polychrysis moneta* Fab. Of the last two mentioned I have only had two and one respectively in my six years experience. I found Mr. Heath's 272 species incredible. I have had only 127 species in six years.

G. Rushton (5130)

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THE IRIS ONSLAUGHT

I first began making observations of the Purple emperor (*Apatura iris* L.) in 1967 in a Sussex locality and have observed it annually since, with 1974 being the most rewarding for sightings, mainly due to my ample opportunity for observing, for it was last summer that I 'retired' for five months in order to spend maximum opportunities in the field. For a serious observer an opportunity like this must be readily taken and despite the sacrifices made, the poor summer weather etc. it was very worthwhile, I was able to be amongst the butterflies on all suitable occasions and I increased my knowledge of their life-histories and adult habits a great deal as well as increasing my fine collection of colour slides to some five-hundred plus, depicting the intimate life-histories of many species thoroughly. Much has been written and reported about our 50 plus butterfly species, so perhaps surprisingly there is still much more information and accurate observation missing, and I often find myself querying items I see written in our present day text-books. The meaning of much observation still has to be determined and there is ample scope for future work. The person I most admire as a lepidopterist is most certainly the late F. W. Frohawk and hopefully I can emulate his work, which I still feel is incomplete, as more and more of the butterfly 'mysteries' unfold before my eyes. The way my work differs from Frohawk is

that I do not collect specimens, the camera not the cyanide does my killing and I suspect from his writings that Frohawk himself would have used this modern method had it been readily available to him, as it seemed he was a true lepidopterist with conservation-biased thoughts. Indeed now in 1975, fifty years on from his heyday, there are fewer habitats and today no one hears of ninety-seven *iris* being captured in a few days by a dealer and his companion in a single wood, as stated by Frohawk (1934).

Needless to say from 10th July onwards much of my attentions were turned to *iris* and I wanted to collate as many observations as I could and also get the elusive photograph of a fine male. Let me say that these days anyone wanting to purely observe *iris* and note and record sightings will have great difficulty, especially if within the confines of a good, well-known, locality. Here one is constantly pestered by some kite-netted maniac who parades up and down in great haste hoping to get a 'swish' at a low flying *iris* and often taking revenge on *camilla* or *paphia* in reply to his failure with *iris*. It was in these similar circumstances that I had my most memorable experience in the field on 20th July in a Sussex locality. My head had been tilted towards the sky for most of the morning and early afternoon and the sun had become hidden behind a large bank of cloud. I was dispirited as I had not seen *iris* fly around an expected oak in the mid-day period and as I trundled slowly down the stone forest road I saw a parked car tucked deep into some trees and this I thought was obviously a collector's, who had probably murdered two or three *iris* which he'd caught in the morning sun?

Thirty yards past the car my spirits were immediately lifted, as for the second time in my life I saw *iris* down on the ground. I became gripped with excitement, prepared the camera and cautiously moved in. On my first occasion of seeing *iris* down I moved rather clumsily and it catapulted high back into oaks without me really getting near it. It wasn't to be so this time, but as I drew near it was disturbed and my thoughts flashed back to my earlier episode. *Iris* flew gently towards me, circled me, about knee height twice, and settled on my trousers just above my left ankle! As I watched *iris* circle me I had the most magnificent and remarkable sight of its purple flush flashing on and off and with the sun behind cloud I can describe the colour as an electric blue. I stood perfectly still with *iris* on me and was filled with awe, at the magnificence of such a creature which had honoured me with its presence at such close quarters. How many times had *iris* looked down on me, yet here I was looking down on he. I watched in amazement for three or four minutes before I decided to try and get some memento of this occasion. Unfortunately my body would not contort itself enough to enable me to photograph it and I eventually disturbed it, despite its involvement in imbibing moisture from the corduroy trouser material.

So with high spirits I ventured further into the wood, but with thoughts

of returning to the same spot perhaps an hour later. I would go and see how the Silver-washed and White admirals were progressing after the ravages of the collecting fraternity. Many thistle-heads were lying in the road, the result of mad slashes with a net, but *paphia* won't learn and were fewer in number than the week previous. At the return to my treasured *iris* spot to my dismay the assumed collector was back at his car imbibing his own kind of moisture. Fortunately on speaking to him I learned that he had seen no sign of *iris* and was basically a micro-lepidopterist, but one who wouldn't mind a male *iris* gracing his cabinets. So as I feared he was a potential *iris* predator, then amazingly as I spoke with him, the male *iris* paid a high speed return visit and I uncontrollably let out a yelp of delight and gave the game away. From then on it paid repeated visits (some three or four) and something of a Laurel and Hardy type situation developed, with on every *iris* appearance, me rushing in with my camera, followed rather gingerly by my net-wielding friend. Amazing scenes followed with *iris* once 'buzzing' me, literally brushing my face and shoulder, and once again settling on me. This time at thigh height on my trousers and on this occasion the frustrated look on the net-bearer's face seemed to be overpowering him, so I turned and gave the back part of my leg a hefty slap in order to frighten *iris* away, which I succeeded in doing. I was determined to prevent the Emperor, which I came to admire so much, from a sticky end in the gas chamber. Finally my collector friend gave up and drove off down the forest road. I must add here that I am extremely grateful to him for restraining from collecting the specimen, despite his ample opportunity, and I can also add that he wasn't the bad type of collector (there are good types?) and I was fortunate enough in not meeting up with some of the more ruthless breed, whence perhaps I should have been called upon to use the increasingly popular oriental martial arts in order to preserve the life of the regal Emperor.

The climax of the whole fiasco came twenty-five minutes after the collector's departure, at 17.55 to be precise, when out of the corner of my eye, and some 25 yds. away I saw something flop down onto the forest road. I turned and walked apprehensively towards it. Surely enough it was this fine male *iris* laying flat on the road surface, obviously sunning itself in the now fine evening sunshine. I carefully got down on all fours, gently rested my elbows on the ground near it and commenced to take seven photographs of it (as close as 8 inches from the actual insect) at leisure! It then lifted itself from the road and 'batted' towards the oaks, some fifty yards away, never to be seen again. What a rich reward I got from my efforts, it was almost as if the Emperor presented itself so willingly as a 'thank you' and I can now glance up as I write this article at my photograph of *iris* staring down at me, the purple on its right side shining as a lasting memory of this unforgettable experience. I also have three first-class colour slides of this Emperor which I can enjoy seeing

through the winter months and as a discussion point with my colleagues who are concerned with *iris* and indeed envious of my incredible luck.

Some points of note here are that the male *iris* was in immaculate condition and was recognisable as being the same insect throughout the afternoon's observations because of this fact. It was concluded that the repeated attraction of *iris* to this same area was for two reasons. Firstly the probable moisture the stone road provided. (*Ladoga camilla* L. could be found in some numbers, particularly evening time, on the road surface feeding.) Secondly its fascination for me, or my clothing. My collector friend tried two methods to obtain its attention, firstly by spreading a white sheet in the middle of the road and secondly by moving his car out from the trees into the centre of the sunny road. Both are supposedly noted attraction for *iris* but both proved completely negative on this occasion, despite *iris's* continual presence. Had I been alone in the wood I would surely have made many more worthy observations and probably got even more photographs, but alas it's an increasingly popular spot and at week-ends in July it becomes uncomfortable. Hopefully someday the Forestry Commission will outlaw all collecting in their property with or without permits and the many visiting collectors will be continually ousted by burly foresters.

The very next day 21st July I was back in the wood at 08.30 as I felt sure this same male would return to the spot which it was so fascinated by the previous afternoon and evening. This wasn't to be the case and I never saw this fine male again. Perhaps he knew it was a Sunday and a high risk day from his human enemy. Sure enough by 10.30 excited chatter was heard and the net men were out, slashing the thistles and securing *Argynnis paphia* L. and *L. camilla* for a carcass display in some dusty old cabinet. After conversing with two collectors and stating my abhorrence at their pastime I trundled away, back along the stone road only to be confronted once again with *iris* down on the ground. This was in a different part of the wood and this time I approached it confidently. It flew up and yet again circled me low, being yet another male with its purple taking on a different appearance in full sunshine. This was certainly a different specimen from the previous day as it was somewhat worn with a piece out of its hindwing and a smaller chip out of its left forewing. As it flew round me, this time I became very much aware of the audible rustling sound it made with its wings in this mode of flight, more noticeable even than Peacock (*Inachis io* L.) a species which is noted for this aspect. It settled on the road with its wings half raised avidly using its proboscis. I took a single photograph after which it moved off the road up into a nearby hazel only some six foot above ground level. Here it rested for four or five minutes. It became clear that once again this specimen was infatuated by the road surface and it came down once more this time to bask on the road. Now for the second time in consecutive days a problem arose of a similar nature to the previous

days and I wonder whether whilst Frohawk was observing he confronted similar difficulties? I had heard the chatter of those two collectors uncomfortably close and seemingly approaching and with *iris* on the ground in front of me. No matter what condition an *iris* specimen is in a collector never fails to take it, one rarely sees immaculate specimens in the slaughter houses. I decided to unfold my own rarely used net and attempt to capture and box this male *iris* and release it when the area was clear. Here I must give *iris* credit, for despite being literally a sitting duck it escaped my amateurish attempt at enclosing it in a net in acrobatic and skilful fashion. Before my net had clattered down onto the road *iris* had soared away high into oaks some fifty or sixty yards away. Perhaps this one was practised at eluding a stroke with a net? At least I believe that really frightened it and I have doubts as to whether it returned to its low level activities and hopefully escaped any gas chambers as the other male had the previous day.

So ended my experiences in this wood, anyway with the male sex of *iris*, but I still had more observations to come, and after speaking with several collectors and butterfly enthusiasts in the wood heard of no males being secured and poisoned, a sad unfitting end to a magnificent creature, so worthy of its twenty-plus days life and gracing our oak woodlands, bringing immense pleasure to an increasing number of people who delight in just watching and photographing the country's butterfly population. After this spate of male sightings and the more usual high flying observations, it became the time of the females and the golden much sought after treasures that they leave behind. Egg-laying females often become vulnerable to a net, so on my first occasion of observations I was pleased to see one ovipositing well out of the reach even of the most unscrupulous and sallow destroying trophy hunters. The number of people that searched this Sussex locality for eggs was remarkably far more than those that came to ensnare the adults. I took two out of harm's way myself as they were on heavily searched bushes. This type of bush was quite unmistakable as they were often leaning unnaturally across footpaths and roads; had broken twigs and even branches and with nearby undergrowth severely trampled. One day in the wood I saw a party of people consisting of two men, two women, a youngster and a large black dog all searching sallows (mostly unlikely ones) but their very trampling alone must have damaged some of the early stages of the small fritillaries and *Leptidea sinapis* L. which breed on the ground. I heard of no successes by these people but I have a tally of seven eggs known to have been taken out of this wood, which I estimate at being approximately 10% of a single female's total quantity of eggs. I purely speculate that a female would have laid approximately seventy ova during the summer of 1974, spread over 7-10 suitable (weather wise) days.

My own observations over seven years come to a conclusion that all egg-laying takes place between 12.00-14.00 hrs. and on each egg laying

flight within these two hours a female will lay up to a dozen eggs with long periods of rest between the laying of a single egg or a spate of three or four eggs. Probably at the very start of its egg laying period the female almost certainly descends from an oak to a willow in order to lay, but from then on it will use other suitable trees and even tall willows themselves as a point at which to drop off onto a suitable willow for ovipositing. I had a spectacular sight of a female at rest on the very tallest branch of a willow in the midst of her egg laying activities and I peered through binoculars at her against a clear blue sky, looking right through her wings as she basked with them outspread.

So the fine *iris* season drew to a close (fine from my point of view anyway, many people considered it a below average season) an active and exciting one for me as my observations were not made in this one Sussex wood alone, I had seen *iris* down for a third time in a Surrey locality. However I was back in the Sussex locality in late summer to find to my disappointment that the Forestry Commission had lopped off several willow branches, all of which were suitably sited for *iris* egg laying, and many were lying withering in the rides. Take note that these branches would not have been touched by the Forestry Commission as a usual practice, but this was done purely because of the damage they had suffered from the molesting egg hunters who pull and drag down even the highest branches in order to find that little precious object. Many insist that they breed to release, but rarely are they released back in the wood of their origin and at the correct time of year. That is if they succeed at all in bringing it through, many don't even have suitable rearing conditions yet still take them to play with.

What future then is there for this, the most magnificent of the forest butterflies? Certainly in this Sussex locality where all these observations were made, I think its position could become precarious. I am now convinced that *iris* is a most collectable insect despite many theories about its relevant safety from extinction by collectors because of its mainly aerial activities. Male and female alike are vulnerable to the persistent pain in the neck collectors. Damage to willow bushes is increasing annually. I saw one that had been completely uprooted last summer by some obvious moron. Eggs and particularly younger larvae are findable and taken out each year. Possibly ten per hundred eggs are taken from strong reputable localities. So the onslaught on the treasured Emperor of the forest continues and its volume intensifies, surely unless a dramatic turnabout is procured we will be having repeats of the great Chattenden Wood affair. This once famous Kent station for *iris* became dry of the Emperor in 1887 after incessant hordes of collectors and profiteering dealers visited the locality year after year, often using baits to lure *iris* to its death. Beware attempts are still being made today to profit from the purple flush of *iris* wings. The Purple Emperor is still being murdered for pounds and p's. Its exotic appearance, rarity and mystique make it a sale item like

our other more exotic species, the Swallow-tail (*Papilio machaon* L.). This insect I've actually seen offered for sale to a dealer, who refused to buy much to the indignance of the collector, who stated that he had travelled all the way to Norfolk just to get them. Shameful, and *iris* itself has recently been listed as a sale item by a reputable entomologist (?). Bred to supply orders. Just what kind of person can shut a killing bottle on this superb insect and pull out the silent and still result, needlessly and uselessly robbed of a life committed to gracing the heights of our forests with its soaring flight, and then there is that electric blue . . .

Perhaps to end on a slightly hopeful note for the future is the fact that *iris* seems fairly widely distributed, with many more localities than people think. Indeed it seems to be increasing its range, being found in most suitable localities in the south. One can only hope that the indignities this insect suffers at the hands of many humans will sometime end once and for all and that the strength of the more responsible of us will increase and eventually win through. May the July skies be full of the magnificent Emperor for future generations to enjoy as much as some of my own generation has done.

K. J. Willmott (3822)

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NOTES ON THE BRITISH RACES OF *EREBIA EPIPHRON* KNOCH

B. C. S. Warren (1936) refers the British races of the Mountain Ringlet, *E. epiphron*, to *ssp. mnemon* Haw., stating the type specimens of Stoddart as being from Ambleside, Westmorland. He states that this race is nearest to *ssp. mackeri* Fuchs (Vosges Mts.) as the four spots in the forewing are all normally present. Thus he maintains that it is related to the northern (Hartz Mts.) *epiphron* rather than the southern races (the 'aetherius' of Esper from the Central European Alps). Our own findings after a close examination of the Cumbrian and Perthshire races is at variance with this and it would appear that British *epiphron* is nearer to *aetherius*, being (to quote Warren) "poorly marked and less constant in its markings". We consider that on the basis of size and markings, *ssp. mnemon* should be used to refer to the Cumbrian specimens and the name *scotica* Cooke should be used to describe the race from Perthshire. While *mnemon* appears to be transient between the northern and southern races, the Perthshire specimens are much larger and the markings even more inconstant than those of *mnemon* (Cribb 1968). The genitalia of the males are certainly near to examples of *aetherius* from the Hautes Alpes. The clasp is the most variable item of the male armature but even within the races there is considerable minor variation in width, shape and toothing. It would seem difficult to determine the races on the basis of such microscopic examinations (see Figs. 1, 2 and 3).

FIG. 1

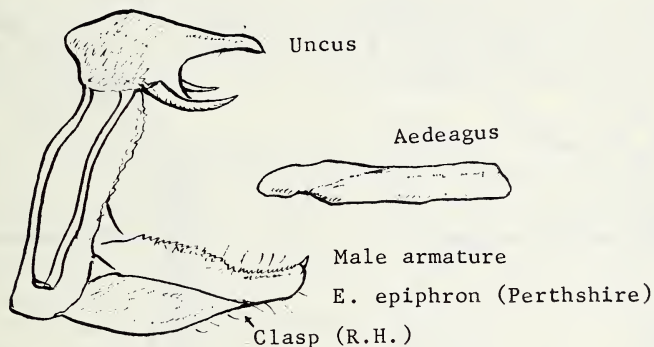


FIG. 2

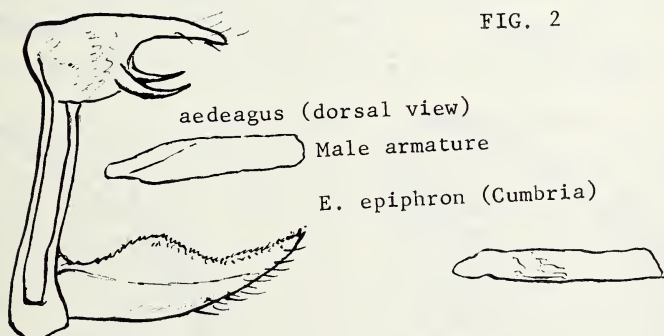


FIG. 3.

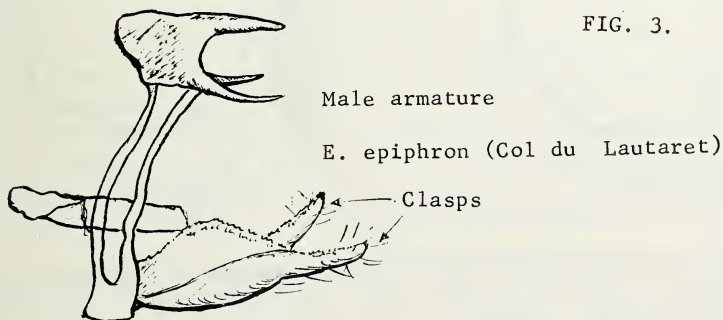


FIG. 1. *E. epiphron* (Ben Lawers, Perthshire) Male armature.
 F.G. 2 *E. epiphron* (Seathwaite Fell, Cumbria) Male armature.
 FIG. 3 *E. epiphron* ssp. *aetherius* (French Alps) Male armature.

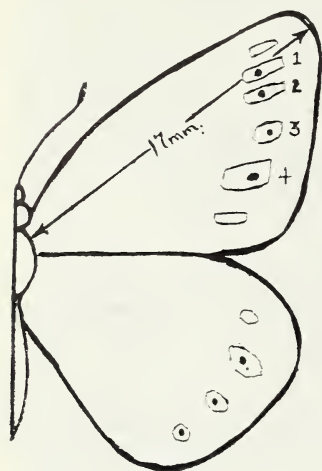


Fig. 4.

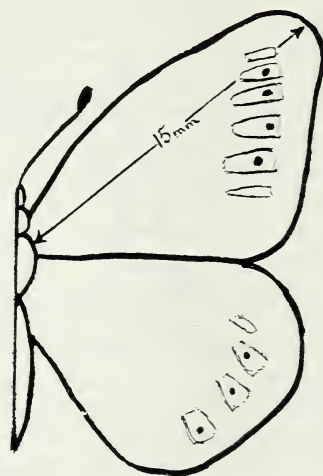
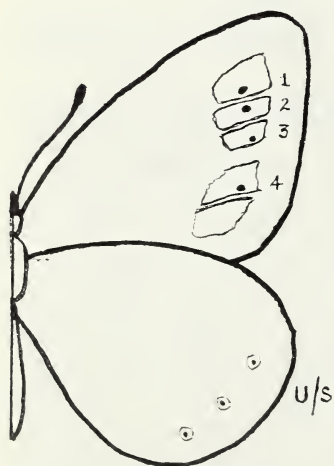
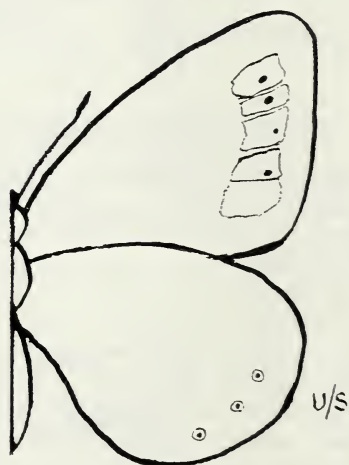


Fig. 5.

PERTSHIRE ♂
Fig. 6.CUMBRIA ♂
Fig. 7.

FIGS. 4 & 6 *E. epiphron*, Perthshire, upper and underside of wings showing spot distribution.

FIGS. 5 & 7 *E. epiphron*, Cumbria.

It would seem necessary therefore to resort more to average size of the specimens and the external features to define the racial characteristics. Figures 4 and 5 show an extreme marking of the male forewing and hindwing upperside and Figs. 6 and 7 the same underside (4 & 6 Perthshire, 5 & 7 Cumbria).

First let us consider the wingspan. The measurement used was that which is as shown in Figs. 4 and 5. A total of 12 Cumbrian females varied from 14 mm to 17 mm (average 16.5 mm) and 10 Perthshire females from 16 mm to 19.5 mm (average 18.1 mm). A total of 73 Lakeland and 64 Scottish males were, however, available for study and the results on these were analysed statistically. Fig. 8 shows the number of specimens at each 0.5 mm increment in size and while it is apparent from the figure that Cumbrian specimens are smaller on the whole, they have a mean of 15.93 mm with a standard error of 0.0874; while the Perthshire specimens have a mean of 17.90 mm with a standard error of 0.0812. This is a significant difference on the size of the sample.

When a series of the two races are put side by side, the size difference is striking.

R. F. Bretherton (in litt.) tells me that he collected *epiphron* in the Lake District in 1929 in the Haystacks and Brandreth areas at between 1,700 and 2,000 ft. His eight males range between 16 mm and 18 mm, with an average of 16.8 mm. These are corrected measurements as he measured his specimens from the centre of the thorax to the wing tip. This gives an average of about 1 mm extra to the length from wing base to tip (checked with calipers). He adds that in 1929 he observed *epiphron* in other places in the first week of July. All localities were high but in some instances down to 1,500 ft at Sty Head Tarn, where we did not find it although it was above this on the slopes leading to Sprinkling Tarn, and at circa 1,600 ft on the Stake Pass. They were mainly in flattish damp places and not on the steep slopes. He adds that his *epiphron aetherius* from the Alps measure between 16.5 mm and 20 mm, with an average size of about 18.5 mm, but at altitude at St. Veran the specimens are markedly smaller. *Epiphron cydamus* from the Alpes Maritimes is a large race with an average size of 19 mm, and *e. pyrenaica* is as large. Those which we took in Durmitor, Montenegro, are again apparently a different race and about the same size as *pyrenaica*. I will be describing them and having a look at their genitalia in a later Bulletin.

With regard to markings, the Perthshire specimens generally look blacker due to the orange areas being smaller in relative area. Figures 4 to 7 show the most extremely marked specimens of both races. The *uppersides* are blackish/brown and the submarginal areas outlined in the sketches are rufous. The ocelli are black, unringed and unpupilled. The Cumbrian race is generally less variable than the Perthshire. Variation may be in the diminution of the rufous areas, a few having it as rings

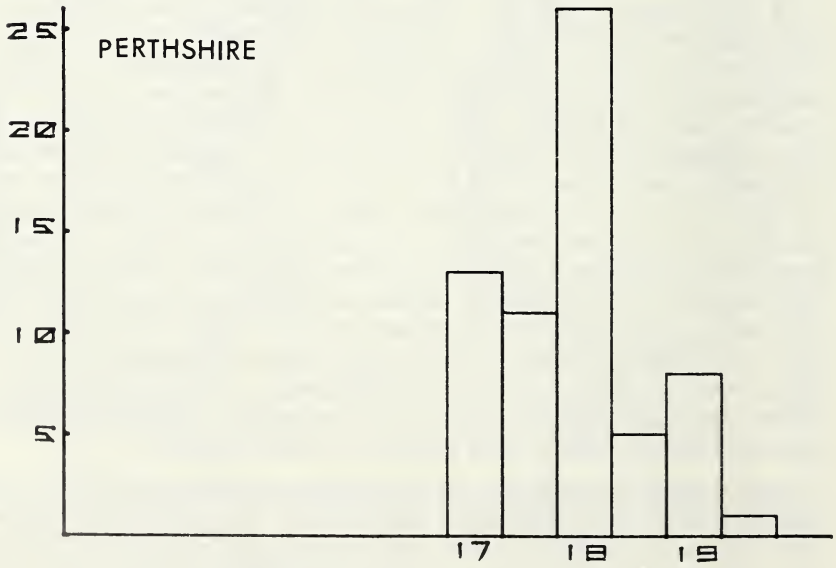
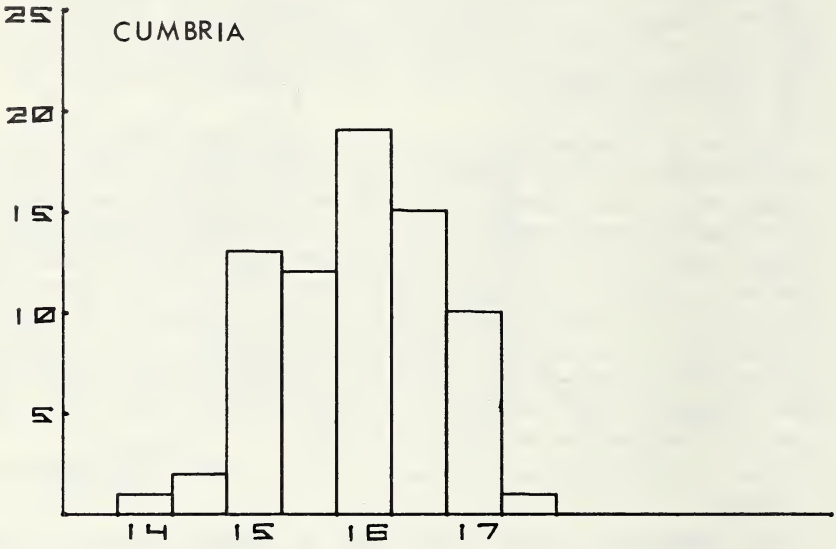


FIG. 8 Histogram showing the size distribution at 0.5 mm measurements of *E. epiphron*.

round the ocelli and in one Perthshire specimen no rufous areas occurred. Spots numbered 1 to 4 may all be present, No. 3 is often very small and is the one absent in 3-ocelli types; Nos. 3 and 4 are absent in 2-ocelli types and usually 1, 3 and 4 in 1-ocelli forms. In the hindwing the three ocelli are normally present but in several specimens all may be absent. The *undersides* have a brown ground colour with the rufous areas smudgy, often running into a band in the upper wing. In the lower wing the rufous areas are small circles but often they are absent, the whole lower wing being brown, darker at the base than in the sub-costal area. The ocelli of the forewing may be four but in most cases only 2 or one are present (positions 1 and 2). The lower wing has 3 minute ocelli but these again are often absent.

TABLE 1

CUMBRIA

MALES (35)

Upperside

	4 ocelli	3 ocelli	2 ocelli	1 ocellus	Nil
Forewing	24	5	3	1	2
Hindwing	0	28	2	1	4
<i>Underside</i>					
Forewing	3	7	23	1	1
Hindwing	0	10	9	3	13

PERTSHIRE

MALES (32)

Upperside

Forewing	14	10	5	0	3
Hindwing	0	21	3	5	3
<i>Underside</i>					
Forewing	3	16	8	2	3
Hindwing	2	7	11	7	5

TABLE 1. Showing the number and distribution of the ocelli in Cumbrian and Perthshire male *epiphron*.

In the extreme form *thomsonii* Cribb the orange areas are present on the upperside and forewing underside but there are no ocelli on any wing. Of those taken by P. W. Cribb, amongst the Perth specimens there were three such forms and K. Porter took another, indicating a fairly large number of this form being present in the race. All were males. Table 1 shows an analysis of the markings of a large sample in each area. Thus the typical male of the Cumbrian race has 4 ocelli on the forewing upperside, 3 on the lower wing upperside, 2 ocelli on the forewing underside and nil to 3 ocelli on the hindwing underside. The Perthshire race typical male has 3 or 4 ocelli on the upperside forewing, 3 ocelli on the upperside hindwing, 3 ocelli on the underside forewing and 2 on the underside hindwing. However the variability is more marked in the latter race.

As mentioned in the last volume of the Bulletin (Cribb 1974), the altitude range of the English and Scottish races studied is different and a whole series of possibilities may account for this. From records it would appear that in the last century *epiphron* occurred at a lower altitude in the Lake District of Cumbria and the indications are that a recession of the lower snow line in winter has meant that the butterfly has moved higher up the slopes to keep within the winter snow belt. If winter snow is essential to the well being of the larvae while hibernating this would explain why the Irish race has disappeared—a race which Warren agrees appears to have been the form *nelamus* Bdv. *ssp. aetherius*. Sheep grazing could have forced a movement to higher slopes but it was noticed in Perthshire that the butterfly is living quite happily amongst the sheep there. The brevity of sunshine would be the reason why it inhabits the south-facing slopes and rainfall hardly seems to affect it as the Seathwaite Fell is the wettest place in Britain. One would like to know what the temperature is at the base of the snow blanket during the winter and the exact minimum altitude where winter snow lies in both areas. Perhaps some member has data on these points. One suggestion of finding likely further localities for the butterfly in the Lakes and perhaps in Scotland would be to take an aerial photograph of the areas in winter to establish those south-facing slopes which have a snow cover. The fact that the butterfly can be reared at sea level in captivity is only significant if the air temperatures to which they are exposed are equivalent to those which would be experienced at altitude in exposed conditions without snow cover.

Considering the point of the larger wing size in the Perth race, the actual wing area is nearly 20% larger. This would give a much greater heat absorption surface and as noted, the black area is relatively greater. This would be of increasing advantage as the available periods of sunlight was reduced. It would need a study of records over a long period to establish that the amount of sunshine in the northern areas was less than that of the Lake District. The writers would welcome any comments or advice on the matters raised in these notes and would be happy to receive examples of *epiphron* from other localities in Scotland other than the Perthshire race referred to.

P. W. Cribb (2270)

K. Porter (4505)

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SOME OBSERVATIONS ON DUTCH ELM DISEASE

Dutch elm disease (DED) is at present posing a threat to the elm trees (*Ulmus* spp.) of this country. Although DED was recognised in Britain fifty years ago, the present epidemic is the most serious on record. The disease is due to infection with the fungus *Ceratocystis ulmi* and this is spread by two species of elm bark beetle *Scolytus scolytus* Fab. and *S. multistriatus* (Marsh).

Dutch elm disease has important implications to the eco-system and naturalists will view its spread with alarm. Large numbers of elms have been killed by the disease, especially in such endemic areas as the Severn Valley, and as a result many arable areas are devoid of trees. The effect of such devastation on animal life is uncertain but there seems little doubt that the results will be far-reaching. In a paper on the effects of DED on birds, Mitchell (1973) lists the kestrel (*Falco tinnunculus*), little owl (*Athene noctua*), tawny owl (*Strix aluco*), stockdove (*Columba oenas*) and ciril bunting (*Emberiza cirilus*) as species likely to suffer. I have been unable to trace any reports on the effects of DED on other animals but should like to suggest that these may not all be disadvantageous.

During a visit to Brookthorpe-with-Whaddon, Gloucestershire, in June 1974, I took the opportunity to investigate the animals associated with dead and fallen trees. The area, which has been badly hit by DED, is one I know fairly well. It is arable land and the vertebrate and invertebrate fauna is rich and varied.

Species found in abundance under pieces of elm log included woodlice, centipedes, millipedes, snails, slugs, spiders (including *Tegeneria* spp., a *Pisaura* sp. and *Dysdera crocata*), ground beetles (*Carabus* spp.) and lesser stag beetles (*Dorcus parallelipedus* L.)

In addition to the invertebrates listed above I found 6 young smooth newts (*Triturus vulgaris*) under one log and a great crested newt (*T. cristatus*) under another. There was evidence of rodent activity, probably *Microtus agrestis*, in the form of tunnels and faeces. Examination of bark showed much evidence of beetles and a number of spiders, woodlice and snails were found under the bark.

This study was not quantitative and no attempt was made to identify all the species found. Nevertheless, the impression gained was that the large numbers of elm logs had produced an ideal habitat for the species listed above. Reference to my diaries for the 1960's shows that on no occasion then did I ever find smooth newts on land even after the breeding season, and my records for spiders and beetles are extremely scanty. This would suggest that either numbers have increased or survival rate improved.

It would appear that DED has not proved a complete disaster. My observations suggest that the disease may have created increased habitat

for invertebrates and it is reasonable to assume that this will have repercussions elsewhere. For example, while the elm nesting or roosting birds listed by Mitchell (1973) may decline, other insect-eating species such as tits (*Parus* spp.) may increase. The slow-worm (*Anguis fragilis*) may benefit from the greater numbers of slugs available and the amphibians from a similar increase in invertebrate food. A number of wood-feeding beetles will probably increase and, possibly, extend their range. Carnivorous insects may likewise multiply in response to improved habitat and more accessible food supplies.

This subject would make a fascinating and valuable project, especially for the amateur entomologist. It would be of interest to hear other members' observations and comments.

J. E. Cooper (2343)

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NOTES ON THE NORTHERN SWALLOWTAIL

The swallowtails are mainly associated with warmer parts of the globe and one would suppose that an insect with so large a wingspan as *Papilio machaon* Linn. would be at a disadvantage in an area where the summer is short and likely to be cool. Nevertheless this majestic butterfly has been taken as far north as latitude 70°. It is rare in Norway, occurring only in certain localities, but it is common in Finland and Sweden.

The Type, *P. machaon machaon* L., resembles the British sub-species (*P.m. britannicus* Seitz), but the yellow ground colouration is paler, especially in females. Also, the butterfly is single-brooded, partial second broods only occasionally occurring in southern Sweden. These fly during August, whereas the usual flight time is June to July.

A third difference is in the choice of foodplant. Fennel (*Foeniculum* sp.) does not occur on the Finnish mainland and the larvae are found feeding wild on a variety of other umbellifers, but principally Angelica (*Angelica silvestris*) growing along roadsides and along copse borders, and Milk parsley (*Peucedanum palustre*) growing round the margins of acidic sphagnum pools and in certain other boggy biotypes. On both of these plants the females lay ova in the wild state. Adults are thus most often observed in two different habitats: either flying powerfully down roads, or dipping among plants growing around the margins of pools or lakes. They visit flowers of various kinds and when disturbed fly off at great speed, often rising well over the tops of forest trees, so that you have it in mind to send for Moses Harris and a dust-gun.

Like most Finnish insects, the abundance of the species varies enormously from year to year, but as the adults are rather sporadically

encountered, larval numbers give a better indication of the situation in any particular year.

One day (8.6.74) I put two males and one female into a large cage in my greenhouse, along with pots of Angelica. A thunderstorm ensued shortly afterwards but it did not last long and at about 3.0 p.m. the sun began to shine brightly once again. After eyeing each other suggestively for a few minutes in conditions of 25,5°C and 40% RH., a pair went into a clinch with the alacrity of a couple of Hollywood filmstars with reputations to keep up. They did not remain paired for long and the female turned out to be a disappointment, as she merely struggled through the process of laying fourteen yellowish eggs before flaking out gracefully across an Angelica leaf.

The eggs lasted and lasted and lasted and then when they were in their fourth week along came an itinerant greenhouse bug who unhitched his rostrum and promptly scoffed the lot. I thanked him warmly as the things were giving me ulcers from worry.

The early stages resemble those of the British swallowtail, described in many books. Ova are almost always laid on the upper surface of leaves, the larvae feeding and going through their ecdyses on this surface, though in the final instar they usually ascend the plant and strip it of its umbels of flowers. Collecting these larvae requires a technique appropriate to the habitat in question. Acid pools are generally pools in the process of being turned into peat bogs by encroaching sphagnum moss. Over this vanguard of layered moss spread sedges (*Caryx* spp.), Cranberry (*Oxycoccus quadripetalus*), Sundew (*Drosera* spp.), and usually only at the very edges, their graceful 'fronds' dipping into the water, well-spaced specimens of Milk parsley. The latter are absent, however, from the majority of such water bodies, so that seeking out productive places is a tedious task.

If you could cut such a habitat neatly down the centre from top to bottom, and tilt this to a convenient angle, you would see a construction similar to that of the front of the human eye, the moss forming the iris and the pool the lens. The quest for larvae involves walking out towards the inner rim of this 'iris' and as you walk smelly bog water, squeezed out from innumerable sopping wet strands of moss, noses upwards towards your knees. At the rim the whole arrangement wobbles like a palsy-stricken jelly: it is, after all, not designed for heavy bipeds. If, by leaning that extra little bit forwards, you push things a mite too far, you do not curse prematurely as you may be lucky enough to get a glimpse of a pike in its natural surroundings as you go in.

Tackling the roadside populations requires a different approach, though in its way it is just as exhilarating. Angelica tends to grow in little groups as though its seeds had been scattered by an inebriate. Since the several kilometres needed to produce a reasonable brace of larvae are best covered in motorised transport, we have adopted a scheme whereby one drives, one leans out of the window, scrutinising the plants. As the plants

grow higgledy-piggledy on both sides of the road, there are times when the rule of the road must be ignored and the car piloted up the wrong side. In a country with one of the highest traffic accident rates in all Europe, the chief prerequisites for this sort of behaviour are a cast-iron nerve and Ultra-comprehensive motor insurance in favour of a third party not cringing inside the vehicle at the time.

The number of eggs found on a plant is variable. Single ova per plant may be deposited down a whole row of *Angelica*, whilst it is not uncommon to discover up to five ova or larvae on one plant, with the next few plants devoid of these. Individual *Angelicas* can be several metres apart and it is interesting to trace the egg-laying 'history' of a female butterfly by means of the ova or larvae discovered. Quite often larvae fall into two or more well-spaced age groups, so that it can be concluded that more than one female has been ovipositing in the vicinity. In this way you can also see what particular situations are sought out by the females for oviposition purposes.

My record number for clumped ova is (14.7.74) two on one plant, five on the next, then seven and finally, on a fourth plant, three—all the plants growing within a foot or two of each other. This was during a very wet summer when in general eggs and caterpillars were far less scattered than normal. The record for larvae per plant is held by my wife, on 15.7.73, with sixteen healthy caterpillars from one isolated, giant-sized *Angelica* growing at the side of a dirt road.

During the dry summer of 1973 many larvae were found coated with dust, as were the leaves on which they were feeding. This did not seem to affect them unduly as many had already grown to a large size. In the wet summer of 1974 I found three caterpillars which had apparently died owing to excess rain water permanently covering the leaves.

The larvae feeding on Milk parsley round the edges of small pools are very prone to attack by hymenopterous parasites, but those collected in isolated groups from roadsides are in our experience generally free of such parasites. The adult parasites generally hatch from the swallowtail pupa the following spring.

The overwintering chrysalides are almost invariably either green and yellow or black and cream, just as in British specimens. Intermediate forms, which may be of a slightly pinkish hue feebly marked with brown, sometimes appear on the wooden sides of a cage, as though the caterpillar had been given an apoplexy by the neutral toned background. Since non-evergreen plants lose their leaves and their green stems become replaced by brown in autumn, I can see little advantage for the green and yellow pupal form in this northern single-brooded type. It certainly does not fit in well with the deep green of spruce needles or those of pine or juniper. In fact, it seems to me that this form was most likely developed as an adaptation to double-broodedness, the ability to form a pupa of such a colour being highly beneficial at the end of the first brood, which

in more southern climes occurs around July when green vegetation is at a maximum.

Having once become "locked up" in the genetic mechanism, this may have proved difficult to eradicate without loss of some other factor of benefit to both broods. Consequently the bizarre green and yellow form would persist even though of partly negative value. A side factor of interest is snow, which probably covers many of the pupae for from four to seven months depending upon locality and thus confers immunity from most predators, irrespective of pupal colouration. This, however, probably produces an adverse effect in early spring, when insects are scarce and much sought after by insectivorous birds such as the abundant Great-tit (*Parus major* L.) and when anything bright green and yellow in hue is likely to be closely scrutinised and if found palatable, promptly despatched.

How important, however, is the angular shape of this pupa?

Leigh Plester (2968)

"JUICE PODS" FOR BUTTERFLIES

Every butterfly breeder knows the problems of keeping butterflies alive in captivity. In the past I have used real flowers and wads of cotton wool soaked in sugar solution and suspended from the roof of the cage. Neither of these methods has been satisfactory: flowers wilt quickly and drop their petals (among which some eggs may have been laid); cotton wool pads dry out within the hour on hot summer days.

In the spring of 1974 I developed a new system which is basically a refinement of the 'cotton wool method'. I constructed what, if you will forgive the North American flavour, I came to term "Juice pods". For want of a better succinct description I shall use the term here.

A "juice pod" consists of a piece of polythene tubing, length four to eight inches, of the type sold for making modern, see-through hose-pipes. The best diameter for this is around two centimetres (about three-quarters of an inch), but thinner tubing may be used. The advantage of the two centimetre diameter tubing is that enough cotton wool can be packed inside it to provide a decent fluid reservoir. Choose where possible tubing that is round in cross section, rather than that which is oval, as the oval tubing seems to retain its curve and is difficult to fix to a flat piece of wood in a cage.

Mass production results in a better job than the making of one "pod" at odd intervals, so cut about ten pieces from the length of tubing you purchased from the local ironmongers or garden sundries shop. Now, using a sharp knife (a modelling knife is excellent), cut out a piece from the length of the tube as illustrated in Figure 1a. Never—I repeat, *never*—have your fingers in front of the knife as you pull, because considerable effort is required to slit the thick-walled tubing and a slip could mean the loss of a finger end that you might have found a use for in the future.

Next block off the ends of the tube. This is best done with thick (say 2mm or one-sixteenth of an inch) polythene sheeting of the type I obtained in 1966 from an obscure London firm to make a new back window for the soft hood of a car. If this material is not available, any sort of plastic or polythene sheeting can be used, even the thin material cut from normal polythene/plastic bags. The ends are glued in place with "clear" Bostik, which forms a strong chemical bond within the minute. As the ends are fitted to the sections of tubing, the latter can be handed to the rest of the family to hold, with a finger on each end, as they watch television. Trim the overlapping corners if you wish.

You now have a set of structures which, I am sure you will agree, do vaguely resemble a bizarre species of seed pod.

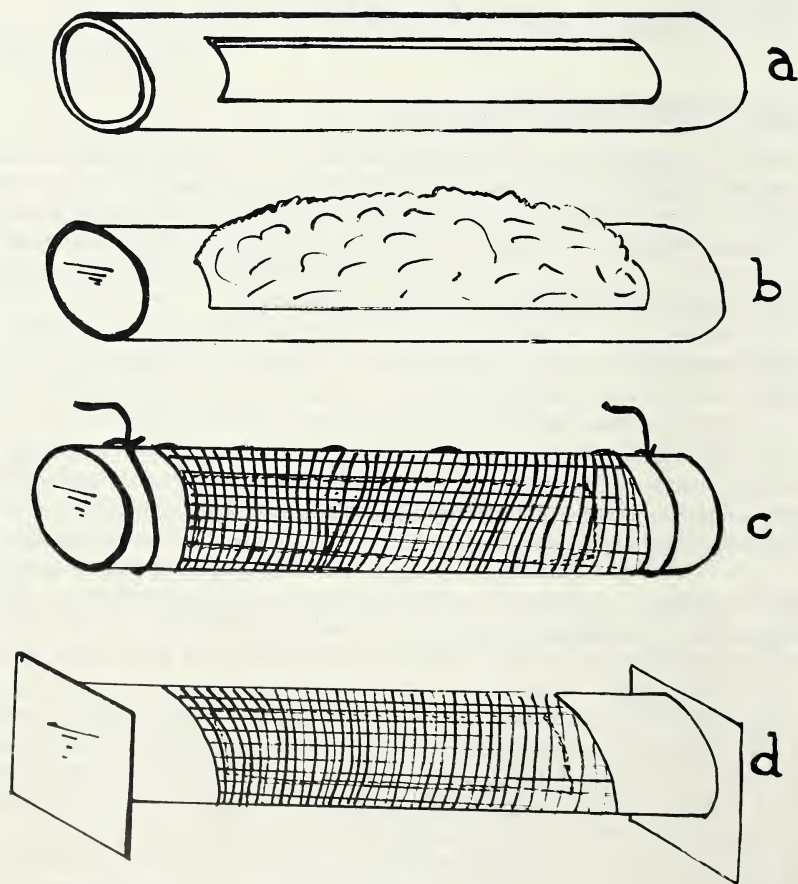


FIG. 1 a, b and c: stages in making a "juice pod". d: standing model.

The "pods" are now stuffed with cotton wool. Push in so much that a really first-class "middle-age bulge" decorates the long slit (Fig. 1b). Cover this with netting, preferably made of nylon, plastic, or similar water-resistant material (to keep evaporation to a minimum). I use a plastic netting that is sold by the roll in Finland and Sweden for making mosquito-screens. It is of the colour which Mad Magazine would describe with relish as "Yechhh-green", but if it is available in the UK, I should lay in a stock as it is also excellent for outdoor cages and will baffle the neighbour's cat. The mosquito netting sold by butterfly dealers is a good substitute and has the advantage that, being black, the eggs that inevitably get laid on the "juice pods" show up clearly on it.

Using a generous overlap, glue the netting in place with Bostik or similar, such that the cotton wool is pushed down flat into the "pod". Wetting the cotton wool enables a much larger quantity to be forced inside, but the Bostik will turn milky before it sets, though this seems neither to affect its tenacity unduly nor to put the butterflies off.

Wire wrapped round each end enables the "pods" to be hung horizontally from small picture hooks (Fig. 1c) screwed into the top strut of a cage. A single wire enables the pod to hang vertically.

"Juice pods" are best affixed mainly to that side of the cage which is going to face the afternoon sunlight. In a large cage one or two may be placed loose on the floor to revitalise that which is tottering about on its last legs. With the opening uppermost a "pod" will naturally dry out a little more quickly than normal. In Figure 1d small "legs" have been left on the stiff polythene at the ends to prevent the "pod" from rolling over.

I load my own "juice pods" with a weak solution of Finnish syrup. This is made so dilute that it just has a perceptible yellowish tone when compared to ordinary water. Honey can also be used. Ordinary sugar solution is satisfactory, though my wife informs me it has not the bug-boosting vitamin content of Finnish treacle. In practice I found that charging with the energy-rich fluid was only necessary about once in three weeks, pure water being used for the rest of the time, to keep the cotton wool damp.

I shoot or inject solution (with the accuracy born of long practice) into the cotton wool by means of a plastic hypodermic syringe that more than lasts a busy season. With the vertical "pod" there is a danger of sticky drops accumulating on the floor of the cage and losing their water during the day by evaporation. The resulting sticky globule has the tenacious properties of a sundew plant leaf and can turn into a death trap for small butterflies. To prevent this happening, I place a small square of tissue or wad of cotton wool under the dripping pod and the former dries out within an hour or two. On occasion, it even gets used, by the nifty, as a temporary food source!

Used in a greenhouse and closed porch, the "juice pod" is the best feeding device I have ever used. Blues, Browns, Brimstones, Commas and other butterflies have taken to the method, and I have had as many as four Camberwell beauties imbibing together from a six-inch "pod".

The record, however, is held by a couple of Green hairstreaks. They liked the system so much they stayed with me for over five weeks, during which time their only source of nourishment was fluid from a set of "juice pods".

Leigh Plester (2968)

ALL IN A SUMMER'S DAY

August 20th turned out warm and sunny. In a month of unpredictable weather this was a day to seize upon, and I was glad to be able to use it to visit an area of Gloucestershire that I had known for many years. It is in a district that has, invariably, produced a good range and quality of wild life. Butterfly populations here manage to survive the pressures that have, in so many places, decimated them. A trip to observe their fortunes is, therefore, usually rewarding, and it was particularly so on this occasion.

The area comprises grassland and woodland and contains typical plants associated with oolitic limestone. One part, of about twenty acres, is so situated that it is favoured by aspect and by a mixture of both habitats. It was here that I spent the day.

The most abundant species was the Chalkhill blue (*Lysandra coridon* Poda) at its north westerly limits in this country. The Common blue (*Polyommatus icarus* Rott.) consorted with it and some of the brighter males raised hopes of seeing the Adonis blue. It used to occur here in the 60's and the habitat is not noticeably altered. Certainly the Horseshoe vetch (*Hippocrepis comosa*) is widespread and flourishing, and *coridon* is as numerous as ever it was.

Anthills, with vestigial mats of thyme, suggest a former home of the Large blue, and, with its Gloucestershire sites not too distant this may not be fanciful conjecture. One Small blue (*Cupido minimus* L.) patrolled a few yards of Kidney Vetch reminding me of the larger numbers flying here earlier in the year, then in company with the Duke of Burgundy Fritillary (*Hamearis lucina* L.). The Holly Blue (*Celastrina argiolus* L.) also appears at that time but I was not to see a second brood specimen this August day.

The Brown argus (*Aricia agestis* Schiff.) and a tattered Dark green fritillary (*Argynnis aglaia* L.) represented other regular species of these limestone grasslands. A sprinkling of Small tortoiseshells (*Aglais urticae* L.) sought the thistles—of which five species grow here—and the three Whites (*Pieris brassicae* L., *P. rapae* L. and *P. napi* L.) appeared from time to time. Only once did one of them turn out to be a belated Marbled

white (*Melanargia galathea* L.). Among the blues an occasional flash of burnished flame exposed the Small copper (*Lycaena phlaeas* L.) harrying interlopers in its territory. The colour of this species like that of the flowers upon which it settled, seems to gain especial lustre, possibly from the calcium which nourishes the whole clean landscape.

Less determined in its way the Small heath (*Coenonympha pamphilus* L.) elected to dine or sunbathe, occasionally soaring in competition with an argus or blue; and, uncertain whether they should linger or hasten, the Meadow browns (*Maniola jurtina* L.) added their size to the scene.

Jostling with the burnets on the heads of Scabious (*Scabiosa columbaria* L.) were Small skippers (*Thymelicus sylvestris* Poda.), and, on approaching the woodlands, Speckled woods (*Pararge aegeria* L.) put in an appearance. Walking into the woods I came to a few acres which had, two years earlier, been clear felled. The regenerating herbage was a butterfly's larder, dominated by Nodding thistle (*Carduus nutans*), Spear thistle (*C. lanceolatus*), Marsh thistle (*C. palustris*), Hemp agrimony (*Eupatorium cannabinum*), Burdock (*Arctium pubens*), Valerian (*Valeriana officianalis*), Scabious (*Scabiosa columbaria*) and Fleabane (*Pulicaria dysenterica*). Silver-washed fritillaries (*Argynnis paphia* L.), Commas (*Polygonia c-album* L.), Peacocks (*Inachis io* L.), and Brimstones (*Gonepteryx rhamni* L.) all enjoyed this haven. I did too as I watched and photographed this abundance of grace and colour. Nineteen different species had come my way and I felt thankful. I had not, however, seen a Wall, Gatekeeper, Large skipper, Red admiral or Painted Lady all of which I had seen here at this time in other years. But I was to have a compensation, for, as I stalked the Silver-washed fritillaries with my camera, there lazily sunning itself was a *valezina* form of the female. So was confirmed the continuation of this colour form in Gloucestershire as South had recorded so long ago.

T. E. C. Parker (4001)

AN UNWELCOME VISITOR

Living in a house which has a liberal build-up of Sparrow's nests in the air vents, I have become used to finding the wandering adult Museum Beetle, *Anthrenus museorum* L., and worse still the little hairy larvae eroding one of my cabinet specimens, invariably the most important one in that drawer. How they get in there through the framed lid and the barrier of flaked naphthalene is always a mystery but they do manage it. This autumn I was catching up with the setting of some material taken in 1973 in Greece, some huge Locusts, when I noticed some large larval skins which had the hairy appearance of *Anthrenus* but were much larger, tapered from a broad head towards the pointed tail, a typical Dermestid larval skin. The shaking of the bodies of the Locusts produced

a beetle which I did not recognise. Mr. L. Christie has kindly identified it for me as *Megatoma undata* L. which is the only representative of the genus in Britain, a Dermestid which is recorded by Hinton as occurring occasionally in houses, while Fowler records it on skins and furs and in nests and burrows in the larval stages while the adults occur on flowers in spring and early summer. It is not figured in Linssen who only mentions the Genus but there is a good picture in L. Auber's *Atlas des Coleopteres De France* and it would appear that it is a scarce beetle in this country. I have found since the larvae had devoured the bodies of several of the papered Greek lepidoptera in the same container as the Locusts—let us hope it remains an unusual beetle.

P. W. Cribb (2270)

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A TRIP TO BOLIVIA, 1971

Bolivia is the poorest country in the world according to the latest F.A.O. statistics, but it presents the naturalist with a wealth of interest. Side by side are the densest of jungles, soaring snow capped peaks, deserts and limitless savannas. For the lepidopterist each of these areas could provide a lifetime's work but only two people, to my knowledge, are at present collecting there in the field. The first is Mr. Franz Steinbach of Cochabamba, who has three assistants in the field collecting bugs to be sent to about seven museums in the States, France and Germany. The second active collector was the daughter of the British Ambassador but a change of post has curtailed her activities.

The Jungle

Of the regions of Bolivia, the more immediately rewarding for the lepidopterist is the jungle, more accessible from La Paz and Cochabamba. The mountains of the Eastern Cordillera Real of the Andes fall abruptly to a few hundred metres. Forest cloaked in perpetual mists (the Ceja de Montaña) slowly give way to true rain forest at around 1,000 metres. The roads are primitive and strewn with puddles and there I first glimpsed some of the most beautiful butterflies in the world. The flashing blue of the *Morphos* was a rare sight but *Heliconids*, *Pierids*, *Nymphalids* and the iridescent green, blue and red *Catagrammas* were abundant and arose in clouds as the jeep splashed through the puddles. My favourite was a flashing green bug that successfully survived my numerous attempts to catch it. In fact, I felt guilty even contemplating netting them but my guilt was assuaged somewhat as I found that most flew at such a speed that I seriously contemplated catching them from the jeep window.

The Altiplano

Although the jungle covers half of Bolivia, the country is most noted for its highlands that roll up to the world's highest navigable lake—Titicaca. The contrast in the vegetation could not be greater and not surprisingly the difference stretches to the insects. I saw no insects at all for several weeks except the occasional white butterfly but patience was rewarded. Although not common around the lake, clouded yellows were sometimes seen flying, apparently in a determined fashion. These species were collected, two of the *croceus* type whilst the third, collected south of the Lake, resembled an underfed *phicomene*. On the higher slopes of the Eastern Cordillera, *Erebias* were numerous and were collected also around the Lake and intermittently northwards near Cuzco and La Oroya, W. Peru. A small fritillary was seen but not collected at Caquiaviri just south of the Lake. Otherwise the only insects seen were whites and insignificant blue butterflies.

The interest of the Altiplano is thus apparent. Nearly all the butterflies are Northern hemisphere species. How have they invaded South America? Most probably they migrated south down the Central American mountain chain and into the Andes in the "Ice Age" and have subsequently been cut off as the climate warmed up.

Minor Regions

As the Andes broaden out in Central Bolivia the puna vegetation of the Altiplano gives way to *scrub desert*, often cactus covered, but occasionally quite devoid of plant cover. To the east of Cochabamba the mountains fall gradually until they flatten out into a plain near Santa Cruz de la Sierra. The climate is hot and wet and supports quite dense woodland known as *chaco*. The butterflies are more jungle species than mountain ones but one species of *Gonopteryx* was particularly common flying along the hedgerows.

Further south, the desert scrub around Tarija gives way surprisingly to woodland—the Selva Boliviana-Tucumana. Butterflies flourish here as well as trees and the roadside streams are adorned by the jewel-like Nymphalids. Whites, browns and yellows were common and this pedestrian company was enlivened by the occasional *Papilio*. Overall, there seemed to be less variety of species here but quantity if not quality.

Peru

A few butterflies were caught in Peru. The vegetation zones in Peru are somewhat similar to those in Bolivia. The Cuzco-Puno road runs across the Altiplano. Macchu Picchu lies in the lower Unibamba Valley. Isolated on a hillside above the river, the jungle creeps up to the base of the Inca ruins. Unfortunately when I was there the weather was poor and the *Morphos* which are here did not grace us with their impressive presence.

NOTES ON BRAZILIAN BUTTERFLIES

Papilio lycophron, Hubn.

The habitat of this yellow and coffee-black swallowtail is South-eastern and Central Brazil. It is not very common.

Personally, I have met with *P. lycophron* only in the highlands of Minas Gerais, at altitudes of 2,600 to 4,600 feet. It is a lazy flyer—when not alarmed—and usually keeps near the tops of low bushes, only rising above 15 feet to hover about the yellow flowers of Mimosaceae and the pink blossoms of tall “paineira” or “silk-cotton” trees (*Bombaceae*), during February and March when these trees are in bloom. I have also seen *P. lycophron* in the company of a motly lot of Pierids, Nymphalids and Lycaenids, enjoying the well-trodden, rather malodorous mud on the approaches to fording places used by cattle and horses, in the Serra de Macda region of Minas Gerais.

There are said to be two female forms of this butterfly—both of them black, or blackish. But I have come across only one of these forms, and then only very rarely. This female is predominantly black or coffee-black. On each forewing it has seven spots, ivory in colour, close to the outer margin, and these spots are not present on the male. The female completely lacks the broad yellow-band, very conspicuous in the male, stretching from near the apex of the forewing to the inner margin of the hindwing. In both sexes the hindwings are adorned with six or seven lunar spots, yellow in the male, ivory in the female. In the female, these lunar marks are “ghosted” by faint bluish-grey shadows, which are absent in the male. Both sexes have a small red patch at the anal angle, have similarly shaped tails, and a similar general shape and size, with a wing span of $3\frac{1}{2}$ inches. In attempts to get “black” females, I have at various times, from 1960 to 1970, collected many larvae on their natural food plant (*Balfourodendron riedelienum*), popularly known as “Tres folhas”, a plant related to Citrus. Although I have sometimes reared these caterpillars on orange leaves (*Citrus aurantium*), for convenience—on which they thrived—I have never found them in their natural state on any other plant but “Tres folhas”.

However, of many butterflies thus reared I have never obtained a single “black” female, which I feel sure must be a rarity. The few female specimens (of the form described) that I have come across, were in, or in the vicinity of, thickly wooded country, whereas I have found the male *P. lycophron* only in fairly open or sparsely wooded terrain.

Anaea rhyphaea, Hubn.

In sheltered glens where fallen leaves cover the ground during the dry period between the rainy seasons, when the foliage on the trees is semi-dry, *Anaea rhyphaea* may usually be discovered.

On being disturbed it takes off at speed from its resting place, its ruby-tinted forewings flashing with a purple sheen as it cuts through the

scattered sun-rays. The forewings are marked with rusty-black at the apices and outer margins. The duller, darker red hindwings, with a slight violet iridescence, terminate, each with a short spiky tail. The female, rather more drab, has a wing-span of $2\frac{1}{4}$ inches; the male, 2 inches. *A. rhyphaea* inhabits many parts of Brazil from the south-east to the north-east, and is popularly known as Barbaleta Rubi—The Ruby Butterfly.

The realistic dead-leaf appearance of its closed wings camouflages it quite effectively when in repose, its rusty-hued outer side with pale pepper dusting, making it almost indiscernible—whether on the mosaic of the forest floor, blotchy bough, or tree-trunk—or amongst the leaves.

But—strangely enough—I have seen *A. rhyphaea* on the evergreen Avelos (*Euphorbia terucalli*, L.) in the arid interior regions of Alagôas, Pernambuco and Paraiba. The foliage of this plant consists of densely tangled smooth green twigs, tipped with a few tiny green leaves.

Since the dead-leaf camouflage of *A. rhyphaea* only makes it more conspicuous on such a plant, it seems that it relies for protection on the crowded twigs, or on the caustic properties of the “milk” of this Euphorbaceae to keep birds and lizards at a distance. (Avelos thrives in arid regions, and in north-eastern Brazil is planted to form “live” fences along the railways. Its dense tangled growth and the copious “milk” exuded by its twigs, when damaged, keep cattle and other animals off the lines).

A. rhyphaea is built for powerful flight as its shape and sturdy body indicate. It flies usually at a height of about 12 feet.

Other species of *Anaea*, their colouring excepted, do not differ much from *A. rhyphaea*, all having a general characteristic likeness to a dead leaf. All *Anaea* have similar habits and fly in the same rapid manner. They enjoy the same general terrain, but tend to frequent areas where the shades of foliage more nearly match their own colouring.

On the poisonous evergreen Avelos, however, I have never seen any *Anaea* other than *rhyphaea*.

Megalura chiron, Fabr.

Not brightly coloured, *M. chiron* is nevertheless quite striking in appearance, with black stripes sandwiched between yellow-brown ones stretching downwards over both wings. The hindwings are yellow-brown, predominantly, the forewings mainly black. The hindwings terminate, each in a long brown daggertail, white-tipped. The antennae are black, the eyes pale green.

This is a medium sized butterfly— $2\frac{3}{4}$ inch span, with hardly any difference in the size of male and female. *M. chiron* is not easily captured in flight because of its habit of darting about at abruptly changing heights, from the ground to, sometimes, 20 feet; and when at rest on the ground, sucking moisture, it is extremely alert, and may be approached only with the utmost caution.

M. chiron seems to have a great fondness for lime. On or near sites where reinforced-concrete bridges or other concrete structures are being built, where water dripping from the shuttering or draining away from the concrete-mixers tends to impregnate the soil with lime, I have sometimes seen as many as half a dozen on the wet ground sucking moisture. On such occasions they are often accompanied by various Pieridae, one or two *Coedaenis julia*, *Callicore meredionalis*, and other small butterflies—all grouped in a small area of 12 or 15 square feet. At times there are other similar groups 25 to 30 feet apart, with never a solitary butterfly in between these groups (I don't know why!).

M. chiron is usually found near water, on wet sandy ground, in open terrain, and on the edges of streams fringed with low bushes, on which it likes to display itself in the sun.

I have come across this butterfly on tidal swamp-land, and hills in Alagôas, Pernambuco and Paraíba, and at altitudes up to 3,500 feet in the highlands of Minas Gerais.

Megalura peleus, Sulz.

Rather a high flyer, but slow, and inclined to settle frequently, this species of *Megalura* can be captured fairly easily. It prefers to settle on leaves rather than on the ground or on branches of trees, and is particularly fond of an evergreen creeping plant (related to *Ficus*, I believe), which is very common in Recife and Rio, where it covers walls in much the same way as ivy in Britain. The caterpillars feed on this plant and on various species of *Ficus*. The butterfly likes most garden flowers, but especially *Cosmos*.

M. peleus has a wing-span of $2\frac{3}{4}$ inches, and its bizarre shape and agreeable colouring continue to make this butterfly very popular with collectors. It is flame-coloured, with three slim brown stripes stretching diagonally over the upper and lower wings, and the wings are strongly indented on their outer margins. The costal margin of the forewing is edged with brown. It sweeps round at the apex to form a hook. The hind wing is double-tailed, the tail at the anal angle being short and wide, the other long and slender. Both tails and the outer margin of the hindwing are brown.

The fact that the tails are very easily damaged—(especially the longer one)—during capture, or are often missing, having been nipped off by a bird or lizard, cause this butterfly to be rather uncommon in collections. *Cocytius antaeus*, Dru.

I have come across this hawkmoth in Paraíba, Pernambuco, Alagôas, Minas Gerais and Gaios, at various altitudes, from just above sea level up to 4,500 feet. It ranges over most of Brazil, always in districts where the Custard-apple (*Anona squamosa*) and other *Anonaceae*—wild or cultivated—flourish.

C. antaeus is robustly built and spans $4\frac{1}{2}$ to $4\frac{3}{4}$ inches. Therefore, as may be expected, the larvae are big, having a length at the final instar

before pupation, of some 5 inches. These large dark-green caterpillars, however, do not cause heavy damage to their food-trees, as there are seldom many of them on the same tree. Blending, as their colouring does, with the foliage, the simplest way to locate them is to search for their droppings. On bare, smooth ground, this is fairly easy; on rough, grassy or gritty ground, however, the pellets are not immediately obvious.

The pupae may be found among the dead leaves on the ground and around the base of the food-tree, if the soil is loose; or amongst the roots of nearby plants and tussocks of grass.

C. antaeus has an exceptionally long proboscis, which in the pupal stage is encased in a curved sheath outside the main body of the chrysalis (which in general appearance is not unlike the pupa of *Herse convolvuli* L.).

The adult moth is seen most frequently during the periods immediately following the seasons of heavy rains. (These seasons are not the same all over Brazil; for example, in Recife, Pernambuco, the rainy season is from March to June, while at Belo Horizonte, Minas Gerais it is from November to March,—to mention only two States). It is not uncommon, and may be seen at night revolving swiftly around the powerful lights of airports, filling-stations and brightly illuminated streets; and, together with other moths, large and small, it may be found in the early morning, asleep on lamp posts and convenient walls below these lights.

Caligo eurylochus, Cr.

This magnificent six-inch span-Brassolid is popularly and aptly nicknamed "Coriya", or owl, because of the ocellar spots on the undersides of its hindwings. These markings, together with the body, and general colouring of the butterfly, simulate the eyes, beak and face of an owl.

The undersides of various other species of *Caligo* resemble *C. eurylochus* in this respect.

C. eurylochus is common in the North and North-East, especially in Pernambuco. During most of the day it likes to rest on a banana-tree stem, sugar-cane stalk or tree-trunk, or to suck the gummy sap which exudes from Sapoti, mango, jackfruit, and breadfruit trees, and the juices of rotting fruits.

Normally, it never takes to flight in open sunlight unless aroused from its resting place or when feeding. But in the after-sundown twilight it appears flitting along the borders of forests, banana groves and sugar-cane plantations, or along the clearings afforded by pathways and irrigation ditches through such areas.

Unless hunted in such comparatively open places before it gets too dark, or when settled, *C. eurylochus* is very difficult to capture. On the wing, especially after being disturbed, its movements are most evasive and it usually dodges rapidly into dense foliage of canefields or forest.

Various species of banana are the foodplants of the caterpillar.

Terence C. Hanson (5242)

A LIST OF THE FOOD-PLANTS OF EAST AFRICAN MACROLEPIDOPTERA

PART 1—BUTTERFLIES (RHOPALOCERA)

Some time ago Mr. D. S. Fletcher, of the British Museum (Natural History), suggested that it might be useful and interesting to compile a list of the foodplants of East African Lepidoptera, drawing it up in two parts—an entomological list of species and the plants on which they feed, and a botanical list of species with the insects that feed on them. The present paper is the first in the series as a result of his suggestion and brings together for the first time all that is known of the food preferences of a large number of African species in which more and more interest is being shown.

The information gathered is the result of my own rearing experiences over a period of fifty years; the extraction of information from a large number of separates; the consultation of the principle books mentioning East African Lepidoptera (listed in the references at the end of this series); additionally I have drawn on a long typewritten list prepared by Dr. V. G. L. van Someren for Erlich & Raven's paper *Butterflies and Plants, A Study in Coevolution* (Evolution, 1965) as well as much information both written and verbal from many entomological friends. In many instances it will be noted that only the genus of the foodplant is given. This is due to the extreme difficulty, indeed at times impossibility, of running down to species many of the very similar members of some plant genera that occur in East Africa. In most cases I believe it will be found that the caterpillars will accept many species of a genus. It would be most surprising, however, if there were not exceptions, both of caterpillars being choosy as to species, and of the aberrant plant species in a genus which, for one reason or another, is unpalatable to caterpillars; indeed may even be poisonous.

I would like to emphasise that this is a factual list, I have only commented when something seems unusual, and nothing more, and I leave it to others better versed in plant chemistry to draw the almost inevitably, controversial conclusions.

PAPILIONIDAE

- Papilio dardanus* Brown—Xymalos (Monimaceae): Calodendron, Citrus, Clausena, Fagara, Teclea, Toddalia, Vepris (Rutaceae).
 ,, *phorcas* Cr.
 ,, *mackinmoni* Sharpe
 ,, *lormieri* Dist.
 ,, *ophidicephalus* Ob.
 ,, *rex* Ob. Calodendron, Citrus, Clausena,
 ,, *constantinus* Ward Fagara, Teclea, Toddalia (Ruta-
 ,, *bromius* Dbl. ceae).

- „ *magda* Giff.
 „ *teita* v. Som.
 „ *jacksoni* Sharpe
 „ *echerioides* Trim.
 „ *homeyeri* Plotz
 „ *cynorta* F.
 „ *nireus* L.—*Calodendron*, *Citrus*, *Clausena*, *Fagara*, *Teclea*,
Toddalia, *Vepris* (Rutaceae).
 „ *demodocus* Esp.—*Pseudospondias microcarpa* (Anacardiaceae) : *Ptaeroxylon* (Meliaceae) : *Calodendron*, *Citrus*,
Clausena, *Fagara*, *Teclea*, *Toddalia*, *Vepris* (Rutaceae) : *Hippobromus* (Sapindaceae) : *Bubon*, *Gummifer* (Umbelliferae).
 „ *almansor* Honrath—*Pseudospondias microcarpa* (Anacardiaceae).
 „ *hesperus* Westw.—*Tylestemon ugandensis* (Lauraceae).
 „ *nobilis* Rog.—*Warburgia ugandensis* (Canellaceae).
 „ *antheus* Cr.—*Anona*, *Artobotrys*, *Uvaria* (Anonaceae) : *Landolphia* (Apocynaceae).
 „ *leonidas* F.—*Anona*, *Popowia*, *Uvaria* (Anonaceae) : *Landolphia* (Apocynaceae).
 „ *angolanus* Goeze—*Anona*, *Uvaria* (Anonaceae) : *Landolphia* (Apocynaceae) : *Sphedamnocarpus* (Malpighiaceae).
 „ *policenes* Cr.—*Anona*, *Artobotrys*, *Uvaria* (Anonaceae).
 „ *philonoe* Ward
 „ *sisenna* Mab.
 „ *porthaon* Hew. *Anona*, *Uvaria* (Anonaceae).
 „ *colonna* Ward
 „ *kirbyi* Hew.

PIERIDAE

Pierinae

- Appias epaphia* Cr.—*Boscia*, *Capparis*, *Maerua*, *Ritchiea* (Capparidaceae).
 „ *sabina* Feld.—*Boscia*, *Ritchiea* (Capparidaceae) : *Drypetes*, *Phyllanthus* (Euphorbiaceae).
 „ *lasti* Gr. Sm. — *Capparis*, *Maerua* (Capparidaceae) : *Drypetes*, *Phyllanthus* (Euphorbiaceae).
 „ *sylvia* F.—*Drypetes*, *Phyllanthus* (Euphorbiaceae).

(N.B. Le Pelley gives *Appias rhodope* F.—*Ritchiea albersii* (Capparidaceae), but this is evidently a misidentification as *rhodope* is a *Loranthus*-feeding *Mylothris*).

Belenois raffrayi Ob.—*Rhus* (Anacardiaceae).

- „ *zochalia* Bsd.—*Capparis*, *Maerua*, *Ritchiea* (Capparidaceae) : *Brassica rapa* (Cruciferae) : *Salvadora persica* (Salvadoraceae).

- „ *margaritacea* Sharpe
 „ *victoria* Dixey
 „ *calypso* Drury Capparis, Maerua, Ritchiea (Capparidaceae).
 „ *subeida* Feld.
 „ *solilucis* Btlr.
 „ *thysa* Hpffr.—Maerua, Ritchiea (Capparidaceae).
Anapheis gidica Godt.—Boscia, Capparis, Maerua (Capparidaceae).
 „ *creona* Cr.—Capparis, Cleome, Boscia, Maerua (Capparidaceae).
 „ *aurota* F.—Capparis, Maerua, Ritchiea (Capparidaceae) :
 Solanum tuberosum (Solanaceae). This last seems doubtful.
Dixeia pigea Bsd.
 „ *doxo* Godt.
 „ *orbona* Geyer Capparis (Capparidaceae).
 „ *spilleri* Spiller
Mylothris chloris F.—Loranthus, Viscum (Loranthaceae) : *Osyris abyssinica* (Santalaceae).
 „ *yulei* Btlr.—*Hevea brasiliensis* (Euphorbiaceae) : *Loranthus* (Loranthaceae) : *Theobroma cacao* (Sterculiaceae).
 „ *sagala* Gr. Sm.
 „ *ruandana* Str.
 „ *tirikensis* Neave
 „ *poppea* Cr.
 „ *somereni* Talb. Loranthus (Loranthaceae).
 „ *sulphurea* Auriv.
 „ *ochracea* Auriv.
 „ *similis* Lathy
 „ *bernice* Hew.—*Polygonum barbatum* (Polygonaceae).
Leptosia marginea Mab.
 „ *wigginsii* Dixey
 „ *hybrida* Bern.
 „ *pseudonuptilla* Bern. Capparis (Capparidaceae).
 „ *alcesta* Stoll.
 „ *nupta* Btlr.
 „ *immaculata* Auriv.
Pontia helice L.—*Alyssum*, *Brassica juncea*, *Erucastrum abyssinicum*, *Lepideum*, *Sisymbrium* (Cruciferae) : *Caylusea abyssinica* (Resedaceae) : *Solanum tuberosum* (Solanaceae). The last seems doubtful.
 „ *glaucanome* Klug—*Erucastrum abyssinicum* (Cruciferae).
Pinacopteryx eriphia Godt.—*Boscia*, *Cadaba*, *Capparis*, *Maerua* (Capparidaceae).

Teracolinae

- Colotis hetaera* Gerst.
 „ *regina* Trim.
 „ *ione* Godt.
 „ *elgonensis* Sharpe
 „ *antevippe* Bsd.
 „ *evenina* Willgrn. Boscia, Capparis, Maerua, Ritchiea
 „ *aurigeneus* Btlr. (Capparidaceae).
 „ *pallene* Hpffr.
 „ *venosus* Staud.
 „ *halimede* Klug.
 „ *celimene* Luc.
 „ *pleione* Klug
 „ *hildebrandti* Staud.—Cadaba (Capparidaceae).
 „ *eris* Klug—Boscia, Capparis, Maerua, Ritchiea (Capparidaceae). Pinhey states 'Dwarf Bamboo in captivity' but I am sure that this is wrong.
 „ *vesta* Reiche—Boscia, Capparis, Maerua, Ritchiea (Capparidaceae) : *Salvadora persica* (Salvadoraceae).
 „ *auxo* Luc.—Boscia, Cadaba, Capparis, Maerua, Ritchiea (Capparidaceae) : *Salvadora persica* (Salvadoraceae).
 „ *eucharis* F.
 „ *danae* F. Boscia, Cadaba, Capparis, Maerua,
 „ *evagore* Klug Ritchiea (Capparidaceae).
 „ *evippe* L.—Maerua (Capparidaceae).
 „ *phisadia* Godt. *Salvadora persica* (Salvadoraceae).
 „ *calais* Cr.

- Nepheronia thalassina* Bsd.—*Hippocratea obtusifolia* (Hippocrataceae).
 „ *argia* F.—*Ritchiea* (Capparidaceae) : *Hippocratea obtusifolia* (Hippocrataceae) : *Cassipourea* (Rhizophoraceae).
 „ *buqueti* Bsd.—*Azima*, *Salvadora persica* (Salvadoraceae).
Eronia cleodora Bsd. Capparis (Capparidaceae) : *Salvadora persica*
 „ *leda* Bsd. (Salvadoraceae).

Coliadinae

- Colias electo* L.—*Cassia* (Caesalpiniaceae) : *Ricinus communis* (Euphorbiaceae) : *Medicago*, *Phaseolus*, *Sesbania* (Papilionaceae). *Ricinus* seems doubtful.
Catopsilia florella F.—*Cassia* (Caesalpiniaceae) : *Gossypium* (Malvaceae) : *Sesbania* (Papilionaceae). *Gossypium* seems doubtful.
Eurema brigitta Cr.—*Cassia* (Caesalpiniaceae) : *Hypericum* (Hypericaceae) : *Acacia*, *Albizzia* (Mimosaceae).
 „ *hecabe* L.—*Cassia* (Caesalpiniaceae) : *Hypericum* (Hypericaceae) : *Albizzia*, *Entada abyssinica*, *Parkia filicoides*.

- Dichrostachys glomerata* (Mimosaceae) : *Aeschynomene*,
Lespedeza, *Sesbania* (Papilionaceae).
 „ *desjardinsi* Bsd.—*Cassia* (Caesalpiniaceae) : *Sesbania* (Papilionaceae).

DANAIDAE

- Danaus limniace* Cr.—*Daemia*, *Hoya*, *Pergularia* (Asclepiadaceae).
 „ *chrysippus* L.—*Asclepias*, *Calotropis*, *Caralluma*, *Ceropegia*,
Cynanchum, *Gomphocarpus*, *Huernia*, *Kanaria*, *Pergularia*,
Periploca, *Schizoglossum*, *Secamone*, *Stapelia* (Asclepiadaceae). Pinhey adds *Rosa* (Rosaceae) and *Antirrhinum* (Scrophulariaceae) but these are almost certainly wrong. *Antirrhinum* may be a copying error for *Pentarrhinum* (Asclepiadaceae), which is possible.
 „ *formosa* Godm.—*Cryptolepis*, *Periploca*, *Secamone* (Asclepiadaceae).
Anauris ansorgei Sharpe
 „ *niavius* L.
 „ *ochlea* Bsd. *Cynanchum*, *Gymnema*, *Marsdenia*,
 „ *echeria* Stoll. *Secamone*, *Tylophora* (Asclepiadaceae).
 „ *albimaculata* Btlr.
 „ *lobengula* Sharpe
 „ *oscarus* Thur.

ACRAEIDAE

- Bematistes aganice* Hew.—*Adenia*, *Passiflora*, *Tryphostemma* (Passifloraceae).
 „ *quadricolor* Rog.—*Adenia* (Passifloraceae).
 „ *poggei* Dew. *Vitis* (Ampelidaceae) : *Adenia* (Passifloraceae).
 „ *tellus* Auriv. floraceae).
Acraea rabbaiae Ward—*Adenia*, *Tryphostemma* (Passifloraceae).
 „ *pentapolis* Ward—*Myrianthus arboreus*, *Musanga smithii* (Moraceae) : *Boehmeria nivea* (Urticaceae).
 „ *vesperalis* G. Sm.—*Myrianthus arboreus* (Moraceae).
 „ *cerasa* Hew.—*Rawsonia* (Flacourtiaceae) : *Rinorea* (Violaceae).
 „ *quirina* F. *Rinorea* (Violaceae).
 „ *admatha* Hew.
 „ *terpsichore* L.—*Passiflora*, *Tryphostemma* (Passifloraceae).
 „ *zetes* L.—*Barleria* (Acanthaceae) : *Hydnocarpus* (Flacourtiaceae) : *Passiflora*, *Tacsonia*, *Tryphostemma* (Passifloraceae).
 „ *insignis* Dist.—*Vitis* (Ampelidaceae) : *Gossypium* (Malvaceae) : *Adenia* (Passifloraceae) : *Thea sinensis* (Theaceae).
 „ *anemosa* Hew.—*Vitis* (Ampelidaceae) : Grasses (Gramineae) : *Modecca* (Passifloraceae).

- „ *egina* Cr.
 „ *caecilia* F.
 „ *doubledayi* Guer. *Adenia* (Passifloraceae).
 „ *sykesi* Sharpe
 „ *melanoxantha* Sharpe
 „ *perenna* Dbl.—*Bridelia micrantha* (Euphorbiaceae) : *Adenia*
 (Passifloraceae).
 „ *acrita* Hew.—*Adenia*, *Passiflora* (Passifloraceae).
 „ *caldarena* Hew.—*Adenia* (Passifloraceae) : *Wormskioldia*
 (Turneraceae).
 „ *braesia* Godm. *Vernonia* (Compositae).
 „ *oncaea* Hpffr.—*Vitis* (Ampelidaceae) : *Oncoba* (Flacourtiaceae) : *Adenia* (Passifloraceae) : *Wormskioldia* (Turneraceae).
 „ *equatorialis* Neave—*Passiflora* (Passifloraceae).
 „ *natalica* Bsd.—*Vitis* (Ampelidaceae) : *Adenia*, *Ophiocaulon*,
 Passiflora (Passifloraceae) : *Wormskioldia* (Turneraceae).
 „ *asboloplintha* Karsch—*Vitis* (Ampelidaceae) : *Adenia*, *Passiflora* (Passifloraceae).
 „ *anacreon* Trim.—*Aeschynomene* (Papilionaceae) : *Adenia* (Passifloraceae) : *Wormskioldia* (Turneraceae).
 „ *rahira* Bsd.—*Erigeron* (Compositae) : *Polygonum* (Polygonaceae).
 „ *wigginsii* Neave
 „ *ventura* Hew. *Cassia* (Caesalpiniaceae).
 „ *encedon* L.—*Commelina* (Commelinaceae) : *Ocimum canum* (Labiatae) : *Pseudarthria* (Papilionaceae).
 „ *excelsior* Sharpe
 „ *sotikensis* Sharpe *Triumfetta* (Tiliaceae).
 „ *uvui* Gr. Sm. *Triumfetta* (Tiliaceae). In an earlier work
 „ *bonasia* F van Someren included *Hibiscus* (Malvaceae) but omits it in his latest list.
 „ *cabira* Hpffr. ceae)
 „ *eponina* Cr.—*Hibiscus* (Malvaceae) : *Nicotiana tabacum* (Solanaceae) : *Hermannia* (Sterculiaceae) : *Triumfetta* (Tiliaceae).
 „ *acerata* Hew.—*Ipomoea batatas*, *I. repens* (Convolvulaceae) : *Zea mays* (Gramineae). In an earlier work van Someren included *Solanum* (Solanaceae), but omits it in his latest list.
 „ *pharsalus* Ward—*Ficus* (Moraceae).
 „ *oreas* Sharpe—*Morus* (Moraceae) : *Urera* (Urticaceae).
 „ *orestia* Hew.—*Fleurya* (Urticaceae).
 „ *penelos* Ward
 „ *quirinalis* Gr. Sm.
 „ *amicitiae* Heron

- .. *ansorgei* Gr. Sm. Ureia (Urticaceae).
 .. *disjuncta* Gr. Sm.
 .. *alcippoides* Jord.
 .. *penelope* Staud.
 .. *jodutta* F.—Boehmeria nivea, Pouzolzia (Urticaceae).
 .. *lycoa* Godt.—Pouzolzia (Urticaceae).
 .. *esebria* Hew.—Boehmeria nivea, Fleurya, Pouzolzia (Urticaceae).
 .. *johnstoni* Godm.—Fleurya, Pouzolzia (Urticaceae).
 .. *rangatana* Eltr.—Nesaea, Rotala (Lythraceae) : Alchemilla gracilipes (Rosaceae).

NYMPHALIDAE

Charaxidinae

Euxanthe trajanus Ward

- .. *tiberius* Gr. Sm.
 .. *eurinome* Cr. Deinbollia, Phialodiscus (Sapindaceae).
 .. *crossleyi* Ward
 .. *wakefieldi* Ward—Deinbollia (Sapindaceae).

- Charaxes varanes* Cr.—Rhus (Anacardiaceae) : Allophylus, Cardiospermum, Schmidelia (Sapindaceae).
 .. *fulvescens* Auriv.—Allophylus (Sapindaceae).
 .. *acuminatus* Thur.—Bersama (Melianthaceae) : Allophylus (Sapindaceae).
 .. *candiope* Godt.—Croton (Euphorbiaceae). Pinhey also gives Pennisetum (Gramineae), which seems unlikely.
 .. *protoclea* Feisth.—Afzelia (Caesalpiniaceae) : Syzygium (Myrtaceae).
 .. *lasti* Gr. Sm.—Julbernardia, Macrolobium (Caesalpiniaceae).
 .. *boueti* Feisth.—Arundinaria alpinus, Oxytenanthera abyssinica, O. brounii (Gramineae).
 .. *lucretius* Cr.—Anona (Anonaceae) : Hugonia platysepala (Linaceae).
 .. *lactetinctus* Karsch—Syzygium (Myrtaceae) : Maesopsis (Rhamnaceae).
 .. *jasius* L.—Afzelia, Bauhinia, Brachystegia, Copaifera (Caesalpiniaceae) : Gymnosporia (Celastraceae) : Croton (Euphorbiaceae) : Sorghum (Gramineae) : Hibiscus (Malvaceae).
 .. *castor* Cr.—Afzelia, Bauhinia, Cassia (Caesalpiniaceae) : Gymnosporia (Celastraceae) : Tragia (Euphorbiaceae) : Sorghum (Gramineae) : Iris (Iridaceae) : Erythrina (Papilionaceae) : Chaetacme macrocarpa (Ulmaceae) : Entada (Mimosaceae).
 .. *phoebus* Btlr.
 .. *ansorgei* Roths. Bersama (Melianthaceae).

- „ *brutus* Cr.—*Fluggea* (Euphorbiaceae) : *Ekebergia*, *Melia volkensii*, *Trichilia*, *Turraea nilotica* (Meliaceae) : *Bersama* (Meliantheaceae) : *Phialodiscus zambesicus*, *Allophylus* (Sapindaceae) : *Grewia* (Tiliaceae).
- „ *pollux* Cr.—*Sorindeia* (Anacardiaceae) : *Flueggea* (Euphorbiaceae) : *Bersama* (Melianthaceae) : *Deinbollia* (Sapindaceae).
- „ *druceanus* Btlr.—*Schefflera goetzenii* (Araliaceae) : *Bersama* (Melianthaceae) : *Eugenia*, *Syzygium* (Myrtaceae) : *Protea* (Proteaceae).
- „ *eudoxus* Drury—*Schefflera* (Araliaceae) : *Garcinia* (Guttiferae) : *Syzygium* (Myrtaceae).
- „ *violetta* Gr. Sm.—*Azelia*, *Brachystegia* (Caesalpiniaceae) : *Deinbollia* (Sapindaceae).
- „ *numenes* Hew.—*Hugonia platysepala* (Linaceae) : *Erythrina* (Papilionaceae) : *Allophylus*, *Blighia unijugata*, *Deinbollia*, *Phialodiscus* (Sapindaceae) : *Grewia* (Tiliaceae).
- „ *bohemani* Feld.—*Azelia*, *Brachystegia* (Caesalpiniaceae) : *Sorghum* (Gramineae).
- „ *cithaeron* Feld.—*Azelia*, *Baphia* (Caesalpiniaceae) : *Hippocratea obtusifolia* (Hippocrateaceae) : *Acacia*, *Albizzia* (Mimosaceae) : *Craibia* (Papilionaceae) : *Cola laurifolia* (Sterculiaceae) : *Grewia* (Tiliaceae) : *Celtis*, *Chaetacme macrocarpa*, *Trema* (Ulmaceae).
- „ *bipunctatus* Roths.—*Phialodiscus* (Sapindaceae).
- „ *tiridates* Cr.—*Bombax* (Bombacaceae) : *Hugonia platysepala* (Linaceae) : *Hibiscus* (Malvaceae) : *Osyris* (Santalaceae) : *Phialodiscus* (Sapindaceae) : *Grewia* (Tiliaceae).
- „ *xiphares* Cr.—*Cryptocarya woodii* (Lauraceae).
- „ *nandina* Roths.—*Drypetes* (Euphorbiaceae) : *Craibia* (Papilionaceae).
- „ *pythodorus* Hew.—*Craibia* (Papilionaceae).
- „ *hansali* Feld.—*Salvadora persica*, *Dobera roxburghii* (Salvadoraceae) : *Osyris* (Santalaceae).
- „ *zingha* Stoll.—*Hugonia platysepala* (Linaceae).
- „ *etesipe* Godt.—*Azelia*, *cassia* (Caesalpiniaceae) : *Croton*, *Phyllanthus*, *Ricinus*, *Tragia* (Euphorbiaceae) : *Entada* (Mimosaceae) : *Dalbergia* (Papilionaceae).
- „ *achaemenes* Feld. *Brachystegia* (Caesalpiniaceae) :
- „ *guderiana* Dew. *Dalbergia* (Papilionaceae).
- „ *blanda* Roths.
- „ *eupale* Drury
- „ *subornatus* Schultze
- „ *aubyni* Poult. *Albizzia* (Mimosaceae).
- „ *cedreatis* Hew.

- „ *contrarius* Weym.
 „ *dilutus* Roths.
 „ *etheocles* Cr. *Albizzia* (Mimosaceae) :
 „ *berkeleyi* v. Som. & Jacks. *Scutia* (Rhamnaceae).
 „ *viola* Btlr.—*Tamarindus* (Caesalpiniaceae) : *Albizzia*, *Entada*
 (Mimosaceae).
 „ *ethalion* Bsd.—*Albizzia*, *Parkia*, *Piptadenia* (Mimosaceae) :
 Scutia (Rhamnaceae).
 „ *baumanni* Rog.—*Acacia*, *Pterolobium lacerans* (Mimosaceae).
 „ *zoolina* Westw.—*Acacia*, *Entada* (Mimosaceae).
 „ *paphianus* Ward
 „ *lichas* Dbl. *Acacia* (Mimosaceae).
 „ *anticlea* Drury
 „ *jahlusa* Trim.—*Acacia* (Mimosaceae) : *Pappea* (Sapindaceae).
 „ *baileyi* v. Som.—*Scutia* (Rhamnaceae).
Palla ussheri Btlr.—*Metaporana densiflora* (Convolvulaceae) : *Toddalia*
 (Rutaceae).
 „ *violinitens* Crowley—*Metaporana densiflora* (Convolvulaceae)
 : *Clerodendrum kentrocaule* (Verbenaceae).

Nymphalinae

- Cymothoe theobene* Dbl.
 „ *lurida* Btlr. *Rinorea* (Violaceae).
 „ *sangaris* Godt.
 „ *herminia* Gr. Sm.—*Dovyalis*, *Rawsonia* (Flacourtiaceae).
 „ *coranus* Gr. Sm.—*Fernandoa*, *Kigelia* (Bignoniaceae) : *Raw-*
 sonia (Flacourtiaceae) : *Vismia orientalis* (Hypericaceae).
 „ *caenis* Drury—*Rawsonia usambarensis* (Flacourtiaceae).
Euryphura plautilla Hew. *Chrysophyllum* (Sapotaceae).
 „ *achlys* Hpffr. *Deinbollia* sp. (Sapindaceae).
Euryphene chriemhilda Staud.—*Hyphaene* (Palmae).
 „ *mardania* F.—*Cocos* (Palmae).
 „ *sophus* F.—*Landolphia* (Apocynaceae) : *Chrysophyllum*
 (Sapotaceae).
 „ *carshena* Hew.—*Marantochloa* (Marantaceae).
Euphaedra neophron Hpffr.
 „ *medon* L.
 „ *eleus* Drury *Allophylus*, *Deinbollia*, *Paullinia*,
 „ *coprates* Druce *Phialodiscus* (Sapindaceae).
 „ *alternus* v. Som.
 „ *spatiosa* Mab.—*Allophylus*, *Blighia unijugata*, *Deinbollia*,
 Paullinia, *Phialodiscus* (Sapindaceae).
 „ *fraudata* Thur.—*Paullinia pinnata* (Sapindaceae).
 „ *uganda* Auriv.—*Rhus* (Anacardiaceae) : *Allophylus*, *Dein-*
 bollia (Sapindaceae).

(To be continued)

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AUGUST 1975



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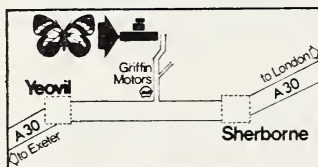
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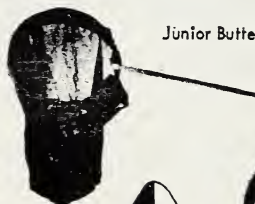
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AES

BULLETIN

No. 308

EDITORIAL

This issue marks the fortieth anniversary of the birth of our publications. The first issue was in August 1935 when we had but six members and was produced by jelly-panning. Later issues over the next four years were, however, duplicated. In 1939 the publications split into a printed Journal with the Bulletin continuing to be duplicated until August 1944 when, in spite of all wartime difficulties, the first printed number appeared in our familiar yellow jacket with Brimstone emblem. Throughout our history we have also been noted for the production of leaflets and handbooks on various aspects of Entomology. With this issue of the Bulletin we are taking another step forward in the appearance of halftone illustrations, which it is intended will be a regular feature in future, adding to the usefulness and interest of our Bulletin, which now has a circulation of over 1200 copies.

Our Annual Exhibition (Saturday September 27) is one of the noted events in the Entomological calendar and we have a larger attendance than any other similar function. In spite of some controversy in the past a noted function of our Exhibition is that it is the one occasion in the year when Entomologists can meet the Dealers and compare the various items on offer. In Europe such occasions are far more frequent than they are here, regular meetings being held in a number of Continental cities.

A particular feature of the AES Exhibition, however, is the advice and help which our more experienced members give in the form of demonstrations of technique and displays of how it should be done, while Junior exhibits are encouraged by the award of a prize. Additionally, of course, the meeting together of so many members and friends in pursuit of the interests of our mutual hobby is, after all, what our Society is all about.

COLLECTING NOTES—AUGUST 1974

THE SMALLER MOTHS

During the last century the Nepticulidae were one of the most popular families with collectors. In *The Entomologist's Weekly Intelligence* for Saturday October 6, 1860 Stainton wrote, "This is an age of progress; why now we have hundreds of collectors who have bred their own Nepticulae, and it is probably within the mark when we say that a hundred thousand specimens of this genus have been reared from the larvae, in England alone, during the last eight years". If you do your

sums, you will find Stainton's figures realistic, in 1973, for instance, I reared about 400 individuals of over 60 species and could have had two or three times that number if I favoured long series.

The family is every bit as attractive today as it was a hundred years ago. One advantage is that fieldwork may be extended on into December and many of the species may be forced out in the early months of the year when other entomological operations are at a standstill. As a general guide, almost all species of *Stigmella* and *Nepticula* (now all called *Stigmella*) may be forced, but other genera are best left to emerge in their own natural season.

Since the leaf-mines are in most instances easier to determine than the imagines, the different species should be kept separately. Species due to be forced may be bred in glass jars. Pack two or three inches of slightly damp sphagnum moss (such as may be found round the roots of heather on almost any heath) into the bottom of the jar and lay the mined leaves on the moss; cover securely with polythene. Remove the leaves after the mines have been vacated in case they turn mouldy and replace the polythene. Other attention, such as watering the moss, does more harm than good. I prefer to start off by exposing the pots to wintry conditions in an outhouse and do not begin to bring them indoors till January. Then, if you have *Stigmella fragariella* Heyden, it will emerge within a day or two, but it will be two or three weeks before other species appear.

Those which are not destined to be forced should be reared in flowerpots. Fill the pots one-third with earth or, better still, peat. Cover the soil with damp sphagnum up to two-thirds and lay the leaves on top. Cover with polythene to retain the humidity. When all the larvae have gone down, remove the leaves, replace the polythene with nylon and sink the pot in soil in the garden. It is probably best to cover half the top of the pot, for example, with a plank of wood, to exclude excessive rainfall. The local cats like dancing on my pots and knock off their covers; but this is of no consequence. It is only when the moths are due to emerge that the pots must be sealed, for then if there is a gap or hole the size of a pin's head the minute moths will escape.

An experienced collector can probably find between 20 and 30 different species in an afternoon's collecting during October, but here I can cover only a few foodplants.

First go to a hawthorn hedge. The long galleries containing frass dispersed in arcs and green larvae are *Stigmella oxyacanthella* Stainton (Fig. 1). The whitish larva with a dark head and spots on its venter, which feeds in a blotch, is *Ectoedemia atricollis* Stainton. If the larva is yellow, look at the formation of the mine. A small, compact blotch, generally situated near the midrib and containing frass which tends to be arranged in arcs will be *S. pygmaeella* Haworth. If on the other

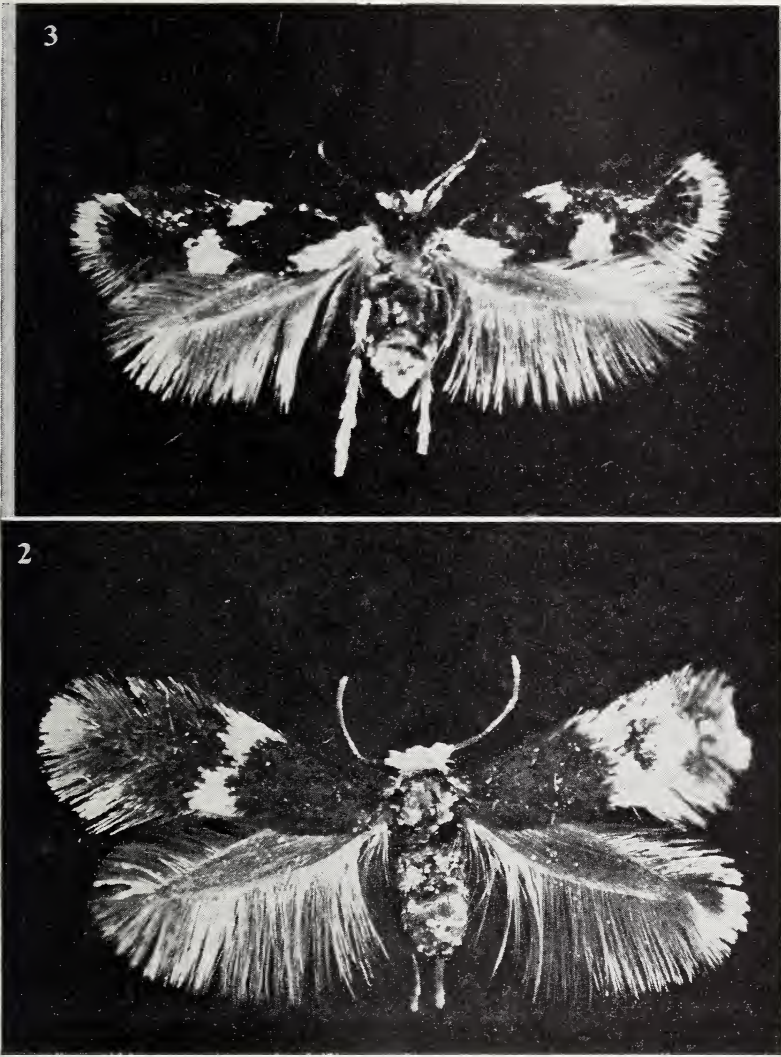


Fig. 2 *E. argentipedella*. Fig 3. *E. subbimaculella*.

(The Editor regrets that due to technical troubles Fig. 1 has had to be held over for a future issue.)

hand the mine started as a fine gallery filled with reddish frass following the leaf-margin, and then expanded into a blotch in which the frass was black, the species is *S. regiella* Herrich-Schäffer. The mines of the other hawthorn-feeding Nepticulidae will be vacated by October.

Now have a look at the birches; bushes and even seedlings being more productive than trees. The roundish blotches with a dark brown blob in the centre are *E. argentipedella* Zeller (Fig. 2); it must have peat or soil for pupation. If you find an irregular gallery with an untidy central line of black frass, look carefully at the larvae; if you can see an obscure chain of dark spots on the venter it is *S. betulicola* Stainton, but if these are absent it is *S. luteella* Stainton. Most species which have ventral spots mine venter upwards, so you examine these larvae from above. If the gallery is completely filled with greenish frass and starts from a brown spot on the leaf, it is *S. continuella* Stainton, but if the frass is blackish and arranged in broad arcs, and there is no brown spot at the start of the mine, you have the much less common *S. distinguenda* Heinemann; but the mine may already be vacated, for the larvae occur at any time from late July till October and are rapid feeders. As in the hawthorns, there may be other mines made by other species which feed earlier in the year.

November is the best month to search for the species feeding in Oak, and these are sometimes most easily found in fallen leaves where the "green islands" surrounding the mine show up conspicuously. If you find a blotch which will probably be situated between veins, turn the leaf over and see if its epidermis is slit at the junction of the veins; if it is, and most of the frass has fallen out of the mine, you have *E. subbimaculella* Haworth (Fig. 3). On the other hand, if there is no slit and the mine contains dense black frass, you have *E. quercifoliae* Toll. To make doubly sure, look at the head and prothoracic plate of the larva; these are blackish brown in *subbimaculella* but red brown in *quercifoliae*. Should you find both species together, never mix them, for though the mines and the larvae are quite easily separated, the adults are almost indistinguishable.

You are certain to find galleries as well as blotches. If the gallery is small and highly contorted and the larva has dark ventral spots, you are very lucky for you have found the local *E. quinquella* Bedell. If the larva has no ventral spots, the species is one of the *ruficapitella* group. Long, sinuous mines, completely filled with green frass belong to *S. basiguttella* Heinemann, but the others are hard to determine. Those with broadly dispersed frass are either *ruficapitella* Haworth, or the much less common *svenssoni* Johansson, though the latter will probably have finished feeding a month or more earlier. If the mine has more or less linear frass, it may belong either to *atricapitella* Haworth or *roborella* Johansson, and you are unlikely to know which until the moth emerges. By the time you read this number of the Bulletin, an account of these oak-feeding Nepticulidae and notes on how to distinguish them should have appeared in *The Entomologist's Record*; I am afraid lack of space prevents me from repeating this information here.

A. M. Emmet (1379)

COLLECTING NOTES—COLEOPTERA

I believe it was the late Dr. Masee that used to employ the method of trapping beetles described below with great success. Although it is a simple method I have never seen it described in any text book.

Before autumn sets in make a collection of fairly thin, reasonably straight twigs and sticks. Ideally they should be dead and dry (suitable for making a 'camp fire'). They should be tied in bundles about six to eight inches in diameter and ideally about three to four feet long. They should then be placed in suitable spots in woods with the hope of attracting certain species that would hibernate in similar sites. (In effect one is making the 'faggots' described in the *Coleopterists Handbook*).

I think it will become obvious at once that these bundles should be well hidden—though not covered with leaves, and preferably not laying flat on the ground—as they may be mistaken by passers by for free bundles of fire wood!

The traps should be examined before spring, by untying them and shaking and banging the twigs over a polythene collecting sheet. After examination re-tie the bundle and leave it in place for re-examination next winter.

Although I have never used this method myself, I have heard from reliable sources that some very desirable beetles may be trapped in this way, for example certain Anthribidae. I will be most interested to hear from anybody trying this method.

J. Cooter (3290)

COLLECTING AS IT WAS, AND AS IT NOW IS

(The following much condensed account is but one of the controversies that appeared in "The Entomologist" exactly a century ago and is an interesting facet in the history of our hobby.—Editor.)

Collecting is at present carried on very differently from how it was fifteen or twenty years ago. It is now much harder work than it was then, owing to the great number there are in the field. So far so good; but (which is much to be lamented) the good old free spirit of collecting is rarely to be found. Years ago, when a few entomologists started on a day's ruralizing, what unbiased delight was experienced and evinced by us all! We started at early morn, intent on one object,—a day's thorough and innocent enjoyment. If one of our number captured a rarity we *all* were pleased; how we congratulated him, and loved to admire his specimen! If the rest of us were unfortunate there was no grumbling, no unpleasant exhibition of the "green-eyed monster;" there were no insinuations of Mr. Dealer So-and-so having that season imported a few gross of continental pupae, and of having placed them in the woods for development, with a view to "making" them "British".

The object was, then, principally a day's innocent pleasure, and not so much with a view to amassing a large number of specimens in the shortest possible time. We want some of that collecting spirit now, for the *pleasure* of entomological rambles is comparatively little sought after; it is, "Who has the largest collection?" And much to the disgrace to many of our time, if collectors cannot get their coveted specimens by honest exertions, they will cheat in exchanging (or "bartering", as one of our best Lepidopterists facetiously termed it); or else procure foreign specimens, and insert them as British. Shame on these collectors; their originally pure pursuit is getting more dishonest than English horse-dealing.

A proof of the deterioration of the manners of most of our collectors is that they are now generally considered, by the non-entomological public, as persons of questionable character.

While collecting last year, in the Hampshire woods, I came across a dealer that I well knew. On showing him my night's total captures at sugar, Mr. Z. remarked, with an indescribably sly chuckle: "Oh, yes! Ah! He, He! but the *other* box;" insinuating that I had another private fuller box in my pocket. This is not said against the *dealers*; by no means; but merely to show what little faith they now have in the word of amateurs, so much dissembling and deceit are there among them.

I knew a gentleman, of considerable standing in the entomological world, who succeeded in obtaining from a boy a somewhat mutilated specimen of a very rare butterfly; it was caught at the end of the gentleman's garden. On exhibiting it at one of our entomological meetings, a whisper was immediately started insinuating that it was very much like an imported German specimen; this remark soon developed itself in quiet corners into "decidedly German!" All this shows there is in the present day much deception among collectors.

H. Ramsay Cox

I can confirm Mr. Cox's reference to "the good old free spirit of collecting." Free enough, in all conscience, that collecting was. I have myself spoken with a gentleman who in one year captured on the south coast *eight hundred* specimens of *Colias Hyale*, and I recollect that he boasted roundly of the exploit! The same once informed me, when I was in search of the second brood of *Leucophasia Sinapis*, that I need not expect again to see that insect in the neighbourhood, because he had that season *taken the whole spring brood*. It is possible that your correspondent has himself heard of these incidents, or others like them; and on these facts I should wish to make one or two remarks.

Anyone who captures eight hundred butterflies of one kind, when his own collection receives perhaps four-and-twenty, must have a very distinct *motive*. Mr. Cox speaks most truly when he hints that "the pleasure of entomological rambles" could have little to do with such a feat. What pleasure, in truth, could come from taking the lives of

eight hundred defenceless Hyale? After the capture of, let us say, the first one hundred and fifty, sensations of "pleasure" must have begun to give way to physical fatigue.

In the case of *Leucophasia Sinapis* the same reflections are suggested rather more strongly; while *Colias Hyale* comes at one time in large numbers, and (whether captured or left alone) then disappears to return again after several years, the gentle creature *Sinapis* may no doubt be easily exterminated. I can picture to myself the dismay of a collector whose "honest" (but too thoughtless) "exertions" have unduly thinned the numbers of a local insect, and the care he will always in future take that a like result shall not again occur. But I can *not* picture (even to myself) the attitude of mind of a collector who knowingly and with determination extirpates *Leucophasia Sinapis*, and talks confidently afterwards of the deed being effectually done!

So much for these instances (the two strongest, I admit, that I have ever heard of); and I am happy to gather that in one way of regarding such feats I am in agreement with your correspondent. With him I cry, "Shame on these collectors!" But I must decline to collect "in the style of the good old times," for these very instances I have mentioned belong (it will be understood) to the period which your correspondent regards approvingly.

I have all the prejudices of one who for sixteen years has collected none but British Lepidoptera; and the intention which I have at length definitely formed of opening my collection to foreign specimens (or rather taking up the European fauna) first had its rise in the condition of things to which your correspondent has alluded. I shall not take the line of urging the duty of all to accept European insects. That has been rather offensively done in the past, by some with whose ways and language towards collectors I confess nothing in common. But, as one individual speaking for himself, I must give up collecting only native insects, because (for one reason) I see to what arts, manners, and customs, I am against my will contributing.

W. Arnold Lewis

MIGRATION OF THE DIADEM BUTTERFLY

Those who have had the good fortune to travel to warmer climates will be familiar with the handsome Nymphalid *Hypolimnas misippus* L. which occurs in large numbers in Central and Southern Africa and in India. It is also found in the Caribbean, Australia, Hong Kong and the Levant.

The wingspan of *H. misippus* is normally $6\frac{1}{2}$ to 8 cm. The male is velvet black with a large white patch edged with iridescent blue or violet on each of its four wings. In Africa the female is an accurate mimic of the African Monarch butterfly *Danaus chrysippus* L. in its various forms and is usually larger than the male.

As the species is found on more than one continent one feels that it might have migratory tendencies but despite search into various books I have found no reference to its migrations except in "Insect Migration" by C. B. Williams (Collins New Naturalist Series) where the butterfly is described as moving from the plains over the Pulni Hills in Southern India.

In January 1974 I found *H. misippus* plentiful in Rhodesia, this being the wet season when hot sunshine is interspersed with thunderstorms. In South Africa the butterfly is not often seen so far south as the Cape Peninsula but in February and March 1974 I did see it there in the hills south of Cape Town, together with a few specimens of a smaller Nymphalid, the Yellow Pansy *Precis hierta* Fab. The well known Pierid migrant *Catopsilia florella* Fab. was common in the Cape Peninsula during the same two months so I gained the impression that this might have been a good year for local migration as I had seen none of these three species in that area during my previous visit in the same month of 1972.

The climax arose on my return voyage to England in the Union Castle ship "Reina del Mar". We were three days out from Cape Town on 19th March 1974 when between 11 p.m. and midnight a large number of *H. misippus* flew on board evidently attracted by the ship's lights. We were then 600 miles from any land, in position 15S, 2.5W, i.e. 600 miles west of the coast of Angola and an equal distance east of the island of St. Helena. The insects eventually settled near the various lights and by walking along the decks I counted over one hundred, so a far greater number than this must have come aboard; there were about three males to each female. With the exception of a few stragglers all dispersed on the following morning.

It would be most interesting to know whether other members have noted migrations of this butterfly.

P. R. Grey (3820)

SOME NOTES ON THE DISTRIBUTION OF EUROPEAN BUTTERFLIES IN JAPAN

Recently I acquired a copy of the book "A Field Guide to the Butterflies of Britain and Europe" published by Collins. I am not an expert but am an interested student (amateur) of butterflies and a Japanese member of the AES. I would like to refer to the distribution of some of the species covered in this book where reference is made to the Japanese mainland and islands.

Pontia daplidice L. This species is neither native nor immigrant but apparently introduced. The first record is in October 1929 in Fukuoka Prefecture and after that specimens occurred in the Prefectures of Shimane, Okayama, Saga, Kagoshima and one was recorded in

September 1958 in Rumoi City, Hokkaido. The Japanese ssp. is *Pontia daplidice orientalis* Kardakoff.

Anthocaris cardamines L. Distributed between 200 and 300 m. in mountainous areas of the North and Southern Alps of Japan and is considered an alpine butterfly. There are two subspecies: *A. cardamines ishikii* Matsumura of the North Alps and *A. cardamines hayashii* Fujioka of the Southern Alps and Yatsugatake Mountains.

Gonepteryx rhamni L. Distributed in central part of the mainland of Japan in the Prefectures of Nagano, Yamanashi, Gunma, Shizuoka, Kanagawa, Gifu, Aomori and Iwate. The Japanese subspecies is *Gonepteryx rhamni maxima* Butler.

Apatura iris L. This species is not known in Japan. There is a similar species, *A. ilia* Schiff, which is distributed from Hokkaido to Kyushu and is quite common. The Japanese subspecies of *A. ilia* is *ssp. substituta* Butler.

Nymphalis antiopa L. Distributed in the northern part of Japan around Mt. Ibuki (Shiga Prefecture). Adults appear in August or later and again after hibernation. The Japanese subspecies is *N. antiopa asopos* Fruhst.

Aglais urticae L. One of the Alpine butterflies of the Japanese mainland. In Hokkaido it is common from the plains to the mountains. Japanese subspecies is *A. urticae connexa* Butler.

Agyronome laodice Pallas. Distributed from Hokkaido to Kyushu on hillsides and mountains. The Japanese subspecies is *A. laodice japonica* Menetries.

Melitaea diamina Lang. Distributed up to 200 to 800 m. from sea level in Hyogo, Shimane, Hiroshima Prefectures. Single brooded.

Mellicta athalia Rott. This is also not found in Japan. There is only one *Mellicta* species in Japan—*Mellicta ambigua nippona* But.—which is very similar to *M. athalia*. It is distributed in the central mainland between Nikko (Tochigi Pref.) and Hida District (Gifu Pref.).

I would like to thank Mr. Cribb (2270) for assistance in preparing these notes for publication.

Yukihara Mori (4657)

REFERENCE

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REARING THE BROWN-TAIL MOTH

Of all the Lymantriidae, *Euproctis chryorrhoea* L. is one of the most interesting. In 1782 this species became so abundant in the neighbourhood of London that the larvae were burnt in bushels, and rewards were offered for their destruction. South records that this species became so

plentiful on Canvey Island, that measures had to be taken against it.

I first began my search for this species in May 1972, when the familiar silken tents of this species adorned nearly every bush of sloe in the area. For anybody wishing to find this species it was common below Beachy Head in East Sussex and also at Seaford on the East coast. This is a species which inhabits the coastal plains all along the South Coast.

I took a small nest home but it must have been last years because no larvae were found inside, so in late March 1974 I went to look for the nests of the Brown-tail moth in Whitbread Hollow near Beachy Head. Some years this species assumes plague proportions but none were visible. Eventually I managed to discover one solitary nest which I checked to make sure that it contained some larvae; it did! The blackthorn was not yet in leaf so I placed the whole nest in a clear plastic box and left it. When I checked it next morning I found three hundred minute larvae clustering in the corner of the box nearest the light. Since their natural food, sloe was not yet in leaf I got some sprays of hawthorn and placed the nest on it. When small the larvae are brown to grey, and on the terminal segments they have two small orange spots. When I placed them on the hawthorn they proceeded to cover it in a fine web of silk and the leaves that were enclosed were devoured to the stem.

They fed up quickly until in early June they achieved a length of 40 mm., although once in the vicinity of their nest I found a larva fully 80 mm. long! It is in this stage of their development that they are best known. In fact, in the insect world they have achieved no small degree of notoriety. The final ecdysis frees the hairs that once covered the larvae, so that they are caught up by the wind and carried long distances. These hairs are poisonous to the skin, and cause an extremely irritating rash, although the degree to which it affects somebody depends on his or her skin.

I have caught this rash frequently from my breeding cages and have even caught it on holiday when I was investigating the nest of the Processionary moth (*Thaumetopoea processionea* L.).

It is a surprising fact that in 1973 the Brown-tail was uncommon at Whitbread Hollow, and only five miles away at Seaford, half the indigenous population was taken ill with severe rashes caused by these apparently harmless larvae. Once the larvae are fully fed they waste no time and make a fine silk cell in which to pupate. Only a small proportion survive in the wild state since cuckoos are fond of them as well as the several species of parasites which attack this group.

Those which do manage to survive hatch three weeks later and immediately mate. The females later seek out a twig on which they can lay their ova which are disguised by a covering of brown down from the

anal segments of the female. It is this brown fur which gives the species its name. The larvae upon hatching spin a tent in which they will spend the winter in a state of torpor.

To anyone interested in rearing this species I suggest they use rubber gloves and forceps when dealing with the larvae, and if you do get the rash the best medicament to apply is "Anthisan" cream.

Mark Hadley (5315J)

OBSERVATIONS ON SOME OF THE BUTTERFLIES OF THE GIRONDE PENINSULA S.W. FRANCE 1964-71

Introduction

The opportunity to study some of the butterflies of this region presented itself when spending camping holidays in the same area each year, from 1964-71 (excluding 1968-9). The earliest date for observations was 31 May in 1964 and the latest 5 July in 1967, i.e. virtually covering the month of June.

The Gironde department is situated in the north of the province of Aquitaine, between that of Dordogne and Landes. Both Gironde and especially Landes are heavily afforested with maritime pine (*Pinus pinaster*) which was re-introduced not more than 100 years ago when the land was reclaimed from an area of desert and swamp, but there is fossil evidence that this species of pine grew here naturally in pre-historic and later times. The whole coastal area is covered with a deep bed of sand laid down in the Tertiary Era left by the retreat of the sea which covered the isthmus attaching the Iberian Peninsula to France at that time. At the end of the 18th century the dunes were encroaching on the mainland at an alarming rate and their stabilisation was accomplished first by planting marram grass and then maritime pine.

The area covered by observation is the coastal strip from Le Verdon (opposite Royan) to Archachon and eastwards to the famous wine-producing area of the Médoc. Between large tracts of maritime pine are a number of pockets of deciduous woodland, rich in insect life. The midsummer weather is generally fine with temperature in the 80's and only in two of the six visits was indifferent weather experienced. It was noticed, however, that even with high temperatures the air was invigorating. This part of France is relatively sparsely populated, well off the main tourist routes and from the apparent lack of literature presumably little visited by the entomologist.

The following is a description of the butterflies encountered with some mention of other orders. The butterflies are arranged according to Higgins and Riley (1970).

The dates of observation for the various years are as follows: 1964 (May 31-June 10); 1965 (June 1-9); 1966 (June 21-30); 1967 (June 26-July 5); 1970 (June 21-July 4) and 1971 (June 9-18). It will

be appreciated that June is unfortunately rather 'in between seasons' which accounts for lack of sightings for certain species in some years. Nevertheless the following notes give a fairly accurate estimate of the flight periods.

PAPILIONIDAE

Papilio machaon L. (Swallowtail)

June is rather in between seasons for this species but a single specimen was seen in each of the years 1964 and 1967.

Pieris brassicae L. (Large white)

P. rapae L. (Small white)

P. napi L. (Green-veined white)

Seen each year but June is between broods and they were not particularly plentiful.

Aporia crataegi L. (Black-veined white)

This species was common in 1964, abundant in 1965 and not seen again until 1971 when one specimen was observed. It would appear to have a short season and was probably over in the middle years.

It has a fairly steady but slow flight with more gliding than *Pieris* and on occasion with shallow wingbeats. It falls an easy victim to road traffic and quite a few dead specimens were found on the roads. It rests often on a leaf with wings half open and frequently feeds in a pendulous position. It is easy to approach and is not so restless as *Pieris*; it seems to be a late riser and does not appear on the wing much before 11 a.m. B.S.T.

Colias crocea Geoff. (Clouded yellow)

Seen each year except 1965 and 1971, but abundant in 1966 when an interesting migration was noticed on 25 June, when they were seen flying singly in from the Bay of Biscay at about five minute intervals, heading in a NNE direction. Some two dozen were seen flying in this manner from morning until mid-afternoon. Others seen from another position about a mile inland were also flying in the same direction, except for ovipositing females. A total of between 50 and 70 individuals were observed in all.

Gonepteryx rhamni L. (Brimstone)

Common 1966-7 and 1970 but not observed in the other years.

Leptidea sinapis L. (Wood white)

One or two over the period 1964-66; more frequent in 1967, but not seen in 1970-1.

Limenitis reducta Stgar. (Southern white admiral)

This species was frequent in 1964-5 and 1970-1 but seems to have a short season, and not seen other years.

L. reducta is not so gregarious as *camilla* and tends to frequent a more open situation. It is easily approachable when feeding and often flies round the observer on hot days in search of perspiration, and will

settle on the bare arm to attain this end. The blue sheen on the wings of fresh specimens is very beautiful but the flight does not appear to be as graceful as *camilla*.

NYMPHALIDAE

Limenitis camilla L. (White admiral)

Seen only in 1964 when it was quite common.

Nymphalis antiopa L. (Camberwell beauty)

A single example of a fully-fed larva was found in 1964 on a stunted sallow at ground level, but no adults seen in any year.

Nymphalis polychloros L. (Large tortoiseshell)

Five adults were observed in 1964 flying round and feeding from sap exuded from a wounded oak tree, together with *Pararge aegeria* L. and hornets. A fast flying, very aware species and difficult to approach. None, however, was seen in the later years.

Inachis io L. (Peacock)

Six individuals were seen in 1967 only.

Vanessa atalanta L. (Red admiral)

Scarce, only one in 1964 and another in 1965.

Vanessa cardui L. (Painted lady)

Scarce, only one in 1964 and another in 1966.

Polygonia c-album L. (Comma)

Only one specimen seen in all the years, in 1964.

Clossiana selene Schiff. (Small Pearl-bordered Fritillary)

Three only seen, in 1965.

Clossiana dia L. (Violet (Weaver's) fritillary)

Common in 1964, one in 1966 and three in 1970.

Frequents open woodland near to water and in full sun. Observed to wave its wings constantly when feeding. It has a similar low flight to *euphrosyne* and *selene*, rapid at times and very wary and difficult to approach.

Melitaea cinxia L. (Glanville fritillary)

One example only seen in 1971.

Mellicta athalia Rott. (Heath fritillary)

One of the commonest butterflies in the area and seen in all years; particularly abundant in 1970.

It flies quite briskly in hot weather about a foot or so above the ground with a certain amount of gliding and with rather a zig-zag course. The larger females are slower and both sexes are somewhat lethargic in dull weather.

SATYRIDAE

Melanargia galathea L. (Marbled white)

Abundant in 1966-7 and 1970, less common in 1971 and not seen in 1964-5 (probably too early for it). Generally speaking this species

appears to be one of the commonest roadside butterflies in France. It does not appear to be confined to colonies as in Britain.

Hipparchia semele L. (Grayling)

Three only, seen in 1966.

Maniola jurtina L. (Meadow brown)

Abundant each year particularly in 1964.

Pyronia tithonus L. (Hedge brown)

A few in 1966 and 1970. Plentiful in 1967 but not seen in 1964 and 1971. In 1970 several were observed hovering round yucca bushes, but the attraction could not be found. No trace of honeydew. One individual, after paying attention to one bush for several minutes then flew straight to another and performed similarly, occasionally settling. No explanation for this behaviour could be arrived at.

Coenonympha pamphilus L. (Small heath)

Plentiful each year. It was particularly noticeable that specimens found near the beach were smaller than those in the damp woodland a mile or two distant. It was confirmed, however, that they were all *pamphilus*.

Coenonympha arcania L. (Pearly heath)

Fairly frequent each year especially in 1967. The species has rather a slow dancing flight not unlike *A. hyperantus* and favours damp woodland with a fair amount of shade, in the vicinity of water.

It orientates itself when settling not unlike *semele* always with closed wings and tilting with one side flat facing the sun. It does not however retract the forewings, at least when resting for a short period. It appears to feed infrequently and is attracted to white surfaces, cars etc.

Parage aegeria aegeria L. (Speckled wood)

Common in 1965-6 and a few in other years. This is the typical continental subspecies with fulvous markings. It seems to favour a more sunny and open habitat than the British subspecies, but was also found in shady situations.

Lasiommata megera L. (Wall brown)

Frequent in 1965 but not seen in the other years.

LYCAENIDAE

Quercusia quercus L. (Purple hairstreak)

Two only seen, in 1966.

Nordmannia ilicis Esper (Ilex hairstreak)

Several in 1964 and 1967; common in 1970-1; Not seen in 1965-6. This species frequents bramble and privet bushes on roadsides bordering woods in full sun. It is easily approachable and often feeds at ground level. It appears very black on the wing, especially the larger females, and again is attracted to the white paintwork of cars.

Callophrys rubi L. (Green hairstreak)

Worn singletons seen in 1965 and 1971.

Lycaena phlaeas L. (Small copper)

Frequent each year, more so in 1970.

Heodes tityrus Poda (Sooty Copper)

Frequent in 1964-66, all worn males. Two females seen in 1971. Habits similar to *phlaeas*, roadsides etc.

Heodes alciphron gordius Sulzer (Purple-shot Copper)

A few seen in 1964, 1967 and 1970. Very local in distribution. The males are easily approachable and docile when freshly emerged, when extensive feeding takes place. After a few days they take up territory and are extremely alert and aggressive. The females however, were quieter and easily photographed. The species frequents rough ground bordering woods with bell-heather and gorse.

Lampides boeticus L. (Long-tailed blue)

One specimen only of this migrant seen in 1965 settled on a cigarette packet.

Everes argiades Pallas (Short-tailed blue)

Two were observed in 1965 and another two in 1971. They were very small, the spring form *polysperchon* Bergstrasser according to South, (1921) the summer form being larger.

Sedentary in habit, in fact one (slightly damaged and recognisable) was seen on the same small patch of bell-heather for three days running.

Celastrina argiolus L. (Holly blue)

Not common. Three seen in 1964 and two in 1967.

Glaucopsyche alexis Poda (Green-underside blue)

Only two seen (in 1964) and probably a May species and therefore over. It has similar habits to *icarus* but the male upperside is a deep violet blue.

Aricia agestis Schiff. (Brown argus)

Quite frequent each year.

Polyommatus icarus (Common blue)

Common each year.

HESPERIIDAE*Thymelicus lineola* Ochs. (Essex skipper)

Abundant particularly in 1966-7 and 1970.

Thymelicus sylvestris Poda (Small skipper)

Seen each year, particularly abundant in 1966-7 and 1970.

Ochlodes venatus faunus Turati (Large skipper)

Not common but seen in each year. Probably almost over.

When visiting France one cannot help but notice the abundance of insect life and indeed wild life generally compared with that in Britain. Although my primary interest is in the butterflies I am interested in other orders to a lesser extent. The coleopterous fauna is impressive both in numbers and species. It is delightful to see hordes of *Cetonia*

aurata L. (Rose beetle) feeding on privet flowers and flying in the sunshine. I have only met with the odd specimen or two in England.

Oryctes nasicornis L. (Rhinoceros beetle) was met with at mercury-vapour street lights. It is a large insect the male of which has the characteristic rhinoceros horn. Both sexes were seen.

Polyphylla fullo L. was also seen, a very large black and white speckled beetle which has a very audible squeak when disturbed. Repeated dive-bombing was performed by *Dytiscus marginalis* L. on the bonnet of the car, evidently mistaking the shiny surface for that of a pond. I have never seen it fly in England.

Melolontha melolontha L. were swarming at the lights of a cafe on one warm evening, and another scarabid *Oxythyrea funesta* Poda was common on flowers in the daytime.

Another 'flying' waterbeetle *Ilybius ater* Wagi, was also identified. Besides these above many unidentified beetles were seen in flight, notably a very large emerald green scarabid, but I was unsuccessful in seeing it at close quarters. Possibly *Potosia speciosissima* Scop. The most interesting moths were *Hyloicus pinastri* L. and *Arctia villica* L. which both came to light, and the Pine Processionary moth *Thaumtopaea pityocampa* Schiff. In 1964 the large, but empty, larval nests of this species were to be seen on the maritime pines, but in 1970 the moths were on the wing. They are clumsy and poor flyers, some malformed at emergence. What struck me particularly was their habit of flying straight down to the ground from the pine trees in exactly the same manner as the winged seeds of the tree are shed from the ripe cones. These cones are very large (about the size of a grapefruit) and the seeds about the same size as the moth. Both seeds and moths flutter down at an angle of about 45 degrees and it is difficult to differentiate between them at first sight. It raises the query as to a possible form of protection. The moths are certainly very vulnerable otherwise.

Another remarkable insect observed was the hymenopterid *Xylocopa violacea* L. a large carpenter bee, bluish-violet in colour with similarly coloured wings which causes it to appear very odd in flight. I saw them only in the first year 1964 at the probable end of their season.

B. R. Stallwood (1547)

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OBSERVATIONS ON THE BEDSTRAW HAWK

A female *Hyles galii* Rott. found in my M.V. trap on the 14th July, 1973, subsequently laid 201 ova between then and the 16th of which 101 were kept. Figure A is a photograph of an adult.

Larvae hatched from the 23rd onwards and were kept in batches of eight. Forty-eight ova (6 batches) were given Lady's bedstraw (*Galium verum* L.) as a food plant, the rest, Rose-bay willow-herb (*Epilobium angustifolium* L.). After a week it was noticed that larvae feeding on willow-herb were larger than those feeding on bedstraw so 32 of these were switched over to the willow-herb which they took readily, and would not later take bedstraw.

The progress of 48 larvae was closely checked, 16 feeding on bedstraw and 32 on willow-herb. The larvae on willow-herb ceased feeding after 17 days, the others a day later, there being a change of colour from black to dark olive-green in the larvae when ready to pupate. All larvae at this stage measured 67 ± 3 mm. The larvae were placed in containers of damp peat about 80 mm deep and after wandering for 24 hours or so they pupated just below the surface, taking up to a week to change. Two fullgrown larvae of different colour forms are shown in Fig. B.

Of the 48 being studied 23 emerged in 1973 between the 3rd September and the 14th October all having fed on willow-herb. Several attempts were made to pair these, but without success. The rest (25) all overwintered successfully. Imagines began to emerge from the 29 May 1974. The first of the 16 fed on bedstraw appearing on the 16 June. Again several attempts were made at pairing, the imagines being put in a breeding cage with flowers of Valerian, from which they fed, and flowering plants of both bedstraw and willow-herb. No success was obtained until the morning of the 22 June when a pair were seen 'in cop' the male being suspended, the pair remained so all day, only parting in the late evening.

The female was seen laying the next day (23rd June) when 4 ova were laid; on subsequent days up to 60 were laid. The female died after 10 days having laid 294 ova, 90% of which were on the flower heads of Valerian; the remainder either on the netting of the cage or on bedstraw with none on willow-herb. All observed egg laying was in the early evening between 18.00 and 19.00 hours.

No egg laying was seen during the day although it is thought that a proportion were laid in the early morning.

The weather was very cold for the end of June, the temperature being mainly below 18° C and only exceeding 22° C for short periods on rare occasions.

Larvae hatched from 30th June, but a large number (114) refused to feed and died, this was without doubt, due to the low temperature. The remaining larvae and ova were given slight heat (about 22° C) and 119 larvae were persuaded to feed. A further 52 ova which appeared to have formed up failed to hatch; the remaining ova appeared to be infertile. About 20° C appeared to be the minimum temperature requirements for this species.

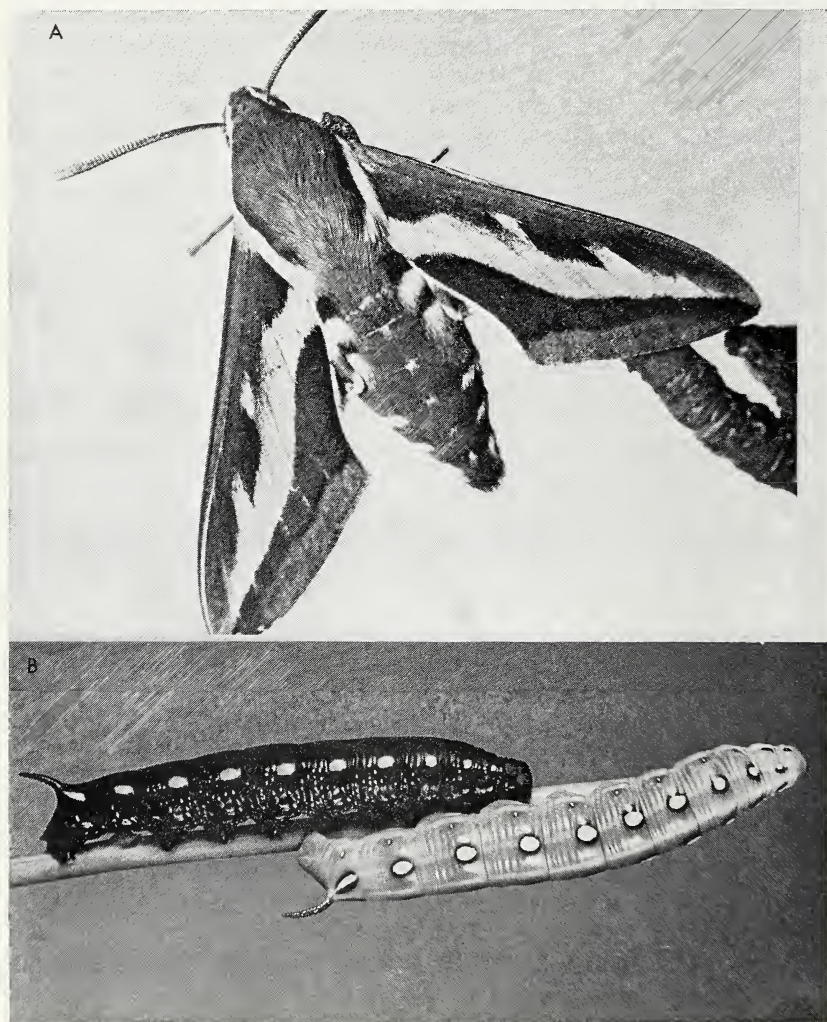


Fig. A. adult *H. galii*. Fig. B. Dark and light forms of the larvae. (Photographed by Leigh Plester)

The larvae were again kept, in batches of eight. Two batches (16) were kept at a temperature in excess of 26° C. These pupated in 15 days. Other larvae were kept at about 22° C, taking 20 days to feed up on *E. angustifolium* and 2 batches (16) fed on *G. verum* took 24 days. There was no marked difference in size of any of these larvae all being 70 ± 3 mm long.

Of the total of 86 pupae, 43 were male ranging from 38-45 mm (average 41.7 mm) and 43 were female, ranging from 39-48 mm (average 43 mm). Four males emerged on 23rd August a further 4 males and 3 females on the 26th and more, intermittently, until the end of September.

In the meantime further attempts had been made at pairings. Only one partial success was achieved, a pair mated for a short time, the female laying 28 ova before dying after 2 days. The larvae were fed on *E. angustifolium* and kept under natural conditions but these all grew too a far larger size than any reared previously, larvae in excess of 90 mm and pupae of average length 45 mm (43-50 mm) and much larger in girth.

The emergence of imagines from these pupae was eagerly awaited but in the event the imagines had larger bodies but the wing span was not greater than normal. There were 11 males and 7 females from this pairing.

Of all the pupae reared 4 (fed on *G. verum*) are overwintering for the second year together with 4 of the 2nd generation, all seem to be healthy.

The following summarises the methods used in rearing larvae.

- (1) Larvae as they hatch are put in small plastic boxes.
- (2) They are cleaned out and fresh food given daily.
- (3) Larvae are not touched but transferred on small pieces of leaf.
- (4) Larger boxes are used as larvae grow.
- (5) All boxes after use are sterilised in Milton.
- (6) Larvae are kept in small batches of eight.

This is done for three reasons

- (a) To limit the spread of disease should it occur.
- (b) To ensure that all larvae are transferred when cleaning out. (Having the same number in each box makes it easy.)
- (c) To make sure any differences in growth rate are not due to overcrowding.

Robin James (5005J)

NOTES AND OBSERVATIONS

PYRALIDAE IN SEPTEMBER.—September really is a good month to search for larvae of many of the Pyralidae not to mention many other microlepidoptera. The following larvae are worth looking out for.

Pyrausta aurata Scop. are to be found under a thin covering of silken threads on the flower-heads of Catmint (*Nepeta cataria*). Similarly larvae of *Sitochroa paleais* D. & S. may be found on wild carrot (*Daucus carota*). Ragwort (*Senecio jacobaea*), may contain the gregarious larvae of *Homoeosoma nimbella* Dup. which may also feed on other compositae. Coltsfoot (*Tussilago farfara*) is the pabulum of *Udea lutealis* Hb. while the larvae of *Anania stachydalis* Germar live in a tube formed

by rolling down the top of a leaf of hedge woundwort (*Stachys sylvatica*). They are night feeders and may be found out of their tubes by torchlight. Turning rather higher up, on Aspen (*Populus tremula*) the larvae of *Nephoterix hostilis* Steph. live in small groups of spun-together leaves. Back on the ground a dwarfed central flower of hemp agrimony (*Eupatorium cannabinum*) is a sign that the stem contains the larva of the plume moth *Adaina microdactyla* Hb. Lastly, it is always worth visiting Beekeeping friends at this time of year. We may be able to relieve them of two of their pests, the greater and lesser waxmoths, *Galleria mellonella* L. and *Achroia grisella* Fab. These may also sometimes be found in Humble bee nests.

LARGE BLUE PROTECTED.—The wild creatures and wildlife protection Bill at present before Parliament will make it illegal to possess or to capture any of seven animals threatened with extinction. One of these seven is the Large blue butterfly (*Maculinea arion* L.) and it will be the first (and so far the only) insect to be given the protection of law which some birds have had for many years. Unfortunately it does not seem to have been overcollecting from which *arion* suffered from so much as climate change and myxomatosis in the rabbit population resulting in a change of grazing pattern, seriously affecting its foodplant and its symbiotic partner, the ant.

NOTES AND OBSERVATIONS WANTED!—As I write this paragraph, winter is upon us but spring not far behind. By the time it is read the collecting season will be in full swing; the date of our Annual Exhibition approaching; the manuscript of the November Bulletin already with our printers. Many members will by then have something interesting to record; a rarity found; a new locality for a local species; a migration record; an unusual variety; an interesting collecting tip. All such snippets will be most welcome and those that arrive by the middle of October will be in time for the February Bulletin.—Editor.

CONVERSION OF CUTLERY CANTEENS.—Even second-hand storeboxes are comparatively expensive these days and new ones very dear. Many old cutlery canteen boxes, however are very well made, usually of polished oak or walnut, sometimes mahogany. Although they come in varying sizes and may not form a neat row they can easily be converted into storeboxes by soaking off the baize lining and internal partitions, lining one side with a thin strip of wood to make the lid air-tight (copydex is a good adhesive to use for this), then corking and finally papering. Where to obtain? Why, your local jumble sale at a price to suit anybody's pocket, varying from 1p to 10p. The most I have ever paid was 30p for a pair in a local auction room, another good hunting ground for suitable containers which can be converted to entomological use. Bundles of sheet cork can still be obtained at very reasonable prices from the dealers who attend our annual exhibition.

DECLINE OF AQUATIC HABITATS.—We have received a copy of 'heritage', No. 56, the quarterly Bulletin of the Loughborough Naturalists' Club. There is an interesting account of the history of the canal locks at Foxton, which shows how some people's pleasure results in the spoiling of the pleasure of others, much of the area having been converted into moorings for pleasure craft, which have displaced the former aquatic plants and animals. However, various insects are stated to still occur in abundance and this is a good locality to see the interesting water spider *Argyroreta aquatica* Walck.

A sad tale is told of the 100 ponds marked on the Ordnance Survey Maps as present in Charnwood forest. Nearly a quarter have totally vanished without trace. Only ten per cent of the ponds were in "good" condition. The remainder were either dry or polluted. In only six ponds was invertebrate life abundant.

A number of caterpillars of *Pieris brassicae* L. are recorded as having been found in late December 1974—a very late date indeed for this species although larvae of the related *P. rapae* L. have been recorded for all months of the year.

OLD COLLECTIONS ARE NOW ANTIQUES:—It is now becoming quite obvious that the speculators of the antique trade have homed in on cabinets and collections as they come on the market. Cabinet drawers are then resold individually as "wall decorations". I have seen such drawers on display at an asking price of from sixteen to twenty five pounds. One dealer was asking £12 for an unglazed cabinet of four very small drawers full of dust and *Anthrenus* beetle! Amongst the remains were a wing or two of the large blue. On being tackled about purveying such rubbish he openly admitted he could enveigle a mum into giving it as a present to her youngster "to encourage him/her to take up Entomology as a career". I have even seen Victorian display cases of butterflies, now faded and broken, fetching more than our present day traders are selling at new!

All this has now placed the price of a second-hand cabinet well beyond the reach of the youngster just becoming seriously interested and indeed compared with twenty years ago, cabinets have virtually disappeared from the market. Far more serious perhaps is the loss to the Entomologist of the unrecorded rarities (I have also come across a Large Copper in an auction lot) which end up destroyed or fading away in non-entomological hands in an effort to keep up with the Jones'.

The real culprits of course for this state of affairs is not perhaps so much the dealers as the large number of people about who have far more money than sense and who uncritically pay well over the odds for anything that looks old. The same thing of course has already happened to all the Victorian source books of our hobby, many of which have now had their plates torn out for framing. What the answer is

I know not, but it does look as if the next generation of Entomologists will be unable to enjoy the pleasures of the Gurney and Brady cabinets of the past.

EXTINCTION AND COLONIZATION:—The Systematics Association published last year a special volume, No. 6 of which chapter 16 is by Mr. J. Heath of the Biological Records Centre and is entitled "A century of change in the Lepidoptera". Mr. Heath draws attention to the major factors which have affected our Lepidoptera. These include the complete drainage of the fens and the replacement of much deciduous forest with conifers. While these activities of man have been the main reason for the extinction of various butterflies and moths, the principal reason for new species to have spread in from their European range has been the marked amelioration of the climate that occurred between 1921-1960. Apart from those species that have become established, an exceptional number of vagrants have been recorded in recent years. While this may be partly due to the use of mercury vapour light-traps drawing in specimens that would otherwise be overlooked it does indicate that there is a continuous influx of new species and the chances of some of these becoming established are very good indeed.

SOME NOTES ABOUT WASPS.—I am particularly interested in Hymenoptera, but last year saw very few *Vespula vulgaris* L. or *Dolichovespula sylvestris* Scop. in South-east London. I expose saucers of honey and fragments of protein for my guests and, in recognition thereof no wasp has ever stung me. A few years ago during a "good wasp year" we had large numbers of such visitors, and strangers received stings but we did not; the insects would alight on our hands and faces, without stinging. Is this unusual, or are we lucky in having the right pheromones?

About fifteen years ago we had a wasp's nest (thought to be *D. sylvestris*) in a garden shed, but it was contained in an old wool blanket and large holes in the blanket led us to suppose that wool rather than wood had been utilized to make the paper of the nest. I did not myself see the insects or nest. My wife described the appearances to me and it is a tribute to her courage that, wishing to use the shed undisturbed, she carefully removed the nest and transferred it to a site in the garden. The description of this operation I heard was of "a cloud of wasps, above a woman's legs, slowly proceeding down the garden path"! She was not stung, either!

Is it known or unusual for wasps to utilise wool in making their nests?—Mark Knight (4940)

REARING OF MACROTHYLACIA RUBI.—At the end of August 1974, while on holiday at Bontddu Gwynedd, I saw lots of Fox moth larvae on top of the hills. I collected some of them with hope of obtain-

ing some adult moths for my collection. I brought them back to my home in Coventry. Heather was layered on a mixture of soil and sand in the bottom of a plywood box. The larvae were then put in with a few bramble leaves. The top of the box was covered with a piece of polystyrene. It was then placed in a sheltered position in the garden. The larvae were given some fresh bramble leaves every day until November, by which time they had stopped feeding and gone into the soil. I did not disturb them until December 27th, when I transferred them to a plastic sandwich box containing peat. Each larva was placed in a small hole in the peat and then covered over. The lid was put on and the box was put into a refrigerator where it was kept just above 0° C. On January 20th I took the box out of the refrigerator and put the larvae into a breeding cage containing cuttings of heather on peat. The cage was put on a shelf in the airing cupboard, and kept at about 25° C. It was sprayed with water every day. On February 5th the first cocoons were spun amongst the heather and on March 5th a female moth emerged.

I now have nine healthy pupae awaiting emergence, and I would have had a lot more if some larvae had not escaped from the box in the garden!—P. A. Brown (4770J)

UNUSUAL PAIRINGS—Referring to the recent interesting articles in The Bulletin on the cross-pairing between two butterflies, the Ringlet (*Aphantopus hyperanthus* L.) and the Meadow brown (*Maniola jurtina* L.), I recall, now many years ago, when I knew the Rev. G. H. Raynor, then of Brampton, Huntingdon, who bred such remarkable varieties of the Magpie moth (*Abraxas grossulariata* L.), writing to me “I have secured a pairing between *lubricipeda* and *menthastris*—this is an unique triumph”—unfortunately, the resulting ova were all unfertile! But at Caslano, in Switzerland on 15th July 1965, I witnessed an attempted copulation between the beetle *Trichodes apiaris* L. and one of the *Cantharidae* which are so common on umbelliferous flowers in the summer. Needless to say the attempts were unsuccessful!—H. Last (117)

LACEWINGS IN IRELAND.—I have been studying insects for two years and it was recently that I discovered that Lacewings are comparatively rare in Ireland. For about eighteen months I have had a specimen of *Chrysopa carnea* Stephens, in my collection, and I have observed at least five other specimens in the wild. The locality of these observations is in the mid-Cork area in county Cork, and as far as I know no other records of this nature have been recorded in Munster.

I think this should be further investigated; unfortunately I cannot do this as I am only 13, and still attending school. But it would be interesting to find out if this and other lacewings are local or widespread in this area.—J. Good (5398J)

TWO NEW RECORDS OF JAPANESE BUTTERFLIES.—During 1973 and 1974 there have been two new species of butterfly recorded as being native to Japan. Both have been shown to be breeding in Japan and one is a member of the Lycaenidae, *Shijimia moorei* Leech, and the other of the Hesperiiidae, *Pyrgus malvae* L. Butterflies are well studied in Japan, almost as well as in Britain, and these discoveries came as a surprise to Japanese lepidopterists. I am sending the Editor a photograph of the two butterflies taken from our publication "Monthly Mushi" (Mushi=Insects) and give a short account of their discovery.

S. moorei. Bred from Mount Ichifusa, Kuma, Kumamoto. This butterfly was discovered in small clearings in virgin forest of Mt. Ichifusa in Kumamoto Prefecture by an amateur entomologist, Mr. Ryushi Kobayashi, on 6 August 1973. Subsequently the species was bred by Prof. Takashi Shiozu of Kyushu University. The food plant is known but is not being revealed so that the species can be protected. The species occurs in China and the island of Formosa (Taiwan). It may be single or double brooded according to habitat.

P. malvae. Collected on Hidaka Mts., Hokkaido. This butterfly was discovered in a small area of the Hidaka Mts. by Mr. Shigeru Suzuki. Females were taken on the 28 May and males on the 4 June 1973. Specimens were later bred by members of the Entomological Society of Hokkaido University and it was shown to be single brooded. The species is common throughout Europe and through Asia to the Korean Peninsular. The foodplant is stated to be *Potentilla fruticosa* L.

I thank Mr. Cribb (2270) for assistance with this note.—Yukiharu Mori (4657)

AN EARLY SIGHTING.—On Monday the 17th March 1975 a school-boy in my village of Woodborough, Nottinghamshire, brought to my house a freshly emerged female *Pieris rapae*, which he had found in his garden. On speaking to the boy's father he confirmed that he had seen the butterfly the day previous when there was snow on the ground.—M. S. L. Simpson (4859)

SOME BRAZILIAN NYMPHALIDS

Prepona demophon, L.

This is a beautiful large Nymphalid with a 4-inch span. It is black on the upperside with a striking iridescent blue band stretching over both wings. It is robust and has a vigorous flight. When disturbed from its resting place, which is usually on a tree trunk or branch, but sometimes on a leaf, it heads swiftly towards the tree tops, and circles and swoops rapidly amongst and above the foliage before descending to settle again.

The pale, silvery grey of its closed wings makes it hard to spot when completely at rest; but, occasionally, it partly opens its wings at short intervals, and if the sun catches the bright blue bands thus slightly

exposed, the glint of this colour makes the butterfly immediately obvious.

P. demophon favours the borders of rather heavy "mato", or jungle, in the sunny late forenoon; and is most often found during the months immediately preceding the heavy rains, which season varies considerably in different regions of Brazil.

I have noticed *P. demophon* to be most frequent (but by no means common), from September to December in Guanabara and Minas Gerais; from January to April in Pernambuco; and during the period of July to December, in Pará. (Any altitude up to 3500 ft.)

This butterfly is extremely hard to capture in flight; but it is aggressive and inquisitive, and is attracted to blue colours. It will fight with a blue rag agitated in the air on the end of a stick. If then missed by the net, it will, in many cases, after darting away for a short distance, return to the fray, or to investigate.

It is very fond of the fermenting juices of fallen fruits which lie rotting on the floor of the jungle; but when regaled, if not too lethargic to fly, it will make for the sunshine again.

Heliconius phyllis, Fabr.

H. phyllis is very widely distributed in Brazil. I have seen it in various States, but most abundantly in Pernambuco, Pará, Minas Gerais and Guanabára. There, always sheltered from the wind—near the fringe of forests, on shady paths, by the overhanging banks of water-courses, where the damp mosses and grasses mingle with decaying leaves, and among the shaggy stems of trees-ferns—are the favourite haunts of this graceful Heliconid. There, in the company of various Ithomiidae, sometimes a *Morpho achilles* L. and usually an *Eresia landsorfi* Godt. or two, it can be found floating leisurely in the air with hardly a flicker of its 3-inch wing span. Other *Heliconius* species are seldom present, as they prefer more open terrain.

When captured, *H. phyllis* emits a peculiarly sweet scent which is offensive to many people—and this may be the principal reason why it enjoys a certain immunity from attacks by birds and lizards (which also do not like its taste, apparently).

The red bands on its forewings, which are strikingly vivid on specimens during the early part of the post wet season, are not nearly as bright on specimens taken later in the dry weather, while the predominant black has taken on a slightly brownish hue.

Hypna clytemnestra, Cr.

Periods of drought and dry weather suit this butterfly. I have met with *H. clytemnestra* in the dry months—from August to January, in Pernambuco and Paraíba; and in June to September, in Minas Gerais and Guanabára (where the seasons are not the same as in the former two States).



However, although camouflaged to blend with decaying leaves, this butterfly apparently does not like dried-up or dead vegetation, and frequents the greener, wooded parts of otherwise dry and barren terrain. When in repose on mossy or lichen-coated branches with closed wings, it is not easily detected in spite of its fairly large size (wing span $3\frac{1}{2}$ inches).

I have found *H. clytemnestra* in gullies and hollows in the arid "Setão" of Pernambuco at altitudes of 1500 to 2500 feet, where clumps of trees and shrubs have managed, with their long tap-roots to reach the underlying moisture and have thus remained leafy and green, while in the surrounding rocky sun-scorched countryside only cacti and gnarled, desiccated thorn trees were evident.

In Minas Gerais, at about 3000 feet, and in Guanabára, near Rio, at 500 feet I have seen this butterfly in thickly forested hillsides, in the vicinity of springs and small streams, where the crisp dead leaves under foot testified to the otherwise dry conditions which prevailed.

The flight of *H. clytemnestra* is jerky and low. When startled, it makes several swift circuits, swerving through the vegetation at heights varying from 6 to 12 feet, but always to settle somewhere close to its starting point.

Ageronia feronia, L.

This beautiful $2\frac{1}{2}$ inch nymphalid, basically grey and complexly marked, (the "Grey Tree-Sticker"), has a very rapid flight in short bursts, when it is disturbed while at rest, usually on a tree trunk. It goes swiftly to another tree, and then returns soon after to the tree it left in the first instance, flying at a height of 6 to 10 feet.

A "clacking" sound is sometimes made during flight; to attract a mate, some affirm; to warn off its enemies, others think. As this "clacking" is often made when two of these butterflies are flying around, and as one usually then departs, it seems probably that it is a warning, rather than a mating signal.

This butterfly has solitary habits and stays—often for hours—in the same position on a tree trunk or branch, by itself.

The characteristic pose of *A. feronia* is unusual for a butterfly, in that its wings, when it is at rest, are spread flat, and are not closed or kept upright. It flies swiftly to its chosen place of repose on a tree trunk (usually), and the instant before hitting it, turns so that it faces downwards. In his position, with wings spread on the lichen-covered bark it is not easily spotted, thanks to the intricate pattern of its beautiful blue-grey markings.

Figs. C-E. The Brazilian countryside. C. Vale do Sol, Mutica, Minas Gerais, D. Itabirito Peak, Serra do Pico, Minas Gerais. E. On the bank of the Amazon: a landing stage at Alemerin, Pará. (Photographs by Terence Hanson (5242))

This insect is very common in Brazil and I have seen it in several States, from Rio to Prá. I once observed one in my garden in Recife, slightly worn and with one torn wing, reposing on the "sapote" tree-trunk, which it would leave and return to, three or four times in the course of each day, for just over six weeks.

A. feronia likes the hot dry periods which follow the heavy rains, but does not usually select sunny spots to rest in.

Ageronia amphinome, L.

This butterfly, (the "Blue Tree-Sticker") is of the same size ($2\frac{1}{2}$ inches) and habits as *A. feronia*. It makes the same sort of "clacking" sound in flight when in proximity with another butterfly. It is basically black in colour with a complicated design of blue-green iridescent markings and a broken transversal band of white on the forewings. When at rest on a tree-trunk it is well camouflaged, but in flight it is much more conspicuous than *A. feronia* because of the striking broad red splash on its underside. This colouring enhances the beauty of *A. amphinome*; but due to its liking for flying rather high—about 15 ft.—attracts the eye more readily than the less striking colours of *A. feronia*.

A. amphinome is not as common, but just as widely distributed as *A. feronia*.

Ageronia arethusa, Cr.

A. arethusa is similar in habits to *A. feronia* and *A. amphinome* except that it has preference for the denser woods and forests of the same regions; and it does not always adopt the usual pose of the genus *Ageronia*, that of flattening themselves head downwards on a tree-trunk when resting. Just as often it rests with its wings closed, and not always facing downwards. It seldom make a "clacking" sound in flight.

A. arethusa has blue-black, $2\frac{1}{2}$ -inch span-wings spotted with lighter blue dots. It is not very common, and is seldom found except in the period around the end of the wet season.

Terence C. Hanson (5242)

BOOK REVIEWS

THE LOCUST, by Robert Barrass. pp. viii, 72; 28 Figs. Second edition 1974. Barry Shurlock, Winchester. Price £1.50.

After ten years we have the second edition of the book that put Locusts on the map, so to speak, at any rate insofar as schools are concerned. As befits a second edition it has been enlarged and augmented.

This book is essentially a practical manual and emphasis is laid on experimentation. Tantalisingly, but in my view correctly, the answers to the experiments are not given. There is a brief section on the classifi-

cation and rearing of the migratory and desert locusts. The section on the head, coming as it does between experiments on growth and feeding—both dealing with living stages—would have been better placed in the section on classification. The numerous experiments of which there are over thirty, are simply described but are of course written on the assumption that experienced supervision and some apparatus normally available in schools, will be available. Nevertheless they are easy to follow and the average amateur entomologist will have or be able to substitute for, the necessary equipment. The experiments are well worth doing in many cases and can be applied to other insects as well. Particularly useful are the formula for locust saline and the methods of making microscopic preparations.

An appendix gives sources of supply, not only of locusts, but of slides and films about locusts and a useful bibliography for further reading. There is an extremely good index. The book is profusely and well illustrated with line diagrams. For a book so obviously meant to be used however, a rather stronger binding would be advantageous. For anyone with an interest in experimenting with insects, locusts or not, this book is a must.

BOCG.

DISCOVERING GARDEN INSECTS AND OTHER INVERTEBRATES, by Anthony Wootton. 79pp. 57 halftone illustrations. Shire Publications Ltd., Princes Risborough, 1975. Price 45p.

This little paperback is No. 190 in the 'Discovering' series. Unlike so many books it deals not only with insects but creepy crawlies which may be found in the same situations as are insects, such as millipedes, slugs and mites. It also makes it clear that such beasties found in the garden are by no means all pests and should be treasured on account of their usefulness or beauty. After opening with a beautifully clear and concise chapter on classification the book is directed into a series of chapters each dealing with the interesting creatures to be found in some aspect of the garden; the flower border; rubbish and compost heaps; ponds and rainwater tanks, etc.

The invertebrates likely to be found in each of these habitats is concisely and succinctly mentioned with facts concerning some aspects of their life history, behaviour, or appearance. The illustrations are on the whole excellent and depict a number of unusual and seldom illustrated invertebrates. The snail with the sinistral shell for instance is a delightful choice. Of particular use to the hitherto uninformed just starting to take an interest, is the chapter on societies and the publications they produce, followed by a bibliography, a rather good glossary and an adequate index. Naturally enough there has to be intensive selection for a small book of this size, but nevertheless Mr. Wootton really has managed to pack an amazing amount of useful information

into these 79 pages, helped a bit, of course, by the use of 6-point type. The layout and production are good, and at the very reasonable price of only 45p this is a book for everyone—gardener and entomologist alike.

BOCG.

STICK AND LEAF INSECTS by J. T. Clark, M.A., M.Sc., F.L.S. Published by Barry Shurlock 1974. pp 65 illustrated by line drawings. Board covers. Price £1.50.

This booklet has been written by Mr. Clark, Head of Biology at Uppingham School, and is aimed primarily at the teacher of biology, to serve as a text book for classroom work on the Phasmids. This group of insects is now accepted as being suitable for study for the public examinations at most levels. The introduction covers the physiology of insects in brief and is followed by chapters on the general biology of the Phasmids, breeding and experimentation and other practical aspects and finally their classification with eleven species described. There is a glossary of terms and finally suggestions for further study projects. The line drawings are clear and simple. AES members may prefer to use the AES leaflet on this group as it is cheaper and with the supplement of the article in the *Bulletin (Bull. amat. Ent. Soc. Vol. 33 pp. 30-36)* most of the same ground is covered. However the hard back format of this booklet will recommend it for classroom work and the exacting conditions of student handling.

P.W.C.

A SUCCESSFUL HOLIDAY IN THE WINDWARD ISLANDS

Recently, while on holiday in St. Lucia, I found some interesting specimens of beetles. I had chosen to go to the West Indies because I hoped I would find something different for my collection. The journey was long but soon passed as good food and rum punch are served to one and all to get them into the spirit of the West Indies.

When we re-fuelled at Ganda airport there was a bomb scare so we were able to leave the plane and spend some time on Canadian soil. However, it was not long enough for me to find any Canadian beetles or perhaps it was too cold for them. Our next stop was Antigua where again we were fortunate to leave the plane and wander around the airport, which is small but with plenty of local colour, most of the local people seemed to be spending the evening there watching the planes come and go. There was even a small steel band which played as the passengers disembarked from each new arrival. The only insects I saw were yellow ants scurrying about as ants do all over the world. At last we reached Hewanorra airport and the end of our journey. Open-sided buses with a 'surrey' on top were waiting to take the tired passengers to the hotel. After the many hours of travel bed was the most wonderful thing in the world.

The next morning after an early breakfast I wandered round the grounds surrounding the hotel which covered many acres and although cultivated in parts had many quite wild areas and long stretches of sandy beaches where one could be completely alone. It was an ideal place for searching for insects,

unhindered by other people. The first beetle I saw was a meloid, orange in colour, fairly large and a member of the genus *Pseudozonitus*, this particular one was *P. lineata*. In the grounds, in a grove, looking rather out of place to me, were some cows, and being keen I turned over some pats and was rewarded by finding specimens of *Onthophagus* and a dynastid.

Fortunately there was always a breeze so however hot the sun, walking was always possible and so I was able to visit the many lovely bays by walking for many miles along the sand. Anywhere along the way it was a joy to stop, the scenery so colourful and the hope of finding the most prized item for my collection. In Honeymoon bay, very aptly named, I thought the sun must have affected my eyes because the sand appeared to be moving in black dots. The black dots kept me busy for some time but I eventually captured some and now have this amazingly quick Tiger beetle under glass. It was the *Cicindela lebrae* which I later found out was a small form of the much larger black and white *Cicindela suturalis*.

On the Caribbean side of the Island there was a particularly beautiful bay where I often went to swim and wander along the beach under the coconut palms. I made friends with some of the children who for a few coins climbed to the tops of the Palms and threw down more coconuts than I could possibly need, although the juice is very good with rum! Here under the stones at the rocky end of the bay I found several Tenebrionids, one of which was *Opatrinus gemellatus*. Here also were members of the genus *Agriotes* and other Tenebrionids similar to our own *Bolitophagus reticulatus* which could be found on both the Atlantic and Caribbean side of the island.

How amazing it was to see the centipedes with green heads and orange bodies, the darting hummingbirds amongst the brightly coloured flowers and also a huge moth possibly *Erebus odora* called the mousebat by the locals. I especially remember the big white flowers with the most fragrant smell I have ever smelt. Anyway on the leaves of this exotic plant one would find ladybirds with orange thoraxes and blue elytra.

In the evening while casually wandering around after a superb cocktail with the mouth-watering name of Pina Colada, I stumbled across the tropical Lantern flies.

One day I spent painting some scenery on the beach and after a swim I walked along the beach in the opposite direction to Honeymoon bay. I came to a bay called Bearfield bay opposite the Maria Islands; here were a few logs washed up on the beach and under these were members of the genus *Phaleria*.

I had asked the receptionist of my hotel to try and catch me some different fireflies, but no luck so far. During the next few days I went to the neighbouring Island of St. Vincent. After seeing the Capital, Kingstown, and the Royal Botanic Gardens, where I tried in vain to catch a fairly large blue cantharid, I went by taxi to an old fort called romantically Fort Charlotte. As the car was coming to a halt, the tropical lampyrid *Aspisoma insperatum* flew on to the windscreen. It was the only beetle I was to catch on this Island.

I also saw many red hunting wasps, possibly of the genus *Eumerides*; by a stroke of good fortune I witnessed the blood-red wasp dig a hole, paralyse a fly and drag it to its burrow, go in then come out, cover the hole up and fly away.

It was the last day of the holiday and I felt quite pleased with myself, later that evening when I had my bags packed. The receptionist came to me and handed me a matchbox. In it was a firefly caught at the nearby town of Saborie. I later found out that although belonging to the same genus as *A. insperatum* it was a different species being *A. superciliosum*. A perfect end to a perfect holiday.

Mark Johnson (3464J)

A LIST OF THE FOOD-PLANTS OF EAST AFRICAN MACROLEPIDOPTERA

PART 1—BUTTERFLIES (RHOPALOCERA)

(continued from page 92)

Nymphalinae

Hamanumida daedalus F.—Combretum (Combretaceae).

Aterica galene Brown—*Quisqualis indica* (Combretaceae). Le Pelley also gives *Typha* (Typhaceae), which I am sure is wrong.

Catuna orithea Drury—*Bersama* (Melianthaceae).

Pseudoneptis coenobita F.—*Antiaris toxicaria*, *Ficus* (Moraceae).

Pseudacraea boisduvali Dbl. *Chrysophyllum*, *Manikara*, *Mimusops* (Sapotaceae).

.. *eurytus* L.

.. *lucretia* Cr.—*Chrysophyllum*, *Manilkara*, *Mimusops*, *Pachystelia*, *Sideroxylon diospyroides* (Sapotaceae).

Neptidinae

Neptis saclava Bsd.—Combretum, *Quisqualis* (Combretaceae) : *Acalypha*, *Ricinus* (Euphorbiaceae) : *Australina*, *Pilea* (Urticaceae).

.. *kariakoffi* Overlt.—*Acalypha* (Euphorbiaceae) : *Paulinnia pinnata* (Sapindaceae) : *Australina*, *Pilea* (Urticaceae).

.. *trigonophora* Btlr.—*Paullinia pinnata* (Sapindaceae).

.. *rogersi* Eltr. *Alchornea cordifolia* (Euphorbiaceae) :

.. *nysiades* Hew. *Paullinia pinnata* (Sapindaceae).

.. *laeta* Overlt.—*Albizzia zygia* (Mimosaceae).

.. *nemetes* Hew.—*Alchornea cordifolia* (Euphorbiaceae).

.. *melicerta* Drury—*Acalypha*, *Alchornea cordifolia* (Euphorbiaceae).

.. *strigata* Auriv.

.. *poultoni* Eltr. *Clerodendrum* (Verbenaceae).

N.B. Le Pelley gives *Acacia mollissima*, *Albizzia* (Mimosaceae) for *Neptis agatha* Cr., but this species has since been split up and it is impossible to be sure to which component these foodplants belong.

Marpessinae

Cyrestis camillus F.—*Ficus* (Moraceae).

Eunicinae

Asterope occidentaliu Mab.

.. *moranti* Trim. *Macaranga*, *Sapium* (Euphorbiaceae).

.. *garega* Karsch

.. *trimeni* Auriv.—*Sapium* (Euphorbiaceae).

.. *boisduvali* Wllgrn.—*Kigelia moosa* (Bignoniaceae) : *Excoecaria*, *Macaranga*, *Sapium* (Euphorbiaceae) : *Sterculia* (Sterculiaceae).

.. *natalensis* Bsd.—*Excoecaria*, *Macaranga*, *Sapium* (Euphorbiaceae).

Eurytelinae

- Byblia ilithyia* Drury Dalechampia, Tragia (Euphorbiaceae).
 „ *acheloia* Wllgrn. ceae).
Eurytela hiarbas Drury—Dalechampia, Ricinus, Tragia (Euphorbiaceae).
 „ *dryope* Cr.—Ricinus, Tragia (Euphorbiaceae).
Neptidopsis fulgurata Bsd.—Dalechampia hildebrandtii (Euphorbiaceae).

Vanessiniae

- Hypolimnas misippus* L.—Asystasia, Justicia (Acanthaceae) : Portulaca, Talirum (Portulacaceae). Pinhey also gives *Prunus armeniaca* (Rosaceae), which seems doubtful.
 „ *antevorta* Dist.
 „ *salmacis* Drury *Urera hypselodendron* (Urticaceae)
 „ *monteironis* Druce *Fleurya* (Urticaceae).
 „ *usambara* Ward
 „ *deceptor* Trim.—*Fleurya* (Urticaceae).
 „ *dubia* Beauv.—*Berkheya spekeana* (Compositae) : *Fleurya*, *Urera hypselodendron* (Urticaceae).
Salamis temora Feld.—Asystasia, Justicia, Mimulopsis, Paulowilhelmia (Acanthaceae).
 „ *parhassus* Drury Asystasia, Isoglossa, Justicia, Mimulopsis (Acanthaceae).
 „ *anacardii* L. lopsis (Acanthaceae).
 „ *cacta* F.—*Urera cameronensis* (Urticaceae).
Catacroptera cloanthe Cr.—*Gomphocarpus* (Asclepiadaceae) : *Barleria*, *Justicia* (Acanthaceae).
Precis chorimene Guer.
 „ *stygia* Auriv.
 „ *terea* Drury
 „ *natalica* Feld.
 „ *sophia* F. Asystasia, *Barleria*, *Justicia*, *Paulowilhelmia*, *Ruellia* (Acanthaceae).
 „ *westermanni* Westw. owilhelmia, *Ruellia* (Acanthaceae).
 „ *clelia* Cr.
 „ *cebrene* Trim.
 „ *limnoria* Klug.
 „ *ceryne* Bsd.—*Scabiosa* (Dipsacaceae).
 „ *orithya* L.—*Hygrophila* (Acanthaceae) : *Englas scandens* (Labiatae) : *Antirrhinum*, *Striga lutea* (Scrophulariaceae).
 „ *archesia* Cr.—*Coleus*, *Englas*, *Iboza*, *Plectranthus*, *Pycnostachys* (Labiatae) : *Eriosema* (Papilionaceae).
 „ *octavia* Cr.—*Coleus*, *Englas*, *Iboza*, *Plectranthus*, *Pycnostachys* (Labiatae) : *Eriosema* (Papilionaceae).
 „ *tugela* Trim.—*Coleus*, *Englas*, *Plectranthus*, *Pycnostachys* (Labiatae).
Vanessa cardui L.—*Anchusa*, *Cynoglossum*, *Echium* (Boraginaceae) : *Arctium*, *Arctotis*, *Artemisia*, *Carduus*, *Chrysanthemum*, *Cirsium*, *Cynara scolymus*, *Filago*, *Gnaphalium*, *Helio-*

chrysum, Laggera alata, Madia, Pentzia, Senecio, Sonchus, Stoebe (Compositae) : Althaea, Malva (Malvaceae) : Argyrolobium, Dolichos, Glycine, Lablab niger, Lupinus, Phaseolus (Papilionaceae) : Boehmeria, Geriadinia, Laportea, Urtica (Urticaceae).

Atanartia schaenta Trim.—Australina, Boehmeria, Pouzolzia parasitica, Urtica (Urticaceae).

- .. *abyssinica* Feld. Australina, Pouzolzia parasitica,
 .. *hippomene* Feld. Urtica (Urticaceae).
 .. *delius* Drury

Argynninae

Lachnoptera ayresi Trim. Rawsonia (Flacourtiaceae). Vismia orientalis (Hypericaceae).

- .. *iola* F.

Phalanta columbina Cr.—Maytenus ovatus (Celastraceae) : Dovyalis, Scolopia (Flacourtiaceae).

- .. *phalantha* Drury—Gymnosporia, Maytenus ovatus (Celastraceae) : Aberia, Dovyalis, Flacourtia (Flacourtiaceae) : Populus, Salix (Salicaceae).

Issoria hanningtoni Elwes Viola (Violaceae).

- .. *excelsior* Btlr.

SATYRIDAE

Melanitis leda L.—Bambusa, Digitaria, Panicum repens, Pennisetum purpureum, Zea mays, Grasses generally (Gramineae).

Gnophodes parmeno Dbl.

- .. *minchini* Heron Grasses generally (Gramineae).

Mycalesis miriam F.

- .. *safitza* Hew.
 .. *dubia* Auriv.
 .. *campina* Auriv. Grasses generally (Gramineae).
 .. *anyana* Btlr.
 .. *saussurei* Dew.

Henotesia perspicua Trim.—Grasses generally (Gramineae).

Physcaenura leda Gerst.—Grasses generally (Gramineae).

Neocoenura duplex Btlr.

- .. *bera* Hew. Grasses generally (Gramineae).

Ypthima asterope Klug

- .. *albida* Btlr. Grasses generally (Gramineae).

N.B. Although I have always considered Satyridae as feeding solely on Monocotyledons, Pinhey gives ? Anona (Anonaceae) as the food-plant of *Henotesia simonsii* Btlr., possibly a mis-translation of the native name 'Mroro'.

LIBYTHEIDAE

Libythea labdaca Westw.

- .. *laius* Trim. Celtis (Ulmaceae).

ERYCINIDAE

Abisara neavei Riley—*Maesa lanceolata* (Myrsinaceae).

LYCAENIDAE**Lipteninae**

Alaena Bsd.

Baliochila Stempf. & Bent.

Cnodontes Stempf. & Bent.

Telipna Auriv.

Pentila Westw.

Mimacraea Btlr.

Teriomima Kirby

Iridana Auriv.

Deloneura Trim.

Hewitsonia Kirby

Van Someren states 'All known records on Lichens'. Pinhey gives ? Grasses (Gramineae) for *Alaena amazoulis* Btlr. and *A. nyassae* Hew., Lathyrus (Papilionaceae) for *Teriomima aslauga* Trim. and *Brachystegia* (Caesalpiniaceae) for *Deloneura sheppardi* Stev. Le Pelley records *Deloneura ochrascens* Neave from *Acacia stenocarpa* (Mimosaceae) and *Alaena subrubra* B. Bak. from *Rhus vulgaris* (Anacardiaceae). Le Pelley also records *Hewitsonia kirbyi* Dew., *Mimacraea kraussei* Dew., *Pentila munata* Dew. and *Telipna consanguinea* Rebel from Lichens. I have bred *Teriomima aslauga* Trim., *hildegarda* Kirby on Lichens growing on tree trunks.

Aslauga purpurascens Holl.—Carnivorous on Membracids.

Lycaeninae

Lachnocnema bibulus F.—Secretions of Jassids, Mebracids and Coccids. Pinhey adds *Theodora* (Leguminosae) and *Sorghum* (Gramineae), presumably the plants on which the Jassids, etc. themselves were feeding.

Virachola dinochares Gr. Sm.—In fruits of *Combretum*, *Quisqualis* (Combretaceae) : *Psidium*, *Syzygium cordata* (Myrtaceae) : *Vigna* (Papilionaceae) : *Macadamia* (Proteaceae) : *Prunus* (Rosaceae).

„ *odana* Druce—*Caesalpinia decapetala* (Caesalpiniaceae) : *Canavalia* (Papilionaceae).

„ *lorisona* Hew.—In fruits of *Coffea* (Rubiaceae).

„ *vansomereni* Stempf.—In fruits of *Agelaea obliqua* (Connaraceae).

„ *dariaves* Hew.—In fruits of *Brachystegia* (Caesalpiniaceae) : *Coffea* (Rubiaceae).

„ *dinomenes* Gr. Sm.—In fruits of *Deinbollia* (Sapindaceae).

„ *livia* Klug—In fruits of *Acacia spirocarpa* (Mimosaceae) : *Punica* (Punicaceae).

„ *diocles* Hew.—In pods of *Baphia*, *Bauhinia* (Caesalpiniaceae) : *Acacia* (Mimosaceae).

„ *antalus* Hpffr.—In fruits of *Acacia spirocarpa* (Mimosaceae) : *Cajanus cajan*, *Canavalia*, *Crotalaria*, *Dolichos*, *Phas-*

- eolus, Pisum, Schotea, Sutherlandia (Papilionaceae) : *Cardiospermum grandiflorum* (Sapindaceae) : *Capsicum* (Solanaceae) : *Quisqualis* (Combretaceae).
 „ *dohertyi* B.Bak. In galls of *Acacia* (Mimosaceae) associated with *Phidole* ants.
 „ *suk* Stempf. associated with *Phidole* ants.
 „ *jacksoni* Talb.—*Loranthus usuiensis* (Loranthaceae).
Myrina dermaptera Wllgrn.
 „ *ficedula* Trim.
 „ *sharpei* B.Bak. *Ficus* (Moraceae).
 „ *silenus* F.
Hypolycaena philippus F.—*Loranthus* (Loranthaceae) : *Ximenia* (Olacaceae) : *Punica* (Punicaceae) : *Ixora* (Rubiaceae) : *Clerodendrum* (Verbenaceae) : *Allophylus alnifolia* (Sapindaceae).
 „ *pachalica* Btlr.—*Combretum* (Combretaceae).
Stugeta bowkeri Trim.—*Loranthus* (Loranthaceae) : *Ximenia* (Olacaceae).
 „ *olalae* Stoneh.—*Ximenia* (Olacaceae).
 „ *mimetica* Auriv.
 „ *carpenteri* Stempf. *Loranthus* (Loranthaceae).
Argiolaus silas Westw.
 „ *parasitanus* Rebel
 „ *ituriensis* Jey. & Talb. *Loranthus* (Loranthaceae).
 „ *crawshayi* Btlr.
Epamera iasis Hew.
 „ *bansana* B.Bak.
 „ *sidus* Trim.
 „ *aemulus* Trim. *Loranthus* (Loranthaceae).
 „ *arborifera* Btlr.
 „ *tajoracus* Wlk.
 „ *mimosae* Trim.
Pseudiolaus poultoni Riley—*Loranthus* (Loranthaceae).
Aphniolaus pallene Wllgrn.—*Loranthus* (Loranthaceae).
Aphnaeus hutchinsoni Trim.—*Loranthus* (Loranthaceae) : *Acacia stenocarpus*, *Entada* (Mimosaceae).
 „ *propinquus* Holl. *Alchornea cordifolia* (Euphorbiaceae).
 „ *orcas* Drury
 „ *eriksoni* Trim.—*Convolvulus* (Convolvulaceae).
Spindasis nyassae Btlr.—*Acacia*, *Entada* (Mimosaceae) : *Mundulea* (Papilionaceae).
 „ *banyoana* B.Bak.
 „ *tavetensis* Lathy *Acacia* (Mimosaceae).
 „ *victoriae* Btlr.
 „ *ella* Hew.—*Mundulea* (Papilionaceae).
 „ *apelles* Ob.—*Rhus villosa* (Anacardiaceae).

- „ *homeyeri* Dew.—Brachystegia (Caesalpinaceae).
 „ *natalensis* Dbl.—Mundulea, Vigna (Papilionaceae).
 „ *mozambica* Bert.—Medicago, Vigna (Papilionaceae).
Axiocerses harpax F.—Acacia (Mimosaceae).
 „ *amanga* Westw.—Acacia (Mimosaceae) : Ximenia (Olacaceae).
 „ *styx* Rebel—Brachystegia (Caesalpinaceae).
Leptomyrina hirundo Willgrn.—Kalanchoe (Crassulaceae).
 „ *lara* L.—Mesembryanthemum (Aizoaceae) : Cotyledon, Crassula, Echeveria, Kalanchoe (Crassulaceae).
Capys catharus Riley—Protea (Proteaceae).
Spalgis lemolea Druce—Carnivorous on Coccids.
Anthene livida Trim.—Kalanchoe (Crassulaceae).
 „ *amarah* Guer.
 „ *otacilia* Trim. Dichrostachys glomerata, Acacia
 „ *pitmani* Stempf. (Mimosaceae).
 „ *nigeriae* Auriv.
 „ *definita* Btlr.—Harpephyllum, Mangifera, Rhus (Anacardiaceae) : Crassula, Kalanchoe (Crassulaceae) : Sorghum (Gramineae) : Bersama (Melianthaceae) : Acacia, Albizzia (Mimosaceae) : Myrica (Myricaceae) : Schotea (Papilionaceae) : Rosa (Rosaceae) : Schmidelia (Sapindaceae).
 „ *larydas* Cr.—Afzelia (Caesalpinaceae) : Acacia, Albizzia, Dichrostachys (Mimosaceae). Pinhey gives ? Hypericum (Hypericaceae).
 „ *princeps* Btlr. Entada (Mimosaceae).
 „ *crawshayi* Btlr.
 „ *indefinita* B.Bak.—Erythrococca (Euphorbiaceae) : Coffea (Rubiaceae).
 „ *ligures* Hew.—Celtis (Ulmaceae).
 „ *lunulata* Trim.—Combretum (Combretaceae) : Albizzia, Entada (Mimosaceae).
 „ *liodes* Hew.—Mangifera (Anacardiaceae) : Combretum (Combretaceae) : Myrica (Myricaceae) : Schmidelia (Sapindaceae).
Phylaria cyara Hew.—Albizzia (Mimosaceae).
 „ *heritsia* Hew.—Bridelia (Euphorbiaceae).
Uranothauma falkensteini Btlr.
 „ *nubifer* Trim. Acacia, Albizzia (Mimosaceae).
 „ *delatorum* Heron
 „ *vansomereni* Stempf. Albizzia (Mimosaceae).
Cacyreus lingeus Cr.—Geranium (Geraniaceae) : Calamintha, Coleus Lavendula, Salvia, Satureja (Labiatae).
 „ *palemon* Cr.—Geranium, Pelargonium (Geraniaceae).
Tarucus grammicus Gr. Sm.
 „ *mediterraneus* B.Bak.

- „ *ungemachi* Stempf. *Ziziphus jujuba* (Rhamnaceae).
 „ *theophrastus* F.
Castalius isis Drury—*Dichrostachys* (Mimosaceae).
 „ *melaena* Trim.—Pinhey gives ? *Acacia* (Mimosaceae).
 „ *calice* Hpffr.—*Ziziphus jujuba* (Rhamnaceae). Pinhey gives ?
 Acacia (Mimosaceae).
 „ *cretosus* Btlr.—*Ziziphus jujuba* (Rhamnaceae).
 „ *hintza* Trim.—*Ziziphus jujuba*, *Z. mauritiana* (Rhamnaceae).
 „ *margaritaceae* Sharpe—*Gouania longispicata* (Rhamnaceae).
Azanus natalensis Trim.—*Acacia* (Mimosaceae).
 „ *jesous* Guer.—*Acacia* (Mimosaceae) : *Medicago* (Papilionaceae).
 „ *mirza* Plotz—*Allophylus* (Sapinaceae).
Syntarucus telicanus Lang—*Burkea*, *Crotalaria*, *Indigofera*, *Medicago*,
 Melilotis, *Mundulea*, *Phaseolus*, *Pisum*, *Sesbania* (Papilionaceae) : *Plumbago* (Plumbaginaceae).
Petrelaea sichela Wllgrn.—*Mundulea* (Papilionaceae).
Lampides boeticus L.—*Cajanus cajan*, *Canavalia*, *Colutea*, *Crotalaria*,
 Indigofera, *Lathyrus*, *Lupinus*, *Medicago*, *Phaseolus*,
 Pisum, *Podalyria*, *Sutherlandia*, *Virgilia* (Papilionaceae).
Cyclyrius crawshayi Btlr.—In roots of *Anchusa*, *Cyonoglossum* (Boraginaceae).
Lepidochrysops peculiaris Rog.—Up to 3rd instar in flowers of *Lantana camara* (Verbenaceae).
 „ *parsimon* F.—*Salvia* (Labiatae).
Euchrysops barkeri Trim.—*Eriosema* (Papilionaceae).
 „ *dolorosa* Trim.—*Ocimum* (Labiatae).
 „ *osiris* Hpffr.—*Rhynchosia*, *Vigna* (Papilionaceae).
 „ *malathana* Bsd.—*Psidium guajava* (Myrtaceae) : *Cajanus cajan*, *Canavalia*, *Phaseolus*, *Vigna* (Papilionaceae).
Eicochrysops mahallakoena Wllgrn.—*Acacia* (Mimosaceae) : *Indigofera* (Papilionaceae).
 „ *messapus* Godt.—*Thesium* (Santalaceae).
Freyeria trochilus Freyer—*Indigofera* (Papilionaceae).
Chilades kenonga Gr. Sm.—*Acacia* (Mimosaceae).
Cupidopsis cissus Godt. *Eriosema* (Papilionaceae).
 „ *jobates* Hpffr.
Zizeeria knysna Trim.—*Amaranthus* (Amaranthaceae) : *Euphorbia* (Euphorbiaceae) : *Oxalis* (Oxalidaceae) : *Medicago*, *Zornia* (Papilionaceae) : *Tribulus* (Zygophyllaceae).
Zizula hylax F.—*Oxalis* (Oxalidaceae).
Actizera stellata Trim.—*Oxalis* (Oxalidaceae) : *Medicago* (Papilionaceae).
 „ *lucida* Trim.—*Oxalis* (Oxalidaceae) : *Argyrolobium*, *Crotalaria* (Papilionaceae).

Lycaena pseudophlaeas Lucas

„ *abbottii* Holl.

Rumex (Polygonaceae).

HESPERIIDAE

Coeliadinae

Coeliades chalybe Westw.—*Cynanchum* (Asclepiadaceae).

„ *libeon* Druce—*Drypetes* (Euphorbiaceae).

„ *forestan* Cr.—*Marsdenia* (Asclepiadaceae) : *Combretum*, *Quisqualis*, *Terminalia* (Combretaceae) : *Geranium* (Geraniaceae) : *Gossypium* (Malvaceae) : *Canavalia*, *Crotalaria*, *Indigofera*, *Milletia*, *Phaseolus*, *Robinia*, *Sesbania* (Papilionaceae) : *Solanum* (Solanaceae).

„ *anchises* Gerst.—*Marsdenia* (Asclepiadaceae).

„ *sejuncta* Mab.—*Acridocarpus* (Malpighiaceae).

„ *pisistratus* F.—*Marsdenia* (Asclepiadaceae) : *Acridocarpus* (Malpighiaceae) : *Indigofera* (Papilionaceae).

„ *keithloa* Wllgrn.—*Marsdenia* (Asclepiadaceae) : *Combretum* (Combretaceae) : *Byrsocarpus orientalis* (Connaraceae) : *Acridocarpus* (Malpighiaceae).

Pyrginae

Tagiades flesus F.—*Dioscorea* (Dioscoraceae) : *Grewia* (Tiliaceae).

Eagris sabadius Gray—*Rhus* (Anacardiaceae) : *Grewia* (Tiliaceae).

„ *lucetia* Hew.—*Allophylus subcoriaceus* (Sapindaceae).

„ *nottoana* Wllgrn.—*Scutia* (Rhamnaceae) : *Dombeya* (Sterculiaceae) : *Grewia* (Tiliaceae).

Eretis djaelaelae Wllgrn.—*Asystasia* (Acanthaceae).

„ *lugens* Rog.—*Asystasia*, *Barleria* (Acanthaceae).

Netrobalane canopus Trim.—*Pavonia* (Malvaceae) : *Dombeya* (Sterculiaceae) : *Grewia* (Tiliaceae).

Caprona pillaana Wllgrn.—*Grewia* (Tiliaceae).

Abantis paradisea Btlr.—*Anona* (Anonaceae) : *Hibiscus* (Malvaceae) : *Cola* (Sterculiaceae).

„ *meru* Evans—*Hibiscus* (Malvaceae).

Sarangesa motozi Wllgrn.—*Justicia flava* (Acanthaceae).

Spialia satespes Trim.

„ *kituina* Karsch *Sida* (Malvaceae).

„ *zebra* Btlr.—*Melhania* (Sterculiaceae).

„ *confusa* Higgins—*Melhania* (Sterculiaceae) : *Triumfetta* (Tiliaceae).

„ *diomus* Hpfrr.—*Hibiscus*, *Sida* (Malvaceae) : *Triumfetta* (Tiliaceae) : *Hermannia* sp. (Sterculiaceae).

„ *dromus* Plotz—*Melhania*, *Waltheria* (Sterculiaceae) : *Triumfetta* (Tiliaceae).

„ *spio* L.—*Althaea*, *Hibiscus*, *Pavonia*, *Sida* (Malvaceae).

„ *mafa* Trim.—*Hibiscus*, *Sida* (Malvaceae).

Gomialia elma Trim.—*Abutilon* (Malvaceae).

Hesperiiinae

- Metisella willemi* Wlgrn.
 .. *metis* L. Grasses generally (Gramineae).
Lepella lepeletier Latr.—Grasses generally (Gramineae).
Gorgyra bibulus Riley—Drypetes (Euphorbiaceae).
 .. *diva* Evans—Byroscarpus orientalis (Connaraceae).
Xanthodisca vibius Hew.—Amomum (Zingiberaceae).
Osmodes adosus Mab.—Marantochloa leucantha (Marantaceae).
Acada biseriatus Mab.—Brachystegia (Caesalpiniaceae).
Parosmodes morantii Trim.—Combretum, Quisqualis, Terminalia (Combretaceae).
Acleros mackenii Trim.—Rhus (Anacardiaceae) : Acridocarpus (Malphiaceae).
Semalea arela Mab.—Zingiber (Zingiberaceae).
Andronymus caesar F.—Blighia unijugata, Deinbollia, Phialodiscus (Sapindaceae) : Macrolobium coeruleum (Caesalpiniaceae).
 .. *neander* Plotz—Brachystegia (Caesalpiniaceae).
Chondrolepis niveicornis Plotz—Imperata cylindrica (Gramineae).
Zophopetes dysmephila Trim.—Phoenix, Raphia (Palmae).
 .. *cerymica* Hew.—Cocos, Raphia (Palmae).
Artitropa erinnys Trim.
 .. *comus* Cr. Dracaena (Liliaceae).
 .. *milleri* Riley
Gretna carmen Evans—Borassus, Phoenix, Raphia (Palmae).
Gamia buchholzi Plotz—Borassus, Phoenix, Raphia (Palmae).
 .. *shellei* Sharpe—Cocos, Borassus, Raphia (Palmae).
Leona stoerhi Karsch—Amomum (Zingiberaceae).
Caenides soritia Hew.—Zingiber (Zingiberaceae).
 .. *dacela* Hew.—Phoenix dactylifera (Palmae).
Fresna nyassae Hew.—Albizzia (Mimosaceae).
Zenonia zeno Trim.
 .. *crasta* Evans Grasses generally (Gramineae).
Baoris fatuellus Hpffr. Panicum trichocladum, Pennisetum purpureum and Grasses generally (Gramineae).
 .. *lugens* Hpffr. ureum and Grasses generally (Gramineae).
Pelopidas mathias F.—Andropogon, Zea mays, Pasture grasses (Gramineae).
 .. *borbonica* Bsd.—Zea mays, Grasses generally (Gramineae).
 .. *gemella* Mab.—Saccharum officinarum, Triticum sativum, Zea mays, Grasses generally (Gramineae).
Gegenes pumilio Hpffr.
 .. *hottentota* Latr. Grasses generally (Gramineae).
 .. *niso* L.

(To be continued)

D. G. SEVASTOPULO.

KULIBANGBANG—UWANG

In measured time the trip home is two and a half hours, give or take ten minutes. The road over which I travel, in a bus that can only be considered a caricature of the genuine article, is a traumatic experience. Something you only expect to encounter in a nightmare.

“Guinness’s” book of records should take note of the number of passengers that, unbelievably, manage to crowd into one bus. To say nothing of the huge amounts of baggage; piled in the aisle helter skelter, high on the top of the bus, to sky-scraper heights. The dust accumulated along the way, fine and grey, is simply the final touch of sadism by a snickering mother nature.

But, to a man anxious to return home, to his own private jungle, it is almost an endless journey. The torture of a crowded bus, rough road and dust are minor inconveniences, in comparison, to his desire to reach his destination.

Every two weeks I must travel to the city of Laoag, Capital of Ilocos Norte, a province of Northern Luzon, in the Republic of the Philippines. To purchase my supplies, viands, vittles, grub. A debilitating, ninety kilometres each way. Immediately forgotten, upon arrival home.

Home is Barrio Gaoa, Sitio Malingay. Municipality of Pagudpud. The area is ninety percent jungle; and I live in a private fifteen hectares of it.

The house stands a mere five hundred feet away from a small bay that is fed by the exotic South China sea. Same distance to the rear of the house is the jungle and the foothills of the Patapat mountains.

With net in hand, before day-break, most times, and my two Boston Terriers for companions I head for the jungle to spend the rest of the morning pursuing a newly acquired hobby. Insect collecting.

I am unable to give the official names of the insects I will describe here—give me a break, I’m still quite new to all of this—but, it might be interesting to discover if you can identify them by my, admittedly poor, descriptions. Too, you may wish to inform me, by mail, of your success, or failure, in doing so.

The insect that most intrigues me is called BANNIRONG in the dialect. The bane of coconuts and coconut trees. A large, shiny brown beetle with two prominent horns, affixed vertically, thick bodied. (1) The children of the Barrio delight in capturing and attaching them to a length of string. They enjoy watching the insect make threatening gestures with his horns and listen to it emit angry, hissing sounds. In overall, grotesque appearance I am reminded of the items produced by toy makers, moulded in plastic or rubber.

ABAL-ABAL is an edible beetle. Considered a delicacy. Personally, my stomach might accept it but, I fear, my Western mind would rebel. The insect is about an inch long, dull brown in colour, tending to black.

Rounded body. The season for Abal-Abal is quite short. Early May, the first rainy season of the year. Another delicacy of the Ilocanos that my Western mind adamantly refuses to accept is the practice of eating dog-meat. Whenever a group of men gather around to do some serious drinking they prepare a dish of diced dog-meat and vegetables. This is a Polutan, side dish, appetizer. Appetizer?

I receive more requests for the MANG-NGARTIB than any other insect in my menagerie. Approximately two inches in length, narrow, metallic green body.

They usually appear in mid-afternoon. Always choosing one particular tree. In flight their bodies glisten in the sun, like detached bits of a rainbow. Like flying jade. They do not fly with their bodies on a horizontal plane, they tilt at a forty five degree angle. Circling the tree once they land heavily on a leaf. At times three or four, or more, pile atop each other. Uncommon though they might be I have netted as many as six with one sweep of the net.

Another interesting beetle is one that looks like a smaller edition of the 'Lady Bug'. About seven mm long. Round, dome shaped body. Light brown with black dots. We have two types, the other is half the size and a bright green. Mini insect-tanks. Sitting on a leaf, undisturbed, its body is raised. When threatened, if it does not immediately take flight, which it seldom does, it might 'play dead' and roll off the leaf into the underbrush. Most of the time it will hunker down and literally hug the leaf. Much like the salt water Abalone does on a rock. In order to break the vacuum between the shell and the leaf it is necessary to slide the insect to the edge and pick him off.

Butterflies? You Lepidopterist types should see the beauties that flit about in that seemingly impenetrable mass of verdure that is my private preserve. Eat your hearts out! !

One, in particular, which I call 'Alikabok'—which means a miniature dust eddy, cyclone—although not rare is difficult to net. The name incidentally, is also the sobriquet of a very close friend of mine. For the same reasons. It is about two inches long. One half of the length is taken up by the twin, narrow tails. Short, inch and a quarter, wing span. Wings are stubby and triangular forward, the rear wings are rounded and much shorter. About three quarter inch spread. Predominantly black colour. A light blue, narrow band starts at mid-body and reaches diagonally forward to the leading edges of the front wings. The tails are edged in the same light blue. In configuration, top view, it strongly resembles the War II fighter plane dubbed 'Black Widow'. The P-38. Twin tail booms, and all.

Alikabok is quite an elusive customer. His flight pattern is fast and erratic. Much like that of his name-sake. He rarely rests for more than a second or two, hardly time enough to get the net into play. When a specimen is taken, extreme care must be taken in handling. They are so

delicate, especially the tails. Much like trying to pick up a charred piece of paper without having it crumble in your hands. I feel elated if, say, out of six specimens I manage to end up with one relatively perfect. It takes me twice as long to put one of these on the spreading board than it does for any other butterfly. I feel like a surgeon attempting a heart transplant. At this writing I have one on the board that is destined for your own Mr. Cribb.

Upon opening one letter, from the U.S., I was obliged to read its contents twice over, to make certain that my eyes had not deceived me the first time. The gentleman requested me to procure tick specimens. Ticks? Fleas? I turned this one over to my friends in the Department of Agriculture. "Even from birds". I reminded them. The sky is the limit! Ah, well, it takes all kinds . . . Oh! Almost slipped my mind. Uwang is beetle in Tagalog. In the Ilocano dialect butterflies are KULIBANGBANG.

Leonard L. Lengyel

BOOK REVIEW

FRESHWATER LIFE by John Clegg. pp. X, 283 : 88 figs. 14 col. and 50 b.&w. plates. Fourth edition 1974. Frederick Warne & Co. Price £6.

This edition of John Clegg's popular book has been extensively revised and is presented in the larger size of the A4 format than the previous "predecimal" editions. This does allow the use of larger illustrations and of a clearer and more spread out typography. The A4 size does however preclude its use as a pocket book, since this format is more suited to the car than the jacket pocket.

The content matter has been upgraded to make the book more suited for school and college use, where some aspects of freshwater life may be part of an examination syllabus. This is of course moving with the times and does not by any means thereby detract from its usefulness to the purely amateur Naturalist who may perhaps be taking up the study of freshwater life later in life as a hobby.

There are some useful introductory remarks and summaries of the broader classification of the mainly aquatic groups of plants and animals. We are then taken through the various groups chapter by chapter. Emphasis is laid throughout on physiological and ecological aspects, as opposed to the almost purely classificatory and descriptive matter of earlier books on the subject. The final chapters give instructions for studying freshwater life and finally an all too brief account of freshwater biology in the service of mankind. We would like to see this section expanded: the account of pollution for instance occupies a mere two pages and yet it is the major scourge of the majority of our ponds, lakes and rivers. The book finishes with a very useful bibliography and an adequate index.

In this book the insects occupy a rather smaller amount of space than they used to in books of this sort. This is of course right and proper, for although the most popular group, they are, after all, essentially terrestrial and aerial animals and do not form the main populations of freshwater habitats.

This of course means that the book is giving more attention to the other groups and in consequence its appeal is greatly widened for those interested in aquatic habitats generally without however losing its usefulness to the pure Entomologist who will still find much of interest and also be brought to an awareness of the total interaction of all the various forms of life.

The numerous line illustrations are good, clear, and helpful to the understanding of the text matter. Most of the black and white plates are as in the previous editions, but from new blocks of larger format which in most cases has added to their clarity, although one may cavil at fig. 4 on plate 16 where the hydra is depicted in black silhouette, far from clear as a photograph, and would have been better as a line diagram. The colour plates have been mostly completely replaced with different subjects and while the ones in the previous editions were pleasing and interesting, the new ones are both good and of more relevancy to the text, depicting individual plants, algae, rotifers, molluscs, dragonflies, beetles, caddis larval cases, mites and amphibians. It is an unfortunate error that the title page of this book claims 16 colour plates (as in previous editions) when there are only 14, and states there are 48 half-tone plates when there are actually 50.

The text and illustrations are there and can be recommended to all our readers. It is therefore a great pity that the binding of this hardback cannot. This is a cased and not a bound book. The use of the arming press has been discontinued and instead of the delightful embossed covers, such a feature for half a century of Messrs Warne's Wayside & Woodland series of books, with their beautifully vignettted end-papers and the book properly and strongly taped to the cover, we have a plain austere plastic cover, the joints of which have already split in your reviewer's copy, and are clearly not capable of standing up to the usage a book of this sort will get. Copies that do fall apart within a few weeks or even months of purchase as a result of perfectly normal use, should be returned to the bookseller and a replacement demanded.

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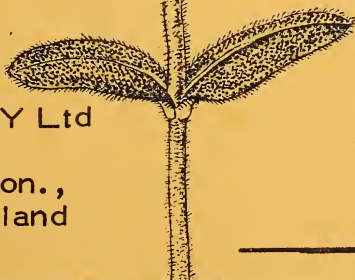


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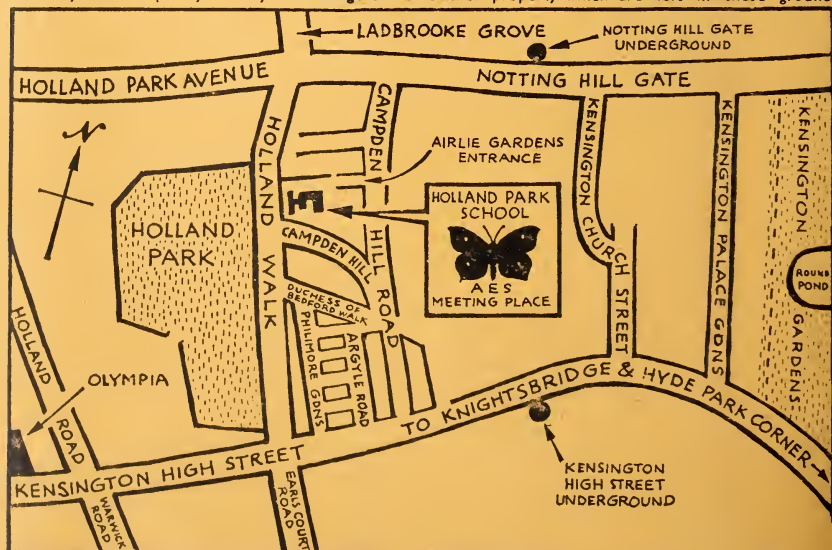
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AES

BULLETIN

No. 309

EDITORIAL

Or rather notice to contributors. To start with, I would like to thank all those authors who have kindly followed my request in last November's Bulletin and submitted their manuscripts accordingly. It has made my work that much easier. However I would now like to add a word in respect of submitted *illustrations*.

Firstly, now that the Bulletin is able to publish halftones, good quality glossy photographs are acceptable for consideration. They should always be at least 6 x 8 inches (that is to say x $1\frac{1}{2}$ the finished size) and should not be lettered or marked in any way, but pencilled instructions etc. should be put on the back; or on a duplicate copy; or on tracing paper laid over the photograph.

Secondly, line illustrations should be in black ink on thick white paper or thin card and also neither lettered or numbered, such lettering should however be on a tracing paper overlay, or on a xerox or rough copy of the diagram. By this means I will get the lettering typed and stuck on and this will lead to more uniformity of our illustrations and, hopefully, less work in having to redraw some diagrams which although otherwise suitable, have illegible or unreplicable lettering!

CONSERVATION OF BRITISH INSECTS

The report of the Society's Representative on the Joint Committee for the conservation of British insects for 1973-1974

Since my last report in early 1973 five meetings of the Committee have taken place and I attended all except one, when I was abroad. It is satisfactory to report that the Code for Collecting has received good publicity from various bodies including the Press, Radio and T.V. as well as the Societies and has been well received by the collecting fraternity. Coupled with the Code, lists of rare and/or endangered species have been compiled, and these too have been sent to various societies and journals for publication. It is hoped that information gathered by the Biological Records Centre and published in map form concerning the occurrence of local species within a county will be made available to the County Trust concerned.

During the last two years applications have been made for grants from the World Wild Life Fund to undertake surveys on certain butterfly species and dragonflies. Grants have been awarded and surveys have been undertaken on *Mellicta athalia* Rott. (Heath fritillary) and *Maculinea arion* L. (Large blue) in Devon; *Melitaea cinxia* L. (Glanville fritillary), *Lysandra bellargus* Rott. (Adonis blue) and *Carterocephalus*

palaemon Pallas (Chequered skipper); this last seems to have disappeared from all of its English localities.

The complex problem of legislation concerning the protection of wildlife has been discussed at length. Much of the proposed legislation concerns vertebrates and the Large blue seemingly is the only member of the Insecta likely to be involved.

An *ad hoc* subcommittee was set up to look into the matter of trade in butterflies and to accumulate as much information as possible on the subject so that should it be thought necessary at a later date to take action to attempt to curb this abuse of Nature for purely decorative purposes the information would then be available. Your representative who is a member of this subcommittee and who is acting as co-ordinator would be very glad to hear from members who may have relevant information on this subject.

Another matter which was raised and discussed at some length was the case of the seedsmen who were offering pupae of four species of butterfly with certain seeds. Although only small numbers were involved it was thought that the choice of *Euphydryas aurinia* Rott. (Marsh fritillary) as one of the species was unfortunate due to the remote possibility of the butterfly establishing itself in a locality where there was already an endemic population. The entomological dealer who supplied the pupae readily agreed that some other non-colonial common species would be substituted should the project be carried on for a further period.

The Committee has been in existence in its present form now for five years and it has reviewed its achievements during this period and has discussed plans for the next five years. One of the main conclusions arrived at is that societies such as ours could be of great help to the Joint Committee where their members who have local knowledge make this information available to the Committee for its use in the continual conservation battle.

Over the past year David Lonsdale, the very able secretary of the AES Conservation Group has been in frequent touch with your representative so that liaison in general has improved and in furtherance of this the minutes and agenda of forthcoming meetings of the J.C.C.B.I. have been sent to him for information and comment.

T. G. Howarth (1627)

SOME OBSERVATIONS ON THE BRIMSTONE BUTTERFLY, GONEPTERYX RHAMNI L.

The Brimstone (Fig. A) is one of our most attractive butterflies and its early appearance in the spring is always a welcoming sight to the entomologist. Its bionomics are also of great interest and there are several mysteries attached to the species, for example its occurrence and often abundance far from its known foodplants and the possibility of

alternative foodplants (as yet presumably unknown) other than the buckthorns. The following observations are all personal ones except where references are given.

Living almost a year in the adult state, the insect is robust with thick wings, powerful flight and body clothed in silky hair well suited to withstand the winter. It is rare to see a very worn specimen even at the end of its adult life, and I do not recollect ever seeing one with chipped wings (common among nymphalids) and this suggests that birds do not often attack them. The butterflies appear to live on some time after breeding and it has been recorded (although I cannot now trace the reference) that some have been seen flying with the recently emerged individuals of the next generation. The adult yearly cycle is roughly as is shown in Table 1.

TABLE 1
THE ADULT YEARLY CYCLE

FEBRUARY	Occasional male seen on a warm day.
MARCH	Appearing in increasing numbers when the weather is suitable, usually from about the 21st of the month.
	All males
APRIL	Many males flying in open country far from buckthorn, as well as in woods. Few females.
MAY	High concentrations of both sexes in the breeding areas. Fewer males in open country. Mating and oviposition takes place.
JUNE	Worn males and females only, the males in the majority.
JULY	High concentrations of both sexes in woods and other buckthorn areas. Males evidently wander off very soon after emergence as females are very much in the majority a week or so later.
AUGUST	Females still in the majority at breeding woods with the males to be seen in more open country, clover fields etc. Towards the end of the month, both sexes can often be seen settled under leaves of evergreens.
SEPTEMBER	In the first part of the month both sexes widespread feeding in open country and gardens. Aestivation-hibernation seems to commence in the latter half of the month, very often despite still warm conditions.
OCTOBER	Occasional stragglers seen.
OCTOBER- JANUARY	Hibernation.

Table 1. Observations applying to an average year from the weather point of view.



Fig. A. Brimstone butterfly at rest on flowerhead.

THE EARLY STAGES

Eggs taken from alder buckthorn (*Frangula alnus* Mill) in Surrey on 17th May, 1948 hatched on 27th May (10 days), fed up on this plant and pupated 18th July (22 days), followed by emergence of adults on 30th July (12 days). This compares with Frohawk's (1934) observations of 10, 28 and 14 days respectively. He also gives the life of the adult as 365 days.

At the time of this breeding experiment I was at first unfamiliar with alder buckthorn, but the freely ovipositing females quickly led me to this rather insignificant shrub and much to my amusement one female followed me and obligingly laid two eggs on a bunch of buckthorn that I was carrying in my hand while walking through the wood.

It was noted at the time that females tend to lay plenty of eggs on very tiny isolated plants where the resultant larvae would have little hope of surviving through lack of food. It was also noted that, in captivity, eggs did not hatch on leaves that had died. There also appears to be a high mortality rate in the early stages as buckthorn plentifully covered with eggs originally was found to have produced very few larvae at a later date.

Early and late stage final instar larvae are shown in Fig. B. and a chrysalis in typical normal position is shown in Fig. C.

COURTSHIP

The following two observations on courtship were made in Surrey in 1952.

Flight I. A pair were seen flying, almost hovering, the male in the lower position but almost touching the female. The female then settled on a dandelion and proceeded to feed with wings *fully expanded* (completely different from the usual habit of feeding with closed wings); in fact the wings were somewhat depressed in an untidy manner. At the same time she was 'challenging' (?) with raised abdomen in the same manner as so often seen with the common Whites. The male settled close to and butted her right wings several times but did not appear to be able to connect. After a short while he flew off leaving the female still feeding with wings fully expanded but no longer 'challenging'. Is this a defensive attitude rather than an invitation to mate? [In *Pieris brassicae* L. the above described female attitude is a definite refusal. — Editor].

Flight II. Another pair were seen flying in the same gentle manner among the branches of birch shrubs, the male again in the lower position. After a few moments they came out into the open and rapidly rose in the sky keeping in the same relative position to one another. This continued until they were entirely out of sight as they were flying 'into the sun'.

It is interesting to note that Eliot (1948) describes the courtship of *Gonepteryx cleopatra* L. in southern France which has many similarities to *rhamni* in behaviour.

FIELD NOTES ON UNUSUAL BEHAVIOUR OF ADULTS

On 31st June, 1951, in the Baldock-Royston region of Hertfordshire a rather worn male flying along a deeply hedged pathway was seen to dive onto, and investigate, a pale green plastic sugar-bowl which was being used at a picnic. This operation was repeated three more times within five minutes as the insect patrolled up and down the path. The colour of the bowl was slightly deeper green than that of *rhamni* female and the lid was about 3" in diameter. Whether the butterfly was attracted to the sugar in the bowl (the lid was closed anyway) or to the approximate female colour, was difficult to say. As the date was rather late for mating the chances are that the sugar was the attraction, although against that the Brimstone is essentially a flower (nectar) feeder.

Another incident of curious behaviour was witnessed on 18 August 1971 at a chalk pit in Hampshire heavily planted with *Buddleia davidii* Fran. The weather was very warm with occasional dull and hazy periods. *Rhamni* was very abundant (over 70 were counted in the small area of perhaps a quarter of an acre) concentrated on the Buddleia. Females

were noticed flying in the dull periods, but no males. However, when the sun came out again the males appeared from the cover of bramble and other bushes and continued to fly and feed with the females. Probably the phenomenon was more noticeable owing to the large number of specimens in so small an area. It was also interesting to note that although there were at least a dozen large bushes present, the bulk of the insects concentrated on one bush.

DISTRIBUTION IN RELATION TO LARVAL FOODPLANT

This is one of the most fascinating aspects of the life history of the Brimstone. It is generally accepted that the distribution of the butterfly reasonably coincides with the distribution of the two Buckthorns *Rhamnus catharticus* L. and *Frangula alnus* Mill. which Heath (1970) shows so well on his distribution maps.

Tutt (1896) referring to the butterfly says "Its distribution in England is entirely governed by its foodplants, which do not extend even into our more northerly English counties". This is not strictly true today as Heath's map shows the foodplant(s) extending just over the border into Dumfries-shire, and the Carlisle area as the most northerly station for the butterfly, but generally the map shows the Brimstone to be mainly found south of the Wash and thinning out rapidly northwards.

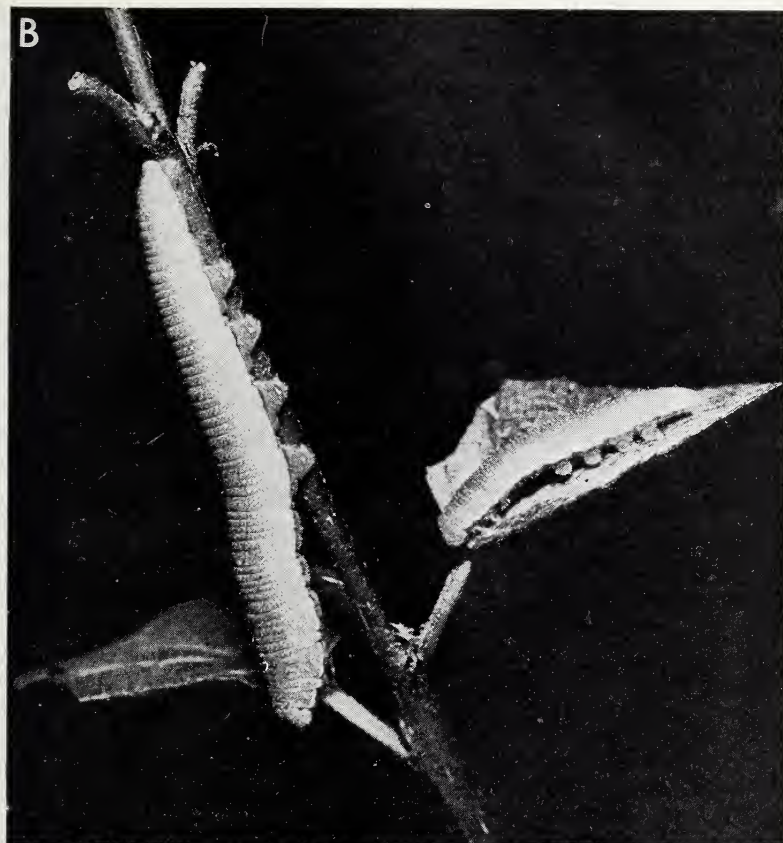
No doubt it does sometimes cross the border, for in the New Statistical Account for Scotland in 1844, an old record shows that the insect was seen in Bedrule parish, Roxburghshire. The unknown author states that it was probably the first record for Scotland. He also adds that *Rhamnus* was very rare north of the border in those days. In the literature it has been stated many times that the butterfly has been seen in localities far from its foodplants, possibly partly explained by the fact that it has a fast and powerful flight, but it has also been recorded in the Channel Islands and the Isle of Man where the foodplants do not occur. It is generally accepted that the species is not migratory, which leads one to suppose that there must be an alternative larval pabulum.

Haines (1945) remarks: "I cannot but think there is some undiscovered peculiarity in the early stages of *rhamni*, and that there is another foodplant than *Rhamnus* spp., of which there is but little here, [? part of Hampshire] although the butterfly is so plentiful. I notice the females are apt to descend into the roots of Ivy, among moss where there is little vegetation than Bramble and Woodspurge. We are reminded of *argiolus* . . . which feeds on *Hedera* and *Rhamnus* . . ." Burkill (1948) noticed a female *rhamni* in Surrey which appeared to be ovipositing on *Betula verrucosa* Ehrh. "I stood and watched her fix her feet as if for

Fig. B. An early stage and a late stage final instar larva of Brimstone.

Fig. C. Chrysalis of Brimstone in typical hanging position on thin stem of buckthorn bush.

(Figs. A-C are reproduced, by kind permission, from colour transparencies by Robert Goodden, Worldwide Butterflies Ltd.)



oviposition on a young leaf. She curled the abdomen round, but the moment its tip touched the leaf the butterfly flew off to settle on another branch. This process was repeated four more times on the same tree . . ." A search was made but no eggs were found. The butterfly then flew to another birch not so accessible. The situation in the Channel Islands is even more interesting:—Halliwell (1933) describes the butterfly as regular in occurrence but never common, and states definitely that the known foodplants do not occur in Jersey. "Consequently we must assume that the insect migrates regularly from Brittany—which is unlikely as it is not a habit of this species to migrate—or that it can feed on other plants—which is not generally recognised." More recently, Long (1970) remarks that there are a few Brimstones recorded most seasons in Jersey and Guernsey and occasionally rather more from Sark. "The small but regular numbers seen have stimulated search for a possible foodplant as neither species of buckthorn occurs except for very small quantities in ornamental shrubberies. So far, firm evidence of their breeding in the islands is lacking."

The only members of the genus showing migratory tendencies are the South American *Gonepteryx maerula* Fab. and *G. chlorinde* Godt. according to Williams (1930), who gives no records at all for *G. rhamnii*.

DISCUSSION

Undoubtedly more field work is needed to try to determine the unknown foodplant(s) of the Brimstone butterfly, and the careful observation of ovipositing females in May might be worthwhile. In addition to the suggestion that Birch may be concerned, other members of the families Rhamnaceae and the nearly related Celastraceae might be more likely, which families contain the genera *Ceanothus* and *Euonymus* respectively. Experiments in captivity i.e. submitting various plants to larvae would not be convincing evidence, because although Allan (1949) remarks that larvae will feed on *Rhamnus alaternus* L. it does not follow that the adult would lay eggs on that plant.

B. R. Stallwood (1547)

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THE COLLECTOR ONSLAUGHT

The healthy argument of camera versus net continues and on this occasion championing the cause of the photographers among us is Mr. K. J. Willmott under the title "The Iris Onslaught" on page 56 of the May Bulletin.

The argument for the camera was skilfully interwoven with the account of his many and fortunate sightings of perhaps our most handsome butterfly, *Apatura iris* L. I, for one, not having been so fortunate as he, read with interest and some envy his article. However, on reflection I realised that unwittingly or otherwise, Mr. Willmott laid several red herrings along the way. Perhaps he wanted a collector like myself to capture a few, and if so he has been most successful, for I shall try just that, with or without my net! In any event, I consider the article begs a reply.

Firstly, it is admirable that Mr. Willmott allows his camera to do the killing, but I think that enough has been written in the pages of our Bulletin previously in connection with the need for collections of both photographs and the real thing. Suffice it to say that I am sure the late Mr. F. W. Frohawk would not have achieved all that he did with only a boxful of photographs to study.

I feel it my duty to point out to Mr. Willmott that today there are not many who can afford the time away from work that he admits is necessary in order to study just one butterfly and therefore most of us have to be satisfied with a representation in our collection. Possibly I may be naive but I sincerely believe that even though it might be possible for a dealer and his companion to collect ninety-seven *iris* in a single wood in the space of a few days, no collector, let alone dealer, would do such a thing. Not just to swell his collection nor for pure monetary gain, as was the inference of the article taken as a whole. I am sure that better awareness of our declining fauna, coupled with conservation education, would see to it that commonsense prevailed.

Further, Mr. Willmott does not endear himself to the majority of entomological enthusiasts by wrongly assuming that one of the prerequisites of owning a kite net is being a maniac. It would appear from his wild accusations that he has neither heard of reasoned argument nor of gentle persuasion. Both of these I recommend him to learn; that is if he is genuinely interested in influencing others to put down their nets and take up the camera? Whilst handing out the advice I might just add that for Mr. Willmott to see a parked car and incorrectly assume the worst, is fatalistic. Fatalists are renowned for being unsuccessful and therefore do not command many followers.

All along I could not help but wonder to whom was Mr. Willmott preaching? On one hand we had maniacs making mad slashes with their kite nets and on the other Mr. Willmott labelling all collectors as bad types with a sub species of a ruthless breed on which he, in his

conservation minded way, could only see fit to deal with by physical violence. It was at this point that credibility was lost and his argument fell apart at the seams. Using his own words "this was the climax of the whole fiasco".

I could be accused of not stating my position clearly, but from my style it is obvious I am one of the bad types. Might I make the point that being one of the bad types does not mean that I would only respond favourably to physical violence and burly foresters. I do wonder however, from Mr. Willmott's tone, if the pressures of not collecting manifest themselves in a morbid desire to hurt ones fellow beings.

Judging by the amount of useful information imparted, it would seem that Mr. Willmott spent far too much time studying forestry, vandals, and morons. If one really wants to, it is not too difficult to find faults in others but I have my doubts as to the number of untrustworthy, un-savoury and unscrupulous characters that he seems to think exist among collectors. I am pleased to say that my experience after meeting many is completely contrary to his.

Mr. Willmott must do better than that by far if he wishes to convince me that his frame of mind is the right one; that his cause is the only worthy one. Like him I have a net and will continue to use it, with appropriate discretion, until perhaps he takes a course in the art of gentle persuasion rather than that of the popular oriental martial. While I am still open to consider all opinions, of one thing I am certain that I will always differ from him.

I find it hard to take Mr. Willmott seriously because of his narrow mindedness, albeit I think I understand the reason, so I close on a light hearted note. In the camera versus net argument, Mr. Willmott was too negative in his approach and attitude and tended to bellow too much. This caused me to put up the shutters and consider he was given too much exposure. (No criticism of the editor). In my estimation the only slide Mr. Willmott has taken for his cause is a backwards one.

M. S. L. Simpson (4859)

SOME THOUGHTS ON THE INTRODUCTION & RE-INTRODUCTION OF BUTTERFLIES

Geoffrey Sell's article 'British Butterflies and the Climate' (*Bull. amat. Ent. Soc.* 34: 24), raises a number of interesting points on the extinction and re-introduction of butterflies in Europe. The localization of a number of species at present resident in Europe may well be due to climatic or other environmental factors, but in several cases the reduction is being helped along at an alarming rate by man (e.g. *M. arion* in England, and *L. dispar* in central Europe). Collecting of species of this type of status is a thing that all true entomologists would condemn.

The normal course of events is that as environmental factors change; the status of the species will change. In most cases environmental

changes are cyclic, and so a species will at any given time either be increasing or decreasing its range. If this occurs the species should permanently have a continuous range over a given area. This has been the case with *P. c-album* L. and *L. camilla* L. in Britain. In those cases where the reduction of range has been due to the activities of man this will not be the case. The pockets where the species survives will in most cases not be the areas where environmental factors are most favourable, and if conditions improve over the area that was once colonised by the species there may still be a gap too large for the species to cross, in these cases man has the right and the duty to re-introduce the species, and in many cases success will be met with.

There are those who will say that it is of no particular importance that a particular species should be returned to an area where it once occurred; to this I will give two answers: Firstly there are aesthetic reasons for having many species of fauna around us; secondly it is of great importance to have the maximum number of species present in any given area, that that area can support. If we liken a given area to a single species we can say that, as in a given species, it is of great evolutionary value to have the maximum gene-pool available to the species, it is in any area of great value to have the maximum diversity of species existing. If in a country the maximum species diversity does occur, then if conditions do change radically there is every chance that that country's life will be preserved in a more natural way. This is not just the case with insects but with all life. Whilst on the subject of species diversity it should be mentioned that in nearly every case it reaches a maximum with the natural fauna of the area in question with very few extra species added. This is exactly the case in Britain, and it is for this reason that I support any attempted introduction of formerly resident species. I also support the careful introduction of species that were never resident here, which, were it not for the fact that we were an island, would probably have spread here naturally, and therefore not radically affect the natural balance of species already here. It is for this reason that I support any attempted introduction of formerly resident *levana* in Wiltshire at the moment. (With the knowledge of the Joint Committee for the Conservation of British insects).

The situation is very different when it comes to species that have reduced their ranges due to environmental causes. These species will also form pockets, but in these cases the pockets will be formed in those areas that are most suitable for them, and it is when this happens that sub-species and new species are formed, and when these extend their ranges, and the pockets meet they will not interbreed. It is in these cases that efforts to introduce a species will end in failure. But it is still of great importance to try; the fact that it fails tells us as much as if it succeeds.

Simon A. Beard (5317)

1974 OBSERVATIONS ON THE CHALK HILL BLUE BUTTERFLY

On the 17th August, a fine sunny but cloudy day, I visited a well established colony of *Lysandra coridon* L. on the chalk downs near Otford, Kent, and was pleasantly surprised by the abundance of this butterfly which far excelled in numbers that of any previous year I had visited the area. Both sexes swarmed everywhere, and the lower slopes, although covered with hawthorn scrub, supported almost as many individuals as the more open part of the down, where the colony is predominant. As I noticed males about half a mile distant in the middle of a cornfield, it appeared that numbers of the butterflies were migrating away from the main colony, a most encouraging sight.

Whilst wandering around the upper slopes I noted a female amongst the undergrowth struggling in vain against a male wasp, which was apparently intent in devouring its captive; rather gingerly I managed to free her from his clutches unharmed; one wonders how many butterflies are likely to end their days at the hands of marauding creatures of this type, but it is probably a very small proportion. Near the top of the upper down I came across four males feeding avidly on old dog excrement, something I have not seen before with this species, and later almost trod on several more whilst on my way back along a path running along the bottom of the down, again fully engaged in this rather unappetizing meal left by a thoughtful (or unthoughtful) dog owner.

The most amusing part of the afternoon, however, came as I watched a male *coridon* avidly chasing a *Plusia gamma* L. (Silver Y) amongst the grasses, apparently taking him for a female of his own kind. Now *gamma*, as most people know, is no slouch in the field, and his day-time excursions are quick and brief; however he could not shake off his determined pursuer who attempted to court him everytime he tried to hide away by rapidly vibrating his wings and trying to get close enough to the moth to commence pairing. In desperation, *gamma* dashed hither and thither to no avail, and his predicament was not helped by another male *coridon* joining in the chase. Eventually both males gave him up (probably as a female already paired), and left him determinedly clinging onto a hawthorn stem.

Finally, on returning to the scrubby slopes on my way home, I was surprised to see someone attempting to uproot a fair sized hawthorn with a shovel, and noticing a recently cleared area nearby, I reasoned perhaps someone had taken an interested viewpoint of the colony and had decided to 'weed out' some of the hawthorn scrub, thus assisting the species to breed in a new area. Imagine, therefore my surprise when, on inquiring of the rather perspiring worker I was told that this stretch of downland had been purchased at auction, and that the owner being a keen model aeroplane flyer needed a clear area in which to land

his radio-controlled aircraft. Hawthorns and aeroplanes don't go well together, and that was the reason for clearing. I had myself, only last winter removed a few smaller bushes from the main breeding slopes, but had given up in the lower hillside because of the extent of the scrub. However, as the butterflies have 'overflowed' into this area, the removal of bushes may assist colonization this year, perhaps next year will tell.

J. Platts (4300)

SOME GENERAL OBSERVATIONS MADE IN LIECHTENSTEIN ON CONTINENTAL RHOPALOCERA IN JULY 1974

In recent years my wife and I have been fortunate enough to escape for holidays in alpine areas in Austria; but for our holiday abroad last the Principality of Liechtenstein — and we arranged our visit for the year we decided upon that small and perhaps notorious "tax haven" — first fortnight in July in order to see as much of the alpine flora and fauna as possible subject to weather conditions permitting. We stayed at a modern and comfortable hotel in Malbun (1,600 m.) which lies in upper alpine pasture just below the tree line at the head of a beautiful valley with surrounding resplendent mountain escarpments forming a sheltered basin. Apart from our well appointed hotel Malbun is basically a small developed Winter ski resort with scattered chalets, and as yet has retained its unspoilt rustic charm.

Liechtenstein covers 157.11 sq.km. and is one of the smallest independent states in the world. It lies on the right bank of the Rhine and is bordered in the east and north by Austria and in the south and west by Switzerland. The terrain is principally mountainous and the most densely populated region is the Rhine plain, which on average, is 465 m. above sea level. The Principality stretches for about 25.75 km. and the average width is about 5.95 km.

The Liechtenstein Alps are approached from Vaduz, the Principality's Capital, by a modern alpine road, which rapidly twists its way up the alpine slopes with numerous hairpin bends providing breathtaking panoramic views of the Rhine valley and plain below, and above Triesenberg the southeasterly route passes through a tunnel into the heart of the Liechtenstein Alps on to Steg (1,300 m.) in the Samina Valley. From here the road continues on its lonely climb into the Malbun valley where it ceases at an altitude of 1,600 m. Because of the diverse character and altitudes of the principal areas visited between Malbun and Triesenberg, I have decided to give brief descriptions of the various species encountered under four headings to indicate the name of the area or nearest village with approximate altitude, since it will be readily appreciated some species found were confined to particular altitudes and were not recorded as being sighted in all areas.

Malbun and surrounding alpine pasture and woodland (1,600 m-1,800 m)

This particular area afforded one with a good opportunity to study butterflies in the field amongst open pasture as well as amongst sparse conifers and small mountain tracks with little risk of being disturbed by much human intervention!

Pieris napi ssp. bryoniae Hbn. This species was widely distributed above the altitude of 1,400 m., and was particularly common in areas of rough pasture and upper alpine wasteland. The female imagines all displayed a heavy suffusion of brown colouration on the forewings with less suffusion on the hindwing areas, although the main vein nervures were usually encased in streaks of heavy brown or grey colouration thereby giving the imagines a somewhat chequered or mottled appearance. A considerable amount of variation in density of colour and overall suffusion was recorded. The male imagines were universally white with the vein nervures often strongly etched in black towards the marginal area of both fore and hindwings. The apical areas on the upper sides of the forewings were usually grey or blackish with a small but often vestigial black spot in space three on the upper sides of the forewings.

P. brassicae L. Only a few imagines both male and female were sighted and recorded in the lower alpine meadows and wasteland below Malbun above 1,400 m. Clearly this species favours lower altitudes and it is suspected that it will not be frequently found above 1,600 m. in this northern alpine region.

P. rapae L. Only a few male imagines sighted with *P. n. bryoniae* in localities as stated above. It is suspected that this species is rarely encountered above 1,500 m.

Boloria pales Schiff. Only one isolated male imago was found in high alpine rough pasture above Malbun, and since no other imagines were recorded during my holiday, it is considered that this species is generally on the wing later in July and into August, and is more likely to be found above the tree line (1,800 m) in open meadowland and the base of mountain scree areas particularly lying to the west of the Principality.

B. euphrosyne L. This species was encountered quite frequently during sunny afternoons flying around mountain paths and slopes around Malbun, and particularly favoured waste areas with protection from cold northerly winds. Both male and female imagines were found and all displayed regular markings. The general colouration displayed by female imagines however, was fuscous in appearance with extended suffusion in the basal area of the upper sides of the hindwings. No aberrations were recorded.

Euphydryas meolans ssp. stygne Ochs. Many male imagines of this species were sighted particularly in the second week on sunny days

in upper alpine meadowland and southwesterly facing mountain slopes around Malbun. However, this species was more abundant at lower altitudes in particular around Steg (1,300 m). In view of the greater quantity of imagines sighted around Steg, it is believed that this species tends to emerge a week or two earlier at lower altitudes and would account for the sparse numbers sighted around Malbun. No female imagines were recorded. The general colouration displayed on the upper sides of both fore and hindwings was deep brown, and it was particularly noted that all freshly emerged imagines had an attractive velvet like sheen to the upper sides, when examined in strong sunlight. Within the post discal area of the upper sides of the forewings there was a deep brick-red band, which was intermittently broken by streaks of brown general colouration. Two black spots with a distinct enclosed white pupil appeared within the upper apical area of this band. This post discal band was almost completely absent from the upper sides of the hindwings, although some imagines displayed three or four vestigial patches of brick-red colouration within this area. Three regularly spaced small black spots with tiny white pupils were often present within these hindwing brick-red patches. The underside of the forewings tended to be paler in colouration and the brick-red post discal band was distinctly larger and more uniform in character than the intermittent band displayed on the upper sides. This species clearly enjoyed plenty of sunshine and was rarely encountered when cloud descended. This species was also gregarious by habit and tended not to remove itself far from the colony boundaries.

C. gardetta de Prun. This species of "heath" was fairly abundant around Malbun within areas of wasteland and upper alpine pasture. All imagines sighted were male and in view of their general good condition, this species was only just emerging. No female imagines were recorded. The general ochreous colouration of the upper sides of the forewings as well as the darker brown colouration of the upper sides of the hindwings were in general uniform in character, although a few imagines were recorded as having a darker and more suffused colouration. The undersides of the hindwings displayed a creamy irregular band in the post discal area with six or less variable black spots with white pupils lying to the outer extent of this band. There was also a slim silver band present in the submarginal area of the undersides of the hindwings. This species clearly confined itself to open areas of land and was often encountered upon exposed windy slopes.

L. petropolitana Fab. Only a few male imagines were recorded as sighted in flight amongst stony scree areas and dry stream beds around Malbun. The particular notable feature of this species is the distinctive large black eye spot in the apical area of the post discal region of the upper sides of the forewings, which encloses a small white pupil. The general colouration is deep brown with wavy darker bands within the

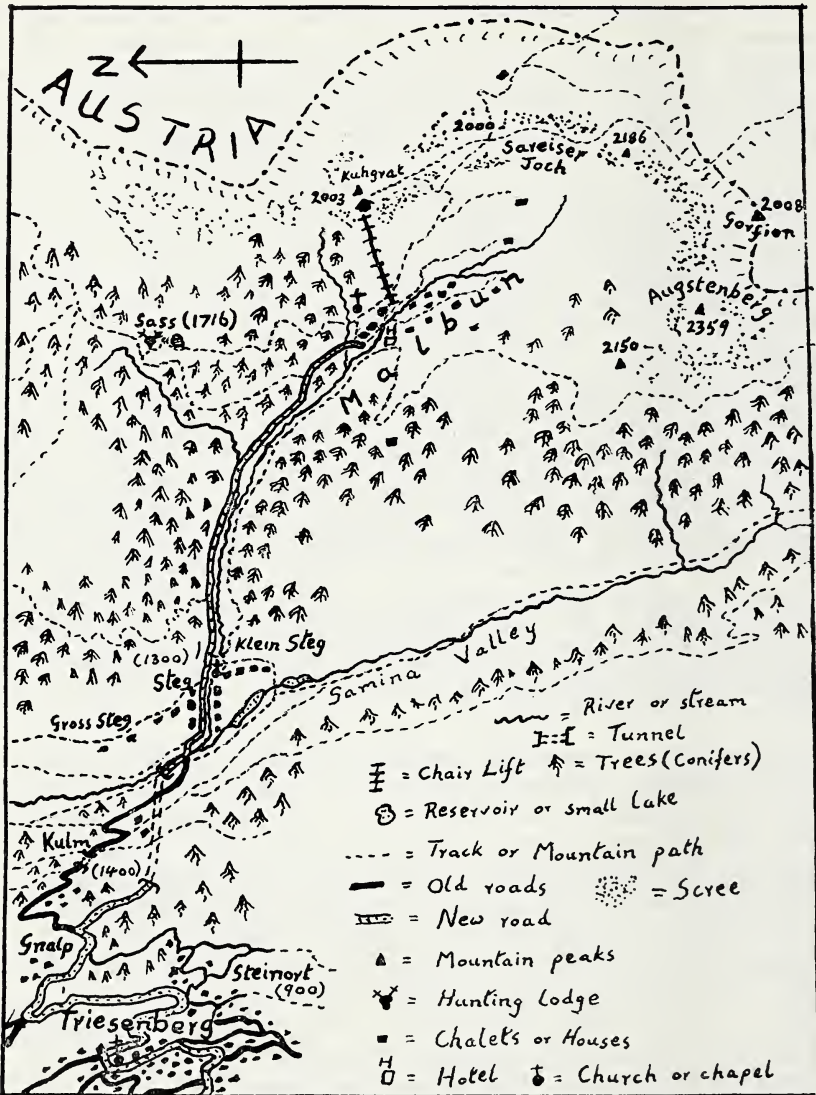


Fig. 1. Map of Liechtenstein showing main collecting areas.

discal areas. The upper sides of the hindwings also display two large black spots with white pupils within a disconnected orange band lying in the post discal area. A small black spot was sometimes present within space 5 above the two larger spots. This species confined its flight amongst stones, and tended to take to the wing only when disturbed.

and then only to dart up into the air for a short period before suddenly alighting amongst stones again, where its mottled undersides provided immediate camouflage protection.

H. tityrus Poda. Both male and female imagines were recorded in areas of open meadowland around Malbun. This species appeared to be widely distributed within altitudes of 1,300 m and 1,600 m and was particularly common on sunny banks and slopes where dense flora existed. The male imagines displayed a deep sooty colouration with a small black oblique spot in the discal cell. The female imagines were paler in colour and the apex of the forewings was distinctly rounded in character.

C. minimus Fuessl. This species was exceedingly common throughout all areas visited and was often present in large numbers around damp patches and pools of water along mountain tracks and paths. General colouration and markings appeared to be uniform throughout. Both male and female imagines were recorded at all times.

C. semiargus Rott. This species was sighted everywhere up to an altitude of 1,800 m., and thereafter only one or two isolated male imagines were found. Both male and female imagines were recorded and although all imagines caught were in good condition, it is quite probable that this species has an extended period of emergence from the middle of June until early September. It is also quite likely that this species has more than one brood throughout the summer period. No aberrations were recorded. Markings and general colouration were stable wherever found.

P. alveus Hbn. Only a few male imagines were recorded around Malbun along mountain paths and dry exposed wasteland areas. The small white spots within the discal and post discal areas of the upper sides of the forewings were largely uniform in character. The upper sides of the hindwings were generally unmarked. It has to be admitted that care has to be exercised over identifying this species having regard to the fact that it is so similar to other species within the same genus.

P. andromedae Wallgr. This species of "skipper" was commonly encountered around the lower slopes and mountain paths around Malbun and appeared to favour somewhat open terrain and enjoyed basking on dry mud and stones. General markings were uniform throughout and no aberrations were recorded.

P. carlinae Rbr. Only a few male imagines of this species were recorded around Malbun in upper meadowland. It is probable that this species has an extended range in other parts of Liechtenstein. Markings and colouration appeared on the whole to be regular.

Steg and adjoining alpine meadowland (1,300 m)

This area is somewhat more open than the area around Malbun due to the fact that Steg itself is a cluster of winter and summer chalets

in the Samina valley, where much of the land is used for cattle fodder. However, around banks close to the road a surprising number of species were recorded.

P phoebus Fab. One imago was caught in flight in the middle of the afternoon of 10th July along a path lying above the river just to the north of Steg. This specimen proved to be almost the last butterfly caught during my holiday and has to be admitted provided me with an unexpected bonus, since I had not expected to find this species within that particular altitude. This imago was found to be a male and in view of its excellent condition, it is believed that this was an isolated early emerged specimen, which may have fluttered down from a higher altitude. I suspect that this species is more likely to be encountered in August and at higher altitudes.

F. niobe L. This species was only just appearing on the wing and a few fine male imagines were found in flight around Steg as well as around Steinort at a lower altitude (900 m). All imagines sighted displayed a bright fulvous colouration with a general standard pattern of markings on the upper sides of both fore and hindwings. This species prefers open meadowland, and is particularly fond of flying along banks and river beds wherever there is a density of flora existing. The flight pattern is strong but erratic, but imagines were recorded as often alighting on flowers such as Knapweed and *ssp. scabiosa*. Flight activity confined entirely to hours of strong sunlight.

C. euphrosyne L. Imagines were encountered from time to time in flight along sunny banks, although this species appeared to be more common around the Malbun area.

E. epiphron ssp. aetheria Esp. This species was found to be very abundant in the pasture and wasteland areas around Steg. No female imagines were however, recorded, and I believe therefore, that this species had only just appeared on the wing within a few days of my arrival. The general colouration was a deep brown with two small brick-red spots in the apical area of the upper side of the forewings enclosing a small black or deep brown spot. Some male imagines also displayed two to three such spots in the markinal area of the upper side of the hindwings, which also enclosed a similar black or deep brown spot. *Form nelamus* Bdv. was also present in small numbers. This form is almost entirely deep brown with only traces of the apical spots. The general flight pattern of this species was weak and imagines tended to fly around together within a metre from ground level and often alighted on long grass blades around rough paths and stony ground. Many imagines would fly together within a restricted area of ground and appeared to be unwilling to fly outside their own prescribed territory.

E. meolans ssp. stygne Ochs. As has been indicated before, this species was found in the Steg area and in greater numbers than around Malbun.

This species was often found in flight together with the preceding species described.

H. tityrus Poda. This species appeared to be somewhat more widely distributed around Steg than elsewhere, and I suspect that this species has almost reached the end of its altitude range after 1,400 m, although a few specimens were recorded around Malbun.

C. minimus Fuessl. This species was just as common around Steg as elsewhere, and no aberrations or unusual characters were recorded.

M. arion L. I was delighted to stumble across an extended colony of this species around the banks in the Steg area close to the Samina River, and the colony appeared to be entirely confined to a large sunny bank adjoining upper alpine pasture. In view of the noted tendency to display suffused colouration except over the basal areas of the uppersides of both fore and hindwings, this colony may in fact be identified as *ssp. obscura* Chr, although this is a matter for positive confirmation. Both male and female imagines were recorded and amongst male imagines size was extremely variable. Flight activity appeared to be confined to the early hours of the afternoon whenever sunshine was strong and imagines rarely flew above two metres from ground level.

E. eumedon Esp. Both male and female imagines of this species were encountered around Steg and clearly this species enjoyed a habitat similar to the species above referred to. Owing to the generally good condition of specimens caught, I believe that this species was only just appearing on the wing and is more likely to be encountered later in the month and early August.

C. semiargus Rott. This species was equally as abundant around Steg as elsewhere. Both male and female imagines were present.

P. icarus Rott. This species was in fact only recorded as being found in the Steg area. It is quite probable that in view of the small numbers sighted, this species was only just appearing on the wing. Both male and female imagines were however recorded and were notably large in size.

P. alveus Hbn. Both male and female imagines were found to be widely distributed around the Steg area, and I believe that this species is not likely to be encountered in large numbers much above the altitude of 1,400 m. This species is definitely a sun worshipper and spends much of its time with wings expanded on stones and waste ground.

Sareiser Joch and surrounding escarpment area above Malbun (2,000 m)

This particular area above Malbun is reached by a chair lift, although it is quite possible to reach this escarpment area on foot; but I do not recommend such an exercise if time is short and the sun is strong in the heavens, unless one's enthusiasm is insatiable! Much of this area

is exposed and rocky and affords one a marvellous opportunity for studying flora and fauna at high alpine levels.

E. cynthia ssp. alpicola Galv. An extended colony was found to exist on the easterly side of the Sareiser Joch stretching along the escarpment to the chair lift platform. All imagines sighted were male and at no time were any female imagines found. This particular sub-species notably displayed heavy grey suffusion in the basal areas of the upper side of the hindwings and the orange lunules in the submarginal areas of the upper side of the hindwings were often small or vestigial. The white areas however in the post discal and discal areas on the upper side of both fore and hindwings were clearly distinct. It is quite probable that this species had been present on the wing for at least two to three weeks before my visits, and it is likely that this species has an extended and prolonged period of emergence throughout most of July and early August. Flight is particularly erratic and fast. The wings in fact move very quickly and enable imagines to withstand heavy gusts of wind and alter their course of direction quickly in order to avoid obstacles and predators. This species was particularly active in bright strong sunshine and often alighted on Juniper twigs and branches with wings fully extended for short periods.

E. aurinia ssp. debilis Obth. This species was only found as a small local colony in a marshy hollow below the Sareiser Joch near the Austrian border at an altitude of 1,900 m. Most imagines observed were male and were diminutive in size with a wing span of approximately 15 mm. Two female imagines were sighted and were distinctly larger than their male counterparts. General colour on the upper side of both fore and hindwings was yellow-grey with vestigial markings and a suffused fuscous colouration. The orange-red discal spots in the submarginal bands were often reduced in size, and it was noted that the discal spots on the upper side of the hindwings did not always enclose a small black spot. The markings and general colouration on the under side areas of both fore and hindwings were often very pale and vestigial.

E. pluto de Prun. This species must surely rank as one of the most dramatic from a colour standpoint of all the many species found in Central Europe of the *Erebia* genus. The small colony encountered was confined entirely to the Sareiser Joch escarpment and was in fact found on a small area of scree above Malbun. All imagines caught or sighted were male and in view of their very good condition, the colony was only just appearing on the wing. The imagines displayed a deep black colouration with a velvety sheen on the upper sides of both fore and hindwings. Some imagines displayed a very faint disconnected post discal band, which tended to be brick-red in colour, although this was so heavily suffused that the band was only discernable upon close inspection. The under sides of the forewings tended to show a more

prominent brick-red area within the post discal region. The undersides of the hindwings were however, universally black. No ocelli were displayed on either fore or hindwings. It was interesting to note that the imagines of this colony were particularly large in size with forewings having an average length of 23-25 mm. The flight was irregular and only covered a few metres. Imagines clearly preferred to remain motionless for long periods amongst small stones and boulders, and would only move when disturbed in a violent manner. Imagines appeared to show a total reluctance to move away from the scree area, and this species has the remarkable ability to avoid detection when at rest by merging with the dark irregular shadows cast by stones and small boulders.

A. orbitulus de Prun. Both a male and a female imago were found late one afternoon flying together amongst short grass and low growing plants on the easterly side of the Sareiser Joch. The male imago is an attractive insect because of its distinctive iridescent blue colouration on both the upper sides of the fore and hindwings, and in appearance this species might initially be confused with *L. bellargus*, although the markings and general colouration of the under sides of both fore and hindwings are in fact distinctly different. Although I have not specifically mentioned the fact, two male imagines were caught in the Steg area, and therefore, I suspect that this species has two distinct forms of habitat.

E. pandrose Bkh. This species was only encountered just below the Sareiser Joch escarpment on the eastern side and was never encountered lower than 1,900 m. Most imagines sighted appeared to be males and only two females were recorded. There is a particularly distinctive species of *Erebia* arising out of the general pale brown colouration and the broad but tapering light brick-red band displayed within the post-discal and sub-marginal areas of the upper sides of the forewings. This band also has four irregular blackish spots without white pupils. The upper sides of the hindwings were generally darker in colouration and displayed three distinct black spots often encased within a brick-red patch in the post-discal area. Towards the costal and apical region of the upper sides of the forewings there was often a greyish colouration giving the imagines a somewhat "faded" or "dewy" appearance. The under sides of the forewings were universally brick-red in colour with thin wavy brown lines³ across the discal areas. The four black spots were particularly prominent within the post-discal band and the sub-marginal area of the under sides of the forewings tended to be brownish. The cilia on the outer margin of both the fore and hindwings were pale grey or brown. The under sides of the hindwings however, were attractively mottled in grey wavy brown lines within the basal and discal areas. The three black spots on the hindwings were also quite distinct on the undersides.

Kulm and lower alpine meadows extending to Steinort (1,400 m-900 m)

F. niobe L. Although this species was clearly just appearing on the wing and a few fine male imagines were found in flight around Steinort above Triesenberg, only isolated imagines were sighted at any one time. It is quite probable that this species is in fact widespread in distribution throughout the whole region and is likely to be found around cultivated areas lying within the Rhine Plain and extending up to alpine pastures at 1,400 m. One specimen caught at Steinort was form *eris* Meig. with all spots on the under side of the hindwings buff coloured except the small post discal spots, which were silver. Although the position requires confirmation, it is suspected that form *eris* is more common in this region than form *niobe*.

C. titania ssp. cypris Meig. Only one isolated male imago was found in the Kulm area (1,400 m) which lies close to the old road leading to Steg, which runs off the new road with the extended tunnel. It is believed that this species was only just appearing on the wing during my visit, and is more likely to be encountered towards the end of July and August. I consider this particular species to be very attractive with its distinctive macular markings and the beautiful mottled coloured patches on the under sides of the hindwings.

M. athalia Rott. This species was only encountered in a small sunny glade amongst conifers in the Kulm area where a small colony of newly emerged imagines both male and female were found flying around alpine flora. Although all imagines appeared to display regular markings on the uppersides of both fore and hindwings, many did have the basal area of the upper side of the hindwings heavily suffused in black, and some female imagines displayed a variable amount of lighter fulvous colouration in the discal band on the upper side of the forewings. The under side of the hindwings were generally well marked with the post marginal lunules heavily etched in black and in each lunule there was often displayed a small orange spot.

M. aurelia Nickerl. Only one single male imago was found in flight within the colony of *M. athalia* referred to above. This specimen was small in size and although the markings were regular, the general colour was pale with a dusky suffusion throughout on all areas of the upper sides of both fore and hindwings. I suspect that other imagines were present in the Kulm area, and this species may well exist in other districts at higher altitudes.

E. melampus Fuessl. This species appeared to be confined to the lower alpine meadows and pasture around Gnalp (1,100 m) and only one female imago was in fact caught. It is quite possible however, that there were more imagines within this area, although this species is difficult to identify in flight whilst *E. epiphron ssp. aetheria* was present. This species is somewhat small and the hindwings are generally

rather elongated and often extend beyond the width of the forewings. There is present in the post discal area of the upper side of the forewings an interrupted brick-red band with deep brown spots in spaces 4, 5 and 6. A similar interrupted band is also displayed in the post discal area of the upper side of the hindwings with two small brown spots in spaces 4 and 5.

E. epiphron ssp. *aetheria* Esp. Many male imagines were found around Kulm, but few were found to exist at lower altitudes. *Form nelamus* Bdv. did appear to be more prevalent around Kulm than elsewhere.

P. hippothoe L. This species was recorded as fairly abundant in the Kulm area and the Steinort area in particular, where both male and female imagines were sighted and caught. However, owing to the worn condition of some imagines, it was readily apparent that this species had been on the wing for some time and its flight period was nearly over at the time of recording. All male imagines displayed the distinctive purple flush in the basal areas of the upper sides of the hindwings as well as the marginal areas of the forewings. There was the usual black oblique spot in the discal cell present in the upper sides of the forewings. Female imagines displayed the usual sexual dimorphic characteristics as regards general colouration and markings. A few female imagines however, were noted as displaying very suffused colouration with a few pale bluish spots beyond the submarginal orange band on the upper sides of the hindwings.

Although I have attempted to describe as briefly as possible most species encountered during my visit to Liechtenstein, I have failed to mention one particular species which was in fact sighted at all altitudes — that was *A. urticae* L. This species was to be found everywhere and at times was particularly plentiful within the higher altitudes and tended to enjoy flying around open wasteland and upper alpine meadows, and many imagines both male and female were even recorded as rapidly flying along the Sareiser Joch escarpment above Malbun. It is perhaps also worth mentioning that I did find in one afternoon two worn male and female imagines of *C. rubi* L. flying around a Juniper shrub within the upper alpine wasteland around Malbun, and it is therefore suspected that this species might be encountered at lower altitudes in early June and perhaps later.

Our holiday proved to be so successful that my wife and I have vowed that we would return to Liechtenstein again as soon as the opportunity affords itself to us, and I shall enjoy having a further opportunity to extend my studies within other districts in the Principality, which we were unable to visit last year.

N. F. Gossling (5169)

REFERENCE

HIGGINS, L. G. & RILEY, N. D. (1970) A Field Guide to the Butterflies of Britain & Europe. Collins, London.

NOTES AND OBSERVATIONS

MORE THEFT:—Is it perhaps another sign of the general lawlessness of our times or just the temptation of the high prices insects are now fetching due to inflation that is causing the increase in the theft of insects? At one time such thefts were unheard of. Two further cases can now be reported, although both occurred some time ago. First was the theft of a cageful of stick insects from a laboratory in Cambridge. The second of a hundred overwintering pupae of *Eacles imperialis* from a refrigerator in an American laboratory.

COLLECTING ABROAD:—Various countries may or may not have restrictions on collecting. We have received a letter from the office of the Guyana High Commission to say that members of the AES may collect insects in Guyana provided the collection is shared with the authorities in Guyana and that the results of any taxonomic research be duly communicated to them.

MASS HIBERNATION OF SMALL TORTOISESHELL BUTTERFLIES:—Mr. and Mrs. E. G. Ballard, who live at Kirkbean, on the north shores of Solway Firth—and about 10 miles south of Dumfries, had occasion on 16th March, 1975 to remove two armchairs from the back of their garage. On the seats of these they found 45 Small tortoise-shells, which flew about when brought into the sunshine. Later a few more were found inside the garage.

V. urticae L. is not uncommon in this district but the aggregation of such a number in one building is unexpected—and raises the question: Does each individual find the place 'ab-novo' from its usual situation—or does each new arrival give out some scent—so that the more there are already there the more "attractive" the site becomes?—C. B. Williams.

UNUSUAL BEHAVIOUR OF SMERINTHUS OCELLATA L. My first emergence of Eyed hawk moths this year occurred on the morning of 22nd June with the simultaneous emergence of one male and one female moth. I revisited the emerging cage at 11.30 p.m. hoping to find the moths successfully paired, but found the female alone at the top of the cage 'calling' and the male firmly *in cop* with a crippled female *Tropaea luna* L. (American moon moth). To make the incident even more bizarre, the *luna* had been dead for about two weeks (I had neglected to remove the corpse from the cage netting). No doubt the male was confused by the strong scent of the female in the enclosed space of the emerging cage (which is kept in the garage)—but to tightly couple with a dead female of a different species is indeed most peculiar. To end the tale on a happier note, the male successfully paired with the correct female the following evening, and fertile ova were produced.—P. A. Sokoloff (4456).

UNUSUAL PAIRINGS:—Notes in recent issues of the Bulletin concerning *Maniola jurtina* L. and *Aphantopus hyperantus* L., being found together *in cop.* prompts me to report that I found a male *A. hyperantus* coupled to a female *M. jurtina* at Bodelva in July 1974. They remained *in cop.* for only a short while after I boxed them, but unfortunately the female died about a week later without having deposited any ova. It would appear that cross pairing between these two may not be unusual, but since no obvious hybrids seem to occur in nature, it would seem to be pretty certain that any ova from such a pairing would not be viable.
— John L. Gregory (4116).

OBSERVATIONS ON YPONOMEUTA:—I think that Col. A. M. Emmet's notes, in the May 1975 issue of the Bulletin, require a few words of comment. On various occasions during the last few years I have reared what I consider to be three species of this genus. There is not much doubt in my mind that these three are specifically distinct, even though no one has so far been able to detect any difference in their genitalia.

First, there is *Y. cagnagella* Hueb., which feeds on both the cultivated Japanese Spindle (*Euonymus japonicus*), which is evergreen, and the wild European Spindle (*E. europaeus*). The larvae of this species are quite a bright yellow colour when full-grown, and not grey as stated by Col. Emmet (I have a colour transparency to prove it). Although larvae of this species have no objection to being changed from one kind of Spindle to another, they will die rather than accept either Hawthorn or Blackthorn (Sloe) (*Prunus* spp.).

Secondly, there is *Y. padella* L. which I suppose should probably now be called *Y. variabilis* Zeller. as the larvae feed on Blackthorn (*Prunus spinosa*). So prolific are the larvae of this species in some years in certain areas of the south coast of Cornwall, that large areas of low scrubby Blackthorn are completely defoliated, and the host-plants killed outright. The full-grown larvae are dark grey or blackish. In captivity this species will not accept a change of diet either to Hawthorn (*Crataegus* ssp.) or to Spindle.

Thirdly, there is *Y. evonymella* L. which were kindly sent to me by Mr. F. Harrison from Derbyshire. In nature the larvae feed on Bird Cherry (*Prunus padus*) and in closed plastic containers, I tried unsuccessfully to tempt larvae to feed on laurel, cultivated plum, Blackthorn, Apple, and cultivated (flowering) Cherry — but all of these plants were refused. Contrary to Col. Emmet's experience, the smell of Bird Cherry in my rearing-containers did not persuade the larvae to accept an alternative food. The fullgrown larvae of this species are grey. Col. Emmet does not mention, in his note, that Kloet & Hincks (1972) gives the spelling *evonymella*, and not *euonymella*. Entymologically the latter would appear to be correct, but chronologically . . . ?

I hope to do further rearing and breeding experiments on *Yponomeuta* species (or races) in the future, and I would be interested to hear from any AES member rearing this genus with a view to exchanging larvae from various food-plants. A further stage in the programme is to attempt to rear second generation *Yponomeuta* larvae on a different species of plant from that on which the first generation fed. — John L. Gregory (4116).

REARING THE MARSH FRITILLARY:—As a result of the kindness of one of the Senior Members of the AES I obtained a nice colony of Marsh fritillary, *Euphydryas aurinea* Rott., larvae this past winter. I was delighted and promptly 'signed on' as a new member!

I watched the little caterpillars progress through the months of March and April. With the aid of sunshine and honeysuckle they fed up quickly in their "Birds" coffee jar homes. They were given fresh food daily. All the caterpillars, bar two, eventually pupated by mid-April, the females being the last. Hatchings started during the last week in April and continued until mid-May. I obtained some pairings and the resultant ova are, I hope, going to continue the species for next year. It is intended to introduce a new colony to a suitable locality — one can be only optimistic!

One interesting thing has emerged from this effort. Two of the caterpillars have stubbornly refused to wake up from their hibernating coma. The sun has not done the trick, so presumably nature's alarm clock has not been heard by these two fellows.

I note Frohawk had the same experience in 1934; he records it in his Complete Book of British Butterflies — Peter K. Atkinson (5566).

PYRALIDAE IN DECEMBER:—*Euzophera cinerosella* Zell. is a very local southern species more usually found in coastal areas. Its larvae feed, apparently throughout the winter, in the roots of wormwood (*Artemisia absinthium*) where it should be looked for in mid-winter when other obscuring vegetation has died back out of the way. Another root to be examined is that of plantain (*Plantago lanceolata*) in which larvae of *Homoesoma sinuella* Fab. may be found. Old stems of the reed *Phragmites australis* should be collected for larvae of *Chilo phragmitella* Hbn. The white silk hibernacula of *Udea prunalis* D. & S. are attached beneath leaf edges of plants such as deadnettles (*Lamium* spp.), but also on a wide variety of other plants

PIPE-CLEANERS FOR 'HANGING PUPAE':—Pupae which normally hang by the cremaster and which have come adrift from their supports can very conveniently be affixed to a pipe-cleaner. They are glued in place by the cremaster with contact adhesive or similar waterproof glue (balsa cement is ideal as only a small amount wells out at a time)

and care must be taken, of course, to prevent glue gumming up any other part of the chrysalis.

The advantage of the pipe-cleaner is that emerging insects can easily run along it and its ends can be quickly fashioned into loops for attachment to the cage. Small picture 'eyes' screwed into roof or walls provide a safe support. — Leigh Plester (2968).

AN EASY METHOD FOR ROUTINE RECORDING FROM GARDEN MOTH TRAPS

The yearly dissemination of the information accrued during the previous season is a somewhat lengthy winter job for most entomologists. Mostly, this information is made available to the Biological Records Centre, County Recorders, Nature Reserve Wardens or the authors of the different volumes of the proposed new tome on the British Lepidoptera. In Kent we are currently running a huge programme for the recording of all natural life based on the tetrad system. At the Maidstone Museum, the information is filed under both species and tetrad. In order however to optimise the information received on lepidoptera, date records are being supplied on each species for every 10-day period. This information among other uses, will be valuable in assessing variation in emergence periods from year to year.

However, recording on this scale, perhaps from several traps each day, demands new approaches to the handling of data. Firstly it would mean that accurate counting is not possible and only an indication of relative numbers may be noted. Secondly it would be extremely advantageous if the data could be presented in such a manner that the occurrence of a species in any 10-day period may be seen at a glance. Thirdly, it would benefit further data abstraction if the recorded list from any trap could be entered into the daily diary in an exact species order, either generic or alphabetical.

In the latter part of 1974, I went some way towards fulfilling these criteria by devising a moth trap check list for the expected moths in my area. This list was divided into daily sections and did indeed greatly speed up the handling of the moth trap records. A number of people have expressed interest in this approach and so I herewith give further details of a system which has been extended so that it may be used throughout the major part of the country.

As can be seen from Fig. 1, it simply consists of a list of the more frequently met with species, allowing space for each to be recorded on any day of the months April-October. It is strictly orientated towards garden trapping and this is reflected in the choice of species. It must be borne in mind however, that recording on single or perhaps several occasions from specialised localities will give a completely different spectrum of species and this will not be covered by the list. Fortunately

		July 17	18	19	20	21	22	23	24
Dasychira	pubibunda								
Euprocotis	chrysorrhoe			1					
Leucoma	similis	S	1	M		F	F		1
	salicis								
Lymantria	monacha								
Miltochrista	miniata			1		F	F		S
Cybosia	mesomella								
Eilema	griseola								
	complana						1		
	lurideola	A	M	A		A	A		S
Arctia	caja	F	F	F		F	M		F

Fig. 1. Enlarged section of completed recording card

- 1 - or any other exact number where necessary
 F - few, 2-4
 S - several, 5-10
 M - many, 10-20
 A - abundant, 20+

Fig. 2. Key to notation used in recording

S	F	.	
M	M	.	
1		.	
F			
	1	.	
2		.	

S	F	S
M	M	S
1		1
F		
	1	F
2		S

Fig. 3. Method for allocating frequency data

the handling of this type of data constitutes no problem, especially if the recording dates are greater than 10 days apart since each individual record is then passed on to the recording schemes.

It can be seen from Fig. 1 that the first of the above mentioned criteria is fulfilled in that the list provides facility for recording approximate numbers. For six years now I have used a numbering system on a five point scale, and find that for almost any insect survey, this system provides adequate information; the notation used is shown in Fig. 2. The amount of time saving involved is prodigious when summed up over a whole season. The system I would recommend for this type of number bracketing is for the initial observation of a species in a trap to be logged as a dot. Then, when in a position after completing the emptying of the trap to be able to allocate frequency data, the appropriate letter may be inserted as shown in Fig. 3. Of course, colour coding could be used to represent approximate numbers.

It is similarly apparent that the system amply fulfils the second and third criteria mentioned above i.e. instantaneous display of the frequency of occurrence of any species and maintenance of a species order for entry into a diary. The system as can be seen from Fig. 1, provides less experienced entomologists with a list according to the new Kloet and Hinks nomenclature and could if desired be cross-indexed to the currently accepted vernacular names according to South.

Robin Ford of Messrs. Watkins and Doncaster has kindly agreed to print the cards and these will now be available for a few pence each. Each recording card is double-faced, one side covering the *Bombycoidea*, *Geometroidea*, *Sphingoidea* and *Notodontoidea* and the other representing the *Noctuoidea*—160-170 species on each side. Two cards will be needed for each season, the first covering 1st April to July 16th, the second, 17th July to October 31st. The layout of each card has been chosen so that at the end of the season the left hand margin of the second card may be removed and the two cards taped together to give a continuous display of the entire years data on each side of the cards.

Of course many teething problems will be apparent in the first seasons trial of the cards, but I can say that for myself, when dealing with several traps daily, no other system seemed to cope so accurately with a similar amount of data. I might also add that I kept a small note pad to hand and any moth not represented on the list was noted in this and inserted into the diary where necessary. One drawback may possibly be the small size of the print and recording squares, but anyone capable of accurate setting of lepidoptera should find no difficulty. Since the list of lepidoptera given on the cards may not accurately represent the garden species found in other parts of the country, I will gladly send free copies to anyone who will return to me at the end of the season, an idea of the unrepresented moths found commonly in their area.

Dr. I. A. Watkinson (3130)

LARVAE OF AUTOMERIS—1—JANUS

The genus *Automeris* is a very large one containing in its broadest interpretation well over one hundred species. The larvae are in many cases spectacularly coloured and it is a great pity we can only illustrate them in black and white. All the larvae are covered with poisonous



Fig. D. Larva of *Automeris janus*, natural size. (Photo by Brian Gardiner).

spines which, be they long or short, can give painful reactions upon the human skin!

Our illustration shows the almost fullgrown larva of *A. janus* Cramer, one of the larger species of the genus, natural size.

The body of the larva is green, yellow and black; the feet blue. The central chalaza of the spines is purple while the spinelets branching from it are pale blue.

The larvae are gregarious throughout their life and spin an aerial open mesh type cocoon, sometimes communally. The larval stage last from two to three months.

The larvae have been successfully reared on Apple (*Pyrus malus*) and Beech (*Fagus sylvatica*) and have been known to refuse many other deciduous and evergreen trees which have been offered. No pairings have been obtained in captivity.

Brian O. C. Gardiner (225)

COASTAL COLLECTING 1974

The following account deals with the period between February and July whilst working and holidaying in the west country, and where I was able to concentrate on searching for larvae during the earlier part of the season.

On February 23rd, on the coast road at Studland Heath, near Poole, Dorset, larvae of the Fox moth (*Macrothylacia rubi* L.) were beginning to show themselves after their winter sleep, unfortunately their habit of running across the road often resulted in them being run down by traffic using the ferry at the far end of the road; however I did obtain a few in an intact condition, although the usual problem of parasites, and an early spring disease took its toll later on. The larva I found on this date which did produce a female moth did me the indignity of emerging badly crippled, in fact I had to assist in its extraction from the cocoon within which she had deposited most of her eggs. The only other sign of life was a young Dark tussock larva (*Dasychira fascelina* L.) sunning itself by the roadside, although a group of Dartford warblers allowed me to watch them as they flitted amongst the gorse and heather at some distance from the coast road. On the first and second days of March, a few more *M. rubi* larvae were rescued from the roadway; despite searching amongst the more open parts of the heath and along the tracks running through the heather I was unable to find any larva anywhere except along the road, perhaps the tarmac giving off extra warmth attracted the larvae, anyway I found it the only place to search with any degree of success.

On the fifth of March I stayed at Fourtuneswell on the Isle of Portland to search at night for the larvae of *Leucochlaena oditis* Hubn. (Beautiful gothic). Above Chesil, along the cliff top path the larvae were readily found with the aid of a pressure lamp, on Annual meadow grass growing

around the bases of stone boulders mainly on the cliff side, the rusty ground colour and blackish dorsal marks, enabling surprisingly easy identification from the much commoner Square-spot rustic (*Amathes xanthographa* Schiff.) which abounds almost everywhere in the spring. Young green larvae of *Aporophyla nigra* Haw. also were plentiful but far too small to be worth collecting at this time of year.

The following two days I searched the earthworks at Maiden Castle, Dorchester for *M. rubi*, and on the sixth obtained five, only one however was healthy the other larvae appeared to be suffering from the spring disease and were rather limp to the touch; however the seventh of March produced a day to be remembered, a beautiful sunny day, and seventeen larvae from the hillside, fourteen of which were firm and as healthy as one could tell. However most of these eventually perished, an abundance of parasites being my fate (and their's) I am continually amazed at this moth's survival in the wild in this locality, rarely can I find healthy larvae, from almost forty caterpillars found throughout March, but one reached the pupal stage, and this emerged as an under-sized and slightly crippled male. The Studland larvae (ten), gave me a better ratio of three pupae, but including the crippled female; all failed to produce good moths. The Wood tiger (*Parasemia plantaginis* L.) colony on the earthworks yielded just one larva on the sixth which later died.

March 17th saw me at Portland to try for *L. oditis* which by now would be larger and involve less work rearing through, as I was somewhat restricted at my accomodation in Weymouth in the amount I could keep in larva boxes etc. In working the same spots as on the fifth of the month I found six near full grown larvae, and an *Apamea* species, also mature. The following evening I looked around at the Bill, but nothing of interest turned up; on the 19th back at Chesil, three more large *oditis*, and the first Mottled Grey (*Colostygia multistri-garia* Haw.) moths were starting to fly along the cliff, and in the quarries, where more sheltered conditions allowed them to fly more freely; on subsequent windy nights they seemed content to sit around on grass stems near the cliff edge where I boxed a few; I also found several pairs in copulation later in the month and early in April.

The 25th March produced a half dozen more *oditis* at Chesil, and the first *A. australis* H. & W. (Feathered brindle) feeding on annual meadow grass and in its penultimate skin, the only one I was to find on this side of the island. Several *Lasiocampa quercus* L. (Oak eggar) larvae about an inch and a half long were sitting about on bramble, which to say the least did not look very nourishing, and I left them to it. On the 28th I came across a freshly emerged Common quaker (*Orthosia stabilis* Schiff.) sitting behind a cliff top boulder facing seaward, a male, and although a common species, a welcomed bonus.

During the first days of April whilst wandering amongst one of the

disused stone quarries on the west side of the island I couldn't fail to notice many plants of Red Valerian with the foliage clearly eaten. A return visit after nightfall revealed the culprit as *Eumichtis lichenea* Hubn. (Feathered ranunculus). Further inspection later in the month and in early May found the larvae in plenty, some feeding on dead nettle species, and annual meadow grass. The larvae of this coastal species was particularly common by the cliff top path where I had found *oditis* in March. The larvae are not fully grown until May, so I declined collecting any at this stage, and after losing some young *A. nigra* Haw. (Black rustic) which did not thrive in captivity I decided to postpone collecting of this larva also until later in the year, and take my chances with parasites. On the night of April 6th I found what I believe was a *Rhyacia simulans* Hufn. (Dotted rustic) larva, however as it later died I can not be sure, unfortunately no more came my way. That same evening I visited the east side of the island at Ope Cove, but confined myself to a small roadway near the Pennsylvania Hotel; here *A. nigra* was the main species, about a dozen small larvae feeding on annual meadow grass. The following day whilst wandering along the paths around Ope Cove a solitary Cream-spot tiger larva (*Arctia villica* L.) in its penultimate skin came my way, surprisingly the first I'd found so far, as this moth seems well established in coastal districts I've worked elsewhere.

After a non-productive evening visit to Swanage to try for *A. australis* on the sea campion, I returned to Weymouth, and during the late afternoon decided to look along the banks of the River Frome at Dorchester, to see if I could find any larvae of the Scarlet tiger moth on the comfrey, which grew by the stream. This I failed to do, but unexpectedly found five larvae of *Plusia chrysitis* L. (Burnished brass), on this plant, and one on the more usual foodplant, stinging nettle, about half grown; the comfrey leaves showing large round holes freshly eaten, invariably had the larvae sitting tight on the underneath, and luckily, unlike most noctuid larvae, they seemed disinclined to drop off as I turned the leaves over. On the 26th of April, two days after my *chrysitis* good fortune, I tried the pathway above Chesil again, and obtained several larvae of *Omphaloscelis lunosa* Haw. (Lunar underwing), sitting well up on the stems of meadow grass. These were in their last skin, but I only found six in two evenings, despite its common status at Portland, and I did not find any on the Bill, although I may well have been too early on my first visit in March and too late on my further searches during May. May opened with a determined search for *A. australis*, which I had failed to find the previous year, and at last I found the larvae surprisingly at the Bill, which earlier in the season had drawn a blank. The second of the month rewarded me with four larvae, on meadow grass, the pink dorsal and pink edged spiracular line together with distinctive black wedged marks each side

of the dorsal line making simple identification. These larvae were feeding at the edge of the grass tufts of couch etc. and close to the cliff edge; the larvae were certainly not in danger of falling into the sea, however any wandering in the wrong direction would precipitate a fall of about fifteen to twenty feet; only a single larva did I find at a lower level, this full grown, the others quite small despite the fact that South says the larvae are full grown in April. More surprisingly, I found on the eleventh, three others in the same spot, only one of which had reached the last skin, and finally the 26th of the month, my best night for this caterpillar, four full grown, and one still half developed, once again along the edge of the cliff, the first larva I half extracted from the soil as darkness had barely descended, making one realise what an impossible task it would be, attempting to find the larvae in daylight hours.

Throughout May I had gathered *A. nigra* larvae together with *E. lichenea* taking only last instar specimens, but, as regards Portland, from my own experience the *nigra* larvae seem to be all of the green form, the only brown one I found being from Maiden Castle on the fifteenth, together with normal green ones. These green larvae often had the dark stripe on each side of the dorsal line broken, and very distinctive, whereas in others where the line was intact, it was sometimes hardly traceable. *E. lichenea* larvae varied in colour between pale off-green to brownish with blackish markings.

A further search along the Frome on the 12th May produced another four *P. chrysitis* larvae, three on one plant of comfrey growing in the ditch running by the river path. Unfortunately the local authorities annual habit of cutting down riverside vegetation as soon as spring reaches its climax meant that many plants were destroyed just as overwintered larvae were attaining full growth. Those areas bordering the stream in adjacent fields did not yield this caterpillar, although left untouched, for some reasons I only found this larva next to the river path. However nearly all of the larva I collected were subsequently parasitised, something I was beginning to accept with reluctance, many of my *nigra* larvae producing a single large grub which pupated inside the caterpillars cocoon, but at least this species was plentiful in its larval stage which later did give me some fine moths.

A short trip the following day to the Abbotsbury end of the Chesil Bank to look for a suitable place for a night work resulted in me spotting a male *Hadena lepida* Esp. (Tawny Shears) at rest on low vegetation by the roadway by the shingle strip, a rather pale specimen. I decided against a night visit that evening and returned to Weymouth by the somewhat infrequent bus service.

The 23rd saw me commencing the long journey from Weymouth to Bodmin Road station by train, my eventual destination being I hoped the coastal breeding localities of *Antitype xanthomista* Gregson (Black-banded). After a long and tiring journey I reached Padstow, which

according to South was the area of the first British capture, and made my way to Trevone, which on the map seemed as good a place as anywhere to start. The larval foodplant was in good abundance on the cliffs running north-eastwards from the bay towards Gunver Head, but a violent blustery wind made night operations impossible, and after a most difficult time attempting to inspect the thrift flowerheads I had to admit defeat after an hour and returned to my tent which I had somehow managed to assemble in a relatively sheltered spot near the shoreline. In the morning I was fortunate to be invited to breakfast at the nearby hotel by one of the guests, who kindly offered to take me across to Polzeath which I had decided to try the following evening. After my newly acquired acquaintance and his wife had left me at Petireglaze, I made my way towards Pentire Point, a spectacular headland profusely covered in sea thrift and sea campion; the field boundary walls likewise ornamented with these plants in full flower. With the wind falling in strength I began night operations with high hopes of success. After two hours or so it became apparent that my quarry did not appear to be in the immediate vicinity; two *nigra* and one *australis* larvae being all I could find. I then contented myself with examining numbers of *Hada nana* Hufn. (Shears) which flew to my lamp throughout the evening, together with several *Hadena conspersa* Schiff. (Marbled Coronet) not in fresh condition, maybe indicating an earlier emergence than usual, and a nice male *Scopula conjugata* Borkh. (Mullein wave). The following morning I returned to Weymouth contemplating a second visit in June when *xanthomista* larvae would be larger, although I was far from convinced that I had searched an area where the species breeds.

On the 28th of May I visited the sand hills at Studland to look for *Agrotis vestigialis* Hufn. (Archers dart) larvae on the Sea-sandwort, which I had noticed earlier in the month was well eaten. Evidently I had left my visit too late, for only a small species of beetle was present in numbers, crawling amongst the plants; some in copulation. I ruefully realised my poor timing and vowed to return in early May the next year. The evening was then spent examining the Marram which produced plenty of *Leucania litoralis* Curt. (Shore wainscot) and a surprise was the finding of two *nigra* larvae on heather at the back of the dunes, this moth certainly appears to be fairly variable in its choice of foodplants along this part of the coast. A couple of young Grass egg larva were the only other larvae noticed, although I made no attempt to search the large tracts of heather stretching into the distance beyond Studland. The only flying moth seen was a single *Dyscia fagaria* Thunb. (Grey scalloped-bar) which alighted at my feet in the glare of my pressure lamp at two o'clock, and which I managed to box on the sand.

The 29th of the month saw me up at the earthworks for the last time,

but only *nigra* and the common wainscots were found. However, about midnight I noticed an unusual object on one of the fence posts marking the border of the hill from the adjacent fields. A closer inspection revealed a pair of *Cucullia umbratica* L. (Shark) in copulation, the female apparently just hatched as she was in perfect condition. This made the trip somewhat worthwhile and goes to show what can turn up unexpectedly when one is engrossed in the hunt for other things. One amusing incident dominated the evening's proceedings however, and something I had not encountered before. Whilst wandering along the pathway at the field boundary larvae searching I was approached by a small herd of cattle in the adjacent sloping field, apparently curious by the glare from my lamp. One of the more bolder beasts approached as close as possible until he nudged the fence separating him from me, and then quite suddenly amidst the moaning and baying of others behind him galloped off into the darkness, the rest of the herd following in an aimless stampede like a scene from a 'B' western film, some few minutes later to return and perform the same act once again. I must admit to being relieved I was the other side of the fence, as I've never seen cattle behave in this manner before. After a half hour of this performance I eventually left them behind groaning in the distance, and continued my interrupted hunt for larvae along the footpath. Several full grown specimens of *Lasiocampa quercus* L. (Oak eggar) were well in evidence amongst wild rose, however I declined the temptation to collect these as I was primarily interested in noctuids, and eventually left the hill and caught the early mail train back to Weymouth.

I was planning another journey to Cornwall about the middle of June, but first made a final search of the pathway at Chesil, where I obtained a dozen more or less fully grown larvae of *nigra*, which subsequently proved to be nearly all stung, eight producing a solitary parasitic pupa.

On the 17th of the month I set out for the Cornish coast, and this time headed towards the area to the west of Padstow at Trevoise. This area I had not tried last time, and as the lighthouse at Trevoise Head seemed the best spot, being well populated with thrift and sea plantain, I reasoned I had as much chance here as anywhere else. The evening was fairly calm, as far as this coastline is concerned anyway, and I began my 'rounds' of the thrift flowerheads as soon as darkness had descended, however as before no *xanthomista* larvae appeared, and only a single *nigra* larva feeding on a thrift flowerhead was reward for my efforts. After several hours fruitless searching I reluctantly returned to the sand hills a mile away at Constantine Bay where I had pitched my tent behind the dunes in a sheltered hollow. On making my way to the crest of the hill at about two o'clock in the morning the light from my lamp picked out a moth at rest amongst a clump of vegetation. This proved to be *Agrotis ripae* Hubn. (Sand dart) and although not in very good condi-

tion I decided the evening next to attempt to secure a few specimens with the aid of my pressure lamp. The following night was very windy, and made the finding of a suitable site difficult, however I found a somewhat sheltered position behind a steep dune, and with the aid of some drift wood and heavy stones managed to keep the small sheet I had with me in a reasonably flat position on the sand. After a little while with nothing appearing, I decided to raise the lamp and sheet up to a level where the light would be more effective I achieved this with the assistance of an oil drum and a flat piece of plywood, all products of the tide line. This was successful, and a fresh male *ripae* promptly dropped onto the sheet within half an hour of the makeshift arrangement being set up. I had to be content with just this solitary specimen however. A strange occurrence was the appearance of several *L. littoralis* at the sheet whilst a few feet away I watched a larva of the same species still feeding on marram. The following evening on the 19th the wind subsided, and I was able to stand the lamp and sheet halfway up the dune where the light would be more visible and in a more exposed area. This proved profitable, and I was pleased to have about a dozen *ripae* to the sheet up to two o'clock, of which five were very fresh males. On the 25th I tried my luck at this spot again, and apart from *ripae*, and several other common species including *littoralis*, which was now very plentiful, several *A. vestigialis* arrived which seemed a little early for this species to be out. It did not appear to be common in this spot as subsequent evenings showed. I reflected on my late search for the larva at Studland. I passed the days looking for *Cucullia* larvae on the mullein and wild chamomile growing in the district and found both species in fair numbers, particularly *C. verbasci* L. (Mullein Shark) which was common in some places. One handsome plant was host to over forty larvae of all sizes, and stood nearly seven feet high. It stood by itself in a disused corner of waste ground that was scheduled for development, and I collected about a dozen larvae. Some two hundred yards away I found two larvae of *C. chamomillae* Schiff (Chamomile shark) on chamomile growing by a boundary wall. On the evening of the 7th I operated the light at Constantine, and had two *A. trux* Stephens (Crescent dart). On the 9th of July I made a last visit to the area around the lighthouse at Trevoise Head. A rather blustery night made collecting unpleasant and I longed for the comparative calmness of the sand hills a mile away. I picked up literally from the roadway leading to the lighthouse a single *trux* which landed at my feet. That concluded a rather unproductive evening, although the day had been far more absorbing. I found *C. chamomillae* larvae in good numbers further west at Treyarnon Bay, mainly small or half grown sitting on the unopened flower heads of wild chamomile which was growing out of the stone walls bordering gardens. I noticed the larvae usually attacked only those plants not yet in flower, and when larger were not to be found exposed in the manner of the smaller ones, but had to be sought for

lower down amongst the bottom of the plants. This spot was also notable for the appearance of three Hummingbird Hawkmoths which flew quickly up and down the roadway during the late afternoon sunshine, searching for suitable roosting places for the night, as occasionally one would alight in the crevices in the stone walls and there remain motionless unless one ventured to touch one of the moths, which would then fly off wildly down the road, soon to return and repeat the investigation of the wall. The 10th of July saw me making the long journey back home, and hoping for the time and patience to attempt another search for the elusive Black-banded moth the following season, and for some kinder prevailing winds.

J. Platts (4300)

BOOK REVIEW

PHOTOGRAPHING NATURE — INSECTS, by Heather Angel. Fountain Press, Argus Books Ltd., Kings Langley, Herts. 1975. pp.96, colour and monochrome illustrations. Price £1.50.

This is primarily a book of tips on understanding insects, getting them and the camera into the right background and lighting at the right moment, clearly by an author of wide and sound experience. It is divided into chapters dealing with the main aspects of insects that anyone knowledgeable about them would wish to portray, entitled: Insects at Large, Behaviour, Immature Insects, Colour and Survival, Portraits, Aquatic Insects and Insect Patterns. A minimum of technical detail about equipment and requisite extensions of the ordinary photographer's formulae for exposure versus aperture is woven into this text.

The book assumes that the reader is already a competent general photographer with a good single lens reflex camera and offers no guidance on choosing one for close-up photography.

The text is as much a primer in field entomological technique as anything and, like the illustrations, covers many orders of insects. The reading and identification list at the end is of very uneven standard, including books from the Wayside and Woodland series to Imms' General Textbook of Entomology. It is however as sound a list as one can contrive from readily-available works in English. It omits the Handbooks for the Identification of British Insects, perhaps because so many of these are so laborious for the non-specialist to use. The whole, whilst straightforward enough, aims to induce aspirations in the reader far beyond a few butterflies to photograph. May it succeed.

The illustrations do nothing to further the authoress's reputation. The monochrome reproduction is too contrasty and the colour reproduction is muddy and lacks the clarity of detail essential to this kind of subject. The pictorial composition is not always what one would expect of a Fellow of the Royal Photographic Society. This could in some

cases be a result of cropping to fit the book. A fine flash photograph of a hoverfly larva holding a hapless aphid in its mouth is reproduced as though it had been taken through a fog by a tungsten street lamp on daylight film. The picture I like best is of *Podura aquatica* springtails on the surface of water with the pink water fern *Azolla*. It happens to suit the colour reproduction in this book and has such a sense of pattern and colour that I would not be surprised to see it turn up as a wallpaper design. How delightful it would be for an entomologist to drift off to sleep counting springtails instead of sheep! This is not a slice of life that many people see, let alone photograph. What a pity it is that there are fine entomologists in photographic societies who are unknown in entomological societies, yet how fortunate that, on the evidence of this book, such people do exist and may help to break down the rigid art-for-arts-sake attitude that discourages many natural history photographers from joining photographic societies.

R.W.J.U.

**A LIST OF THE FOOD PLANTS OF EAST AFRICAN
MACROLEPIDOPTERA
PART 2—MOTHS (HETEROCERA)**

ZYGAENIDAE

Pompostolinae

Charidea homochroa Holl.—Cissus (Ampelidaceae): *Pisum sativum* (Papilionaceae).

Zygaeninae

Epizygaena xanthosoma Jord.—*Maytenus ovatus* (Celastraceae).

Saliunca styx F.—Cissus (Ampelidaceae).

„ *chalconata* Hamps.—*Vitis* (Ampelidaceae).

Astyloneura cupreitincta Hamps.—Cissus (Ampelidaceae).

„ *meridionalis* Hamps.—*Sorghum* (Gramineae).

Tasema fulvithorax Hamps.—*Pentas* (Rubiaceae).

Arniocera auriguttata Hpfrr.—*Grewia* spp. (Tiliaceae).

SYNTOMIDAE

Trichaeta pterophorina Mab.—Flowers of *Zinnia* sp. (Compositae).

Amata phoenicea Hamps.—Flowers of *Cosmos sulphurea* (Compositae).

„ *Vaupelia* (Boraginaceae).

„ *tomasina* Btlr.—*Ipomoea* (Convolvulaceae).

„ *alicia* Btlr.—*Bidens pilosa*, *Dahlia* (Compositae) : *Cupressus* (Cupressaceae) : *Manihot glaziovii* (Euphorbiaceae).

„ *chrysozona* Hamps.—Pasture grasses (Gramineae).

„ *cuprizonata* Hamps.—*Heliotropium* (Boraginaceae) : *Hordeum vulgare* (Gramineae).

Epitoxis albicincta Hamps.—*Dianthus caryophyllus* (Caryophyllaceae) : *Cynodon dactylon*, Grasses generally (Gramineae).

- Thyretes negus* Ob.—Pasture grasses (Gramineae).
Apisa canescens Wlk.—Cosmos (Compositae).
Metarctia lateritia H.Sch.—Senecio (Compositae).
 „ *flavivena* Hamps.—*Bidens pilosa*, *Dahlia*, *Sonchus* (Compositae).
 „ *flaviciliata* Hamps.—*Commelina* (Commelinaceae) : *Cineraria* (Compositae) : *Pennisetum purpureum* (Gramineae).
 „ *rufescens* Wlk.—Pasture grass roots (Gramineae).
 „ *flavicincta* Auriv.—Grasses generally (Gramineae).
 „ *inconspicua* Holl.—*Aster*, *Zinnia* (Compositae) : *Ipomoea*, *Stictocardia* (Convolvulaceae) : *Zea mays* (Gramineae).
 „ *invaria* Wlk.—*Aster*, *Zinnia* (Compositae).
 „ *rubripuncta* Hamps.—*Ipomoea batatas* (Convolvulaceae).
 „ *haematica* Holl.—*Aster* (Compositae).
Balacra testacea Auriv.—*Carica* (Caricaceae) : *Morus* (Moraceae) : *Coffea* (cherries and bark) (Rubiaceae) : *Solanum* (Solanaceae).
 „ *flavimacula* Wlk.—*Sonchus* (Compositae).
 „ *rattrayi* Roths.—*Gossypium* (Malvaceae).
 „ *ehrmanni* Holl.—*Coffea* (dry leaves) (Rubiaceae).
Euchromia interrupta Grnbg.—*Ipomoea* (Convolvulaceae).
 „ *formosa* Guer.) *Ipomoea*, *Stictocardia*
 „ *amoena* Mschi.) (Convolvulaceae).

ARCTIIDAE

Nolinae

- Nola major* Hamps.—*Quisqualis indica* (Combretaceae) : *Tibouchina semidecandra* (Melastomaceae).
 „ *steniphona* v. Son—*Bersama* (Melianthaceae).
Roeselia infuscata Hamps.—*Terminalia atappa* (Combretaceae).
Celama fovifera Hamps.—*Sorghum*, *Zea mays* (Gramineae).
Celama melanoscelis Hamps.—*Clerodendrum* (Verbenaceae).

Lithosiinae

- Siccia cretata* Hamps.—Lichens.
Asura atricraspeda Hamps.—Lichens.
 „ *sagenaria* Wllgrn.—*Cinnamomum zeylanicum* (Lauraceae).
 „ *obliterata* Wlk.—*Securinega virosa* (Euphorbiaceae) : *Coffea* (Rubiaceae).

Hypsinae

- Aganais speciosa* Drury—*Entandrophragma angolense* (Meliaceae) : *Antiaris toxicaria*, *Ficus capensis*, *F. congensis*, *F. erio-botryoides*, *F. natalensis*, *F. thonningii* (Moraceae).
Sarothroceras pallida Druce—*Voacanga obtusa* (Apocynaceae).

Micrarctiinae

- Utetheisa pulchella* L.—*Heliotropium*, *Myosotis*, *Vaupelia* (Boraginaceae).

Spilosominae

- Spilosoma punctulata* Wllgrn.—*Ipomoea batatas* (Convolvulaceae).
- „ *oligosticta* Hamps.—*Manihot esculenta* (Euphorbiaceae) : *Gossypium* (Malvaceae).
- „ *aurantiaca* Hamps.—*Sapium* (Euphorbiaceae) : *Solanum* (Solanaceae).
- „ *maculosa* Stoll — *Commelina* (Commelinaceae) : *Aster*, *Bidens pilosa*, *Senecio abyssinicus*, *Sonchus* (Compositae) : *Ipomoea* (Convolvulaceae) : *Zea mays* (Gramineae) : *Phaseolus*, *Pseudarthria* (Papilionaceae) : *Theobroma cacao* (Sterculiaceae).
- „ *rattrayi* Roths.—*Ornithogalum sordida* (Liliaceae) : *Musa sapientum* (Musaceae) : *Canavallia ensiformis* (Papilionaceae).
- „ *scioana* Ob.—*Ipomoea* (Convolvulaceae).
- Spilosoma investigatorum* Karsch—*Bignonia* (Bignoniaceae) : *Carica papaya* (Caricaceae) : *Commelina* (Commelinaceae) : *Aster*, *Cosmos*, *Dahlia*, *Galinsoga parviflora*, *Zinnia* (Compositae) : *Ipomoea batatas* (Convolvulaceae) : *Ricinus* (Euphorbiaceae) : *Gossypium* (Malvaceae) : *Morus* (Moraceae) : *Boerhavia* (Nyctaginaceae) : *Arachis hypogaea* (Papilionaceae) : *Nicotiana tabacum* (Solanaceae) : *Russelia juncea* (Scrophulariaceae).
- „ *sulphurea* Bartel — *Acanthus arboreus* (Acanthaceae) : *Senecio abyssinica* (Compositae) : *Solanum* (Solanaceae).
- „ *flava* Wllgrn.—*Lantana* (Verbenaceae).
- „ *lucida* Druce—*Commelina* (Commelinaceae) : *Aster*, *Cosmos*, *Zinnia* (Compositae) : *Morus* (Moraceae) : *Boerhavia* (Nyctaginaceae).
- „ *atridorsia* Hamps.—*Commelina* (Commelinaceae) : *Gossypium* (Malvaceae) : *Morus* (Moraceae) : *Erythrina abyssinica* (Papilionaceae) : *Coffea* (Rubiaceae) : *Solanum* (Solanaceae).
- „ *lutescens* Wlk.—*Canna* (Cannaceae) : *Commelina* (Commelinaceae) : *Bidens pilosa* (Compositae) : *Entada abyssinica* (Mimosaceae) : *Ficus*, *Morus* (Moraceae) : *Boerhavia* (Nyctaginaceae) : *Russelia juncea* (Scrophulariaceae) : *Tacca pontaloides* (Taccaceae) : *Lantana* (Verbenaceae) : *Cassia tomentosa* (Caesalpiniaceae) : *Acacia mollissima* (Mimosaceae) : *Vigna* (Papilionaceae) : *Solanum seaforthianum* (Solanaceae).
- „ *sublutea* Bartels—*Aster*, *Lactuca* (Compositae) : *Acalypha* sp. (Euphorbiaceae) : *Morus* (Moraceae).
- „ *jacksoni* Roths. — *Commelina* (Commelinaceae) : *Aster*, *Bidens pilosa*, *Galinsoga parviflora*, *Zinnia* (Compositae) : *Boerhavia* (Nyctaginaceae) : *Solanum* (Solanaceae).

- „ *screabilis* Wllgrn.—*Bidens* (Compositae) : *Zea mays*, Pasture grasses (Gramineae) : *Entada abyssinica* (Mimosaceae) : *Phaseolus* (Papilionaceae).
 „ *lineata* Wlk.—*Hippeastrum* (Amaryllidaceae) : *Aster*, *Cosmos*, *Zinnia* (Compositae) : *Gloriosa* (Liliaceae) : *Morus* (Moraceae) : *Boerhavia* (Nyctaginaceae) : *Angraecum* (Orchidaceae).
Maenas bivittata Bartel—*Ipomoea* (Convolvulaceae).
Estigmene unipuncta Hamps.—*Arachis hypogaea* (Papilionaceae).
 „ *scita* Wlk.—Grasses generally (Gramineae).
 „ *tenuistrigata* Hamps.) Pasture grasses (Gramineae).
 „ *multivittata* Roths.)
Amsacta flavicosta Hamps.—*Senecio abyssinica* (Compositae) : *Ipomoea* (Convolvulaceae) : *Gossypium* (Malvaceae) : *Pisum sativum* (Papilionaceae).
 „ *flavizonata* Hamps.—*Gossypium* (Malvaceae).
Creatanotus vittata Druce—*Cordia abyssinica* (Boraginaceae) : *Vernonia amygdalina* (Compositae) : *Manihot esculenta* (Euphorbiaceae) : *Phytolacca dodecandra* (Phytolaccaceae).
 „ *leucanioides* Holl.—Grasses generally (Gramineae) : *Crotalaria* (Papilionaceae) : *Capsicum* (Solanaceae).
Rhodogastria pannosa Grnog.—*Senecio* (Compositae) : *Coffea* (Rubiaceae).
 „ *carneola* Hamps.) *Dracaena* (Liliaceae).
 „ *fennia* Druce)
 „ *leucoptera* Hamps.—*Senecio* (Compositae).
 „ *bubo* Wlk.—*Erythroxylum coca* (Erythroxylaceae) : *Bridelia*, *Croton* (Euphorbiaceae) : *Ficus congoensis* (Moraceae) : *Musa sapientum* (Musaceae) : *Erythrina* (Papilionaceae) : *Coffea* (Rubiaceae).
 „ *atrivena* Hamps.—*Erythroxylum coca* (Erythroxylaceae) : *Chlorophora excelsa* (Moraceae) : *Phytolacca dodecandra* (Phytolaccaceae) : *Maesopsis eminii* (Rhamnaceae) : *Grewia mollis* (Tilliaceae) : *Trema guineensis* (Ulmaceae).
 „ *fuscivena* Hamps.—*Landolphia* sp. (Apocynaceae).
Teracotona rhodophaea Wlk.—*Commelina* (Commelinaceae).
 „ *euprepia* Hamps.—*Justicia* (Acanthaceae) : *Commelina* (Commelinaceae) : *Aster*, *Bidens*, *Zinnia* (Compositae).

Callimorphinae

- Argina cribraria* Clerck) *Crotalaria* (Papilionaceae).
 „ *amanda* Bsd.)
Amphicallia pactolicus Btlr.) *Crotalaria* (Papilionaceae).
 „ *tigris* Btlr.)

N.B. Le Pelley mentions a third species, *Amphicallia solai* Druce, which Gaede in Seitz states is probably a synonym of *f. piceosig-*

nata Brtl. of *tigris*, with food-plants *Schinus molle* (Anacardiaceae) and *Crotalaria* (Papilionaceae). I very much doubt an *Amphicallia* eating *Schinus*.

Nyctemerinae

Secusio doriae Ob.—*Senecio* (Compositae).

Nyctemera restricta Btlr.)

„ *apicalis* Wlk.) *Senecio* (Compositae).

„ *itokina* Auriv.)

„ *leuconoe* Hpffr.—*Bidens pilosa*, *Crassocephalum vitellinum*, *Cynara*, *Senecio abyssinica* (Compositae) : *Morus* (Moraceae) : *Rubus* (Rosaceae). I am doubtful of the last two.

LYMANTRIIDAE

Stilpnotia ogavensis Holl.—*Macaranga schweinfurthii* (Euphorbiaceae).

„ *parva* Plotz—*Aspilia latifolia*, *Wedelia menotriche* (Compositae).

„ *albissima* B. Bak.—*Acalypha* (Euphorbiaceae).

„ *nigripes* Holl.—*Canthium hispidum* (Rubiaceae).

Naroma signifera Wlk.—*Ficus* (Moraceae) : *Cajanus cajan* (Papilionaceae). I am very doubtful of the last.

„ *varipes* Wlk.—*Ficus* spp. (Moraceae).

Pterodoa monosticta Btlr.—*Erythrina abyssinica* (Papilionaceae) : *Grewia mollis*, *Grewia* sp. (Tiliaceae).

Cropera testacea Wlk.—*Ipomoea batatas* (Convolvulaceae) : *Digitaria scalarum*, *Imperata cylindrica*, *Panicum*, *Pennisetum purpureum*, Pasture grasses, Grasses generally. I am doubtful of *Ipomoea*.

„ *phaeophlebia* Hamps—Grasses generally (Gramineae).

„ *sudanica* Strand—*Ricinus communis* (Euphorbiaceae) : *Sterculis Theabroma cacao* (Sterculiaceae).

Crorema fuscinotata Hamps.—*Pennisetum purpureum* (Gramineae).

Olapa nigribasis Janse—*Azanza garckeana* (Malvaceae).

„ *tavetensis* Holl.—*Ochroma lagopus* (Bombacaceae). *Gmelina arborea* (Verbenaceae).

Porthesia producta Wlk.—*Nerium*, *Plumeria* (Apocynaceae) : *Cassia* (Caesalpiniaceae) : *Ricinus* (Euphorbiaceae) : *Eleusine coracanus* *Zea mays* (Gramineae) : *Gossypium* (Malvaceae) : *Musa* (Musaceae) : *Cajanus cajan* (Papilionaceae) : *Punica granatum* (Punicaceae) : *Ziziphus* (Rhamnaceae) : *Coffea* (Rubiaceae) : *Citrus* (Rutaceae) : *Anacardium occidentale* (Anacardiaceae).

„ *lyona* Swinh.—*Erlangea* (Compositae) : *Ipomoea batatas* (Convolvulaceae) : *Alchornea cordata*, *Ricinus* (Euphorbiaceae) : *Eleusine coracanus* (Gramineae) : *Lagerstroemia* (Lythraceae).

- Porthesia dewitzi* Grnbg.—*Helianthus* (Compositae) : *Ipomoea batatas* (Convolvulaceae) : *Eleusine coracana* (Gramineae) : *Lagerstroemia* (Lythraceae) : *Gossypium* (Malvaceae) : *Cajanus cajan* (Papilionaceae) : *Ziziphus* (Rhamnaceae) : *Coffea* (Rubiaceae).
- „ *aethiopica* Snell.—*Coffea arabica* (Rubiaceae).
- Lacipa argyroleuca* Hamps.—*Hyparrhenia rufa*, Grasses generally (Gramineae).
- „ *melanosticta* Hamps.—*Vernonia* (Compositae).
- „ *quadripunctata* Dew.—*Dianthus caryophyllus* (Caryophyllaceae) : *Eleusine coracana* (Gramineae) : *Gloriosa* (Liliaceae) : *Gossypium*, *Hibiscus*, *Urena lobata* (Malvaceae).
- Euproctis fasciata* Wlk.—*Rhus vulgaris* (Anacardiaceae) : *Annona* (Anonaceae) : *Araucaria* (Araucariaceae) : *Markhamia napoleoni* (Bignoniaceae) : *Casuarina* (Casuarinaceae) : *Alchornea cordifolia*, *Ricinus* (Euphorbiaceae) : *Lagerstroemia* (Lythraceae) : *Gossypium* (Malvaceae) : *Acacia*, *Entata* (Mimosaceae) : *Oxygonum sinuatum* (Polygonaceae) : *Ziziphus* (Rhamnaceae) : *Solanum* (Solanaceae) : *Anacardium occidentale* (Anacardiaceae) : *Sideroxylon diospyroides* (Sapotaceae) : *Lantana* (Verbenaceae).
- „ *rubroguttata* Auriv.—*Maesopsis eminii* (Rhamnaceae).
- „ *melanopholis* Hamps.—*Smithia* (Papilionaceae).
- „ *utilis* Swinh.—*Alchornea cordifolia*, *Bridelia micrantha* (Euphorbiaceae).
- „ *chrysophaea* Wlk.—*Gossypium* (Malvaceae).
- „ *nessa* Swinh.—*Quisqualis* (Combretaceae) : *Ipomoea batatas* (Convolvulaceae) : *Gossypium* (Malvaceae).
- „ *mediosquammosa* B. Bak.—*Ricinus* (Euphorbiaceae).
- „ *coniorta* Collnt.—*Lagerstroemia* (Lythraceae).
- „ *gemmata* Dist.—*Alysicarpus* (Papilionaceae).
- „ *florida* Swinh.—*Dianthus caryophyllus* (Caryophyllaceae) : *Gloriosa* (Liliaceae) : *Gossypium* (Malvaceae).
- „ *discipuncta* Hol.—*Quisqualis* (Combretaceae).
- „ *impuncta* Btlr.—*Eleusine coracana*, *Panicum maximum*, *Sporobolus* (Gramineae).
- „ *rubricosta* Fawc.—*Delonix regia* (Caesalpiniaceae) : *Terminalia catappa* (Combretaceae) : *Ricinus* (Euphorbiaceae) : *Gossypium* (Malvaceae) : *Samanea saman* (Mimosaceae).
- Euproctis torrida* Dist.—*Ricinus* (Euphorbiaceae) : *Acacia* (Mimosaceae) : *Lantana* (Verbenaceae).
- „ *geminata* Collnt.—*Alchornea cordata* (Euphorbiaceae) : *Lagerstroemia* (Lythraceae).
- „ *hargreavesi* Collnt.—*Bridelia micrantha* (Euphorbiaceae) :

- Urena lobata (Malvaceae) : Acacia polycantha (Mimosaceae) : Morus (Moraceae) : Cajanus cajan, Erythrina abyssinica, Indigofera (Papilionaceae) : Lantana trifolia (Verbenaceae).
- „ *molundiana* Auriv.—Basella alba (Basellaceae) : Markhamia platycalyx (Bignoniaceae) : Canarium schweinfurthii (Burseraceae) : Combretum (Combretaceae) : Alchornea cordifolia Bridelia micrantha, Sapium ellipticum, Securigena virosa (Euphorbiaceae) : Eucalyptus, Psidium guajava (Myrtaceae) : Barteria nigritiana (Passifloraceae) : Rosa (Rosaceae).
- „ *turificator* Collnt.—Bridelia micrantha (Euphorbiaceae).
- Aroa discalis* Wlk.—Cleistachne sorghoides, Grasses generally (Gramineae).
- „ *interrogationis* Collnt.—Panicum (Gramineae).
- Laeilia xyleutes* Hamps.) Cyperus (Cyperaceae).
- „ *figlina* Dist.)
- „ *bethuneana* Strand.—Elettaria cardamomum (Zingiberaceae).
- „ *eutricha* Collnt.—Pasture grasses (Gramineae).
- „ *fracta* Sch. & Clem.—Mariscus (Cyperaceae) : Panicum, Grasses generally (Gramineae).
- „ *subrosea* Wlk.—Grasses generally (Gramineae).
- „ *straminea* Hamps.—Erythrina abyssinica (Papilionaceae).
- „ *lignicolor* Holl.—Aframomum spp. (Zingiberaceae).
- „ *hemippa* Swinh.—Acacia (Mimosaceae).
- Bracharoa quadripunctata* Willgrn.—Begonia (Begoniaceae) : Cajanus cajan, Medicago sativa (Papilionaceae) : Pinus radiata (Pinaceae) : Corchorus (Tiliaceae).
- Dasychira achatina* Hering—Macaranga (Euphorbiaceae).
- „ *daphne*—Hering—Allophylus (Sapindaceae).
- „ *pulcherrima* Hering—Alchornea cordifolia (Euphorbiaceae).
- „ *extorta* Dist.—Ficus spp. (Moraceae).
- „ *albibasalis* Holl.—Allophylus (Sapindaceae).
- „ *gloveri* Swinh.—Crassocephalum vitellinum (Compositae) : Allophylus africanus (Sapindaceae) : Gmelina arborea (Verbenaceae).
- „ *rocana* Swinh.—Terminalia catappa (Combretaceae) : Brachystegia (Caesalpiniaceae).
- „ *goodii* Holl.—Ficus (Moraceae).
- „ *umbrensis* B. Bak.)
- „ *geoffreyi* B. Bak.) Chrysophyllum (Sapotaceae).
- „ *carpenteri* B. Bak.)
- „ *plagiata* Wlk.—Cajanus cajan, Erythrina (Papilionaceae) : Coffea (Rubiaceae).
- „ *georgiana* Fawc.—Piliostigma reticulatum (Caesalpiniaceae) :

- Bridelia, Ricinus (Euphorbiaceae) : Geranium (Geraniaceae) : Gossypium (Malvaceae) : Acacia (Mimosaceae) : Eucalyptus camaldulensis (Myrtaceae) : Cajanus cajan, Erythrina abyssinica, Trifolium, Vigna unguiculata (Papilionaceae) : Rosa (Rosaceae) : Typha (Typhaceae).
- .. *tessmanni* Hering—*Quisqualis* (Combretaceae).
- .. *ila* Swinh.—*Albizia* (Mimosaceae).
- .. *longistriata* Hering) *Marantochloa* (Marantaceae).
- .. *orgyioides* Auriv.)
- .. *proleprota* Hamps.—*Achras*, *Sideroxylon* (Sapotaceae).
- .. *bonaberiensis* Strand) *Bridelia micrantha*
- .. *compsa* Collnt.) *Euphorbiaceae*.
- .. *danva* Sch. & Clem.—*Aspilia* (Compositae).
- .. *batoides* Plotz—*Smilax kraussiana* (Smilacaceae).
- .. *azelota* Collnt.—*Sapium ellipticum* (Euphorbiaceae) : *Syzygium* (Myrtaceae).
- .. *affinis* Holl.—*Harungana madagascariensis* (Hypericaceae) : *Canthium* (Rubiaceae).
- .. *Iampropoda* Collnt.—*Cardiospermum grandiflorum* (Sapindaceae).
- .. *thysanoessa* Collnt.—*Ficus* (Moraceae).
- Polymona rufifemur* Wlk.—*Ozoroa mucronata* (Anacardiaceae).
- Hermerophanes enos* Druce—*Quisqualis* (Combretaceae).
- .. *lybyra* Grnbg.—*Combretum*, *Quisqualis* (Combretaceae).
- Lymantriades obliquilinea* B. Bak.—*Canna* (Cannaceae).
- Heteronygma flavescens* Holl.—*Cupressus lusitanica* (Cupressaceae).
- Jacksonia striata* Collnt.—*Thunbergia alata* (Acanthaceae) : *Rubus* (Rosaceae).
- Orgyia basalis* Wlk.—*Allium cepa* (Amaryllidaceae) : *Anthonotha macrophyll* (Caesalpinaceae) : *Vernonia conferta* (Compositae) : *Alchornea cordifolia*, *Manihot esculenta*, *Ricinus* (Euphorbiaceae) : *Dovyalis macrocalyx* (Flacourtiaceae) : *Geranium* (Geraniaceae) : *Tritonia crocosmaflora* (Iridaceae) : *Gossypium* (Malvaceae) : *Albizia* (Mimosaceae) : *Maesa lanceolata* (Myrsinaceae) : *Eucalyptus camaldulensis*, *E. torrelliana* (Myrtaceae) : *Cajanus cajan* (Papilionaceae) : *Pinus radiata* (Pinaceae) : *Rosa* (Rosaceae) : *Coffea* (Rubiaceae).
- .. *mixta* Snell.—*Schinus molle* (Anacardiaceae) : *Casuarina* (Casuarinaceae) : *Cupressus pygmaea* (Cupressaceae) : *Alchornea cordifolia*, *Ricinus* (Euphorbiaceae) : *Geranium* (Geraniaceae) : *Lagerstroemia* (Lythraceae) : *Acacia* (Mimosaceae) : *Syzygium* (Myrtaceae) : *Pinus radiata* (Pinaceae) : *Ziziphus* (Rhamnaceae) : *Ulmus pumilis* (Ulmaceae).

- „ *hopkinsi* Collnt.—Cupressus lusitanica (Cupressaceae) : Lagerstroemia (Lythraceae) : Coffea arabica (Rubiaceae).
- „ *vetusta* Hamps.—Alchornea cordata (Euphorbiaceae) : Gossypium, Hibiscus (Malvaceae) : Acacia mearnsii (Mimosaceae) : Cydonia, Pyrus malus (Rosaceae).
- „ *affinis* Holl.—Smilax kraussiana (Smilicaceae).
- Lymantria modesta* Wlk.—Rhus vulgaris, Sclerocarya caffra (Anacardiaceae) : Maerua hoehnelii (Capparidaceae).
- Psalis pennatula* Wlk.—Hyparrhenia, Pennisetum purpureum, Saccharum officinarum, Triticum sativum, Grasses generally (Gramineae).
- Mylantria xanthospila* Plotz—Aspilla latifolia (Compositae) : Grasses generally (Gramineae) : Pinus patula (Pinaceae) : Psychotria (Rubiaceae).
- Argyrostagma niobe* Weym.—Newbouldia laevis (Bignoniaceae) : Casuarina (Casuarinaceae) : Terminalia superba (Combretaceae) : Alchornea cordata (Euphorbiaceae) : Lagerstroemia (Lythraceae) : Acacia mearnsii (Mimosaceae) : Ficus (Moraceae) : Eucalyptus torrelliana (Myrtaceae) : Cytisus palmensis, Erythrina abyssinica (Papilionaceae) : Trema orientalis, (Ulmaceae) : Julbernardia magnistipulata (Caesalpinaceae).

LASIOCAMPIDAE

Malacosomatinae

- Chrysopsyche mirifica* Btr.—Quisqualis (Combretaceae) : Alchornea cordifolia (Euphorbiaceae).
- „ *imparilis* Auriv.—Combretum, Terminalia (Combretaceae) : Gossypium (Malvaceae).

Lasiocampinae

- Lechriolepis nigrivenis* Strand—Quisqualis (Combretaceae) : Alchornea cordifolia, Neoboutonia (Euphorbiaceae) : Eucalyptus (Myrtaceae) : Rosa (Rosaceae).
- „ *jacksoni* B. Bak.—Quisqualis indica (Combretaceae) : Syzygium guineense (Myrtaceae).
- „ *leucostigma* Hamps.—Maerua hoehnelii (Capparidaceae).
- Laeliopsis punctuligera* Auriv.—Terminalia (Combretaceae).
- Trabala lambourni* B. Bak.) Quisqualis (Combretaceae).
- „ *aethiopica* Strand)
- „ *charon* Druce—Combretum (Combretaceae).
- Beralade bistrigata* Strand—Dichrostachys cinerea (Mimosaceae).
- Chilena bettoni* Auriv.) Acacia (Mimosaceae).
- „ *pelodes* Tams)
- „ *marshalli* Auriv.—Grasses (Gramineae).
- Philotherma rennei* Dew.—Quisqualis (Combretaceae) : Laggera alata (Compositae).

- „ *sordida* Auriv.—*Ipomoea batatas* (Convolvulaceae).
Olyra reducta Wlk.—*Pennisetum purpureum* (Gramineae).
 „ *suplineata* Wlk.—Grasses generally (Gramineae).
Bombycopsis bipars Wlk.—*Eucalyptus camaldulensis* (Myrtaceae).
 „ *conspersa* Auriv.—*Hypoestes verticillaris* (Acanthaceae).
 „ *indecora* Wlk.—*Barleria*, *Justicia* (Acanthaceae): *Chrysanthemum*, *Laggera alata*, *Microglossa*, *Wernonia amygdalina*, *Zinnia* (Compositae) : *Ipomoea* (Convolvulaceae): *Leonotis africana* (Labiatae) : *Gossypium* (Malvaceae) : *Albizia*, *Acacia mearnsii* (Mimosaceae) : *Maesa lanceolata* (Myrsinaceae) : *Cajanus cajan* (Papilionaceae) : Various Ferns (Polypodiaceae) : *Rosa* (Rosaceae) : *Coffea* (Rubiaceae).
Eucraera decora Fawc.—*Lannea alata* (Anacardiaceae).
 „ *nigrovittata* Auriv.—*Chrysanthemum*, *Senecio*, *Vernonia amygdalina* (Compositae).
Nadiasa sodalium Auriv.—*Acacia abyssinica* (Mimosaceae).
 „ *butiti* B. Bak.—*Cyperus exaltatum*, *C. papyrus* (Cyperaceae) : *Pennisetum purpureum* (Gramineae) : *Gossypium* (Malvaceae) : *Alysicarpus* (Papilionaceae) : *Pinus patula* (Pinaceae).
 „ *carinatum* Willgrn.) *Gossypium* (Malvaceae).
 „ *misanum* Strand)
 „ *diplocyma* Hamps.—*Mangifera indica* (Anacardiaceae) : *Maytenus heterophylla* (Celastraceae) : *Ricinus* (Euphorbiaceae) : *Gossypium* (Malvaceae) : *Indigofera* (Papilionaceae) : *Rosa* (Rosaceae) : *Citrus* (Rutaceae).
 „ *concovum* Strand—*Cupressus* (Cupressaceae) : *Ricinus* (Euphorbiaceae).
 „ *nyassanum* Strand) *Cassia* (Caesalpinaceae).
 „ *splendens* Druce)
 „ *graberi* Dew. *Sapium ellipticum* (Euphorbiaceae).
 „ *singulare* Auriv.
 „ *cuneatum* Dist.—*Sapium ellipticum* (Euphorbiaceae): *Acacia mearnsii* (Mimosaceae) : *Eucalyptus* (Myrtaceae) : *Eriobotrya japonica* (Rosaceae).
 „ *basale* Wlk.—*Sapium ellipticum* (Euphorbiaceae) : *Albizia* (Mimosaceae).
 „ *distinguendum* Auriv.—*Centaurea* (Compositae) : *Acacia mearnsii* (Mimosaceae) : *Sesbania* (Papilionaceae) : *Prunus domestica* (Rosaceae).

(To be continued)

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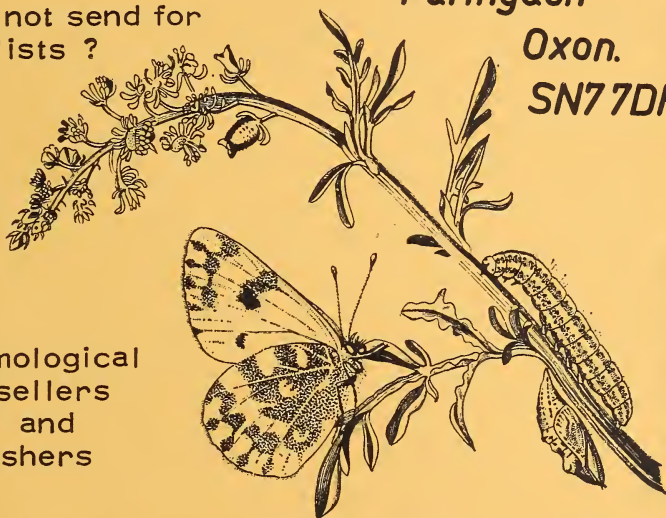
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