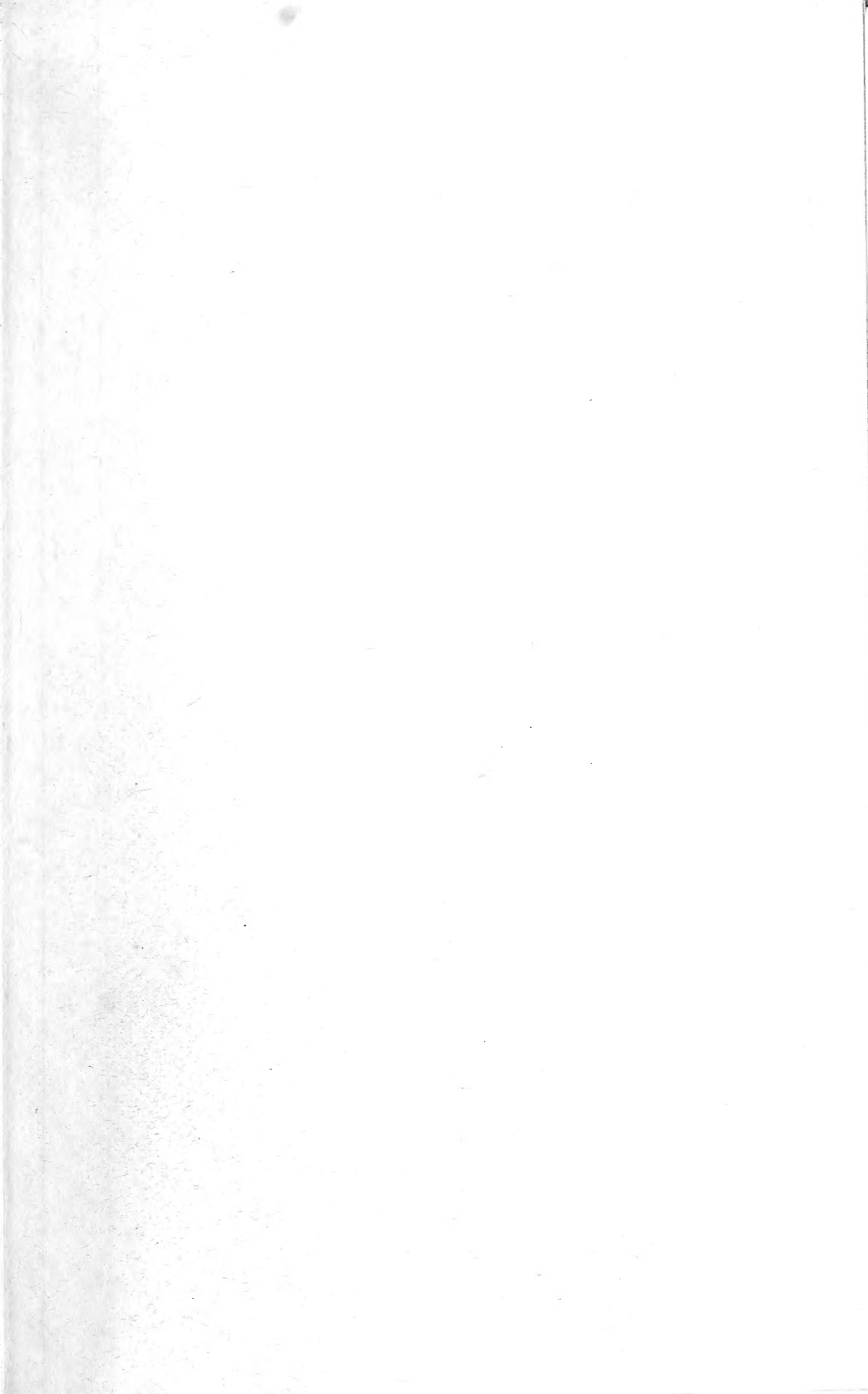


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VOLUME 40



1981

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# THE BULLETIN OF THE AMATEUR ENTOMOLOGISTS' SOCIETY

WORLD LIST ABBREVIATION:

BULL AMAT ENT SOC

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EDITOR:

BRIAN O. C. GARDINER, F.L.S., F.R.E.S.

Index compiled by

PAUL SOKOLOFF, M.Sc., M.I.Biol., F.R.E.S.

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

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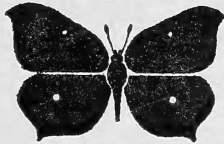
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EDITOR:  
BRIAN O. C. GARDINER, F.L.S., F.R.E.S.

# The Amateur Entomologists' Society

(Founded in 1935)

<b>President :</b>	<b>R. C. DYSON</b>	Sherbourne, 58 Stanford Ave., Brighton, Sussex BN1 6FD
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<b>Hon. Bulletin Editor :</b>	<b>B. O. C. GARDINER</b>	c/o ARC Unit, Dept. of Zoology, Downing Street, Cambridge.
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# A New A.E.S. Publication

## REARING AND STUDYING THE PRAYING MANTIDS

AES LEAFLET No. 36

Written by George L. Heath, well known to members attending our Annual Exhibitions for his displays of living mantids, it describes the various stages from ootheca to breeding adults with concise details for rearing them at home. The species of mantids most likely to be available are listed with 7 plates illustrating the text.

For those breeding the Phasmids, it opens up a new field of study and interest and provides exciting new subjects for insect photography. The price is £1.50 but this should not deter enthusiasts who wish to study exotic insects.

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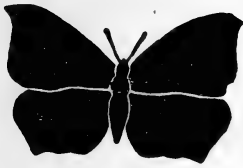
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# AES BULLETIN

## No. 330

### SOCIETY NOTICES

#### **Treasurer Wanted**

Keen volunteer urgently required to take over the duties of Treasurer-ship. The present Treasurer, Mr. Reg Fry, finds that increased demands on his time at work will not allow him to do justice to this important post in the future. The Secretary (address on inside front cover) would like to hear from any member able to undertake this job. An ability with figures and the attendance at not more than six council meetings per year in London (Caxton Hall) is required.

#### **Annual General Meeting**

This has been fixed for 2-30 p.m. on April 4th 1981 at the rooms of the Royal Entomological Society, 41 Queens Gate. There will be an illustrated talk by our President, Mr. R. C. Dyson. Further details are to be found in the Wants and Exchange Sheets.

### AVOID A DISAPPOINTING TRIP

#### **Permits required in Cumbria**

The secretary of the Cumbria Naturalists Trust has informed the Society that while visitors to their reserves are welcome, any collecting can only be undertaken if a prior permit has been obtained and in the absence of such permits their wardens had to turn away several people last year. In particular permits are required for Smardale Gill and for Meathop and Caterag Mosses. Applications for these should be made to the Conservation Officer, Miss Joy Ketchen, Labefield Cottage, Near Sawrey, Ambleside, Cumbria LA22 0LB.

### EDITORIAL

One of the appointed tasks of the Nature Conservancy Council is to protect Britain's wildlife. One of the methods is to designate, after proper consultation, 'Sites of Special Scientific Interest', which should, of course, henceforward be protected. Sadly this is not so and some half-a-dozen such designated S.S.S.I. are being destroyed annually. A recent partial destruction of an important potential site has been of Wendlebury Meads, Oxfordshire, a medieval relict meadowland, very rich indeed in species: It appears that lack of finance was one of the reasons, since the owners were willing to sell. Nevertheless money was available for ploughing some of it up.

Here is a marvellous opportunity for the government, which is

apparently so keen to cut public spending, to actually do so. The £500 million paid out in grants every year for 'improvement' schemes to the agricultural industry and which are the root cause of so much habitat destruction should cease forthwith. Not only would this cause an immediate and large saving, but at the same time, without cost, would enable government legislation, as applied to the environment, actually to be implemented. It would be even better, and in our view juster, if say ten per cent of the saved money were actually used to purchase the sites in danger.

## A MORAL

for

### Captain Brown's Book of Butterflies

Minims of Nature!—Creatures of the skies!  
 Ye bright-wing'd flutterers! sunborn butterflies!  
 From flower to flower o'er nectar'd fields ye go,  
 Peerless in beauty! atoms of the bow!  
 Ye living gems! ye fairy-formed things!  
 Floating in bliss, on gold-bespangled wings!  
 Oh! how enraptured would this spirit be,  
 Freely to soar through ambient heavens, as ye!  
 Where is the silken shroud? the grov'ling worm?  
 Where now the veil which once enshrined each form?  
 Where the cold, lifeless chrysalis of clay?  
 I pause and ponder here—like you, mankind  
 Are born, frail insect! ignorant and blind;  
 Man's mind—his heart, in dust and darkness furl'd,  
 In gold! in glory! in the blaze of day!  
 His bright soul's clouded by a wintry world.  
 But when this dream of life hath pass'd away—  
 When this pure spirit bursts her bonds of clay!  
 Ah! then what hope to trembling man is given—  
 The bless'd shall mingle with the blaze of heaven!

Charles Doyne Sillory, Esq. (1834)

## ANNUAL EXHIBITION 1980

We had every reason to believe that last year's venue, the Alexandra Palace, would be available for a number of years. But once again, an unexpected development programme and a disastrous fire necessitated, at short notice, a search for a new centre. Our fortunate choice was the Old Hall of the Royal Horticultural Society, Vincent Square, London for Saturday, 27th September. The enthusiastic support of members and friends with the ready co-operation of the entomological dealers and ideal weather combined to ensure a successful day for our main event of the year.



The 1980 season with its late spring, indifferent summer and dearth of autumn insects, notably butterflies, was disappointing for many naturalists. With only average results, some members decided not to exhibit this year. This was a pity as the ordinary run of insects is interesting to many people. An encouraging feature was two outstanding junior exhibits prepared by Ashley Kirk-Spriggs and John R. Mynett. It seemed unfair to choose between them for the 'Ansoerge Award', (given for the best junior exhibit on the day), so both will receive the full cheque and certificate. Further details of their projects appear in the classified list.

The attendance of some 2,000 members and friends was most rewarding. Many had made this a special date appreciating obviously the opportunity of seeing the displays, discussing the season, meeting a wide cross-section of people with similar interests and the chance to inspect and buy, if required, from the full range of entomological books and equipment on show. The smooth running of the show was a tribute to the Exhibition Committee, headed by Colin Hart, Reg. Fry and family who manned the Registrar's Stand, Paul Sokoloff and family, selling the AES publications, Peter Taylor and company on the surplus material stall and, as always, Eric Bradford who produced the maps and the signs and posters.

Details of exhibits were received from:—

*AES Conservation Group*—see D. Lonsdale.

*AES Exotic Entomology Group*. Species being bred currently including Atlas silkmoth (*A. atlas* L.) hybrids and a cross between the American Moon moth (*T. luna* L.) and the Spanish Moon moth (*G. isabellae* Hubn.)

*AES Insect Behaviour and Ants Study Group* gave details of the work and aims of the Section and concentrated on the recruitment of new members.

*British Butterfly Conservation Society*. Details of the proposed M40 extension which would pass through and probably destroy some rare butterfly habitats. (Currently the M40 ends east of Oxford.)

*British Entomological and Natural History Society* showed current publications.

*Barrington, R.* (6023J). A good collection of type and varieties of British lepidoptera.

*Baylis, R. M. E.* (5930). Lepidoptera taken in the Guadia region of Spain, July 1980, with a large map and local brochures.

*Chalmers-Hunt, J. M.* (1683). A perfect example of the rare ab. *olivacea* of the Swallow-tailed moth (*O. sambucaria* L.).

*Cheeseman, V. Mrs.* (6386). The various stages of some of the larger British moths, mainly Sphingidae.

*Cribb, P. W.* (2270). Type collection of all the Hawk-moths occurring in Britain including the rare migrants, Oleander (*D. nerii* L.), Spurge

(*C. euphorbiae* L.), Bedstraw (*C. galii* Rott.), Striped (*C. livornica* Esp.) and Silver-striped (*H. celerio* L.) Pairs of European butterflies which may be easily confused.

*Gossling, N. F.* (5169). Butterflies collected in sub-alpine meadows and waste ground in Northern Slovenia, July 1980. Also a detailed map of the area.

*Halstead, A. J.* (6346). A nest of the social wasp *D. norwegica* Fab. from Wisley Gardens, Surrey. Five of the seven social wasps on the British list occur here but *norwegica* is easily recognised by the yellow bases to the antennae, the anchor-like marking on the face and the fact that this species is most likely to construct a nest above ground level.

*Hart, C.* (3845). A display of macro-lepidoptera caught in S.W. Wales in August, 1980. This showed new sites for the Devon Carpet (*L. otregiata* Met.) and the Cloaked Carpet (*E. biangulata* Haw.). The evolution of the site, ancient woodland on steep sided valleys, was described.

*Hilliard, R. D.* (99). Summary of the moths, macro-lepidoptera, noted during 1980 at m.v. light in a London suburban garden at Stanmore. It is interesting to note that, even in this well below average season, approximately one-third of the moths on the British list were recorded.

*Howell, M. I. A.* (5842). A representative collection of butterflies collected in Turkey during July and August 1980.

*James, R. J. F.R.E.S.* (5005). Lepidoptera from Teneriffe, September 1980 including the striking form of the Large White butterfly (*P. brassicae cheiranthi* Hueb.) and photographs of typical habitats. Large colour prints of the Oleander Hawk-moth (*D. nerii* L.).

*Keen, D. H. R.* (3309). and *Vick, G. S.* (4942). A comprehensive exhibit of Dragonflies (Odonata), presently occurring in Britain and examples from the Continent of species thought now to be extinct. Rare species shown were *C. hastulatum* Charp., *A. caerulea* Strom., *S. arctica* Zett., *S. nigrescens* Lucas, all restricted to a few Scottish localities; *S. flaveolum* L., a fairly frequent immigrant, *S. fonscolombeii* Selys., a very rare visitor, *A. isosceles* Mull., with a precarious hold in the Norfolk Broads and *I. pumilio* Charp., *G. vulgatissimus* L., *B. pratense* Mull., local in S. England.

The second feature, the larval skins (exuviae) of all but 9 of the British species was probably the first time so many had been shown together.

*Kirk-Spriggs, A.* (Member of the St. Ivo N.H.S.) **Ansoorge Award.** A detailed project on British coleoptera associated with carrion, comprising descriptions of species, dead specimens, drawings and general notes on flight. They included rove beetles (Staphylinidae) many of them predators feeding on the scavenging insects associated with carrion and the true burying beetles (Silphidae).

*Lonsdale, D.* (4137). Set up the Conservation Stand with the title 'Insects in isolation'. Habitats are often far apart and for various reasons a species may die out in one area. The chance of this area being re-colonised must depend largely on the proximity of a successful habitat and the mobility of the species.

*McCormick, R. F.* (3375) and *Penney, C. C.* (3880). Lepidoptera bred from captured females and larvae collected in the field. Of special interest were the Alder Kitten (*H. bicuspis* Borkh.), Scarce Blackneck (*L. craccae* Schiff.) and the Butterbur (*G. petasitis* (Doubl.)

*Mynett, J. R.* (Member of the Field Study Group of Warren Comprehensive School.) **Ansorge Award.** Ecological survey of the Moby Dick Field, Romford. Maps, diagrams and photographs detailed the trees, plants, animals, insects and allied orders.

*Parker, R., Sqdn Ldr.* (5480). Butterflies collected in Oberammergau, June 1980 and Brittany, July 1980. For comparison, the Wood White butterfly (*L. sinapis* L.) from three localities in Bucks.

*Payne, J. H.* (5923). Bred specimens of ab. *brunneomaculata* Stand. of the Wood White butterfly (*L. sinapis* L.) showing the colour range, especially in the male apical blotch.

Bilateral gynandromorphs of the Silver-washed fritillary (*A. paphia* L.) from Yugoslavia exhibited on behalf of D. Goodhad.

*Pickles, A. J. and C. T.* (5225). A selection of moths taken or bred during 1980. Notable was a fine example of var. *nigro-virgata* Tutt. of the Dun-bar (*C. trapezina* L.) and the migrants from Lymington, Hants included the Bordered Swallow (*H. peltigera* D. & S), Slender Burnished Brass (*D. orichalcea* Fabr.) and the pyrale, *P. unionalis* Hüb.

*Platts, J.* (4300). Examples of British Noctuidae. Of note were the Pale Lemon Sallow (*C. ocellaris* Borkh.) from the N. Kent locality and the Feathered Brindle (*A. australis* H & W) from Portland and N. Cornwall.

*Revels, R.* (3942). Several panels of colour photographs of British butterflies, their aberrations and life histories. British butterfly aberrations, bred or caught during 1980, mainly the results of his successful selective breeding programmes.

*Sandwell Valley Field Naturalists Club.* Information about this 1,000 acre site in the West Midlands.

*Bloxham, M.* (6551) showed 300 set specimens of diptera found in the valley, a model of the fly, *O. viridis* and colour prints of other species mainly of the eyes of Horse flies (Tabanidae).

*Shirley, P.* A graphical display relating to the Cynipid Wall wasp (*B. pallida* Olivier) including the oak-apple gall of the sexual form and root galls of the asexual generation.

*Simmonds, M.* Diptera and parasitic Hymenoptera associated with carrion. The display consisted of a series of photographs illustrating the main decomposition stages of a rabbit carcass. Wall charts were used to show the abundance and variety of diptera species visiting carrion during the year. Live specimens of the Braconid, *Alysia manducator* and Chalcids, *vasonia*, *muscidifurax* and *spalangia* were included.

*Skinner, B. F.* (2470). Series of lepidoptera taken and bred during 1980. Of note, the Northern Dart (*X. alpicola* H & W) from two localities, Small Dotted Footman (*P. obtusa* H & S) from the Norfolk Broads and some of the northern forms of the variable Blue-bordered carpet (*P. rubiginata* Schiff.).

*Sokoloff, P.* (4456). Samples of wool damaged by the clothes moth, (*T. bisselliella* Humm.). A vigorous culture of larvae, pupae and adults of this moth. Moths captured or bred during 1980 including the Scarce Chocolate-tip (*C. anachoreta* Schiff.), Lempkes Gold-spot (*P. putnami gracilis*) and an aberration of the Plain Golden Y with the Y absent (*P. jota* L. ab. *inscripta* Esp.).

Micro-lepidoptera bred during the season including *S. grandipennis* and *C. roseana*.

*St. Ivo Natural History Society.* Our congratulations to Henry Berman on the Silver Jubilee of his Club. They have supported our Exhibition for many years and are always one of the highlights of the show. This year was no exception and a wide range of wild life was on show, tended by the expert scholars.

*Watson, A.* (5691) continued his programme of exhibiting annually a specific section of his 'National Collection of British Lepidoptera'. This year it was represented by 10 drawers of the Large White butterfly (*P. brassicae* L.), covering most of the known varieties of this species.

*Wealden Entomology Group.* Members showed initial results of year's work: Pratt, C. (5965), British lepidoptera; Parsons, M. (5983), British micro- and macrolepidoptera; Hadley, M. (5315), Lepidoptera taken on shingle at the 'Crumbles', Eastbourne.

*Cotton, A. and Kitching, I.*, presented a representative collection of Hawk-moths (Sphingidae) from Thailand.

R. D. Hilliard (99)

## THE SECOND MIDLANDS ENTOMOLOGICAL FAIR AND EXHIBITION, LEICESTER, APRIL 12th 1980

The rowdy football supporters from London were thankfully left behind on the Sheffield train, the ancient red brick buildings of Leicester glowed warmly in the radiant spring sunshine, and the imposing Holiday Inn beamed its message of entomological welcome. March 1979 had seen the first-ever fair of this kind in Leicester, yet most of us already

view these events as a proud annual tradition with a secure and prosperous future. Once again, it succeeded in attracting many hundreds of enthusiastic visitors of all ages from all parts of the U.K.

Despite this seething throng of humanity, the keen eye readily observed a record attendance of other living creatures with more (or less) than two legs. Everything from snails to snakes combined with a multitude of fascinating insects and arachnids. Could April be easier than September for producing more diverse species of livestock (lepidoptera livestock, anyway) for a specific exhibition date? After all, many still-hibernating temperate Hawk and Saturnid pupae now found themselves table neighbours to a number of surprisingly advanced batches of capitively-raised ova and larvae which one would normally expect out in May. Most thrilling of all, however, were the large tropical butterflies on display, ranging from the extraordinary shaped giant pupae of *Troides aeacus* to the vigorously fluttering adults of *Troides helena* and *Danaus plexippus*, in a tall flight cage especially constructed for the occasion. I think that few of us understand how difficult and exact one's co-ordinations with overseas breeders have to be for importing such sensitive exotics safely into Britain at precisely the right time for our pleasure.

As usual, numerous colourful papered and set lepidoptera were vigorously traded on all sides, along with abundant entomological literature and accessories. The British Butterfly Conservation Society continues to offer very valuable information to the public, but I would now really like to see both conservationists and dealers getting together to demonstrate clearly that their interests and their services should ideally be (and usually are) complementary, not contradictory. There is still far too much muddled thinking and misapplied emotion on the whole issue of wildlife conservation, and it is imperative that both naturalists and the public at large should get the real ethics and practicalities of it crystal clear, while a few worthwhile green habitats still remain outside our own private gardens. Perhaps future Leicester and AES exhibitions will see some progress in this direction?

AES members and traders were generally far more involved with this second Leicester show, but I would greatly welcome two further advances in 1981. Firstly, the half-page Bulletin announcement should be increased to a whole page to include a detailed road map of the exact venue. Secondly, it was widely felt that those AES tables allocated to a separate, smaller, rather poorly-signposted room, not immediately adjacent to the main hall, were at a distinct disadvantage, competitively. While one must sympathise that accommodation always presents problems, it is important to strive for the visual continuity of all facilities available, in a major public function of this kind.

Finally, I find it both surprising and distressing that so many people should still find it necessary to smoke cigarettes, and even cigars, in a

heavily crowded, low-ceilinged, exhibition room. Even some dealers, after those all-too-familiar, long, exhausting days and nights of hard preparation, are often seen to present themselves before their valued customers absolutely shrouded within a thick blanket of acrid fumes fit to deter all but the bravest adventurer! Our entomological enthusiasms are prepared to tolerate certain degrees of physical fatigue and mental confusion, as caused by the inevitable closeness of tightly-packed premises. We would not wish fewer visitors, but please let us not deliberately make such an atmosphere, and its energy-draining effects, ten times worse! Most dignified public meetings and entertainments now display 'No Smoking' signs, and it is high time we did the same. At ALL shows. Other considerations apart, it is the least mark of respect we can show to loyal, hard-working organisers, who make such occasions not only possible, but so richly rewarding for everybody.

Brian Wurzell (3718)

[This article was promised for, and should have appeared in, our August issue last year in time to be read before our own exhibition. Unfortunately, due to a faulty Xerox of part of the original which became indecipherable, our printer was unable to typeset and this became evident too late for the November issue. It is now published just before the Third Midlands Fair is due to take place. The Editor would like to extend his most sincere apologies to Mr. Wurzell.]

## ECDYCES IN EXTATOSOMA TIARATUM (MACLEAY)

### INTRODUCTION

More or less detailed accounts on the ecdyces of Phasmida has been published for *Phasma gigas* (L.) (Foucher 1916), *Diapheromera femorata* (Say) (Severin & Severin 1911), *Carausius morosus* (de Sinéty) (Roth 1916) and *Extatosoma tiaratum* (MacLeay) (Lau 1979). For a complete photographic sequence of an ecdyces see the excellent work by Foucher (1916).

In this paper the different stages (parts) of an ecdyces are studied, with particular reference to the male sex of *E. tiaratum*.

### DESCRIPTION OF THE STAGES

*Stage I.* This is the stage when the insect prepares itself for the ecdyces. It spends this period just hanging waiting for the moult.

*Stage II.* The insect breaks through and splits the skin just behind the head, and starts gliding out of the old skin.

*Stage III.* The insect just hangs with the last abdominal segment in the old skin.

*Stage IV.* The insect turns around. It places its front legs on the old skin and pulls out the last abdominal segment from the old skin.

*Stage V.* The wings start to develop. The insect pumps "blood" (haemolymph) in the wings and slowly rocks from side to side. More or less as soon as it has turned around (Stage IV) the wings start to develop.

*Stage VI.* The wings reach their maximum length.

*Stage VII.* The wings start to fold and get their final shape.

*Stage VIII.* The skin is hard (at least in the mouth parts) and the insects start eating their old skin.

Stage I is the preparatory ecdysis period (PEP). Stages II-III is the ecdysis period (EP). Stages V-VII is the wing developing period (WDP). If stage V is absent, as it is in wingless forms, then Stage IV can be used instead. For apterous species or nymphs the WDP is omitted.

TABLE 1.—The final ecdysis in males of *Extatosoma tiaratum*. The time (t) is measured in minutes, and it is set to zero (i.e.  $t=0$ ) at Stage II. From Stage II the cumulative times are given. For further information see text.

Stage	1	II	III	IV	V	VI	VII	VIII
t: mean, X ...	—	0	15	25	—	95	115	—
Minimum ...	—	—	15	22	—	83	92	—
Maximum ...	—	—	15	30	—	101	138	—
S.D. ...	—	—	0	4.4	—	10	32	—
N ...	—	—	33	3	—	3	2	—

## RESULTS

From Table 1 it can be seen that the EP is only about 10 minutes. The WDP is approximately 90 minutes.

Korboot (1961) reported the EP to be from 9 to 43 hours for *E. tiaratum*, and Roth (1916) reported it to be 2 to 6 days for *C. morosus*.

From juvenile insects it was found that the skin was eaten after ca 90 minutes.

## DISCUSSION

Since the ecdysis is an important and dangerous period of the life of an insect, it is of great importance for the rearer of those insects to know the exact time of all stages in an ecdyses. With the knowledge of those different stages one can decide when it is time to help an insect to get rid of the old skin if something goes wrong.

Even if only a small number of insects has been studied in this paper (since it is rather difficult to notice the ecdysis), the values are rather uniform (small values of the standard deviation SD).

Ulf Carlberg (5771)

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## LETTER TO THE EDITOR

30th October 1980

### ENTOMOLOGICAL CONSERVATION OF MINISTRY OF DEFENCE LAND

Sir,

As a direct result of the Report of the Defence Lands Committee 1971-73, chaired by Lord Nugent, the Ministry of Defence appointed a Conservation Officer, Lieut.-Colonel C. N. Clayden, in 1975. During the first four years of office he has been instrumental in the setting up of nearly 150 local conservation groups on MOD property ranging from Culdrose in Cornwall to Benbecula in the Outer Hebrides, from Lydd in Kent to Castlemartin in Dyfed. One of the objectives of these groups is to identify sites and habitats of special natural history interest on these areas so that they may be preserved, provided that this can be achieved without detriment to the primarily important military function of the area. Clearly before this can be accomplished, the Conservation Officer and the Conservation Group need to know which species of animal and plant occur on the area. As MOD Adviser in Entomology it is one of my responsibilities to assist in collecting specimens and records of insects on MOD land. I am only too well aware that to do this work properly could occupy a battalion of entomologists for at least a hundred years! We desperately need all the help we can get, from both amateur and professional entomologists, first of all in collecting specimens, and perhaps more important in identifying them to species. In return we can offer the opportunity to spend pleasant days collecting in some of the most attractive parts of the country which under normal circumstances are rarely visited by members of the public. It may also be possible to become a specialist member of a local MOD conservation group. If any of your members are willing to help in this venture by collecting and/or identifying specimens, I would be most grateful if you would suggest that they contact me at the address below. They may have a particular entomological interest in an area of MOD land near where they live, but I would ask you to remind them that for their own safety they must obtain, through me at the address below, the agreement of the Commanding Officer of the site in question and the MOD



Conservation Officer before visiting the area. Your help and that of your members would be very much appreciated.

I am, Sir,

Yours sincerely,

Dr. N. R. H. BURGESS, B.Sc., Ph.D., F.R.E.S., M.I.Biol.  
Lecturer and MOD Adviser in Entomology,  
Royal Army Medical College,  
Millbank, London SW1P 4RJ.

## BOOK REVIEWS

*Moths*, by Pat and Helen Clay. 24 pp. Illustrations.

*Insects We Need*, by John B. Free. 26 pp. Illustrations. A. & C. Black, London. Price £2.50 each.

These small hardbacked books are two of a series called 'Nature in Close-up'. They are full of good clear colour photographs, 36 in "Moths" and 38 in "Insects We Need". The accompanying text is simple yet informative. They would appeal to young readers and should find a place on many bookshelves both at home and school. The series may not have the content for the knowledgeable young enthusiast but should well stimulate a greater interest with the average child interested in Natural History.

The series title is very accurate, as it shows many close-up photographs of details often difficult to see with a magnifying glass and live subject.

"Moths" deals with information such as: the life cycle, mating, moth families, pollination, predators and defence. The photographic sequence of the emergence of the Puss Moth is particularly good.

In "Insects We Need" we see the 'classics'. Ladybirds, honeybees and silkmoths as well as those which are not thought of as beneficial or perhaps not considered much at all; the lacewings, ground beetles, parasitic wasps, solitary bees, bumblebees and hoverflies. The life-cycle of the 7-spot ladybird is excellently illustrated. Of course to the young 'bug-breeder' many of the insects may well be ones he or she doesn't need!

S.P.

*Social Wasps, Their Biology and Control*, by Robin Edwards, 398 pp. 9 cold. plates. 200 figs, 8 maps and 25 tables, hardback. Rentokil Limited, East Grinstead, 1980. Price £10.

This is a very well produced volume with an excellent selection of photographs and a most readable text. A high quality paper has been used and the numerous figures and tables appear within the part of the text to which they relate. It is seldom necessary, therefore, to dodge about from one part of the book to another.

The first half of the work deals with the life history, including nest building and population dynamics in considerable detail. Just about every conceivable facet of the subject is covered but even the most complicated areas have been written in such a way that they are easily understood. Lengthy passages are included on the behaviour of these insects, such as the gathering of wood pulp, liquid and animal food.

Life in the nest is discussed in great detail, with particular reference to the growth and feeding habits of the larvae. How the colony expands during the summer and finally declines in the autumn is explained with the use of several tables that show the numbers and castes of the insects that are likely to be present at any given time. Whilst Robin Edwards has concentrated on the seven British species, including the hornet, reference is also made to species in other countries where research has uncovered new facts. I found it particularly interesting to note how the behaviour of *Vespula germanica* (Fabr.) in New Zealand differs from that recorded in Great Britain. Incidentally, there are 58 species of Social Wasps and Hornets recorded throughout the world.

Naturally, predators, parasites and commensals receive close attention. The chapter that deals with this subject also contains information on mimicry by beetles, flies, moths and other kinds of wasps.

Other chapters contain fascinating facts about control methods, the origin and evolution of the social wasps and their classification, morphology, anatomy and physiology. The black and white photographs that accompany the last-named chapter are amazing, and include some taken with the aid of a scanning electron microscope—up to  $\times 10,000$ .

Discussions about the distribution of the British species are complemented by the usual distribution maps prepared by the Institute of Terrestrial Ecology for the N.C.C. A very detailed and well illustrated key to the identification of the adults of the British species is followed by a key which enables most nests to be identified. The key to the adults appears to be far more reliable than either Saunders or Step and is certainly much easier to follow with the help of the many illustrations.

Experimental techniques involved in the marking, trapping and counting of adult wasps is followed by an account of methods of nest collection, population studies, the keeping of nests in captivity and the collection of venom. The book is completed by a Check List of the Vespinæ of the World and an extensive Bibliography. The latter contains details of over 600 other works, including some unpublished papers, on Social Wasps and allied subjects, with cross-references to the parts of the text in which they are mentioned.

It will be gathered from this brief account of this book that it is a first class work of reference. It is ideal for the beginner as well as the specialist; for the general entomologist and the local authority employee who has been charged with the control of these insects; for the manufac-

turer of confectionery and the like as well as for the environmental health officer.

Mr. Edwards is to be congratulated for writing such a useful book on this fascinating group of insects. This volume would form a most suitable addition to the library of any member who has even the slightest interest in these insects.

DHRK

*Memoir of the Life and Works of Edward Newman* by T. P. Newman, London, 1876. Facsimile reprint with introduction by E. W. Classey, *Classica Entomologica* No. 6. 32 pp. with portrait and wood engravings. E. W. Classey Ltd., 1980. Price £2.50.

There appears to be only two known copies of the original issue of this "memoir", which was written by Edward Newman's son shortly after his father's death. Essentially the text consists of recollections of Newman, his friends and his entomological works. The five small woodcuts illustrate places associated with Newman, including one of the Bull Inn, Birchwood, where the annual dinners of the Entomological Club were held during the last century. The memoir makes fascinating reading for all those with an interest in the biographical details of great entomologists.

PAUL SOKOLOFF

*The Butterflies of Oregon* by Ernst J. Dornfeld. Published by the Timber Press, Forest Grove, Oregon, U.S.A. 276 pp. 45 drawings, 45 b/w plates, 4 colour plates. Price \$24.95.

The price of this comprehensive survey of the butterflies of Oregon (around £12) is excellent value for the money and one wishes we could produce books of this standard at the price. Although a paper-back, the book is in sections and could be rebound. The page size makes it too large for a pocket-guide. All species recorded in the State are dealt with in sections covering each family. Each species is named with its scientific and local name, its colouring is described with reference to the relevant plate at the end of the text; its habits and habitat, the egg, larva, pupa and foodplants are also described. References follow each species indicating sources and further reading. There are four coloured plates showing 87 species and forty-eight black and white plates covering the remaining 155 species listed in a check-list together with racial forms. There is a glossary and a comprehensive index. The opening chapters deal with the ecology and physiography of the State as it relates to the butterfly fauna and there are some fine habitat pictures. Brief chapters deal with the biology of the order, conservation, evolution and classification and a chapter on collecting, rearing and photographic techniques.

For anyone contemplating collecting or studying butterflies in the States, this will prove an invaluable aid.

PWC

*Provisional Atlases of the Insects of the British Isles.* Published by the Biological Records Centre.

All are in A4 format with plastic spiral spring binding. We have received the second editions of several of these which are noted below. Being of the small orders they are all presented as only one large map to an A4 size page which makes for clarity.

*Part 5, Hymenoptera: Formicidae, Ants.* Edited by K. E. J. Barrett. Second Edition 1979. Price £3.

The only two year old first edition has been updated by further records. Perhaps with the ants, more so than in some other groups, absence of records may indicate rather an absence of Hymenopterists than of ants. However the fact that a second edition has been called for so soon after the first is an encouraging sign that there must be considerable interest in this fascinating group.

*Part 6, Orthoptera, Grasshoppers and Crickets.* Edited by E. C. M. Haes. Second Edition 1979. Price £2.50.

Here again we see signs of increased interest in the grasshoppers as expressed by the additional records since the first edition. In the introduction Mr. Haes rightfully points attention to the *lacunae* in the records which, oddly enough, comprise areas of the South Midlands and the more inland areas of Southern England such as the Northern parts of Devon, Hampshire and Wiltshire.

These two atlases are well produced and clearly provide a need. When we consider the pages and pages of 'localities' quoted in books such as Tutt's *Lepidoptera* it is clear what a boon and time-saver those distribution maps are. Large, clear and informative at a glance they are of great use both to those who wish to collect, to observe, or to photograph a particular species and also those whose aim in life is to look in likely spots in unlikely areas with the aim of 'joining the dots' and adding to our knowledge of distribution.

SAC

*Part 7, Odonata, Dragonflies.* Edited by D. G. Chelmick. Second edition 1979. Price £3.

This edition, prepared about two years after the first, includes all substantiated records received up to the end of 1978. The layout follows the well-proven and accepted format of this series.

It only requires a quick glance to see the strides made in the establishment of distribution records of our species of Odonata during the last few years.

Much new ground has been covered by various groups of enthusiasts led by David Chelmick. Inevitably there has been a lot of "gap-filling" but many records have been sent in for species from quite unexpected localities. One of the most interesting being the colony of *Cordulia aenea*

(Linn.) from the Highlands of Scotland. In the period when this edition was being prepared the total number of records received increased by 40%—a quite staggering figure.

It is clear from this increase in records that the interest in this group of insects is developing considerably. Further work remains to be done and Mr. Chelmick includes a request for further details from Ireland. Most parts of the country should continue to receive the attention of recorders as it is essential that the overall picture of the distribution of our species is known as early as possible.

It is a pity to have to end with a "complaint" but I find it very unfortunate that the scientific names of three species have been changed from those included in the first edition. I feel rather deeply that this continual changing of names will only deter the amateur from taking a deeper interest in the subject. For those wishing to keep "up-to-date" with these matters, please note that the species of the genus *Agrion* are now included in *Calopteryx*. *Sympetrum scoticum* (Don) reverts, yet again, to *danae* (Sulz).

DHRK

## NOTES AND OBSERVATIONS

**Deaths-head hawkmoth in Surrey**—On 31st August 1980 I found an almost perfect male specimen of *Acherontia atropos* L. resting on the patio wall of my house in Giles Travers Close, Thorpe, Surrey.—Derek Boon (5996).

**Oleander Hawkmoth in Buckinghamshire**—On 11th September 1980 I found a very worn male specimen of *Daphnis nerii* L. at Downley, High Wycombe, Bucks. The specimen was fed and then released.—J. Cave (4755).

**Hornets in Norfolk**—Amongst the various insects brought to me for identification last year, were examples of *Vespa crabro* L. which originated from a nest situated at Scoulton, near Norwich, Norfolk.—Brian O. C. Gardiner (225).

**Tenacity of hibernating Herald moths**—One week last autumn a trader on Cambridge Market asked me what the curious creatures were on a small item of furniture he had for sale. They had been there for several weeks and the old Victorian washstand in question had, of course, been moved back and forth from the market some half-a-dozen times. The 'curious objects' which were grouped in a corner on the underside proved to be three fine and perfect examples of the Herald moth (*Scoliopteryx libatrix* L.). Since the washstand had come from an auction in a distant town the provenance and time of arrival of the Heralds could not of course be ascertained, but having once settled on their hibernation site they were determined to stay there as the washstand

had been subject to considerable vibration and movement. The moths are now continuing their hibernation in my garage.—Brian O. C. Gardiner (225).

**Use of Foam Plastic as Building Material by Insects**—Recently I was working at the bottom of my garden painting my greenhouse when I noticed a continuous clicking sound. On investigating I saw what looked like a wasp (*Vespula* spp) flying from an expanded polystyrene foam box which my wife uses to grow herbs in: I thought I saw the wasp carrying a small piece of foam plastic and on examining the rather dirty herb box I found numerous clean white areas which could have been chewed by wasps. I continued painting in the area for several days but only once, two days later, did I hear the clicking sound and I rushed to the box to confirm my suspicions. The wasp was actually carrying off pieces of foam plastic, presumably to make its nest with. How well would plastic and the usual chewed wood stick together? Would the other wasps reject the novel nesting material?

Has anyone else noticed the above behaviour or seen a nest made of such material?

While on the subject of foam plastic, I also came upon insects using it earlier this year. I was disgusted to see a small pond near Brentwood in South Essex (TQ69) littered with broken pieces of the same sort of foam plastic. On looking closer I noticed that a number of caddis larvae (*Trichoptera* spp) had used small pieces of the foam to make their cases with, instead of the usual small pieces of plant material. One disadvantage of the new building material to them was that when they lost their grip on the water plants they floated to the surface of the water.—Ian McClenaghan (2499).

**Newcomers to Britain's gall-causing fauna**—Mr P. R. Shirley's notes (*AES Bull.*, August 1980) on the life history and West Midlands distribution of *Andricus quercuscalicis* were of considerable interest to me because I have been keeping very rough records of occurrence of this and some other gall-causing organisms in the course of my work at Kew Gardens, in Surrey.

Large numbers of Knopper Galls were noticed last year (1980) on an oak (*Quercus robur*) in front of Kew Palace, but in spite of the very heavy infestation there are still many good seeds produced, and the total effect on the tree and its potential progeny seems to be small. Specimens sent to Kew over the last few years include some received in 1973 (southern England), 1977 (Sidmouth Estate), and 1979 (Epsom, Surrey).

Other gall-forming organisms recorded especially in the last few years include *Aceria genistae* (a mite) which infests *Cytisus*. This has increased rapidly in occurrence in Britain since the early 1970s, and probably came in from southern Europe. Host plants are sometimes killed, apparently

by the effects of the very large numbers of galls destroying young shoots. Another mite gall—that of *Eriophyes tristriatus typicus* on the leaves of walnut trees (*Juglans regia*)—causes only minor leaf surface distortion. This species has been recorded at Kew since 1972, and specimens have been received from Sussex, Dorset, Middlesex and the Isle of Wight. Late last summer infested leaves were also found as far north as East Yorkshire.—J. L. S. Keesing (4414).

**Knopper gall in Devonshire and Hampshire**—I was very interested to read the article by P. R. Shirley on the ‘Knopper Gall’ caused by *Andricus quercuscalicis* on oak. I first came across this in Romsey, Hants in 1974. None of my botanical friends could identify it and a local forester suggested sending it to a plant pathology group in Reading. From them I learned that it had first appeared in this country, from Europe, at the beginning of the sixties and was known from six (unspecified) counties. My first sample was unlike that illustrated in the article, and most of those I have seen since, in that the gall was actually formed on the fully grown acorn and not as a replacement for the acorn in the cup.

At the present time *A. quercuscalicis* is widespread in Hampshire and the New Forest and I found an infected tree in Budleigh Salterton whilst on holiday in Devon. One interesting point is that in the early days one or two galls might be found beneath a given oak but now the area at the base of infected oaks is usually littered with dozens if not hundreds of fallen galls.—D. K. Jenkins.

**Kentucky '80**—Some ‘Public Relations’ visits in Louisville provided the opportunity to do some collecting in North Kentucky in mid-July 1980.

We drove it in one day, stopping at Cincinnati on the way down. The prospects looked good as I found a male *Citheronia regalis* in a gas station in the afternoon as we neared Louisville.

That night we left the motel at around 10 p.m. and drove back along Interstate Highway 71, stopping at rest areas and lit up service stations. Conditions seemed excellent, with the temperature dropping slowly from the day's high of 100°F. at 6 p.m., and light cloud cover, however we failed to find anything of note. Finally we decided to eat at a ‘greasy spoon’ off the highway, where my business associate Curtis Hemlock sampled the local recipe, some of us being compulsive risk takers. On finishing our ‘meal’ we walked around the parking lot and came across an immaculate male *regalis*.

The next night about 30 miles north of Louisville, we decided to try the back roads, and found nothing. We then retraced our steps of the night before, climatic conditions seemed identical, however at a truck weigh station we found a male *Pholus pandorus*, and another male

*regalis*. While we were searching the grass, an *Eacles imperialis* dropped out of the sky! We then returned to the diner, and on the walls of a dimly lit gas station sat two more *regalis*, females this time as big as sparrows! The rest of the night was equally fruitful, female *Actia luna*, *imperialis* and more *pandorus* followed. Curtis photographed the live specimens.

At the time of writing, I have *Automeris io* sleeved on Honeysuckle, *imperialis* on Box Elder (*Acer* sp.), *regalis* on Plum, and *luna* on willow in my small backyard. Plus Michigan *cecropia* and *polyphémus*. Come October I won't have a leaf left; at least I won't have to rake them.—Chris A. Young (5236).

**Abundance of Stag Beetles in Croydon area**—There seems to have been a particular abundance of Stag beetles (*Lucanus cervus* L.) in the East Croydon area during the summer of 1980. Walking to the station each day from late June to early August, a distance of about a mile, it has been unusual not to see at least one, or the remains of one, on or near the pavements. One day in late July I encountered no less than four, including a mating pair, whereas in previous years it has been rare to see more than two or three individuals in a whole summer. Could the exceptionally wet conditions this summer have increased mortality, and hence visibility? Many of the beetles seen were either dead or dying.—Michelle Green (5451).

**Lime Hawk again in York**—Further to my observation of the 9th June 1979 (*AES Bulletin*, p. 17, Vol. 39) regarding capture of an adult specimen of the Lime Hawk (*Mimas tiliae* L.) at York. It would appear that this species is now established in this northern locality, as I found a full grown larva on the pavement, under a tall lime tree (*Tilia intermedia* (*Vulgaris*)), on 30th August 1980, close to the centre of York. Unfortunately this failed to pupate successfully.—A. J. Gillery (3653).

**Volucella Zonaria in Middlesex**—I was interested to read the article in the May *Bulletin* regarding *Volucella zonaria* in Tottenham. This year I have found it on Buddleias in Isleworth in the grounds of the hospital at which I work. This is the first time that I have seen *zonaria* in this country. I saw the first specimen on 7th August while it was sunning itself on the front tyre of a car. On the 15th August I encountered five further examples on Buddleia along with a single *V. inanis*.

The abundance of this rare fly in this particular location may be due to the proximity of a number of beehives. It is well known that larvae of *Volucella* species are associated with the nests of the Humble-Bee (*Bombus*) and the Common Wasp (*Vespula vulgaris*) but I wonder if anyone can tell me whether *Zonaria* larvae have been found in commercial beehives.—Dr. M. C. Aldridge (4351).



## IS THE ESSEX SKIPPER EXTENDING ITS RANGE IN SOUTHERN ENGLAND?

It is always difficult to assess whether the discovery of a species in a new locality is due to lack of observation on the part of others in the past or arises from the spread or introduction of the species. Some years ago I found the Essex skipper, *Thymelicus lineola* Ochs., quite commonly around Feltham in Middlesex from where it had not previously been recorded, despite at least one well-known entomologist living close-by. The butterfly tends to be on the wing slightly later than *T. sylvestris* Poda, the Small skipper, but their flights overlap and they frequent the same types of habitat so that it is necessary to check specimens by netting them before one can be certain of identity and perhaps this fact has meant that often the presence of *lineola* is overlooked. However, on the 12th August I visited the South Downs behind Seaford with Dr. Peter Ashdown, another member, in the hope of seeing the Silver-spotted skipper, *Hesperia comma* L. With the late season we saw none and only a few Chalkhill blues, males, freshly emerged flying with equally fresh Common blues. However, resting on the grasses were several small skippers which I assumed, at first, to be Small skippers but on netting a female (and only females were present) I discovered it to be *lineola* with its distinctive black tips to the antennae. Four further females were the same species and none was *sylvestris* among all the others observed. Over many years I have visited this spot about the same time of the year but had not been there for the last three years so unless I had been less observant in previous visits it would appear that the butterfly has established itself here fairly recently. On checking the distribution maps for this species compiled at Monks Wood I see that there is an indication of a pre-1940 record in this area with later records from areas east of Eastbourne so it is possible that the butterfly has been in the area for some time and has just recently spread into the valley which I visited.

P. W. Cribb (2270)

## THE WHITE ADMIRAL (LIMENITIS CAMILLA L.)— OBSERVATIONS ON LAYING HABITS

In the company of two other members, David Marshall and John McFeely, I visited woodlands on the Surrey/Hants border on the 14th August. We hoped to observe the Purple Emperor, *Apatura iris* L., on the wing but the poor weather conditions with cloud and later drizzle precluded this although I did find a newly-laid egg which indicated that the butterfly was recently ovipositing in the area. Despite the lack of sunshine, the warm muggy conditions were sufficient to cause many species to fly—Speckled Woods, Gatekeepers, Meadow Browns, Common Blues, Small Coppers and single specimens of the Red Admiral and Painted Lady, along with Green-veined and Small Whites and, sur-

prisingly, several White Admirals which were obviously bent on egg-laying. This is a very late date for such activities and was obviously due to the very indifferent summer. One often wonders how our butterflies cope with some of our poor summers but they do manage and one of our observations is of interest. We spent some time searching for ova on the honeysuckle sprays growing beneath the canopy of oaks and found both eggs and larvae. The eggs are, for the greater part, laid on the upper surface of the leaf and at the edge and not too difficult to find once one has got one's eye in. The small larvae eat away the tip of the leaf so that the mid-rib is left and upon this the larva rests, usually surrounded with frass particles which have adhered to the silken pad spun by the larva. Pendulous sprays from plants growing around coppiced hazels and those hanging down from plants growing round the boles of the oaks seem to be the main choice of site and the eggs seem to be laid on leaves about waist-height and upwards to sprays six or seven feet up, provided they are still shaded by the canopy. As we searched we observed a female fluttering around the sprays of honeysuckle growing around a medium-sized oak bole and we then observed her lay two eggs, one on one side of the tree at a height of seven feet and the other on the opposite side at about the same height. The time of the day was now 6 p.m. and a light drizzle was falling and the light under the trees was too poor to register on my light-meter. On the same plant we found further eggs and three small larvae. It seems clear that provided the air temperature is high enough to raise the metabolism of this species, it is quite capable of flying and laying its eggs in light rain with the sun totally obscured and at a time of day when respectable butterflies have gone to bed.

P. W. Cribb (2270)

### CONSERVATION, AND A TOUCH OF THE BLUES

In July, 1978, I was exploring the hills and heaths around the sleepy little town of La Ferté-Alais, in the Essonne Valley, just S.W. of Paris. Quite by chance, in a sheltered, sandy meadow, ablaze with thyme and other wild flowers, I discovered a very small, isolated, colony of the Large Blue, *Maculinea arion*.

I returned there in July, 1980. The meadow had been entirely quarried away for mineral extraction. It was a devastated mess of yellow mud, surrounded by a creaking wire fence, with "access forbidden" notices pinned to it. Needless to say, I was not tempted to investigate further.

So I had some unexpected time available to sit on a nearby rock and philosophise. This was in France, remember. The Large Blue butterfly is neither protected nor endangered there, and no-one thinks much about it. Many entomologists I've spoken to greet our passionate British tale of woe with astonishment and amusement, followed by an enquiry whether we have any of the other European *Maculinea* species to com-

pensate? My negative reply to that one usually evokes a Gallic gesture of polite commiseration. "Ah, ze Engleesh, they have not ze good habitat." That is an ideal moment to refrain from pointing out that their richer French habitats are now being even more ruthlessly vandalised than our own. But then, courtesy is also worthy of conservation. That's just by the way.

But it's strange. Think of the proverbial flying crow, and glance at the traditional world atlas. La Ferté-Alais is just about as many miles south from London as Cornwall is west, and Cornwall held most of our former British Large Blue colonies. I've no doubt that other colonies survive on French soil still closer to the Channel. So why all the fantastic fuss and expense on our side of the water only? Did this beautiful butterfly demonstrate any genetic or varietal distinctions which scientifically justified such a dramatic contrast of attitude? Did it become, for us, more of a popular symbol of our eternal battle for wildlife these days? Or did we merely exaggerate our feelings of patriotic pride, giving our better-endowed continental colleagues yet another chance to enjoy an affectionate chuckle?

Future generations will know whether any (or all) of our conservation antics, today, are indeed a comedy—or a tragedy. National pride is still very, very precious to us, and can only too easily cloud the more far-reaching implications of what we do to protect our wild heritage. I'm afraid that dry, scientific stuffiness can only too easily alienate the general public: I've seen it happen many times. And it is sad that well-intentioned release-breeding activities can only too easily induce euphoric states of self-congratulation and complacency, while the environmental consequences are nil, or even negative.

And then, there are our enemies! Land-hungry, heartless, mercenary, there they lie under such labels as local authorities, and mineral companies, and "entertainment" benefactors. There they sit, with the infinite patience for which they're handsomely paid. There they watch, not even taking the trouble to smile at our fretful squabbles about nets and cameras. They know better. They know that the last word will be theirs.

Of course, it's all about money. Modern conservation antics may be comic or tragic, but the stark reality is that they are all desperately short of funds. To protect a species, or a habitat, or both, is very expensive. The professional conservationist frankly now has to choose between service and sacrifice. Do we always agree with his evaluations and priorities?

Let's consider a few pointed questions about conservation policy. Should the professional concentrate on particular British rarities, which are carefully chosen for their purely outstanding character and appearance, so that they evoke spontaneous emotional appeal among the public at large? Such choices may or may not have any relation to whether

the overall *world* populations of these species are secure or precarious. And in that context, it does strike me that such items as Large Blues, Ospreys, and many of our Orchids have more public-gallery appeal than actual danger of total extinction. On the one hand, spectacular species make good publicity; on the other, there are many drab, nondescript ones more in need of protection. No doubt the gentle art of compromise is called for.

Should the taxpayer's money subsidise the maintenance of hidden, holy shrines, whose precise whereabouts are deadly secrets? "Priceless" localities known only to those tiny elitist groups who have sworn blood oaths never to divulge where they are, nor ever to touch any of their contents? We've all heard of such places. And it's obvious that they will never serve the community as a whole. Who is to judge what their real values are? Or, at the other extreme, should such money be used more liberally, in order to preserve as much general wild greenery as possible for the widest possible cross-section of our society to benefit from? Funds will never be adequate to get the best of all worlds; the service-sacrifice dilemma is never-ending. We must choose.

I'm not going to discuss every point, but will express some personal views, and expect that readers will come back to me with some of theirs. Frankly, I don't think it is morally correct to spend very large sums of money protecting, or trying to protect, any plant or animal species scarce in Britain which is relatively common and apparently identical overseas. Nor even would the "scientific" interest of very subtle regional variations of a species really offer sufficient human benefit to justify heavy expenditure. "Scientific" considerations are not always as overwhelmingly valuable or significant as they are claimed to be, especially when no-one is doing any actual research on them. By the same token, the secret shrine policy is surely only justified when it safeguards something truly endemic, or of genuine *world* rarity. In such circumstances, no pains should be spared. But, otherwise we have many sites where common European species have one or two colonies only on British soil. It would certainly be sad to lose them, but I do not think we should pour a lot of money into preserving them. The very few people in the know, who can afford the luxury of enjoying their isolated pilgrimages, can also afford a passport and a boat ticket! Their national pride should not be a burden on other people's pockets. Not for Large Blues, nor for anything else.

Without question, I would favour more conservation money used to ensure that more of our relatively ordinary, easily accessible, English countrysides (what we have left of it) be preserved to serve the amenity requirements and the wildlife education of millions of ordinary people. And let the rarities tend to take a second seat, except in very special circumstances. How else can we get and hold vital public support? Certainly not by catering for a tiny specialist minority, who can often

see the same things more easily overseas, anyway.

It is vital that we watch our *habitats*, above all else, not so much single species. Nothing can survive with nowhere to live.

Goodness knows, all of us want our countryside to have some kind of future. Imagine a child of the next century, saying: "Daddy, daddy, is it true, when you were a little boy, that you could actually walk out into open places full of grass, and trees, and uncut wild flowers, without writing to the warden first?"

I sincerely hope that the Large Blue experience in Britain will help all of us towards recognising far more wisely chosen priorities, before all is lost.

And may heaven help all naturalists of future generations, for it is today's cash-starved conservationists they are so helplessly dependant on!

Brian Wurzell (3718)

#### NOMENCLATURE GONE MAD, OR A ROSE BY ANY OTHER NAME. . . .

A few years back I was collecting with the late Leo Coleridge in an alpine valley in North Italy and he boxed a Blue which he brought across for me to identify. "I believe it is *Lysandra hylas*," he said. I had to tell him that it had been renamed *Lysandra argester* in the latest book by Forster and Wohlfahrt. "You can't be sure," was his reply. "We have been out here nearly a fortnight and it could have been changed." How right he was for on our return I received my copy of the first edition of Higgins and Riley's new book on the European butterflies and there it was as *Plebicula dorylas* Schiff.

Published in 1970 "A Field Guide to the Butterflies of Britain and Europe" by Higgins and Riley, one hoped that here was an authoritative book giving the correct nomenclature for the species covered. The AES published a check list which was amended to bring it into line with this publication. In 1975 Dr. Higgins published his book on the classification of European Butterflies and already major changes were introduced. It would be too much to list them all here but we can look at a few. In the genus *Pieris* the new work retained only *brassicae* and five species previously in the genus were moved to *Artogeia* which had been erected by Verity in 1947. The move was based on structural differences of the genitalia and scales which had been known previously. In the 1970 book a genus had been used, for a group of the Lycaenidae, which had been erected by Higgins in 1969, *Plebicula*, and into this genus were placed seven species which had previously been in the genus *Lysandra*. In the 1975 book there were three of these, *amanda*, *thersites* and *escheri* which had been moved into another existing genus *Agrodiaetus*. The previous species in this genus, *A. admetus*, *ainsae*, *damon*, *dolus*, *fabressei* and

*ripartii* have imagines with quite distinctive features, so much so that they can be confused in the field but the new additions are quite unlike the other *Agrodiaetus* spp. being distinctly spotted on the undersides and much more akin to the genus *Lysandra*. The three additions also have a CN (chromosome number) of 24 while the remainder of the *Agrodiaetus* are in excess of twice this number. Still among the Blues we find that the genus *Aricia* has been tidied up by grouping several of the 'species' of 1970 as subspecies so that *cramera*, *montensis* and *allous* are taken into *A. agestis* and *A. artaxerxes*. *A. nicias* becomes *Pseudaricia nicias* (genus erected by Beuret 1959). Similarly *Philotes* becomes *Pseudophilotes* (Beuret 1958).

Returning to the Pierids we meet complete confusion over *Euchloe ausonia*. This butterfly, the Dappled White, appears in 1970 as a single species with a lowland bivoltine form called *E. ausonia ausonia* and a univoltine montane form called *E. ausonia simplonia*. In 1975 Dr. Higgins had second thoughts and referred the lowland race to *Euchloe crameri* Butler and the upland race to *E. ausonia*, losing *simplonia* on the way. The race in Corsica is referred to as *E. insularis*, possibly a form of *E. crameri*. However the latest revised edition of The Field Guide by Higgins and Riley (1980) changes things once again. Now the upland race is treated as a good species under the name *E. ausonia* while the lowland one is named *E. simplonia*. This is despite a note in the text that the difference between the two is rather like that between *E. aurinia* and *E. aurinia debilis* i.e. the differences between upland and lowland races of one species. Having bred both races on several occasions and finding that many of the pupae of the lowland race lie over until the following spring (i.e. are univoltine) I consider that the minute larval differences do not merit anything more than one species with subspecies. At all events, why turn the nomenclature upside down?

In this latest edition there are further major changes, the most obvious being the loss of the genus *Euphydras*, a genus that Dr. Higgins has dealt with in fine monographs in the past. In its place appear two new genera *Eurodryas* and *Hipodryas*, erected by Dr. Higgins to differentiate between the structural differences of the species previously in *Euphydryas*. Thus we have *H. cynthia*, *iduna*, *intermedia* and *maturna* and *Eurodryas aurinia* and *E. desfontainii*. One wonders what has happened to the North American species previously in *Euphydryas*.

I find it difficult to appreciate what the general intention is underlying all the changes. In 1970 *Coenonympha iphioides* is considered a good species and certainly the great differences between it and *C. glycerion* north of the Pyrennees present a better case for this than do any differences observed in *E. ausonia*. Yet in 1980 it is worthy only of sub-specific status to *glycerion*. Similarly *Agriades aquilo* in 1970 becomes a sub-species of *A. glandon*. However *C. arcania darwiniana* of 1970 has been given specific status as *C. darwiniana* although there would seem to

be a very good case for considering it to be only a montane form of *arcania*.

The Skippers appear to have been left reasonably alone since 1970 and only *Muschampia* has been lost to a resurrected genus, *Syrictus*. In the Nymphalidae (Apaturidae) there is one newcomer, *Apatura ilia metis* is considered to be a good species, *A. metis*. The Satyridae have not fared quite so well as three species have been moved from *Hipparchia* to *Neohipparchia* (de Lesse 1951) on genitalic differences and there are changes and additions in the genus *Pseudochazara*. *P. mamurra* of 1970 is renamed *P. graeca* and two new Balkan species are added, *P. anymone* Brown (1976) and *P. cingovskii* Gross (1973) which might be of sub-specific status.

One might have hoped that by now some level of standardisation of names could have been achieved so that much of the confusion could be avoided but it would seem that we must accept new genera erected by distinguished entomologists *ad infinitum*. One must feel considerable relief that Warren kindly left the *Erebia* alone but there is sufficient variation in structure and habit in this genus for any busy taxonomist to have a field day. I think that Dr. Higgins is right to group all those strange *L. coridon* forms in Spain into *L. coridon* and *L. albicans* despite there being chromosome number variations but to diversify in other directions does not help in the study and understanding of the European butterflies.

P. W. Cribb (2270)

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#### FIRST RECORD OF THE ORDER TRICHOPTERA FROM THE MALTESE ISLANDS

This note reports the first record of a species of the order Trichoptera from the Maltese Islands. It is hardly surprising that this order has not been previously recorded from the islands. This is almost certainly due to dearth of suitable freshwater habitats—the Maltese Islands having no lakes or rivers and very few permanent streams. The species taken, *Tinodes maclachlani* Kimmins (= *T. aureola* McL.) is a small caddis fly of the family Psychomyiidae. Two specimens, a male and a female, were taken from Buskett (Malta) on 31st December 1979 by beating vegetation surrounding a small man-made irrigation channel, which at the time, was in use. Dr. L. Botosaneanu who determined the species comments that the male genitalia of the Maltese specimen is somewhat different from those of British examples, but it is difficult to evaluate the

importance of this from one specimen. *T. maclachlani* is known from Britain, Spain, the Pyrenees, parts of Central European mountain regions, peninsular Italy, Corsica, Sicily, and now, Malta.

I am very grateful to Dr. L. Botosaneanu of the Instituut Voor Taxonomische Zoölogie, Amsterdam, for supplying valuable taxonomic and zoogeographical information.

Stephen P. Schembri (5519)

### SOME INSECTS IN AN INDIAN WILDLIFE SANCTUARY

Having now identified some of the species found, this is the first of two accounts of insects seen during visits to India in 1977 and 1978. The first of these was made in May 1977 to the Mudumalai and Bandipur Wildlife Sanctuaries in the foothills of the Nilgiris in tropical South India. As with other monsoon regions the best time for insects was at the height of the rains a month or so later but May saw the first of the pre-monsoon showers so insects were at least more abundant than they would have been a few weeks earlier at the end of the long hot dry season. The forests of the rolling foothills lie between the rain-forest of the Western Ghats and the dry tropical forest of the plateau to the north and east and is classified as moist deciduous but in fact varies a good deal. The banks of the Moyar River, in the centre of the Mudumalai Sanctuary, carry dense stands of a variety of large trees, while away from the banks teak predominated with a ground flora of grasses and scrambling plants. At Bandipur and Masinigudi the forest was often little better than dry scrub particularly impoverished near the little village of Masinigudi by the grazing of domestic cattle.

A rich bird and mammal fauna still survives in these sanctuaries, once the hunting preserve of the Maharajahs of Mysore, and it was to see some of these that was the main object of my visit, but the insects added to the fascination of wandering in jungles inhabited by leopards, tigers, wild dogs, hyenas, sloth bears, elephants, monkeys, deer and gaur, the giant wild ox. Although the insects were generally rather disappointing for what one might expect in a tropical forest, several groups flourished: the Odonata, cicadas, termites, butterflies and dung beetles, particularly the latter. Any open window of a lighted room at night was the target for multitudes of small dung beetles, mostly *Onthophagus* spp. along with a medium sized species such as *Catharsius* and the rotund brown *Bolbocerus quadridens*. Others of this group not found at light included the huge black *Helicopriss dominus* which buried the elephant dung, the metallic dark green and copper *Onthophagus vividus* also specialising in elephant dung and the scarab-like *Garreta dejeani* common in cow dung around Masinigudi. The activities of *Helicopriss* were instantly recognisable; piles of elephant dung were mixed up with mounds of freshly dug earth larger than mole hills. Beneath were one or two shafts about 2 in. wide probably going deep into the soil.



Apart from the dung beetles Coleoptera were not well represented, but those found included seven species of Buprestidae the largest of which were *Chrysochroa mutabilis*, the least spectacular of a genus of big, brilliantly metallic beetles, and the red and black *Agelia pectinicornis*; the metallic green click beetle *Campsosternus splendidus* which was flying around a clearing; the black and white water beetle *Hydaticus festivus* conspicuous as it swam in a rock pool; three species of red and black Clytrinae on foliage of *Albizzia*, two of these being *Clytra succincta* and *Clytrasoma palliata* and there were many other leaf beetles mostly *Calasposoma* spp. of the Eumolpinae. The most interesting species was a ground beetle, in appearance a typical  $\frac{3}{4}$  in. long black carabid, that exhibited parental care of its offspring which I did not realise existed within this family. Unfortunately the specimen taken was eaten later by a gecko and so remains unidentified. The species was common under stones and logs in the forests. Four adults were found guarding either their young white grubs or their eggs which are unusually large in proportion to the insect (and I counted 30 eggs in one batch). The larvae when they leave the nest are two-tone red and black creatures that move actively about on tracks in the sunshine.

Without catching any I counted about 30 species of butterfly. One, the widespread *Danaus melissa*, occurred in swarms; by the end of May streaming through the trees accompanied by smaller numbers of the yellow pierid *Catopsilia pomona*. Other species included *Precis hierta*, *P. limonias*, *Danaus limniace*, *Eurema hecabe*, *Hypolimnas bolina*, *Neptis* spp. and several dark swallowtails. Moths in contrast to butterflies were scarce, only a few small individuals were attracted to lights.

The forests during the day were filled with the high pitched singing of Cicadas of at least four species, none large. These must have provided an abundant source of food for birds. One kind, *Platypleura octoguttata*, pale brown with light red hind wings, often rested on the ground or low vegetation and would suddenly fly up with a loud buzzing as I walked by. Dragonflies and damselflies of many different forms flew over the multitude of pools that had formed from the heavy showers in depressions and in outcrops of rock. These must have been completely dry until about a month before when the dry season ended and the heat was at its greatest, but now aquatic plants had sprung up and duck weed floated on the surface; life was prolific in even the smallest rock pools a few inches across. As well as small frogs, great numbers of tadpoles including one type almost transparent except for its digestive tract which glinted gold in the sunlight, curious copepods and leech-like worms there were gyrenid beetles, gerrid bugs and dead mayflies on the surface of the pools and small Dytiscidae and Notonectidae beneath.

Two forms of termite mounds were a feature of the more open areas, one was the usual single pinnacled cone reaching to 4 to 5 feet in height.

The other consisted of a cluster of hollow conical structures 9 to 15 inches high. I knocked off one of these projections from the latter type of mound; in the interior just below ground level was a rounded mass of dark soft material inside which were a few worker termites. One species of the *Nasutitermitinae* lived in cracks along the outcrops of rock. The presence of the colonies was indicated by dark powdery encrustations beneath which were the black worker termites whose heads were protruded in front into a beak or tube. In a field on the forest verge at Masinigudi I came across four separate streams of large, pale brown termites entering a hole in the ground while a fifth stream flowed out of it. The workers were swarming over the branches of small dead shrubs around the nest, some chewing the ends of the twigs and dry sticks on the ground. Occasionally one made a rapid tapping motion with its head against a branch or one of its fellow workers. About one in every hundred or so of these insects was a much larger individual with enlarged head and mandibles. Although the sky was overcast at the time it was unusual to see worker termites active on the soil surface in the daytime.

Just beside this scene of termite industry was a small *Caesalpinia* plant. At the base of each leaf stalk was a dark nodule and ants of the genus *Camponotus* were attending to these as if they were aphids; no doubt they exuded some sweet substance. I read later of an *Acacia* in Mexico that has developed nectar bearing nodules at the base of the leaf stalks apparently designed to attract ants who in turn keep the plant clear of vegetarian insects. In the forests of Bandipur I sometimes came across a ball of dark woody material up to a foot in diameter formed around the branches of small trees. These were the nests of a species of *Crematogaster* ant. If I tapped on one of these carton nests the inmates would come pouring out of the top waving their pointed gasters in the air.

I stayed several days in a hut at the village of Masinigudi on the fringe of the Mudumalai forests. Here some of the jungle had degenerated into scrub and outside the boundary of the reserve there were fields and rough pasture with scattered clumps of trees and bushes. Insects were far more in evidence in these habitats especially butterflies and Hymenoptera. Flowering bushes of the alien *Lantana* attracted butterflies not seen in the interior of the forests such as the almost black crow butterflies of the genus *Euploea*. There were huge black carpenter bees and several species of hunting wasps. Beside the rough tracks along which village cattle were driven to graze in the scrub nearly every rock harboured a scorpion of one of three kinds. A smallish brown form was the most abundant and was common throughout the forest. Some of the females were smothered with their young which they carry on their backs. Another species was large, 4 to 5 inches in length, dark green with an orange poison sack. One female with her young was exposed when I turned over a large boulder; the 9 or 10 little scorpions were

about  $\frac{1}{2}$  an inch long, soft, pure white and hardly capable of independent movement. One fell off the mother's back as they were disturbed and lay helpless on the soil until placed back amongst her brothers and sisters.

Elsewhere at the forest verge and on the pastures around Masinigudi turning over of rocks and logs uncovered an assortment of lizards, scorpions, spiders, centipedes, millipedes, snails, earthworms, crickets, mostly wingless cockroaches and black ground beetles. Also one small snake and a brenthid beetle (*Amorphocephalus* sp.). Under one log were several brown crickets and one black cricket with four bright yellow spots on its back. One of the cockroaches here was identically marked with four yellow spots.

Whilst wandering on foot in these forests I had many encounters with the larger mammal inhabitants; not only with elephants, deer and monkeys, all of which are common, but also with some of the much more elusive species such as tiger, gaur and giant squirrel. The elephants were the only hazard; their population in these sanctuaries proved to be particularly temperamental and liable to charge, though usually only as part of a threat display.

S. Von Lösch (6490)

## OBSERVATIONS ON RHOPALOCERA IN ANDORRA— JUNE/JULY 1979

(Continued from Vol. 39, page 208)

### **LOCALITY:** Els Cortals (Encamp)

**Habitat:** Open rough pasture and damp meadowland areas surrounded by thick coniferous belts on higher ground.

**Average altitude:** 1600 m.

**Date of observations:** 30th June 1979.

As this day was designated as our 'rest day' without any planned activity, I decided to spend as much of the morning and afternoon in an area of high summer pastures lying to the south-east of Encamp and approached by a narrow twisting road. Els Cortals is itself a broad mountain valley and is particularly popular with local visitors in the summer months as a picnic area. I decided to concentrate my own survey work mid-way below the high pastures where the road ends in the hope that I would find quiet meadows and pastures set back from the road with some protection from the inquisitive gaze of visitors passing by! In any event as the weather conditions were perfect with scarcely a cloud in the sky, I knew full well that to attempt to walk the full distance would have occupied most of the morning and would prove to be an exhausting experience. My decisions proved to be very sensible as my final choice of meadows and pastures yielded the greatest density of butterflies ever recorded by me throughout the whole of my

holiday. I left our hotel at 9-00 a.m. and after a brief stop at the top of a small track which by-passed some of the lower road bends, in order to collect a small series of Lycaenids found in numbers amongst terraced fields, I reached a beautiful area of undulating pastures with a small stream on the southern side at an altitude of 1600 m where I decided to make my base for the day. I reached this spot shortly after 11-00 a.m. and as insect life was so numerous throughout the rest of the morning and afternoon it was only with reluctance that I decided to return to Encamp at 5-00 p.m. by which time the sun was beginning to set behind the mountains and the temperature began to drop quite sharply.

### PAPILIONIDAE

Although both *P. machaon gorganus* and *L. podalirius feisthamelii* were sighted on various occasions during the day, neither species appeared to be in abundance and only isolated ones were seen at any one time. As the temperature was high their activity on the wing was fast and powerful and I was afforded no opportunity to approach any insect closely. There were also a few male *P. apollo pyrenaicus* sighted in flight throughout the afternoon. However, as these latter butterflies tended to fly around the higher slopes close to the road, I decided against the perhaps fruitless task of attempting to chase after such a quarry that day!

### PIERIDAE

Without any doubt the most common species sighted throughout the day and in particular in the mid- and early afternoon was *A. crataegi*, which although never abundant in any particular area, was always seen in solitary flight wherever there was a density of flora present. I never ceased to marvel at the imperious flight of this large butterfly, which could be seen from quite a distance in view of its pure white general coloration in contrast to the general greenery. Most appeared to be male, although I did towards the end of the afternoon sight a few females present.

There were few *P. brassicae*, *P. rapae*, or *L. sinapis* present and in fact *brassicae* and *rapae* appeared to be entirely confined to the lower meadows where I had briefly stopped on my way up from Encamp in the early morning. There was always a limited number of *C. crocea* to be seen zig-zagging around the meadow banks and higher ground and all appeared to be males.

My highlight of the day was the sighting of a male *A. belia euphenoides*, which I sighted on no less than three separate occasions and on each occasion I failed to net this insect due to impatience on my part! Despite my failure to catch this butterfly, I was at least very pleased to have recorded such a sighting in a region of Andorra where this species is unlikely to be encountered frequently.

In a few sheltered pockets around a small stream I frequently came across both male and female *A. cardamines* fluttering about in search of cruciferous plants, and amongst these butterflies it was not unusual to see the odd male *G. rhamni* L. gracefully sailing and soaring around small saplings close to the banks of the stream. Later in the afternoon I also saw a limited number of *C. australis* Verity in flight over higher meadow ground.

### NYMPHALIDAE

At frequent intervals I was guaranteed to see a few male and female *V. atalanta*, and *A. urticae* feeding on thistle heads and other tall plants, and I was surprised to find these in good condition, as I would have expected to see these species in such a locality at a later period in the summer.

On two occasions during the late afternoon I found a male and female *P. c-album* basking amongst the foliage of small saplings flanking the stream; both were in good condition and members of the spring brood.

It was however, amongst the fritillaries that I found the most activity. Both sexes of *C. selene* and *C. euphrosyne* were very common around the lower meadow pasture slopes and the banks of the stream. I was also pleased to see once again *B. ino* in small numbers amongst the damper hollows; all of this latter species were, however, male and no females were recorded that day. I also found a limited number of both sexes of *M. cinxia* on higher pasture ground, although I did note that most were distinctly worn and few in good condition.

Whilst resting in order to take some well-earned refreshment (both liquid and otherwise!) I noticed a small fritillary fluttering close at hand, which appeared to display a paler fulvous coloration than I had seen earlier, and on closer inspection, I found it to be a fine male of the local species *P. eunomia* Esper., which is generally uncommon throughout Central Europe and is more widely distributed as a distinct sub-species in Norway and Sweden. The most distinguishing characteristics of this species are the markings and general coloration of the undersides of the hindwing with a series of post discal spots with white or pale-yellowish centres; no other similar species of fritillary displays such markings. As has been indicated, the general coloration of the upper sides of both fore- and hind-wings is a pale fulvous-orange, and I did find some were almost yellow where they had been on the wing for some while. This species favours boggy areas and rarely flies beyond its prescribed colonial territories. Later in the afternoon I found an extensive colony of this species, although all sighted appeared to be male at the time of my visit.

Upon my arrival in the meadows which were to become my base for the day, I found my first male *B. napaea* Hoff. lazily flying from one

flower to another. This species is apparently local and is difficult at times to tell apart from *B. pales pyrenesmiscens* Verity, which is more widely distributed throughout Andorra. However the former species can be generally recognised by the paler fulvous coloration and the upper forewing black markings being distinctly linear in character whereas those of *pales* are generally thicker and more macular in character. I personally found *napaea* tended to favour exposed higher ground areas whereas *pales* tended to prefer damp meadow areas and were often present in numbers as a distinct local colony. I also suspect that *napaea* is more likely to be encountered later in July and throughout most of August, although this fact has yet to be confirmed.

A small colony of *M. athalia celadussa* was found in short meadow pasture close to the stream; all appeared to be male and were noticed to display a somewhat fuscous general coloration although the black markings were very clear and distinct.

## SATYRIDAE

As would be expected for such a favourable locality I found present on the wing in small numbers four of the previously recorded *Erebia* genus—*triaria*, *meolans*, *oeme* and *epiphron*. I found *triaria* and *oeme* to be more abundant than the other two species and *meolans* appeared to be largely confined to higher ground areas. I further found that *meolans* tended to show intermediate characteristics between those of the nominate form and those of the larger form *zagasia*, which appears to be fairly widely distributed in this area. I suspect however that *zagasia* is more likely to be found as the predominant form or sub-species further to the south over the border into Spain where the mountain terrain is distinctly drier and warmer. *E. epiphron* was found to be sparsely distributed in this area and was largely confined to damp and sheltered hollows within lower pasture areas; the reduction in numbers of this species was I suspect, due largely to the fact that my visit was on the early side for recording imagines on the wing as this species is probably not fully on the wing until later in July. However, I was interested to record the presence of a few female imagines which I would not expect to appear until the males had been on the wing for a week or two. I should also mention that in this central area of Andorra *epiphron* was represented by its sub-species *fauveaui* de Lesse, which displays a notable feature on the upper-sides of the forewing—a distinct but somewhat irregular broad post-discal brick-red band with four blind black spots, which are somewhat variable in size. In other respects this sub-species is similar to other sub-species found elsewhere in Europe, although I would say that the general size of this sub-species is perhaps a little larger and the general ground colour of the upper sides of the hind-wing is often particularly dark.

Strangely enough I found *C. arcania* in short supply compared to

elsewhere, although I did find *C. pamphilus* to be perhaps more numerous than elsewhere. Altitude factors may have had a control over the appearance of the former species and it may be that *arcania* emerges somewhat later above 1500 m and is therefore more likely to be encountered in greater numbers later in July.

Large female *L. maera* were often to be found flying around exposed ground areas as well as amongst the small trees flanking the stream close-by. Because of the overall fulvous coloration of these insects there was no doubt that they were of the form *adrasta*, which appears to be widely distributed in this region of the Pyrenees. No males were seen, which somewhat surprised me. I did subsequently come to the conclusion that the males tend to confine their flight to lower altitude levels around rocky paths and slopes as well as scree areas and old stone walls; the females on the other hand appeared to have a stronger flight pattern and would often venture onto more exposed terrain elsewhere.

#### LYCAENIDAE

On my way up to the higher levels of Els Cortals I passed many small terraced fields of open pasture which by mid-morning were full of *idas*, *argus*, *semiargus* and *icarus*, both male and female. Because there was so much sunshine with little or no wind present these insects spent much of their time basking in the sunshine amongst a galaxy of meadowland flora, and they did not appear to be greatly concerned at my sudden appearance amongst them!

Once I had reached my chosen area for survey work I found the above mentioned species to be even more abundant in the lower pasture areas around the stream and amongst them *P. amanda* was frequently found. The only new species of Lycaenid recorded that day was *P. doryllus* Schiff.; this brilliant blue species is unmistakable because of its pale blue coloration, which seems to stand out when in flight more than any other species to be found. This species can sometimes be superficially confused with *L. coridon* Poda because the general coloration of the undersides of both the fore- and hindwing is often powder grey with the usual distinct black markings. As only two males of this species were recorded, it was obvious to me that my visit to this area was on the early side; a week or two later and I would no doubt have found this species to be present in larger numbers and more widely distributed. In any event I was delighted to be afforded the opportunity of seeing this species for the first time.

On higher and more exposed ground I also found a few small colonies of *C. minimus* present and as most appeared in good condition, there was little doubt that this species has its peak period of emergence in late June/early July.

Amongst the "coppers" I only recorded a limited number of male *P. hippothoe* present amongst the damper sheltered meadows close to

the stream. I was pleased to see that most were still in good condition with much violet suffusion around the costal area of the forewing and within the basal area of the hindwing. No *H. virgaureae* were seen during this particular visit, although I have no doubt that this species would be found in such an area a week or two later.

### HESPERIIDAE

As my attention was so largely focused on other butterfly species throughout the day, I was unable to spend much time recording the present of "Skipper" species. I did however, observe that *T. sylvestris* and *E. tages* were plentiful in the densely flower-carpeted lower meadow pastures, and on higher exposed slopes a few *O. venatus faunus* Turati males were to be found. I suspect that other species were present but were simply not noticed by me.

### LOCALITY: Els Cortals (Encamp)

**Habitat:** Open rough pasture and meadowland.

**Average altitude:** 1600 m.

**Date of observations:** 1st July 1979.

We had planned to spend this day contouring around some of the higher frontier peaks lying to the south of Pas de la Casa, which are apparently most spectacular and provide the mountain walker with some magnificent views into France and Spain. However, due to low-lying cloud our leader's plans were abandoned and we were taken to a small skiing area further inland called Grau Roig from where we began what was to be one of our longest walks of the holiday. The weather conditions in fact proved to be somewhat variable insofar as there was swirling low cloud around and a brisk breeze which tended to restrict butterfly activity to the minimum. I therefore decided to abandon any hope of carrying out any serious survey work during that day, and instead give myself the opportunity to study and photograph mountain flora, which proved to be very profitable.

After spending most of the morning and a lunch-break in the midst of a group of small mountain lakes and cirques (Estanys dels Pessons—average altitude 2300 m) we struck eastwards in order to follow the length of the Cortals Valley passing in the late afternoon the area where I had spent so many pleasant hours' survey work during the previous day, before finally dropping down to Encamp and back to our hotel. We spent the best part of six hours walking during which time we traversed about 12 kilometres of the central highland region of Andorra, which is largely exposed and treeless heath-like terrain well above 2000 m, flanked on the southern side by bare mountain peaks and outcrops of scree and rock. In bad weather this area would be very depressing and bleak and we were all somewhat relieved that the weather



conditions were at least bright and sunny for most of the day with no signs of rain appearing to spoil our day's walk! I sighted few butterflies on the wing and apart from a few *triaria* flying around the lower meadows around Grau Roig at the start of our walk, little else was seen throughout the day until we began to drop down towards Encamp in the late afternoon when I saw a number of *crataegi* males and females roosting on top of various flowerheads including one pair *in cop.*, which I presumed would remain in such close proximity until the following morning!

No Nymphalids were seen throughout the day—this was certainly due to unfavourable windy conditions. Amongst Lycaenids there was likewise little to be seen except that I did find at rest my only recorded *L. bellargus* Rott., a male.

It was strange for me to pass through the meadow pastures where I had spent so many hours on the previous day amongst such a density of butterfly life only to sight on this occasion the odd butterfly in desultory flight or at rest.

**LOCALITY:** Coma de Ransol

**Habitat:** Damp meadowland areas surrounded by steep mountainous slopes containing scree and sparse growth of conifers, broom and alpenrose bushes.

**Average altitude:** 1800 m.

**Date of observations:** 2nd July 1979.

After the previous day's somewhat disappointing observations, this day proved to be almost as exciting and profitable as my first visit to Els Cortals. It was decided that our party would spend this day traversing the length of Coma de Ransol, a broad and fertile valley extending over 4 kms and lying between Canillo and Soldeu. This charming valley has the great benefit of being sheltered and runs north to south thereby attracting a large amount of the sunshine throughout the day. It was the ultimate aim of our party to continue beyond the head of the valley to the northern frontier peaks adjoining France. I, for my part, had decided that as weather conditions were ideal, this would be an excellent opportunity for me to carry out a full day's butterfly survey in this valley where little such work has been carried out before. Upon arrangement, the rest of our party left me behind in the middle of the valley after I had agreed to meet up with them on their return to the village of Ransol in the late afternoon in order to catch a local bus back to Encamp.

As soon as I was left on my own, I was astounded at the total tranquility present with not a single human in sight, and I shall always remember that day as containing some of the most blissful and enjoyable hours in perfect surroundings as I have ever spent abroad so far.

### PAPILIONIDAE

The only member of this family recorded during this day was *P. apollo pyrenaicus* which was seen on a number of occasions throughout the day either in flight or at rest around the lower meadow pastures wherever there was a reasonable density of flora present. On this occasion I was able to inspect this butterfly at close quarters when avidly feeding on flowerheads, and I was most impressed at the large size of this sub-species as well as the general pristine quality of the male imagines found. I was clearly too early to see any females on the wing and it is doubtful if they appear much before the middle of July.

### PIERIDAE

Amongst the damp meadow pastures and small enclosures which lay close to the Ransol River I found plenty of male and female *crocea* flying powerfully around in open sunshine, and in the sheltered pockets close to the river there were a few male *cardamines* to be found in search of females. Later in the afternoon I did see a few male *rapae* listlessly flying around the corner of a small cultivated plot of ground.

Whilst spending some time on the western slopes of the valley amongst sparse vegetation I frequently encountered in fast flight male *ausonia* which appeared to confine their erratic flight behaviour to the lower steep slopes lying below the main conifer belts which covered the higher regions of the valley. Those sighted were very restless and seldom stopped to rest amongst flowers in the vicinity. I did however, after much effort, succeed in catching one male, which I found to be in good condition. Although it was hard to verify the fact, it did appear that most were male and therefore, I suspect that this species had not reached its peak emergence period.

### NYMPHALIDAE

It was amongst members of this family that my most important discoveries lay. Very shortly after I was left behind in the valley I chanced to spot a bright fulvous coloured butterfly flying close to the ground a short distance away from the path where I was standing, in the midst of a large area of damp meadowland, and on approaching this insect without much difficulty I was delighted to discover that I had found my first *B. pales pyrenesmiscens*. This is certainly a somewhat local subspecies which appears to be found throughout the Pyrenees and the Cantabrian mountains in isolated colonies on higher exposed mountain slopes. My own observations do however lead me to say that I found this subspecies to favour open damp meadow areas and they did not appear to wander far from their colonised areas. I certainly never found them on exposed slopes or far away from water sources. Within minutes of my first discovery I found the meadow in fact to be swarming with both males and females which were clearly awakening from their night's roost and were enjoying the warmth of the early

morning sunshine, and at the time of my discovery they had not been too stimulated by the warmth of the sunshine so as to be very active on the wing. In fact I was able to encourage butterflies to crawl on my finger with ease and furthermore, I was able to photograph them whilst basking on blades of short grass. The timing of my discovery was without doubt fortuitous as an hour or two later these butterflies would have been extremely active and difficult to see and identify. This subspecies is a most attractive butterfly and the bright orange-fulvous coloration as displayed by the males on the upper sides of their fore- and hindwings is particularly striking in bright sunshine. The macular black markings on both the fore- and hindwings are however, susceptible to much variation, and I did find two extreme aberrations where the discal and post-discal markings were almost totally absent and the sub-marginal markings were reduced to black striated lines adjoining an indeterminate fuscous band. The females on the other hand were somewhat larger and displayed a paler coloration with more prominent markings and a general fuscous suffusion throughout. The undersides of the hindwing displayed a complex pattern of mottled markings in shades of yellow, ochre and dark red with a few silverish spots towards the base.

Amongst the colony of *pyrenesmiscens* I also found two male *B. napaea* and I later found further isolated ones elsewhere in the valley. This species is somewhat difficult to identify from the former species mentioned and can only be clearly identified after having been caught and examined in detail. Generally this species appeared to be a shade smaller and displayed a paler fulvous coloration with fine black linear markings with a less dense black basal area on the upper sides of the hindwing. I am inclined to believe that this species does not confine its flight activity so much within colonial areas as appears to be the case with the former species. Certainly *napaea* is often found as a vagrant insect on exposed ground above the treeline whereas *pales* appears to favour lower altitudes.

Amongst scrub and wasteground areas around the western valley slopes I made my first discoveries of *M. parthenoides* Kef. This species is easily confused with *M. athalia celadussa* Fruh. as the general coloration and markings are very similar and furthermore, both species are often found together. I did find however, that *parthenoides* was generally a smaller insect and displayed a brighter orange-fulvous coloration with less macular markings, and in many instances *parthenoides* failed to show any regular markings in the discal area of the upper sides of the hindwings. Only a close examination will determine identity. Flight habit of both species very similar, although I did find that *parthenoides* often favoured dry terrain whereas *athalia* were confined to distinct colonies within damp meadow pastures.

I did find an extensive colony of *athalia celadussa* lower down the

valley within a small field of summer pasture close by the village of Ransol itself. These were distinctly fuscous in coloration and the markings were at times very thick.

In the midst of the *celadussa* colony I also found a few male *P. eunomia* fluttering around a small patch of bistort which was growing close by the riverside. This species had not been encountered elsewhere in the valley, although there were areas elsewhere where it could easily have established itself.

The only other fritillaries recorded were a limited number of *C. euphrosyne* fluttering around amongst damp pastures in the middle of the valley during the late morning. I did not encounter this species during the afternoon. On the other hand *C. selene* was found in flight throughout the day wherever a certain amount of shade and dappled sunshine existed.

Around steep slopes and pastures in the lower valley both *atalanta* and *urticae* were frequently seen searching around for suitable nectar-producing flowers.

### SATYRIDAE

*E. triaria* and *E. oeme* were to be found throughout the day wherever open pasture existed. *Meolans* was not, however, recorded as being present, although I suspect that this species would have been found at higher elevations if I had had time to explore the head of the valley. Both *pamphilus* and *arcania* were also present in varying numbers throughout the valley on higher slopes and wasteground areas.

### LYCAENIDAE

Apart from a limited number of *C. minimus* and *C. semiargus*, which were found in pastures in the lower valley, there were few other representatives of this family present. I did, however, find a small colony of *E. eumedon* Esper. flying around a small patch of *Geranium pratense* L. close by the area where *eunomia* was found in the lower valley. The existence of this species is clearly governed by the presence of its food plant (*G. pratense*) and I was not surprised, therefore, that I had not found colonies elsewhere as I did not find its principal food plant present to any extensive degree elsewhere in the valley. This species can easily be overlooked by reason of its dark brown general coloration and shy behaviour.

During the early part of the morning I also found one worn male *C. rubi* fluttering around a broom bush. It is unlikely that this species would be generally encountered so late in the season as this is principally a Spring brood insect.

### HESPERIIDAE

There was little activity observed amongst species of this family during the morning around the higher slopes of the valley or even amongst the

central pastures and meadowland. A few *tages* and *venatus* males and females were recorded around the edges of the main valley track and adjoining wasteground pockets in the late morning. These two species were also more frequently encountered around the edges of small enclosures and broader meadows at the bottom of the valley close to the village of Ransol. Other species were probably present, but the generally higher altitude compared to that around Encamp may have accounted for the paucity of numbers and the restricted species recorded for early July.

**LOCALITY:** Vall del Riu

**Habitat:** Broad open summer pastures and damp meadowland with sparse conifers and deciduous bushes on higher elevated ground.

**Average altitude:** 1900 m.

**Date of observations:** 4th July 1979.

Whilst our party spent much of the day rambling around the head of this beautiful valley amongst a cirque of small lakes lying in a remote northern quarter of the Principality, I decided to deploy my time in carrying out a general survey of the central areas of the valley as the weather conditions were particularly favourable. The sky was in fact cloudless for many hours and the intensity of the sunshine was such that I was obliged to retreat into the trees around the higher valley slopes in order to reduce the risk of severe sunburn. This valley is in some respects similar to Coma de Ransol, but is perhaps more remote in character with steeper slopes towards the head of the valley in the north. The central area comprises a number of irregular shaped fields of summer pasture with pockets of marshy wasteland lying close to the river. The valley forms a small gorge towards the south before the river finally joins the Riu Valira.

Although weather conditions were so favourable I found few butterflies on the wing in the central areas and higher elevations, and it was not until the early afternoon when I was exploring the lower regions of the valley and some summer pastures lying to the west of it that I found any appreciable insect life. I concluded that the exposed nature of some of the pastures as well as the reduced extent of meadow flowers present throughout the valley were possibly contributory factors behind this generally low density of insect life.

**PAPILIONIDAE**

There were very few members of this family sighted at any time, and no species were recorded during the morning whatsoever. However, during the early afternoon I sighted two *gorganus* rapidly traversing the river course around the steep banks of the lower valley region. On two later occasions I also sighted two *apollo pyrenaicus* males flying around

in their ungainly manner amongst exposed meadow pasture lying to the west of the valley whereupon I concluded that this species had no doubt been present elsewhere in the valley.

### PIERIDAE

The only species found in any numbers during the morning was *A. cardamines* and both sexes of this species were particularly numerous around the river banks and shady hollows wherever cruciferous plants abounded. In this region male *cardamines* appeared not to be so diminutive in size as those found elsewhere on previous days.

Amongst the bushes and conifer groves on the higher slopes of the valley *L. sinapis*, as well as a limited number of *E. ausonia ausonia* males, were frequently encountered in flight during most of the morning; these two species were, however, less frequently encountered in the afternoon at lower altitude levels further down the valley.

*C. crocea*, male and female, were certainly not uncommon around exposed hillside areas and meadow pastures lying to the west of the valley behind Canillo, and I also sighted a small number of *C. australis* Verity in flight as a small isolated colony in a sheltered area of pasture in the higher region of the valley during the early part of the morning; this latter species was not sighted elsewhere in the valley and it may be that this species is somewhat local in this particular region of Andorra.

A few isolated *A. crataegi*, male and female, were never far away throughout the day and I never ceased to marvel at the graceful manner of this species' effortless flight around meadow pastures extending to the coniferous belts above the valley.

### NYMPHALIDAE

I was surprised to find only a few members of this family on the wing throughout the day in this valley as the general habitat was so suitable for many of the commoner species. However, I did regularly sight a few male *M. parthenoides* fluttering around small bushes and enjoying basking in the bright sunshine around the higher slopes of the valley, and I did notice that many were slightly fuscous in appearance and were therefore quite probably the Pyrenean form *plena* Verity. Although apparently fairly widely distributed throughout the Central Pyrenees, I suspect that its appearance is localised throughout the region and is not always easily to be found. Certainly I did not find this form in any other district in Andorra and I am inclined to believe that certain altitude factors may have an important bearing on its distribution and presence.

Amongst lower pastures *M. athalia celadussa* was not uncommon and this species did not appear to be present much above 1700 m where *parthenoides* became the more predominant species on the wing.

In one isolated boggy area away from the main valley itself I stumbled across an extensive colony of *P. eunomia* which confirmed to me that

this particular species is not uncommon wherever suitable sheltered damp meadows surrounding mountain streams exist on higher terrain.

Whilst I was spending a short break by the river banks in the early afternoon so as to eat my packed lunch and take some well earned liquid refreshment, I disturbed from a hummock of grass a male *E. aurinia* which had been quietly basking in the sun. Upon closer examination I noticed that the general coloration was greyish yellow with somewhat indistinct orange discal spots and sub-marginal bands on the upper sides of the fore- and hindwing and the black markings generally lightly etched or vestigial in character to such an extent that I decided that this was an example of the sub-species *debilis*. This sub-species is undoubtedly a mountain form and is confined to damp meadowland and marshy areas above 1500 m throughout the central Alpes and Pyrenees. Although I spent a short period after my lunch break in carrying out a close inspection of this local ground area, I failed to find any more and so I concluded that perhaps I had simply stumbled on an isolated late emerged insect as the species has its peak emergence period in mid-June.

### SATYRIDAE

It was no surprise to me to find that *E. triaria* and *E. oeme* were reasonably abundant throughout the valley, although most did appear to be male thereby indicating that these two species had not reached their peak emergence period. *E. meolans* was not encountered in this valley, which was a surprise to me as its appearance had been widely recorded in most districts visited to date. In the lower pasture areas I also found a small colony of *E. epiphron fauveaui* de Lesse.

This sub-species displays a reduced orange brown post-discal band on the upper sides of the forewings with four regular black spots fairly evenly spaced within the centre of this band; the upper sides of the hind wing also disclose three or four reddish post-discal spots with black pupils and the general brown colour is a deep chocolate brown. It is perhaps the predominant form found in the eastern Pyrenees and I certainly found it to be widely distributed and abundant amongst open pasture areas.

Apart from the above mentioned *Erebia* species the only other Satyrid found in reasonable abundance amongst bushes and sheltered pockets in the lower valley region was *C. arcania* and both sexes were recorded as being plentiful.

### HESPERIIDAE

Although the general habitat throughout the valley was certainly suitable for many members of this family, I only recorded but a very limited number of *T. sylvestris* and *E. tages* males and females in flight in sheltered damp hollows close by the river banks in the central valley region. None of either species were found above 1600 m and few were

found in the midst of drier wasteground areas on the valley slopes below coniferous belts.

**LOCALITY: Collada de Montaner and Cortals de Sispony**

**Habitat:** Rough open mountain ground area with scattered conifers surrounding the frontier region. Increasing density of conifers and low scrub on lower levels with isolated hillside clearings.

**Average altitude:** 2000 m.

**Date of observations:** 5th July 1979.

This proved to be another hot sunny day in which we spent the morning climbing through high summer pastures on Spanish territory lying to the west of Andorra until we reached a spectacular frontier col (Collada de Montana—2078 m), where we took an hour's break in order to admire the magnificent panoramic view across Andorra. Thereafter we spent the early part of the afternoon gently descending through a broad valley (Cortals de Sispony) with the aid of rough tracks and paths which latterly followed a small mountain stream until we reached the small village called Sispony where our day's expedition ended with a local bus trip down the Valira del Nord Valley to Les Escaldes from whence we travelled back to Encamp in the late afternoon.

I was particularly interested to have the opportunity of sampling the open mountainous terrain on the western frontier, which is generally much more exposed to the elements than elsewhere in the Principality, and furthermore this particular region is greatly influenced by the warmer air currents from Spain. It was, therefore, no surprise to me to find butterfly life in a more advanced stage of emergence than elsewhere, although in general it appeared to be sparse on the higher exposed terrain. The lower meadows which were afforded shelter by reason of the surrounding conifer belts yielded on the other hand a reasonable abundance of butterflies of differing species.

**PAPILIONIDAE**

Apart from one unconfirmed sighting of a male *P. apollo pyrenaicus* gliding and soaring around some bushes some distance below me whilst we were descending into Cortals de Sispony, there were no recorded sightings of any other Papilionid species throughout the day. I suspect, however, this was a freak phenomenon as habitat and weather conditions were certainly ideal for the presence of both of the previously recorded Swallowtails.

**PIERIDAE**

There were few species of this family present throughout the day and in fact apart from the appearance of a limited number of male *A. cardamines* sighted in the midst of a sheltered area of meadow pasture in the lower area of the valley, my notable record was the capture within a



few metres inside Andorran territory (Collada de Montaner) of a fine example of the white female form *helice* Hübner of *C. crocea*, which suddenly presented itself in front of me whilst I was enjoying a short lunch-time break with our party. My strenuous efforts to catch this insect in the full view of members of our party caused much hilarity! To my surprise no further *crocea* were sighted during the rest of the afternoon and I can but only surmise that this one female had been blown off course from some neighbouring pasture.

### **NYMPHALIDAE**

Only one species out of the large number representing this family was in fact recorded during this afternoon and that was a small but active colony of *P. eunomia* in the midst of a small damp meadow in the lower regions of Cortals de Sispony. So far as I could ascertain all imagines appeared however, to be male and therefore, this colony was clearly in the early stages of emergence.

Although the habitat and weather conditions were generally suitable for many of the other species of Nymphalid found round Encamp and elsewhere, I cannot provide any satisfactory reason for such paucity of species present in this region on the day of our visit.

### **SATYRIDAE**

Whilst ascending through the high summer pastures and open mountain wasteground on Spanish territory to the high area of Collada de Montaner during the later hours of the morning, I frequently encountered both sexes of *E. triaria* and *E. meolans* in flight. Both were particularly abundant in open terrain with short grass and sparse conifers. As we descended through rough ground and a belt of dense conifers to the valley region below, these two species became noticeably less abundant and were quite scarce by the time we reached the lower valley pastures.

No other *Erebia* species were recorded in flight, although I suspect others were present in pockets of waste ground and could have been found if I had had time to hunt further afield.

Amongst bushes and conifers in lower valley pastures *C. arcania* was reasonably common; although most were male, there were always a few females to be found.

No other Satyrid species were recorded during this particular day.

### **HESPERIIDAE**

I found no species of this family on the wing whatsoever above 1800 m, and below this altitude only *E. tages* and *T. sylvestris* were found as small colonies in damp areas amongst lower valley pastures.

**LOCALITY: Bordes de Beixalis and Vila (Encamp)**

**Habitat:** Rough pasture and meadowland areas with steep terraced fields around Vila surrounded by a thick coniferous belt on higher ground.

**Average altitude:** 1600 m.

**Date of observations:** 6th July 1979.

As this was the last full day of my holiday, I had decided to spend it as profitably as possible if the weather was suitable, in carrying out a detailed field survey amongst the wasteground areas around Vila (1400 m) and the higher summer pastures (Bordes de Beixalis—1600 m) which lie within a comfortable walking distance from Encamp and through which we had passed during the first morning of the holiday (25th June). In fact the weather was destined to be perfect with bright sunshine and cloudless blue sky throughout the day, with light breezes to provide some welcome respite from the heat of the sun; an idyllic day in which I spent some of the most rewarding hours I can remember in butterfly hunting.

As soon as the rest of the party with our leader had departed on a local bus towards Soldeu and the eastern frontier to spend a full day's trekking around the frontier peaks, I started off with pack-lunch, camera and the usual entomological impedimenta shortly after 8.30 a.m. so that I should not waste much of the morning in reaching the lower mountain slopes where I wished to start my survey work. I had allocated the morning hours to surveying an area of old neglected terraced pastures which had reverted to wasteground over the years and lay close to the hamlet of Vila, and I had decided to use the afternoon in survey work amongst the higher open summer pastures where the ground was less steep and more fertile.

**PAPILIONIDAE**

Both *P. machaon gorganus* and *I. podalirius feisthamelii* were reasonably abundant in both areas, although *feisthamelii* did appear to favour the lower dry wasteground region and were less commonly sighted in the higher summer pastures. In the late afternoon I did witness one male *feisthamelii* gracefully gliding up and down a short stretch of path where water trickled across from a spring at the base of a sloping bank nearby; it often alighted for brief moments on the ground in order to imbibe water in greedy fashion before resuming its searching flight behaviour.

**PIERIDAE**

Both male and female *A. crataegi* were frequently sighted in flight around open wasteground areas throughout the day; most favoured the high summer pastures where mountain flowers were particularly plentiful.

*C. crocea* was also frequently encountered at higher altitude levels during the early afternoon when I was exploring the more exposed area of high summer pastures. This species was certainly more widely distri-

buted in this region than had been the case elsewhere on other previous days. No female *helice* were recorded.

Amongst the other previously recorded species *A. cardamines* and *L. sinapis* were locally common in damp hollows and around mountain streams.

### NYMPHALIDAE

I found *M. cinxia* and *M. parthenoides* were very plentiful in the lower terraced areas especially amongst low scrub and in the midst of dry wasteground pockets; most *cinxia* were female and were very worn in condition as their flight period was nearly at an end. *Parthenoides* were in prime condition and were a delight to watch as they fluttered from one flower to another without being unduly concerned at my presence; all appeared to be male as their flight period had not reached its peak.

A few male and female *M. deione* Geyer, were sighted in mid-morning in one pocket of wasteground close to the main path; this species appeared to favour open dry terrain and enjoyed basking on large stones and barren earth. I noted that the females displayed a marked tendency towards colour contrast in the post-discal areas of the upper fore and hind wings, which were paler than the rest of the upper sides. The males were not easily distinguishable from *M. athalia celadussa* in flight and I found that a close inspection was essential.

Two new species of fritillary were recorded during this last day. *M. phoebe* Schiff. was encountered in small numbers on wasteground areas around Vila; all sighted were male and displayed particularly bright bitonal fulvous coloration on the upper sides of both fore- and hind-wings. This species appeared jealously to protect its chosen territory by patrolling such area at regular intervals and readily chased off any unwary intruder; *M. didyma* Esper. was also found to be emerging with the appearance of some fine males displaying a deep red coloration with irregular black discal and post-discal markings. This latter species was confined to dry wasteground with patches of flowering thyme.

I found both sexes of *M. athalia celadussa* reasonably abundant as small colonies amongst damp pastures on higher ground levels; males appeared generally to display a fuscous coloration although all markings were regular and uniform.

In the midst of one overgrown lower meadow pasture I found *A. adippe* to be plentiful amongst a patch of tall growing knapweed; I was not unfortunately afforded any chance to photograph this species as they were very restless and easily disturbed from their feeding activities. All appeared to be in good condition.

Later in the afternoon whilst exploring the higher summer pastures (Bordes de Beixalis), I was delighted to encounter a few early males of *aglaja* on the wing. These insects were particularly resplendent with bright fulvous coloration and bold macular markings.

As an unexpected bonus two male and one female *A. lathonia* were observed feeding on wild thyme (*Thymus serpyllum*) which was cascading over some stones on a steep bank adjoining the main path at its higher level. I was delighted to have stumbled upon a further record of this species as my last record had occurred on the first morning of the holiday amongst the lower terraces behind Encamp.

*B. ino* was to be found in sheltered damp pockets close to small streams; this species was however only present as small colonies and was not recorded as being present above 1600 m. I also found a limited number of worn *C. selene* males in flight around higher pastures; this latter species was clearly close to the end of its flight period. Amongst other earlier recorded Nymphalids only *A. urticae* was found in limited numbers throughout the day in all visited localities.

### SATYRIDAE

*C. arcania* was to be found everywhere amongst shrubs and sheltered areas in the lower wasteground region; this species was scarce however, above 1600 m where the summer pastures were more open in character.

During the later afternoon I stumbled across three male *M. galathea lachesis* flying together along the path above Vila. This species had not been recorded by me since my earlier visit to St. Julia de Loria on 26th June during the previous week, and as they were fresh specimens there was little doubt that this species was only starting to emerge in this particular region of the Principality.

Within seconds of sighting *lachesis* I disturbed a large greyish brown butterfly from rest on the path, and on catching it discovered I had found my first male *H. alcyone* Schiff. Its condition was perfect and the wing span was notably large—35 mm from apex to base. Another was sighted flying across an area of scree some metres below the path shortly after my first encounter.

There were few *Erebia* found amongst the lower wasteground slopes; but above 1600 m *triaria* and *oeme* were reasonably plentiful with a few *meolans* and *epiphron* in higher pastures.

*L. maera* form *adrasta* males and females were frequently disturbed from rest amongst rocks around the main path and around dry wasteground areas; all appeared to be in excellent condition with strong markings and fulvous coloration. At lower levels *L. megera* was also present in limited numbers; this species which is so common elsewhere in Northern and Central Europe, had not strangely enough been previously found by me during this holiday visit. Perhaps this species has a habit of appearing on the wing later in July.

### LYCAENIDAE

This family was well represented at all altitude levels visited and the weather conditions were ideal for good records. *P. argus* and *L. idas* form *alpinus* Berce were widely distributed around flowery banks and

amongst the richer summer pastures above 1600 m. This form, which may in fact have sub-specific status, is particularly striking with deep-blue coloration on the upper sides of both fore and hind wings with a narrow sub-marginal black band and is generally larger than the nominate species. *P. icarus* appeared to be less common in this region and was particularly scarce above 1600 m.

*A. allous montensis* Verity was to be found amongst the higher summer pastures and were notably large with orange sub-marginal lunules generally present on both upper sides of the fore- and hind-wings. *P. amanda* was also encountered frequently around the path and within areas of open pastures; both males and females of this latter species were on the wing. *C. semiargus* and *C. minimus* were also to be found, although they tended to be confined to higher areas in sheltered pockets of wasteground.

Amongst the "coppers" only *H. virgaureae* was recorded in reasonable numbers in flight amongst lower pastures and damp meadowland areas; one solitary female was found in the midst of a colony of freshly emerged males. Clearly this lovely species would be even more plentiful later in July.

During the mid-morning I was pleased to find two male *S. spini* Schiff. fluttering around a small bush (*Prunus* sp.) on wasteground, providing me with my only record of this species. No other "hairstreaks" were to be found and I suspect my visit was just too early to benefit from recording the presence of other species known to be found in the Principality.

## HESPERIIDAE

Apart from the sporadic appearance throughout the day of numbers of *sylvestris*, *lineola*, *venatus* and *tages*, I also found *S. sertorius* Hoff. to be widely distributed around dry and stony wasteground areas above Vila; both sexes were present.

## GENERAL CONCLUSIONS

There is no doubt that due to the fortunate timing of my visit and the favourable weather conditions prevailing during the second week in particular I was able to record the presence of no less than 72 species of Rhopalocera in remarkably diverse habitats with the added enjoyment of photographing a surprising quantity of Pyrenean endemic plants. Many recorded species had not reached their peak emergence period at the time of my visit and were, therefore, in good condition. Although a visit in late July would certainly have provided me with a few extra records, I would have undeniably missed seeing so much colourful mountain flora; a difficult compromise perhaps but, in this instance, successfully achieved with many treasured memories of some of the most beautiful unspoilt and tranquil scenery which I have so far encountered.

Nigel F. Gossling (5169)

## A SECOND LIST OF THE FOOD-PLANTS OF EAST AFRICAN MACROLEPIDOPTERA

Since completing the drafting of my paper "*A List of the Food-plants of East African Macrolepidoptera*" in 1973, I have collected a considerable number of further records. These have come from various sources, my own breeding experiences, items from various entomological journals and monographs, and from two prolific sources—E. G. C. Pinhey's *Moths of Southern Africa* (1975, Cape Town) and the late Dr. V. G. L. van Someren's *List of Food-plants of some East African Rhopalocera with Notes on the Early Stages of some Lycaenidae* (1974, *Journ. Lepid. Soc.*, 28: 315-331).

The format follows the original paper and I have taken the opportunity to correct an error in the botanical classification. *Richardia*, one of the food-plants of the sphingids *Basiothia medea*, *Hippotion osiris*, *H. eson* and *Theretra monteironis*, is listed as belonging to the Aroideae, it belongs, of course, to the Rubiaceae.

### I—ENTOMOLOGICAL LIST

#### RHOPALOCERA

#### PAPILIONIDAE

- Papilio lormieri* Dist.—Fagaropsis (Rutaceae).  
 „ *teita* v. Som.—Vepris (Rutaceae).  
 „ *demodocus* Esp.—Aegle marmelos (a newly introduced species),  
     Fagaropsis (Rutaceae).  
 „ *policenes* Cr.—Landolphia (Apocynaceae).

#### PIERIDAE

##### Pierinae

- Belenois raffrayi* Ob.—Capparis (Capparidaceae).  
*Anapheis gidica* Godt.—Salvadora persica (Salvadoraceae).  
 „ *aurota* F.—Boscia (Capparidaceae).  
*Pontia helice* L.  
 „ *glaucanome* Klug  
 Erucastrum arabicum (Cruciferae).  
*Mylothris sagal* Gr. Sm.—Viscum (Loranthaceae).

##### Teracolinae

- Nepheronia buqueti* Bsd.—Ritchiea fragrans (Capparidaceae).

##### Coliadinae

- Colias electo* L.—Oxalis (Oxalidaceae).  
*Eurema brigitta* Cr.—Sesbania (Papilionaceae).

#### DANAIDAE

- Danaus chrysippus* L.—Aspidoglossum, Stathmostelma (Asclepiadaceae).

#### ACRAEIDAE

- Bematistes quadricolor* Rog.—Vitis (Ampelidaceae).  
*Acraea aequatorialis* Neave—Malva verticillata (Malvaceae).

- „ *asboloplintha* Karsch—Tryplostemma (Passifloraceae).
- „ *anacreon* Trim.—*Alchemilla gracilipes* (Rosaceae).
- „ *uvui* Gr. Sm.—*Sparrmannia ricinocarpa* (Tiliaceae).

## NYMPHALIDAE

### Charaxidinae

- Charaxes jasius* L.—*Elaeodendron*, *Maytenus* (Celastraceae).
- „ *castor* Cr.—*Brachystegia* (Caesalpiniaceae): *Elaeodendron*, *Maytenus* (Celastraceae).
- „ *tiridates* Cr.—*Flacourtia* (Flacourtiaceae): *Celtis*, *Chaetacme* (Ulmaceae).
- „ *ameliae* Doumet—*Brachystegia*, *Julbernardia* (Caesalpiniaceae).
- „ *jahlusa* Trim.—*Dalbergia* (Papilionaceae).
- „ *penricei* Roths.—*Securidaca longipedunculata* (Polygalaceae): *Entada* (Mimosaceae).
- „ *achaemenes* Feld.—*Dalbergia*, *Pterocarpus* (Papilionaceae).
- „ *guderiana* Dew.—*Dalbergia* (Papilionaceae).
- „ *eupale* Drury—*Scutia* (Rhamnaceae).
- „ *etheocles* Cr.—*Celtis* (Ulmaceae).
- „ *viola* Btlr.—*Acacia* (Mimosaceae).
- „ *ethalion* Bsd.—*Tamarindus indica* (Caesalpiniaceae).
- „ *fulgurata* Auriv.—*Erythrophlaeum* (Caesalpiniaceae).
- „ *alpinus* v. Som.—*Albizzia* (Mimosaceae): *Scutia* (Rhamnaceae).
- „ *manica* Trim.—*Albizzia* (Mimosaceae): *Dalbergia* (Papilionaceae).

*Charaxes virilis* Roths.—*Adenanthera pavonina* (Mimosaceae).

### Nymphalinae

- Euryphene mardania* F.—*Borassus*, *Hyphaene*, *Phoenix* (Palmae).
- Aterica galene* Brown—*Quisqualis litorea* (Combretaceae).

### Neptidinae

- Neptis poultoni* Eltr.—*Paulinia* (Sapindaceae).
- „ *lativittata* Strand.—*Cycina* (Euphorbiaceae).

### Eunicinae

- Asterope morantii* Trim.—*Excoecaria bussei* (Euphorbiaceae).

### Vanessinae

- Hypolimnas misippus* L.—*Dyschoriste thunbergiflora* (Acanthaceae).
- „ *anthedon* Dbl.—*Urera hypselidendron* (Urticaceae).
- Precis orithya* L.—*Englerastrum scandens*, *Plectranthus* (Labiatae).
- „ *tugela* Trim.—*Englerastrum scandens* (Labiatae).
- Vanessa cardui* L.—*Obetia pinnatifolia* (Urticaceae).
- Atanartia abyssinica* Feld—*Obetia pinnatifolia* (Urticaceae).

### Argynninae

- Phalanta phalantha* Drury—*Trimeria* (Samydaceae).

**SATYRIDAE**

*Melanitis leda* L.—*Setaria sulcata* (Gramineae).

*Mycalesis iccius* Hew.—Grasses (Gramineae).

*Aphysoneura pigmentaria* Karsch—*Arundinaria alpinus* (Gramineae).

**LYCAENIDAE****Lipteninae**

*Teriomima subpunctata* Kirby

„ *micra* Gr. Sm.

*Baliochila hildegarda* Kirby

„ *dubiosa* Stempf. & Bennett

„ *fragilis* Bennett

„ *minima* Hawker Smith

„ *stygia* Talbot

*Cnodontes vansomereni* Stempf & Bennett

*Telipna sanguinea* Plotz

„ *consanguinea* Rebel

*Orniphodotos muhata* Dew.

*Mimacraea poultoni* Neave

„ *marshalli* Trim.

*Hewitsonia kirbyi* Dew

*Epitola kamengoensis* Jackson

„ *cercena* Hew.

„ *catuna* Kirby

*Iridana incredibilis* Staud.

„ *perdita* Kirby

*Deloneura ochrascens* Neave

Lichens on tree trunks.

**Lycaeninae**

*Hypolycaena philippus* F.—*Millingtonia hortensis* (Bignoniaceae).

*Axiocerses tjoene* Wllgr. (harpax F.)—*Brachystegia spiciformis*  
(Caesalpinaceae).

*Chloroselas pseudozeritis* Trim.—*Acacia stenocarpa* (Mimosaceae).

*Anthene hodsoni* Talb.—*Acacia* (Mimosaceae).

*Azanus mirza* Plotz—*Dichrostachys glomerata* (Mimosaceae).

*Euchrysops dolorosa* Trim.—*Vigna* (Papilionaceae).

*Zizeeria knysna* Trim.—*Spinacia oleracea* (Chenopodiaceae).

**HESPERIIDAE****Coeliadinae**

*Coeliades hanno* Plotz—*Acridocarpus* (Malphigiaceae).

**Pyrginae**

*Eagris lucetia* Hew.—*Rhus* (Anacardiaceae).

*Eretis lugens* Rog.—*Justicia* (Acanthaceae).

*Abantis paradisea* Btlr.—*Bridelia cathartica* (Euphorbiaceae).

„ *meru* Evans—*Vernonia* (Compositae).



**Hesperiinae**

- Kedestes brunneostriga* Plotz—*Setaria* (Gramineae).  
*Zophopetes cerymica* Hew.—*Phoenix* (Palmae).  
*Zenonia zeno* Trim.—*Sorghum*, *Zea mays* (Gramineae).  
*Pelopidas thrax* Hbn.  
 „ *fallax* Gaede  
 Grasses (Gramineae).

**HETEROCERA****SYNTOMIDAE**

- Amata cerbera* L.—*Coffea* (Rubiaceae).  
*Euchromia amoena* Mschl.—*Carissa* (Apocynaceae): *Secamone*  
 (Asclepiadaceae).

**ARCTIIDAE****Lithosiinae**

- Asura sagenaria* Wllgrn.—Lichens. This seems more likely than  
*Cinnamomum* (Lauraceae).

**Hypsinae**

- Aganais speciosa* Drury—*Acokanthera*, *Carissa* (Apocynaceae).

**Micrarctiinae**

- Utetheisa pulchella* L.—*Trichodesma* (Boraginaceae): Grasses  
 (Gramineae): *Gossypium* (Malvaceae): *Musa* (Mussaceae).  
 I am very dubious about the last three.

**Arctiinae**

- Spilosoma investigatorum* Karsch—*Bidens pilosa* (Compositae): *Peltophorum*  
 (Mimosaceae): *Lupinus* (Papilionaceae).  
 „ *lineata* Wlk.—*Tagetes minuta* (Compositae): *Passiflora*  
 (Passifloraceae).  
 „ *lutescens* Wlk.—*Mesembryanthemum* (Aizoaceae): *Tecomaria*  
 (Bignoniaceae): *Zea mays* (Gramineae): *Ligustrum*  
 (Oleaceae): *Medicago* (Papilionaceae).  
 „ *flava* Wllgrn. — *Cassia* (Caesalpinaceae): *Senecio*, *Tagetes*  
 (Compositae): *Lilium*, *Ornithogalum* (Liliaceae):  
*Tephrosia* (Papilionaceae): *Protea* (Proteaceae): *Smilax*  
 (Smilacaceae).  
*Teracotona euprepria* Hamps.—*Nicotiana tabacum* (Solanaceae).

**Callimorphinae**

- Amphicalia bellatrix* Dalm.—*Crotalaria* (Papilionaceae).

**Nyctemerinae**

- Nyctemera leuconoe* Hpffr.—*Vernonia* (Compositae): *Coffea*  
 (Rubiaceae).

**LYMANTRIIDAE**

- Pteredoa monosticta* Btlr.—*Dombeya* (Sterculiaceae).  
*Olapa nigribasis* Janse—*Dombeya* (Sterculiaceae).

- Euproctis fasciata* Wlk.—Cassia (Caesalpiniaceae): Combretum platypetalum (Combretaceae): Eriosema (Papilionaceae): Protea (Proteaceae).
- Porthesia producta* Wlk.—Terminalia catappa (Combretaceae).
- Bracharoa quadripunctata* Wllgrn.—Gerbera (Compositae).
- Dasychria georgiana* Fawc.—Rhus (Anacardiaceae): Bauhinia (Caesalpiniaceae): Quercus (Fagaceae): Elephantorrhiza (Papilionaceae): Trema (Ulmaceae).
- Orgyia mixta* Snell.—Zea mays (Gramineae): Gossypium (Malvaceae): Fragaria, Pyrus (Rosaceae): Coffea (Rubiaceae): Citrus (Rutaceae).
- Polymona rufifemur* Wlk.—Schinus molle (Anacardiaceae).

## LASIOCAMPIDAE

### Malacosomatinae

- Haplopacha cinerea* Auriv.—Ziziphus (Rhamnaceae).

### Lasiocampinae

- Odontocheilopteryx myxa* Wllgrn.—Acacia karroo (Mimosaceae): Eriosema (Papilionaceae).
- Philotherma rosa* Druce—Vitis (Ampelidaceae): Sclerocarya (Anacardiaceae): Sonchus (Compositae): Persea (Lauraceae): Eriosema (Papilionaceae): Pyrus (Roseaceae): Trema (Ulmaceae).
- „ *rennei* Dew.—Eriosema (Papilionaceae).
- Bombycopsis bipars* Wlk.—Bidens pilosa, Senecio (Compositae).
- „ *indecora* Wlk.—Pentzia (Compositae): Eriosema (Papilionaceae): Protea (Proteaceae).
- Catelebeda jamesoni* B. Bk.—Grasses (Gramineae): Pterocarpus (Papilionaceae).
- Nadisa carinatum* Wllgrn.—Royena (Ebenaceae): Acacia (Mimosaceae): Eriosema, Robinia, Sesbania (Papilionaceae).
- „ *polydora* Druce—Rhus (Anacardiaceae): Brachystegia, Julbernardia (Caesalpiniaceae): Acacia, Albizzia (Mimosaceae): Eriosema (Papilionaceae): Citrus (Rutaceae).
- Pachypasa sericeofasciata* Auriv.—Jacaranda (Bignoniaceae): Persea (Lauraceae): Pyracantha (Rosaceae).
- „ *truncata* Wlk.—Acacia (Mimosaceae).
- Pachypasa bilinea* Wlk.—Annona (Anonaceae): Bauhinia (Caesalpiniaceae): Persea (Lauraceae).
- Leipoxais peraffinis* Holl.—Combretum (Combretaceae): Ekebergia (Meliaceae).
- Eucraera gemmata* Dist.—Brachystegia, Julbernardia (Caesalpiniaceae): Lannea stuhlmannii (Anacardiaceae).
- „ *salambo* Vuill.—Eucalyptus (Myrtaceae).

**Gonometinae**

- Grammodora nigrolineata* Auriv.—Brachystegia, Cassia (Caesalpinaceae).  
*Anadiasa punctifascia* Wlk.—Acacia, Peltophorum (Mimosaceae).  
*Dollmania purpurascens* Auriv.—Ficus (Moraceae).

**EUPTEROTIDAE**

- Hoplojana rhodoptera* Gerst.—Jasminum (Oleaceae).  
*Phasicnecus obtusus* Wlk.  
 „ *gregorii* Btlr.  
*Strychnos* (Loganiaceae).

**SATURNIIDAE****Attacinae**

- Epiphora mythimnia* Westw.—Fernandoa magnifica (Bignoniaceae):  
 Helinus (Rhamnaceae).

**Saturniinae**

- Argema mimosae* Bsd.—Commiphora (Burseraceae): Spirostachys  
 (Euphorbiaceae).  
*Bunaea alcinoe* Stoll.—Bauhinia (Caesalpinaceae): Gymnosporia  
 (Celastraceae).  
*Nudaurelia arata* Westw.—Albizzia, Peltophora (Mimosaceae).  
 „ *jacksoni* Jord.—Scleria (Cyperaceae).  
 „ *zaddachi* Dew.—Euclea (Ebenaceae): Heteropogon, Sporobolus (Gramineae).  
 „ *belina* Westw.—Rhus (Anacardiaceae): Carissa (Apocynaceae): Colophospermum mopane (Caesalpinaceae):  
 Diospyros (Ebenaceae): Ficus (Moraceae).  
 „ *cytherea* F.—Rhus (Anacardiaceae): Cupressus (Cupressaceae): Euclea (Ebenaceae): Quercus (Fagaceae):  
 Watsonia (Iridaceae): Liriodendron (Magnoliaceae):  
 Myrica (Myricaceae): Myrsine (Myrsinaceae): Eucalyptus,  
 Psidium (Myrtaceae): Leucospermum, Protea  
 (Proteaceae): Rhamnus (Rhamnaceae): Crataegus,  
 Cydonia, Pyrus (Rosaceae).  
*Nudaurelia wahlbergi* Bsd.—Mangifera (Anacardiaceae): Maerua (Caparidaceae): Quercus (Fagaceae): Psidium (Myrtaceae):  
 Prunus (Roseaceae): Trema (Ulmaceae).  
 „ *zambesina* Wlk.—Petrea volubilis (Verbenaceae).  
 „ *said* Ob.—Oroza mucronata (Anacardiaceae).  
 „ *tyrrhea* Cr.—Pyrus (Rosaceae): Populus, Salix (Salicaceae).  
*Lobobunaea tyrrhena* Westw.—Ekebergia (Meliaceae): Albizzia (Mimosaceae): Psychotria (Rubiaceae): Celtis, Trema  
 (Ulmaceae).  
*Cinabra hyperbius* Westw.—Julbernardia (Caesalpinaceae): Ekebergia (Meliaceae).  
 „ *pygmaea* Maass & Weym.—Burkea (Papilionaceae).

- Melanocera menippe* Westw.—Ficus (Moraceae): Ochna (Ochnaceae).  
*Imbrasia ertli* Rebel—Brachystegia, Julbernardia (Caesalpinaceae):  
 Ekebergia (Meliaceae): Acacia (Mimosaceae).  
*Cirina forda* Westw.—Rhus (Anacardiaceae): Euclea (Ebenaceae):  
 Ekebergia (Meliaceae): Acacia, Albizzia (Mimosaceae).  
*Urota sinope* Westw.—Sclerocarya (Anacardiaceae).  
*Gynanisa maia* Klug.—Elephantorrhiza (Papilionaceae): Prunus  
 (Rosaceae).  
*Pselaphelia flavivitta* Wlk.—Afromomum (Zinziberaceae).  
*Usta terpsichore* Maass. & Weym.—Melia (Meliaceae).  
*Heniocha dyops* Maass. & Weym.—Acacia (Mimosaceae).  
*Decachorda rosea* Auriv.—Hyparrhenia (Gramineae).  
*Micragone ansorgei* Roths.—Julbernardia (Caesalpinaceae).

### Ludiinae

- Holocera smilax* Westw.—Rhus (Anacardiaceae): Piliostigma (Caesalpinaceae): Ekebergia (Meliaceae): Pinus (Pinaceae).  
*Ludia delegorguei* Bsd.—Uapaca (Euphorbiaceae): Salvia (Labiatae).  
*Goodia kuntzei* Dew.—Brachystegia, Julbernardia (Caesalpinaceae):  
 Acacia (Mimosaceae).

## SPHINGIDAE

### Acherontiinae

- Herse convolvuli* L.—Rumex (Polygonaceae).  
*Acherontia atropos* L.—Cannabis (Moraceae): Vicia (Papilionaceae):  
 Euonymus (Sapindaceae): Lycopersicum (Solanaceae).  
*Coelonia mauritii* Btlr.—Bignonia, Fernandoa magnifica, Newbouldia  
 imperialis (Bignoniaceae): Hebe speciosa (Scrophulariaceae):  
 Stachytarpheta indica (Verbenaceae).  
*Pemba favillaceae* Wlk.—Millingtonia hortensis (Bignoniaceae).  
*Poliana witgensis* Strand.—Spathodea nilotica (Bignoniaceae).

### Ambulicinae

- Platysphinx piabilis* Dist.—Craibia, Millettia, Mundulea, Ostryoderris,  
 Pterocarpus (Papilionaceae).  
*Polyptychoides grayi* Wlk.—Ehretia (Boraginaceae).  
*Phylloxiphia punctum* Roths.—Ochna (Ochnaceae).

### Philampelinae

- Nephele peneus* Cr.—Crytoplepis hypoglauca (Asclepiadaceae).  
*Temnora fumosa* Wlk.—Commelina (Commelinaceae). ? Copying error  
 for Camelina.  
 „ *plagiata* Wlk.—Apodytes (Icacinaeae).

### Choerocampinae

- Basiothia medea* F.—Ipomoea batatas (Convolvulaceae): Galium,  
 Richardia (Rubiaceae).

*Celerio lineata* F.—*Sonchus* (Compositae): *Scabiosa* (Dipsacaceae):  
*Emex* (Polygonaceae): *Linaria* (Scrophulariaceae).

*Hippotion osiris* Dalm.—*Richardia* (Rubiaceae).

„ *celerio* L.—*Ipomoea batatas* (Convolvulaceae): *Acacia*  
 (Mimosaceae): *Epilobium* (Onagraceae): *Galium*  
 (Rubiaceae): *Daucus* (Umbelliferae).

„ *eson* Cr.—*Cissus* (Ampelidaceae): *Colocasia*, (Aroidae):  
*Coprosma baueri*, *Richardia* (Rubiaceae): *Bougainvillea*  
 (Nyctaginaceae).

*Theretra monteironis* Btr.—*Richardia* (Rubiaceae).

### THAUMETOPOEIDAE

*Anaphe reticulata* Wlk.—*Diplorrhynchus* (Apocynaceae): *Dombeya*  
 (Sterculiaceae).

„ *panda* Bsd.—*Diplorrhynchus* (Apocynaceae): *Bridelia*  
 (Euphorbiaceae).

### NOTODONTIDAE

*Hampsonita esmeralda* Hamps.—*Faurea*, *Protea* (Proteaceae).

*Simesea orestes* Kiriakoff—*Terminalia catappa* (Combretaceae).

*Desmeocraera latex* Druce—*Ficus* (Moraceae): *Chrysophyllum*,  
*Mimusops* (Sapotaceae).

*Rhenea mediata* Saal—*Combretum*, *Terminalia* (Combretaceae):  
*Ekebergia* (Meliaceae).

*Phalera imitata* Druce—*Rhynchosia viscosa* (Papilionaceae).

*Galona serena* Karsch—*Terminalia* (Combretaceae): *Psidium*  
 (Myrtaceae).

*Turnaca grisea* Holl.—*Hyphaene* (Palmae).

*Diasemina simplex* Wlk.—*Glycine* (Papilionaceae).

*Trotonotus bettoni* Btlr.—*Brachystegia*, *Julbernardia globiflora*  
 (Caesalpiniaceae).

### LIMACODIDAE

*Latoia vivida* Wlk.—*Combretum* (Combretaceae): *Prunus*, *Rosa*  
 (Roseacea): *Pavetta* (Rubiaceae): *Thea* (Theaceae).

„ *latistriga* Wlk.—*Celastrus* (Celastraceae): *Ricinus*  
 (Euphorbiaceae): *Prunus* (Rosaceae).

„ *urda* Druce—*Uapaca* (Euphorbiaceae): *Lagerstroemia*  
 (Lythraceae).

*Neomocena convergens* Hering—*Coffea* (Rubiaceae): *Dodonea*  
 (Sapindaceae).

*Neogavara imitans* Janse—*Coffea* (Rubiaceae): *Thea* (Theaceae).

D. G. Sevastopulo (5562)

(To be continued.)



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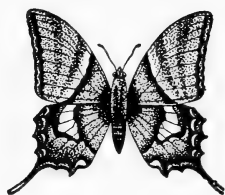
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VOL. 40 NO. 331



MAY 1981

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This year's Annual Exhibition will be held on Saturday, 10th October in the Hounslow Civic Centre, Hounslow, Middx. Entry will be by purchase of a programme, costing 20p. Think about your exhibit now please! We should like to remind Junior members that the more entries we get for the Ansorge award the better. They should also make it clear on their exhibit that it is from a Junior member and therefore eligible for the award.

### **FIELD STUDIES COUNCIL**

We have received this council's brochure for 1981. As usual there is a varied and interesting selection of courses at their nine centres. Full details can be obtained from the Education Officer, Field Studies Council, Preston Montford, Shrewsbury SY4 1HW.

We put a note about the Field Studies Council's activities in last year's May issue of the Bulletin. Your editor would be interested to consider for publication any account concerning an entomological course members may have attended.

For this year, Juniper Hall Centre is holding a two-part course on Butterflies and Moths for beginners (29th–31st May and 24th–26th July). At Leonard Wills Centre is a course on Introducing Butterflies and Moths (29th–31st May), while Juniper Hall Centre has Introducing Insects (12th–14th June). A longer course on Butterflies and Moths is being held at Preston Montford Centre (24th–31st July), while spiders are amply catered for at Flatford Mill (16th–23rd September).

Editor.

### **LETTER TO THE EDITOR**

Dear Sir,

For a long time now I have thought that AES members should be able to meet more frequently than once a year at the Annual Exhibition. Being a national society—as opposed to a regional one—this would, of course, present problems if such meetings were to be arranged on a national basis. But if someone in a particular region were to arrange informal meetings for those members who lived in or near the area it would, I feel, be a viable proposition.

I propose to start the ball rolling by organising a London Meetings Group for members in the London area. I have in mind one evening a

month—a sort of 'At Home' in the tradition of the illustrious H. T. Stainton—when fellow-entomologists can meet for informal discussions, slide shows, exchange of specimens and livestock, demonstrations of collecting and mounting techniques, a forum for comparing notes on breeding and rearing, and so on. I will of course provide light refreshments. Subjects covered at meetings need not necessarily be confined to entomology: any aspect of Natural History will be welcome.

Interested members are asked to write to me (7 Brockwell Court, London, S.W.2) letting me know the most convenient day of the week, in which week of the month, and what time in the evening would suit them best, to enable me to organise something on dates and at times which reflect the majority choice.

Members in other regions please copy!

S. J. Patel (751)

#### NORTH BRITISH SAWFLY RECORDS (HYM., TENTHREDINIDAE)

In spite of R. B. Benson's energy and scientific accuracy in the collection and recording of British Symphyta, the group remains underworked in this country. Recorded distributions given in Benson (1952, 1958) often indicate only the areas in which hymenopterists have been most active. Furthermore, collection of these insects has tended to be most intensive in the south of England, so that in some essentially northern genera (e.g. *Amauronematus*), certain species have been recorded as scarce merely because they were collected on the edge of their range. Below are listed some recent sawfly records which fill gaps in our knowledge of distribution. Most specimens are from southern Scotland. The majority was collected by the writer. Nomenclature follows Kloet & Hincks (1978) except in the recognition of *Pontopristia* Malaise.

#### HETERARTHRIINAE

##### *Heterarthrus aceris* (Kaltenbach)

I have noted previously (Liston, 1980a, b) that *H. aceris* occurs north to the Firth of Forth. The first leaf-mine of this species that I found (Liston, 1980b) was in *Acer campestre* L., a very scarce tree in southern Scotland. *A. campestre* seems to be the preferred foodplant in other parts of Europe where I have observed it. Since making these records I have found leaf-mines in *Acer pseudoplatanus* L. in every part of the Lothians, and also in Peebleshire and Stirlingshire. The most northerly records yet are from Perthshire (leaf-mines collected at Pitlochry and Castle Blair, 13.9.1980). Altenhofer (1980) divides the *Heterarthrus* complex attached to *Acer* into five species, giving only one a name. No species attacks *Acer platanoides* L., possibly because its leaves are much thinner than those of the others.

## BLENNOCAMPINAE

*Apethymus braccatus* (Gmelin)

9 ♂♂, beside River Tweed near St. Boswall's, Roxburgs., 17.8.1980. These specimens were part of a large assemblage found resting on the shrubby growth at the foot of an oak's bole. This species appears earlier in Scotland than in England, demonstrating the often forgotten fact that not only are northern spring insects later, but the autumn ones are earlier. Presumably these specimens were freshly emerged and awaiting the appearance of females. Protandry is widespread in sawflies. Benson (1952: 95) recorded *braccatus* as local in England, Wales and W. Scotland.

## TENTHREDINIDAE

*Tenthredo obsoleta* Klug

1 ♀, Catcleuch Reservoir, Northumberland, 31.7.1980. Not previously recorded in England. A northern species closely related to, and possibly conspecific with *T. mesomelas* L. In Britain, *obsoleta* has been found in various Scottish localities and Ireland (though not always on moorland as Benson (1952) suggests: see Liston, 1980b). Much of the area around Catcleuch is now forested with conifers, but the species appears to be able to survive quite well in such situations. It is chiefly in subalpine coniferous forest that it is found in Central Europe.

*Macrophya albipuncta* (Fallén)

1 ♀, Towpath of Union Canal in City of Edinburgh, 11.6.1980 (leg. K. Haughney & A. D. Leslie). I was disappointed not to have witnessed the capture of this insect by my colleagues. It is a scarce species which is normally found in subarctic and high subalpine habitats (e.g. Liston, 1980c). In Scotland it was recorded by Benson (1952: 130) from Aberdeen and Inverness (Perths. and Kircudbr.) and, in England, in Yorkshire. Its foodplant (*Geranium sylvaticum* L.) has a northern distribution in Britain, but is scarce in the Lothians and was not recorded from the canal corridor by Sheldon (1976). Records of *sylvaticum* from nearby localities (Martin, 1934) suggest that this *albipuncta* could have been vagrant from a local population.

## NEMATINAE

*Hoplocampa chrysorrhoea* (Klug)

4 ♀♀, Corstorphine Hill, Edinburgh, 30.4.-8.5.1980. Benson (1958: 152) recorded this species as occurring north to Kircudbrightshire.

*Pseudodineura fuscula* (Klug)

1 ♀, Corstorphine Hill, Edinburgh, 11.6.1980. Benson (1958: 155) recorded *fuscula* from England and the following Scottish counties: Lanark, Dumfries, Moray, Caithness.

*Pristiphora confusa* Lindqvist

1 ♀, Leadhills, Lanarkshire, 16.5.1980. Swept from *Salix phylicifolia* L. The two previous British records also based on single females are from

southern England (Benson, 1958: 160). One might expect *confusa* to be more widespread in Scotland, for in continental Europe it is essentially northern or montane. The bushes of *S. phylicifolia* at Leadhills, at ca. 1000 ft. above sea level, support an interesting fauna of characteristically northern insects, several of which are mentioned in this note.

*Pontopristia amentorum* (Förster)

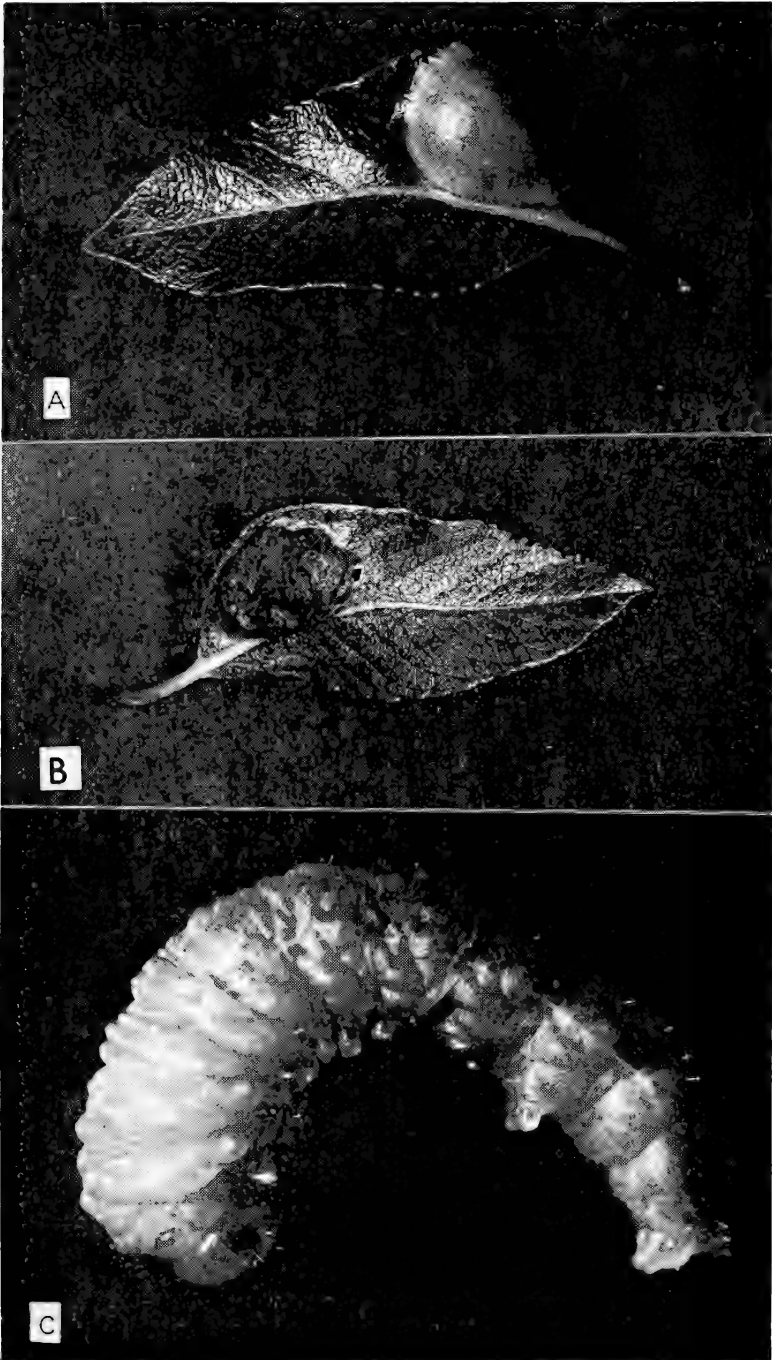
2 ♀, Leadhills, Lanarkshire, 16.5.1980. From *S. phylicifolia*. *P. amentorum* was known as a scarcity from several widely separated English localities (Benson, 1958: 182) until the same author (1959) found this species in the North-West Highlands, and described the previously unknown male. Benson (1959) remarked that the Scottish and alpine Swiss specimens which he had examined represented the "boreo-alpine dark form" of *amentorum*, while the previous British records had referred to the "lowland pale form". It has since been proved that Benson's specimens, determined as *amentorum* (Benson, 1955), then as *latiserra* Malaise (Benson, 1960) represent *P. boreoalpina* Lindqvist. Ruthe (1859) described dark specimens from Iceland, resembling the Scottish ones, as *suavis*, now considered synonymous with *amentorum*.

Lindqvist (1961), the only available useful treatment of the European species, considered Benson's Wester Ross material to belong to another species, *kamchatica* Malaise. Lindqvist separated this species from *amentorum* on the basis of its deeper black coloration, the larger teeth on the female's saw and its larger body size. My specimens from Lanarkshire are referable to *kamchatica* using Lindqvist's descriptions, but I do not hold this species to be distinct from *amentorum* which is undoubtedly a very variable insect. Conde (1938) has already synonymised *kamchatica* in this way, though he probably went too far in treating some of the other taxa as synonyms of *amentorum*.

*Pontopristia* Malaise, 1921 has not been accepted by all authors. Conde (l.c.) placed these species in *Amauronematus* and was followed by Benson (1958) and others. Recently, however, several authors (e.g. Benes, 1962; Hellén, 1970) have realised that the distinction is justified and useful. *Pontopristia* is clearly differentiated from *Amauronematus* on biological and morphological grounds. Larvae of *Pontopristia* feed in the catkins of *Salix* (and are unique amongst the Nematinae in this way) whilst *Amauronematus* are unspecialised leaf-feeders on *Salix*, *Betula* and *Vaccinium*. It is true that only the females of *Pontopristia* can be separated from *Amauronematus*, but this is also true for the genera *Phyllocolpa* Benson and *Pontania* Costa. The case for the separation of the latter groups is exactly the same as for *Pontopristia* and *Amauronematus* and yet *Phyllocolpa* is universally accepted as valid.

*Amauronematus sagmarius* Konow.

Photos A and B. Galls of *Pontania pustulator* Forsius on *Salix phylicifolia*. Length of leaf = 3.5 cm. Photo C. Last instar larva of *P. pustulator*. Length = 8 mm.



1 ♀, Cademuir, Peebleshire, 19.5.1980. Benson (1958: 189) stated that *sagmarius* was a "Northern and Western species. On *Salix atrocinerea* Brot., etc." He recorded it (p. 179) from Dartmoor (Dev.) and upper Teesdale (Yorks. and Durham), and from Ireland. My specimen was taken from *S. atrocinerea*. It is a Holarctic species, boreal in N. America and Siberia, but occurs locally over much of Europe, as do its hosts. Stritt (1952: 289) gives its European distribution as Hungary, S. Russia, S. Germany and Finland. Also in Switzerland (Benson, 1961: 167).

*A. tillbergi* Malaise

1 ♀, Leadhills, Lanarkshire, 16.5.1980. From *S. atrocinerea*. Recorded from southern England and Ireland (Benson, 1958: 184), Sutherland (Benson, 1959), Selkirkshire (Liston, 1980b). Typically an arctic-sub-arctic species, records from S. England are anomalous. Outside Britain known from Lappland, Northern Russia, Kamchatka, Alaska and Canada. Dr. B. Peter (*pers. comm.*) has found it in the Swiss Alps.

*Pontania pustulator* Forsius

Galls of this species were collected at Leadhills from *S. phylicifolia* L. (Liston, 1980b). Since its natural history is poorly known (briefly described in Forsius (1923) I make some comments here. The galls are developed equally above and below the leaf-blade at the base of the leaf and touch the midrib, the walls are very thin. They are green until a few days before the larva leaves to pupate (photo A), they then turn reddish (photo B). Occasionally more than one larva occurs in a gall, but only one survives to reach the third instar. The fully grown larva is 6.5–8 mm long, with a greyish-white body, pale brown head, black ocellar fleck and darker brown mouthparts (photo C).

The cocoon is an interesting structure, differing from other *Pontania* that I have reared in that it has a distinct outer wall which supports the walls of its cell. This outer wall is loosely formed, but comparatively strong, with thick strands of silk holding small fragments of soil and plant debris in place (fig. 2, ca. 8 mm long). If the coating of soil is removed, it can be seen that there is an inner cocoon suspended inside the first. The inner cocoon is more fragile, closer spun and of "typical" nematine type (fig. 1). Wong (1951) studied the gross structure of sawfly cocoons, and attempted a classification of those of some Canadian forest pests. In the Nematinae he thought that cocoon structure was broadly stable for most genera except *Nematus* and *Amauronematus*. He said of *Pontania* and *Phyllocolpa* "Cocoons of species reared have single walls. They are shining, leather-like or parchment-like, cylindrical, with rounded ends. Colour brown or dark-brown. Length 5–6 mm".

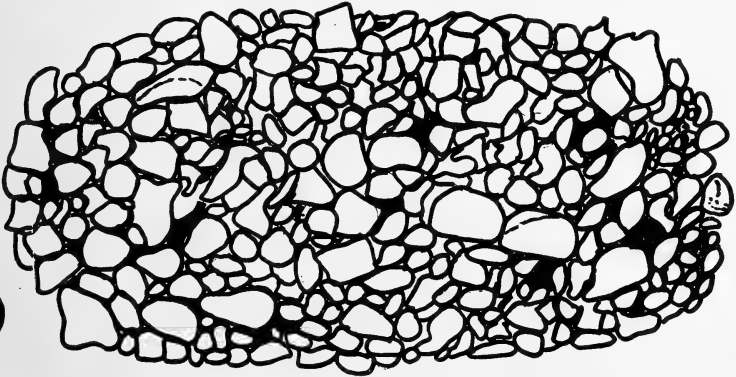
With *Pontania vesicator* (Bremi) and the N. American *P. bruneri* (Marlatt), *pustulator* forms a distinctive species group within *Pontania*.

Figs 1 and 2. Cocoons of *Pontania pustulator* Forsius. Scale line = 1 cm. Fig. 1 with coating of soil removed. Fig. 3. Fold made in leaf of *Salix pentandra* by larva of *Phyllocolpa excavata* (Marlatt). Scale line = 1 cm.

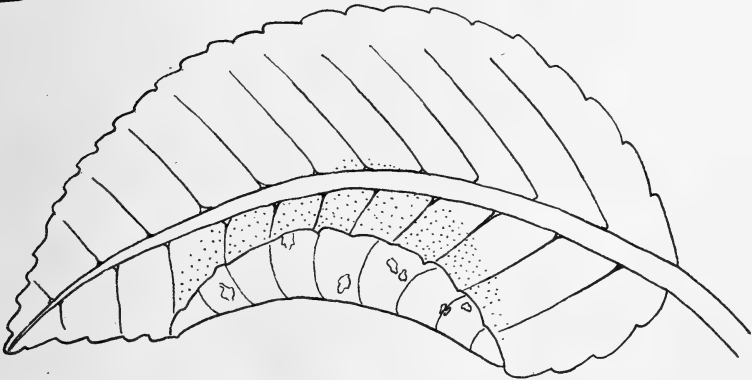




1



2



3

The double-walled cocoon described above may be another characteristic of this species group. It appears from Staeger (1919), that *vesicator* constructs a similar cocoon. Their biologies are very similar in most ways, only the fooplant associations, adult morphology and coloration and their distributions separate them. *P. pustulator* is restricted to Northern Europe, *vesicator* occurs throughout Europe (subarctic Finland to lowland Greece). Though Benson (1961) stated that *vesicator* is boreo-subalpine, this is not true for its distribution outside Britain.

*Phyllocolpa excavata* (Marlatt)

Leaf-rolls with larvae on *Salix pentandra* L. in Beecraigs Wood (nr. Linlithgow), W. Lothian, 15.6.1980; Red Moss (Balerno), Midlothian, 24.5.1980. Benson (1958: 201) recorded this species from W. Yorks., Roxburghs., Stirling and Co. Leitrim. It is the only species of sawfly to make leaf-rolls on this willow, and the larva can be recognised by its blackened bases to the thoracic legs. A "roll" is perhaps not the best name for this species habitation (fig. 3), a "fold" would suit it better, for it is quite flat. The larva eats small holes in its fold. At first it leaves the upper epidermis intact, producing an irregular blotchy pattern on the down-folded part of the leaf. Older larvae eat right through the leaf. Growth of the leaf is usually affected on the side which the larva is feeding. This causes the midrib to bend. *Ph. excavata* is a subarctic-subalpine species, monophagous on *S. pentandra* in Europe.

*Nematus brevivalvis* Thomson

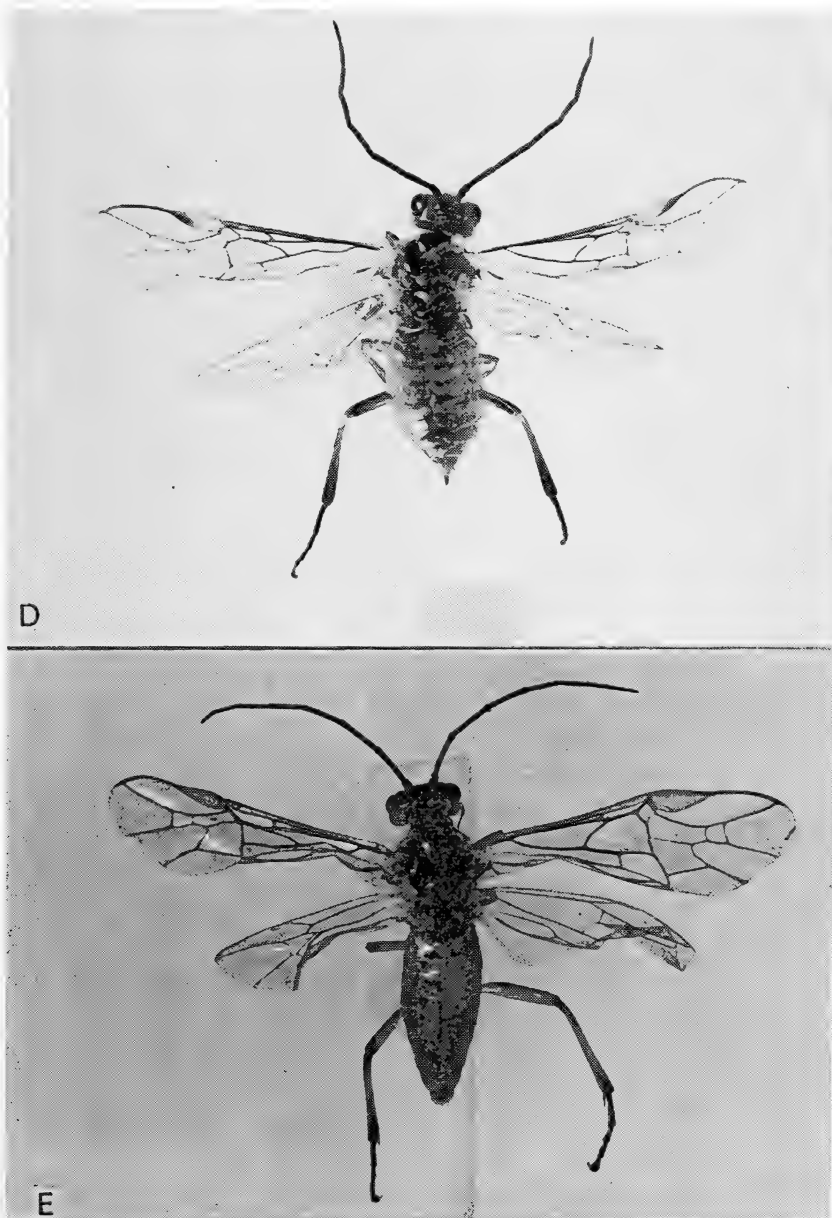
1 ♀, Portmore Loch, Peebleshire, 1.6.1980. This locality possesses the Lothian's largest area of birch forest. Apparently a scarce species and much under-recorded. Benson (1958: 225) gives records from southern English localities and Inverness in Scotland. Speight & Moller (1979) added it to the Irish list. Outside Britain, Benson (1958) could only give Sweden and Finland. Including the type localities of *Pteronus kriegeri* Konow, *Amauronematus spurcus* Konow and *Pteronidea absimilis* Lindqvist (all are synonymous with *brevivalvis*) it is known also from Norway and Northern Russia. Hellén (1976) suspected the species to occur in Central Europe. Oostrroom (1976), in his list of Netherlands sawflies, confirmed this.

*N. cadderensis* Cameron

1 ♀, Upper Whitadder Valley E., Dothian, 11.5.1980. Probably found locally throughout Britain, but scarce. In Scotland it has been found in Lanarks., Argyle, Inverness (Benson, 1958: 221) and Fife (Liston, 1980b).

*N. flavescens* Stephens

1 ♀, Red Moss (Balerno), Midlothian, 24.5.1980. Benson (1958: 218) gave various English areas for this species. In Scotland it has been found in Ross & Cromarty and Inverness.



Photos D and E. Females of *Nematus oligospilus* Först. Representative of spring (D) and summer (E) broods. Lengths from frons to basal plate of sawsheath = 7 mm.

*N. oligospilus* Förster

Seasonal variation is often extreme in this species. Temperature is almost certainly the crucial factor. As Benson (1958: 224) has already noted for *bergmanni* Dahlbom, spring forms of the first brood (flying V-VI) are usually much darker than summer ones of the second brood (VII-VIII). The proportion of dark forms increases for both broods in more northern regions. Female specimens show these differences best. Two specimens from Peeblesshire are illustrated. Photo D shows an insect taken on 19.5.1980. That on Photo E, taken on 3.8.1980, was one of the summer brood. Areas which show more extensive dark coloration in the spring brood than the summer one are the apex of the stigma, ocellar fleck, upperside of antenna, mesonotum, tergites of abdomen along the median line, apices of middle and hind femora, tibiae and tarsi.

**Acknowledgements**

I thank Messrs A. D. Leslie and K. Haughney for their generosity in presenting material from the Union Canal, Edinburgh. Mr. T. E. Gray kindly made photographic equipment available.

**Summary**

First English record of *Tenthredo obsoleta* Klug is made. *Pristiphora confusa* Lindqvist and *Amauronematus sagmarius* Konow are recorded in Scotland for the first time. New county records for 11 other species are included. Variety of structure in cocoons of genus *Pontania* is noted. Seasonal variation is described in female *Nematus oligospilus* Förster.

Andrew D. Liston (6983)

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## BOOK REVIEWS

*Love among the Butterflies*, by Margaret Fountaine (edited by W. F. Cater). 224 pp., well illustrated in both colour and sepia. Royal octavo. Collins, London 1980. Price £8.50.

Miss Fountaine died, as she would have wished, net in hand, in 1940, leaving by her will a sealed black box "not to be opened until 1978". The pupal period was long; the eclosion and wing expansion short, the resultant imago absolutely superb. The black box contained her diaries. In excess of a million words written over a period of sixty years, illustrated by both photographs and sketches. This is an achievement that

ranks with Pepys and Evelyn and, like those diarists, it may well be a couple of centuries before they are ever printed in full, for this present production is but the distilled essence. It is superbly designed and produced as if it were a rare limited de luxe edition from a private press. There are running titles and borders; vignettes and colophons; decorative corner motives (as used by Miss Fountaine in her diaries); the editorial matter clearly typeset to a smaller layout than the diary; sepia type on a cream wove paper; the coloured illustrations with an appropriately chosen, coloured border and background. What a pleasure it is just to handle and look at this book.

The editor has done his job well. The book flows onwards from Miss Fountaine's early life in Norfolk and her unhappy love affairs to her deepening interest in butterflies, her meeting with Khalil Neimy, a Syrian dragoman, who was to be her constant collecting companion until his death many years later.

This book gives a fascinating insight into life in late Victorian and Edwardian times, both in Europe and further afield. We do not today realise the difficulties and hardships of travel in those days. The only thing that was so much easier was the crossing of frontiers! It is not a great list of species caught. It is the thoughts and fears, the loves and anguishes, the day to day doings of a restless lady ever inspired to journey on and on with her love and passion for butterflies as her *raison d'être*. Difficulties are made light of and her delight in butterflies comes through clearly.

Consider the following passage:—

"Another day we started early from Budapest, a party of five; about two hours in a slow train brought us to Dabas; then a sort of miniature hay wagon entirely innocent of springs took us along a road where wheels sank up to axles, then across the grassland; and through great sheets of water in which we stuck in the mud and I thought nothing could save us from being upset. After more than two hours of bumping and jolting along we arrived—an entomologist's dream realised, a forest abounding with butterflies, the *Suvarovius* flying by hundreds, a white graceful creature; *M. Aurelia*, *A. Daphne*, *P. Alicphron* and *C. Morphheus*; butterflies rare in other localities were abundant here. It was 11.30 before I got back to the Hotel Bristol that night."

Miss Fountaine was an exceedingly attractive woman, even in middle age. This does not come through in her photographs, but does from contemporary written evidence. A Victorian lady travelling alone was more than enough to attract comment, especially if she also, unconventionally, rode astride and not, as was then respectable, side-saddle. It is not surprising that male interest was thereby aroused. Hence the title of this book. For example:—

"I complained bitterly to the Baron that I had come to Sicily to collect butterflies, and had almost been persecuted by men. To which the Baron

replied, 'And you do not like it! Oh, Miss Fountaine, if all the women were in love with me as all the men are with you, I should be the happiest man in the whole world!!' I believe he really was in love with me."

The illustrations are spaced throughout the text in the relevant place. They are a mixed bunch and although a general acknowledgement as to source is given it would in our opinion have been more constructive to have given the provenance of all of them. They range from photographs (many obviously taken by Miss Fountaine), sketches, some of which are clearly not Miss Fountaine's, pages from her diaries and notebooks, and coloured reproductions of specimens in the Fountaine-Neimy collection now in Norwich Museum. These show clearly that meticulous perfection both in specimens, setting, and labelling attained and held to by Miss Fountaine.

It is clear that Miss Fountaine had an immense amount of entomological knowledge and accumulated a large amount of data throughout her life. Little of it is published. The brief glimpses we are given here of her notebooks (which are in the Natural History Museum and do not form part of the diaries) consisting as they do of coloured paintings of larvae, chrysalids and foodplants, are tantalising. They contain we suspect much new and unpublished information and seem to us to deserve publication in their own right.

This book should be in the library of everyone. At its very modest price it is phenomenal value for money and we suspect it may well be one of the best sellers of the year. Other Entomological publishers should take note and try and bring their productions up to the same standard and down to the same price. Sadly, however, a word to purchasers. Check the copy you intend to buy. Several have slipped through production control with pages 82-83, 86-89, 90-91 and 94-95 absolutely blank.

Brian Gardiner (225)

*Leaves from a Moth-Hunter's notebooks* by P. B. M. Allan. [Edited and introduced by R. S. Wilkinson]. 281 pp. Hardback octavo. E. W. Classey Ltd. Price £9.00.

It is over thirty years since Mr. Allan's previous entomological book was reviewed in this journal (Moths and Memories, *Bull. amat. Ent. Soc.* 8: 46). It should have been less but as has so often been reported for *Eriogaster lanestris* this book has been unduly long eclosing. One of the reasons for this was apparently the discovery at a late stage of production of an additional chapter which Mr. Allan had sent off for an opinion upon shortly before his demise. Very sadly there is still a chapter missing. This is the one on the fens and *Noctua subrosea* which your present reviewer enjoyed the privilege of opining on and had already

returned to Mr. Allan. Perhaps he, or the editor, considered it unsuitable; maybe it has been lost or destroyed. Whatever the reason its non-appearance is a sad loss to posterity.

What can one say about the inimitable Mr. Allan and the contents of this book? Little, really, that has not already been said. It is written in the format of his previous entomological volumes. The style is witty, erudite, entertaining, easy to follow being written in good grammatical English and not, as so often today, mid-atlantic, franglais or computorese. Like his three previous entomological books this one also has the word 'moth' in its title but deals in no small measure with 'butterflies'. More so in fact than did any of the previous volumes. As usual, too, Mr. Allan has his own determined opinions on certain subjects which he himself admits are 'heretical'. So much the better.

The book consists of eight chapters plus the chapter on "The Glanville Fritillary", the missing item which caused the delay in publication and which for some reason is inserted as an Appendix. The chapters deal with, in order, The Middle Copper; The Mazarine Blue; the Swallowtail mystery—in which *podalirius* is discussed with the same ardour as *machaon* was in *Talking of Moths*; The Oak Prominents—an expansion of the theme taken up in *A Moth-hunter's Gossip*; Larvae-hunting in Spring; Moths in a Searchlight; Interlude; Some Possible Settlers.

As has been noticed in his previous works *The Old Moth-Hunter* was not only a fine entomologist with a "feel" for insects but he was also a determined detective and an indefatigable investigator into historical aspects of the subject. This comes through most clearly in his accounts of the mystery of whether *Papilio podalirius* was even a true British insect and of the Glanville Fritillary.

The book is very well printed on the same soft off-white paper as its predecessors and is to be thoroughly recommended to one and all.

I must now make a few carping remarks. These are not intended in any way to put any intended purchaser off this otherwise excellent book, but to encourage the editor and publisher to make alterations to the next edition. First: we should have liked to have seen the photograph of Mr. Allan which forms the frontispiece rather better done and of larger size. Preferably on plate type paper and without the top of the head scalped off. Secondly: the editor, Dr. Wilkinson, in his introduction gives us some tantalising insights into some of Mr. Allan's other publications. As the possessor of (and having read!) some of these I can state quite unnequivocally that they are equally entertaining, and do feel that the opportunity should have been taken to compile a bibliography—at least of the major works—of the "Old Moth-hunter". Be it under whatever pseudonym (and there were many) he was publishing. Thirdly: a very bad case of inattention to detail. Internally this book is titled and headed as leaves from a moth-hunter's notebooks (plural)



but on the external cover the titling has notebook (singular). Do I detect a wry posthumous smile?

BOCG

*The Butterflies of Scotland* by George Thomson, pp. xvii + 267; 8 col'd. + 31 plates + 97 figs. medium octavo. Croom Helm, London 1980. Price £19.95.

What an unexpected and pleasant surprise it was when this book suddenly, and without warning, appeared on the shelves of our local bookshop. No pre-publicity; no interminable delay between announced date and actual date of publication, as is so often now the case; hence of course no let-down after the publicity build-up but real pleasure in its perusal.

This book follows on and continues in the tradition of E. B. Ford in expanding and amplifying books about butterflies from being mere faunal lists and descriptive matter to being a fully integrated biological study. We are led on to the actual butterflies with a concise but clear account of Scotland's climate, geology, history, people and flora. Of particular use in this respect are the distribution maps given in many cases not only of the butterflies but also of the relevant foodplants. This shows at a glance where rare or unconfirmed species should perhaps be sought. In some cases the question should perhaps be asked as to why is the foodplant so widespread and abundant but the butterfly confined to a handful of localities?

Coming to the butterflies themselves, their history, present status, habits, subspecies to be found in Scotland, and time of appearance is given. This last is a most useful feature of the book since probably all books on butterflies tend to give the often much earlier southern England dates of appearance. The larvae are not discussed—but they have after all been thoroughly and often described elsewhere—but the much more useful foodplant details are given.

Mr. Thomson has found 68 species listed as Scottish. This may come as a surprise to many Sassenachs even though many of the species (e.g. *Parnassius apollo*) are unlikely to be found now. All are however thoroughly discussed and evaluated.

Mr. Thomson is especially strong on historical delving and has clearly browsed deeply and distilled the essence into his text. Not only does this appear in the butterfly section but the final fifty or so pages of the book contain an historical account of Scottish Entomologists (sadly, Professor James Rennie and Capt. Thos. Browne have been overlooked), Societies and Journals; a glossary; a brief account of and map of Nature Reserves; the vital check-list of butterflies; a very adequate bibliography; finally an adequate index.

Mr. Thomson has written an excellent book which should be of use and interest to all lepidopterists. On the whole a well-produced and

printed book although on coloured plate 14. Fig. 8 has had an attack of the "blues" and the modern half-tone 'xerography' does not, let us face it, give the same standard of pleasant reproduction as the old photographic half-tone screen block on plate paper with a border. Also it is not quite fair to call the small marginal vignettes of Scottish Entomologists "Plates", especially when similar size diagrams in the front of the book are "Figures".

Brian Gardiner (225)

*Handbook for the Identification of British Insects, vol. IX part 5: Diptera Dolichopodidae* by E. C. M. d'Assis Fonseca. Royal Entomological Society of London, 1978, 90 pp. Paperback 8vo. Price £3.30.

This latest addition to the 'Handbooks' seems to follow the trend of increasing specialisation within the series, confining itself to a single family. In this, we can safely presume that the author is a specialist on his subject and this is borne out by the detail and professionalism of the work. The numerous line drawings in particular are admirably clear and have been executed by the author, ensuring that the reader sees what he intended us to and not an artist's impression, as sometimes happens!

Also to be applauded is the inclusion of additional, alternative keys to certain particularly 'sticky' genera, providing as it does both a cross-check and a means of salvation if one becomes hopelessly 'fogged' by one key.

The family is large—267 British species—and not surprisingly little is known of the biology or distribution of most of them. This of course is where this book comes in, providing a relatively easy means for the average entomologist to add to our knowledge of this group. From the all-too-brief introductory details of the family, they appear to have a fascinating life-history, some preying on water-fleas (*Chydorus sphaericus* Muell.) in the manner of miniature ospreys!

Some comment must be made about the price—£6.30 for a slim 90 pages. The introduction to this series of handbooks used to read (as recently as 1972) "conciseness and *cheapness* are main objectives in this series" (my italics). That claim is notably absent from this volume, and one wonders at what point the Royal Ent. Soc. decided no longer to make cheapness an objective in issuing this otherwise excellent series?

Nonetheless, a welcome and admirable addition to the literature upon which the author is to be congratulated.

CJG

The two book reviews published below are reprinted with permission from the 1980 Field Studies Council News and the Editor would like to thank Mr. P. S. Croft for agreeing for them to appear in our Bulletin. Although not exactly entomological in content they are both of vital

importance in showing how the habitats on which our insects so depend have been shaped in the past, the present pressures upon them, and what hope there may be for the future so far as insect life is concerned.

*The Industrial Archaeology of Farming in England and Wales* by Nigel Harvey. Published by Batsford. 1980. £15 hardback. ISBN 0 7134 1845 1.

This must be a good contender for the 'Book of the Year' award as far as I am concerned; I found the contents absolutely fascinating, the style of the book light and easily readable and yet full of facts. Anyone who has an interest in farming, in architecture, in machinery or more particularly in the evolution of the landscape will derive a great deal of pleasure and knowledge from reading it. The book has nine chapters, some of which are relatively minor ones and others which are dealt with in some detail. The first two chapters ('The Winning of the Waste' and 'Fields and Field Systems') deal with the evolution of the landscape from the natural wilds up to the present day. The reclamation of woodlands, heath and moorlands and wetlands are all dealt with, and examples are given from within the British Isles; the inclusion of place-name information as a guide to the history of a particular area should prove useful. Details given about fields and field systems I found even more interesting. Such obvious facts as the links between field shape and the implements in use at the time had escaped me before reading this—perhaps because I had little knowledge of the history of farming tools. Enclosure is dealt with in some detail and the different forms of boundary markings—hedges, walls, fences and barbed wire—are all discussed. Short chapters on 'Water Supplies and Irrigation schemes', 'Sources of fertility', 'Field Drainage', 'Historical Crop Varieties' and 'Historic Breeds of Livestock' are all interesting, particularly that on drainage (ridge and furrow, mole drains, tile drains etc.) and they lead into the next major section of the book. 'Tools, Implements and Machines' is perhaps one of the most interesting chapters that I have read in any book during this year. The implements used for each of the jobs that takes place on a farm are described, and the developments which led to wholesale changes in farming methods should interest anyone living in a country whose landscape is so dominated by agriculture. The seed-drill of Jethro Tull is perhaps a prime example which most people have heard of, but with few understanding the exact benefits which the advance brought. The final chapter on 'Farm Buildings' is at the same high level. I must admit that I had not previously realised that animals were housed indoors over the winter months primarily to tread straw into manure; perhaps we are now so conditioned by the attitude towards welfare of animals in this country that any shelter provided and litter put down is only ever thought of as being for the animals' welfare. The fact that straw is a wasted resource unless trodden in by the animals had totally escaped me! Mr. Harvey assures us that the Hanoverians were well acquainted with the fact that

the indoor production of manure incorporating straw improved the fertility of the fields considerably when compared with that obtained from the outdoor wintering of livestock.

The book is well illustrated with black and white plates (74 pictures in all) which complement the major features of the text; the list of references given is comprehensive; at 47 pages it is the second largest chapter. Those who have real interest in the subject will find this section most useful; the casual reader will no doubt regret the amount of space used in this way. Finally the price: as one who frequently criticises the high cost of books at the present time I can hardly ignore the fact that this one costs £15. The book is well produced but even so £15 is really a relatively high price compared to any of the other books reviewed. I can only imagine that the publisher felt that the potential market was small and priced this volume accordingly. I must agree that the number of people attracted by a book titled "The Industrial Archaeology of Farring" is not likely to be great—for some reason it sounds off-putting. Don't miss it; beg, borrow or steal a copy to read—if you like it as much as I did you will then almost certainly buy it!

P. S. Croft

*The Common Ground—A Place for Nature in Britain's Future* by Richard Mabey. Published by Hutchinsons in association with The Nature Conservancy Council. 1980. £8.95 hardback.

This book must be regarded as one of the major works in the conservation field. It was commissioned by the Nature Conservancy Council but was not ghost-written by them; the Council gave the author help but the views are his own.

The book is divided into three parts. Part one is called Perspectives and looks at the conservation movement from many viewpoints. The author points out that for him involvement in conservation was prompted by a sense of personal loss associated with the changing habitats and the loss of certain species within his local area. I am sure that this is the way that many of us become involved—although with time the sense of personal loss widens to encompass other issues. The author states that the need for conservation has arisen because the changes that man induces in his environment are now so rapid that they are occurring faster than the rate of adaptation of living things; the natural rate of extinction (and species have, of course, always faced extinction) has therefore been exceeded.

Conservation in real terms can always be reduced to an evaluation, whether it be a financial or a cultural one; when these two conflict it becomes necessary to represent each case objectively. Mr. Mabey illustrates this point by one of the most famous examples in conservation history—that of the decline of the peregrine falcon. In 1959 the outcry from pigeon fanciers regarding the predation of their birds by the pere-

grine resulted in the census that showed the catastrophic decrease in numbers of the falcons, which Derek Ratcliffe linked to seed dressings of persistent insecticides in a now classic paper. The quick action taken in Britain led to a recovery of the population which is now a major proportion of the European total. However despite the appeal of such cases the author points out that it is the decline of common species which is important rather than those which are natural rarities: such a decline is symptomatic of habitat destruction.

Part two deals with Nature and Land Use: Past Harmonies and Discord. This is treated in three sections: forestry, agriculture and recreation. The author pinpoints the apparent contradiction that although the amount of woodland is increasing the acreage of *old* woodland is decreasing rapidly. Linked with this is the decline of the traditional woodland management techniques (pollarding and coppicing) and he suggests that a return to these systems in a proportion of our forestry could well save much of our woodland fauna and flora from further threat. The fact that the woodburning stove could result in this occurrence is one factor in its favour that many have not considered. The agricultural scene reflects a similar situation: the trend is towards intensive management and even so-called permanent pasture is ploughed and re-seeded at regular intervals. The development of a diverse fauna and flora which accompanied the slow changes of agricultural practices of former days is now seriously threatened and studies have indicated that if every piece of the agricultural landscape were modernised 80% of birds and 100% of butterflies would disappear. Mr. Mabey argues strongly that the retention of marginal land (in both senses: at the edge of the farm and also ground which is only marginally worth improving) as areas undergoing traditional management would maintain variety without lowering the profit level unrealistically. He also points out that it is possible that the application of high levels of fertilisers to agricultural land may actually cost the community more than traditional forms of management. The increased profits of the farmer ought to be balanced against the results of increased nitrate concentrations in water courses. This eutrophication of water may need complex and costly treatment and has already led to the free distribution of bottled water for newly born babies in some areas. Recreational uses of the landscape are also more intensive and should be costed in the same way as the others. The immense success of Operation Osprey has done much to promote the conservation movement (three-quarter million people have been to Loch Garten to see the breeding birds and many millions have watched their progress in the media) and public pressure to see variety in the countryside does much to preserve it: The author feels that this far outweighs the minor annoyances of litter, erosion and other destructive aspects of the public in the countryside. He goes on to discuss commons, common rights and public access to commons.

Part three is concerned with Policies and Priorities. These largely stem from issues raised in the first two parts and the author stresses that the conservation of ancient habitats which cannot be replaced (bog and primeval woodland for example) must receive the greatest attention. After this must come the retention of traditional habitats (ponds, old meadows) in marginal land. Individual species should also be protected and the author points out that many predators have been virtually eliminated by persecution, especially by gamekeepers. He discusses the effects of the various Acts, particularly the impressive legislation aimed at the protection of birds, and points out that it is difficult to assess the effects of the 1975 Act on Conservation of Wild Creatures and Wild Plants as not one prosecution has yet taken place. The various shortcomings of this and other Acts are discussed.

A section on Sites and Reserves is followed by the final one on Conservation and the Community. The difficulties associated with bureaucracy's entanglements are examined: the fact that Water Authorities are still subsidising the drainage of land the NCC wants kept wet and that only change of use of Sites of Special Scientific Interest has to be notified despite the fact that changes in agricultural policy and afforestation are responsible for the majority of habitat loss. The author suggests that we should be speaking in terms of rewards for good conservation rather than the more discouraging term compensation.

The book as a whole makes a major impact on the reader; the examples in particular have been carefully selected and I was intrigued to learn the inside story about many of the incidents which had received scant attention in the national press. The coverage of the conservation movement and the conservation ethic is very thorough and all conservationists will enjoy reading it. It is as a consequence a lengthy book and I wonder if this might not put off those who most need to read it. It is also expensive—despite the quality of production and the lovely illustrations £8.95 is a lot of money. Hopefully a cheaper paperback version is on the way because I personally would like to see it in every gamekeeper's Christmas stocking; the harm that the profession as a whole does to our wildlife is admirably summarised, but at £8.95 I doubt whether any of them will find it there.

P. S. Croft

### BUTTERFLIES OF THE KENYA COAST PROVINCE

Having collected on the Kenya coast at all seasons for the last twenty-five years, from the Tanzania border to within a few miles of Watamu, I would like to make a few remarks on S. V. Shelley's Watamu list (Some Difficulties in Identifying East African Butterflies, 1980, *Bull. Amat. Ent. Soc.*, 39: 95).

First of all I was most surprised to see the record of *Precis sophia* F.,

I have never seen this on the Kenya coast. It is a species that I know well, it being very common in Kampala, where I worked out the genetics between the nomino-typical form and f. *albida* Suff. It is a fairly distinctive insect and I cannot think of any species with which it might have been confused.

There are a number of somewhat surprising omissions. Amongst the Pierids I would have expected to see *Anapheis creona* Cr., *Mylothris chloris* F., *Catopsilia florella* F. and *Eurema hecabe* L., all very common species. The absence of *Acraea eponina* Cr. is also surprising. Among the Nymphalidae, I think the *Phalanta* is more likely to have been *columbina* Cr. than *phalantha* Drury. It is surprising to see a record of *Charaxes bohemani* Feld., a fairly uncommon species, and none of *varanes* Cr., *candiope* Godt. and *brutus* Cr., all much more common, and I would have expected *Precis clelia* Cr. and *P. natalica* Feld. I would also have expected a record of *Melanitis leda* L. and *Ypthima asterope* Klug, a large and a small Satyrid. Again *Papilio demodocus* Esp. is common all over Kenya and its absence is surprising. *Danaus chrysippus* L. was, presumably, f. *dorippus* Klug, the prevalent coastal form.

The female of *Bebearia mardania* F. is one of the many species that mimic *Danaus chrysippus*. *D. chrysippus* is the model for a complex of Mullerian mimics, which includes several *Acraea* spp., the moths *Weymeria athene* Weym., *Heracleia poggei* Dew (Agaristidae), *Aletis helcita* L., *A. erici* Kirby and *Cartaletis libyssa* Hpffr. (Geometridae). Its Batesian mimics include *Papilio dardanus* Brown, f. *trophonissa* Auriv., the females of a number of *Euphaedra*, *Euryphene* and *Diestogyne* spp., as well as *Hypolimnas misippus* L. and *Argynnis hyperbius* Joh. and the Lycaenid *Mimacraea marshalli* Trim.

I would like to make a plea for the avoidance of, so called, English names for African butterflies. Many of them are not very suitable, what, for example, can be more absurd than Vine Leaf Vagrant for *Eronia cleodora* Hbn.? It is not, so far as I know, a migrant, and it has nothing to do with vines, either in the restricted English sense of the grape-vine, nor the wider American sense of any climbing plant. Again the tip of the male forewing of *Colotis ione* Godt. is a brilliant violet, not purple, and Purple-tip would be more aptly applied to *C. hetaera* Gerst. (not *hataera* as printed). I could cite many more examples.

Finally, I would strongly advise anyone contemplating an entomological trip to East Africa, or anywhere else for that matter, to do a little preliminary research in the literature of the region, and also examine any relevant collections before setting out. This would help to reduce the difficulties about which Mr. Shelley complains. As far as East Africa is concerned, the National Museum in Nairobi has a very good collection of East African butterflies and moths, as well as of other orders.

D. G. Sevastopulo (5562)

## SOME OBSERVATIONS ON THE COMMON EMPEROR

The following is a description of the various stages of a lovely variety of *Bunaea alcinoe* Stoll, the ova of which was sent to me by a friend out in Sierra Leone, West Africa. These moths are quite common there in the rainy season, and one large female flew into the room where my friend was. In fact he was actually writing to me, and quickly got up and 'grabbed' the moth, which later laid a large number of ova, which were then enclosed with his letter.

The following are notes taken from one such batch of ova. They were laid in Freetown on 3rd July last year, sent by air-mail to me, started hatching on 17th July and finished on 23rd July.

### OVA

These are very large, white, with a depression on the top. Best method of hatching them was found to be to dry them out for some hours completely, and then spray with cold water. Extensive hatching then started in a matter of hours, when kept in the airing cupboard.

### LARVAE

#### 1st Stage

Size: 7-8 mm on hatching. Accept oak as foodplant. Duration one week. Head orangy brown. General body colour: orange/brown, yellowish between segments. Short hairs on claspers. Front legs darker brown. Larvae tend to 'spit' out fluid if disturbed, and feed mainly at night.

#### 2nd Stage

At first, larvae are still brown, but change dramatically during next 24 hours or so, and become very beautiful. Very large head still orange brown, but whole body of larvae now black, with orange/brown anal segment. Row of ten white 'tufts' of short white hair along each side, just above legs. Front legs black.

Larvae gather in groups of about eight per leaf, and do not wander as much as during the 1st stage. The whole body is now also covered in short black 'spines' about 1 mm high.

#### 3rd Stage

Larvae become even more beautiful now. General body colour is still black, head still orange/brown, with anal segments orange/brown also. Body still covered in short spines, four rows on top, and below two rows of white spines. Between the two white rows of spines on either side there are some small orange dots.

#### 4th Stage.

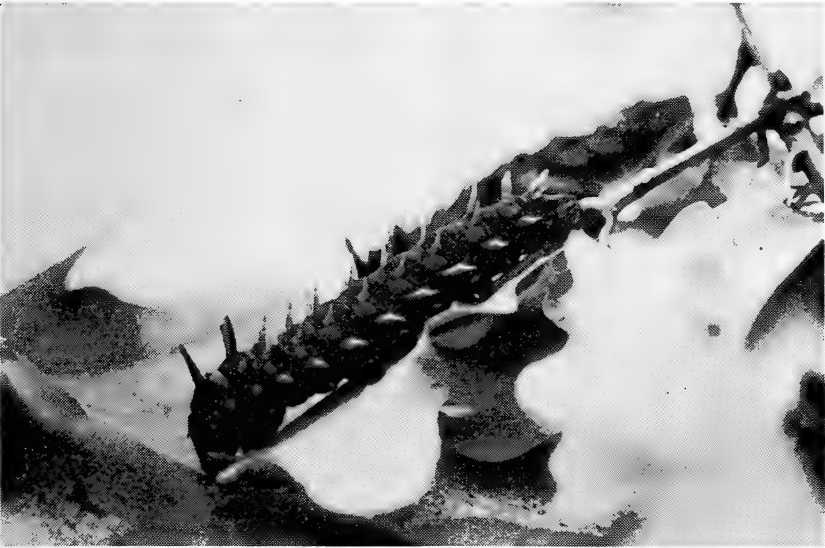
Body still black. Head and anal segment chestnut brown. The rest of the body is now covered in orange spines—nine rows of them. Along each side low down are orange spiracles with red in the centre. Spines now 5 mm high.

#### 5th Stage

The larva now puts on great bulk. Head and anal segment still chest-



nut brown. Body still velvet black. First two sets of spines behind head are black. Behind these are eight rows of long, yellow and very vicious looking, though not stinging, spines! On the 2nd last row of spines, the centre spine is forked, like a snake's tongue, but all other spines are single, and about 7-8 mm high. The spines lowest down on each side of the body are white, and there are eight large orange dots along each



side also, half circled in red. There are also two orange spots behind the head. Both the true and prolegs are now black.

These are really beautiful and spectacular looking larvae, though they do tend to 'drop dead' very suddenly during the final stages for no apparent reason.

### PUPAE

The larvae pupated in peat, and the resulting pupae were surprisingly small for the size of the larvae. These pupae were overwintered in peat, 'standing' on end, head up, at about 60°F., and were then placed in the airing cupboard to speed up emergence in April.

W. Caswell (3153)

### HOLLY EATING LARVAE

Members may be interested to hear of a small number of moth larvae found on a holly tree (*Ilex* sp.) on 19th September 1978 near Weston-super-Mare in the West Country. This tree is in my parents' garden and the presence of the larvae was reported to me by letter. The larvae completely ate individual leaves (including the main veins) but left intact the hard spiny outline (photograph taken by David Chambers (6228)).

None of the holly eating larvae reported in the literature agreed with



Remains of holly leaves after attack by Dot moth larvae. Note mid-rib eaten but hard edge of leaf rejected. Photographed by David Chambers (6228). (Processed by John Lewis at East Malling Research Station.)

the description given by my parents. However they kept one of the larvae in captivity. This together with the other larvae had pupated by the time I visited that part of the country, a few weeks later. The following June I was surprised to see a Dot Moth (*Melanchra persicariae*) emerge from the pupa.

According to South ('*Moths of the British Isles*', Vol. 1, p. 169, 1973) the Dot moth larva 'is found from August to October on all sorts of low plants and in the garden is very fond of the foliage of *Anemone japonica* and lupin'. The fact that in the case reported above, the larvae were eating tough leathery holly leaves, although more tender plant material was available in the vicinity, indicates the strength of the mandibles in this species. The mid-rib of the leaf seemed to present no barrier to the larvae. Larvae were also found on lettuce, chickweed and vine in the same garden, but I have not come across a previous reference to Dot Moth on holly (the larvae were of the pale green form with darker green markings). I would be interested to hear comments from other members.

S. H. JUSTIN (6216)

## ON DISAPPEARING BUTTERFLIES

In my previous item published in the Bulletin (Vol. 39 No. 326) about disappearing butterflies I stated that I was not totally satisfied with the explanation about thermals causing the disappearance of these butterflies; in fact the more I thought about it the more dissatisfied I became.

East Wretham Nature Reserve is across country, almost in the middle, between two meteorological units. One being at the area headquarters of the Forestry Commission at Santon Downham, and the other at Morley Agricultural Station, and from them I was able to obtain all the relevant information on the weather from 26th August to 2nd September 1979. However they could not give me any information about thermal activities between these dates, and so I decided to try the R.A.F. They informed me that from 26th-30th of August there was no active

TABLE 1. Computed Weather Data: East Wretham Nature Reserve, Norfolk.

Date	Wind Direction	Wind Speed (*)	Maxi Temp (C)	Mini Temp (C)	Grass Mini (C)	Rainfall (mm)	Run of Wind (Miles)	Sunshine (Hours)
26.8.79	NNW	3	17.6	5.7	3.75	0.0	73.5	6.35
27.8.79	NW	3	15.35	5.05	3.25	0.0	63.5	5.8
28.8.79	West	2.5	20.7	4.15	1.75	0.0	38	11.7
29.8.79	WSW	1	24.25	4.15	1.7	0.0	96	11.3
30.8.79	ESE	1.5	24.85	7.2	3.65	0.0	53.5	10.45
31.8.79	SSW	2	24.9	5.4	3.85	0.0	50	7.1
1.9.79	SW	2	24.3	9.75	6.2	1.4	62	7.95
2.9.79	WSW	2	20.75	12.8	8.3	0.85	131	4.65

(\*)=Estimated by means of Beaufort Scale)

thermals in the area, and that from the 31st August to 2nd September the thermals were only weak. By using the data from these two sources I have compiled a weather table for East Wretham (Tab. 1). I am told that this is an adequate method for working out the weather at East Wretham. I now think that the disappearance of these butterflies was due to harvesting of the Lucerne on which they were feeding, and although I cannot give an exact date on which the Lucerne was cut, what I can do is make a comparison, for in 1980 the field has been replanted with a cereal crop, and the numbers of Nymphalidae are down.

A year later the original incident is still raising questions, the newest being so radical that it could almost be ridiculous. It is a proven fact that worker bees can pass on information as to where a good supply of nectar bearing flowers can be found in relation to the sun, the message being passed through the hive by the returning bee doing a kind of "dance". If butterflies have a similar capability, would it not go some way as to explain how some species of butterfly are able to come together in large number and then migrate en masse, e.g. the Painted Lady (*Vanessa cardui* L.) and the Milkweed (*Danaus plexippus* L.), and it would also be possible for the adult butterflies to pass on such information about foodplants (not larval foodplants) relative to their needs, and this would account for the high concentration on the field of Lucerne. I do not suggest however that butterflies use this method of "dance" to communicate, perhaps they use scent as the attraction in a similar way as some species use it to attract a mate.

I would still be interested in hearing from any member on the idea of marking Lepidoptera, or on their opinion of this disappearance, and would be most grateful if they would write to Mr. C. P. Gunston, 5 Wood Lane, Swardeston, Norwich, Norfolk NR14 8DQ.

C. P. Gunston (6578)

## NOTES AND OBSERVATIONS

**The Nuptial flight of *Formica rufa***—In May 1980 I visited the New Forest area to study ants, especially *Formica rufa* L., the Southern Wood ant. On the 25th May 1980 I visited Kings Copse Enclosure near Blackfield. The day was warm and sunny, and at about 12.15 p.m. I observed many winged males and females mating on the surface of certain mounds. Also several males were observed in flight, although about 6 ft. was the furthest flight followed. The nuptial flights must have been taking place before I got there, as three fertile females were observed wandering on the path and near a mound.

I visited the enclosure on several other days and on 30.5.80 at 11.30 a.m. I observed another nuptial flight. All mating took place on the surface of the mounds. Two mating pairs were observed re-entering the mound.

I opened a part of a mound, from which winged sexes were observed, and noticed hundred of unhatched male and female cocoons. It seems that *rufa* flies on several suitable days in a season, as cocoons hatch at different times. This would account for small numbers in nuptial flights of this ant.

I observed many interesting aspects during these two days, and one in particular is worth mentioning. I noticed around 4.00 p.m. on the 25.5.80, many fertile females on the surface of several mounds, which were surrounded by crowds of worker ants. On closer examination I noticed that these females were being attacked by the workers and several females were dead. This act somewhat surprised as I was led to believe that females were readily accepted into mounds.—Kevin Henry.

**Hornets in Derbyshire**—Mr. Stallwood's notes on *Vespa crabro* L. brought me to record several sightings at Shardlow, Derbyshire, in the grounds of Shardlow Hall, in September 1979.

Positive confirmation was ensured by capture and identification by Ministry of Agriculture Entomologists, as Shardlow Hall is the Regional Headquarters of the Agricultural Development and Advisory Service!

On this and several other occasions I captured (and later released) several specimens to show to people, and was impressed by the widespread intense and unreasoning fear of hornets.

They were in fact quite docile, and as if to emphasize this, on releasing one specimen it returned and landed on my bare arm, where it walked about for some time!

I am told that specimens have occasionally been seen in the same area in previous years.—Andrew Eames (4648).

**Painted Lady larvae on nettles in Warwickshire**—Enfield Preservation Society's last visit in 1980 was to Charlecote in Warwickshire on 28th September. Whilst walking in the grounds beside the River Avon I came across a clump of nettles which had been cut and regrown to 8 in. high. Among these I found four small tents of leaves and inside each was a caterpillar some 1½ in. long, blackish-grey with a yellow line down each side and yellow spines with a black head.

I thought they could be either Painted Lady or Small Tortoiseshell in the last stage. They pupated after two days and I still was not sure.

The first butterfly emerged on 23rd October and it was a beautiful Painted Lady (*Cynthia cardui* L.). The other three emerged next day and as the weather was sunny but cold I set them free in the garden.—B. W. Page (6581).

**Nature Reserve Enlarged**—A national nature reserve which covers the largest remaining tract of Dorset heathland has been trebled in size under the terms of a lease which the Nature Conservancy Council has negotiated with the Kingston Lacey and Corfe Castle Estates.

The Studland Heath national nature reserve supports a number of rare plants and animals, including the Dorset heath and marsh gentian, the smooth snake and the sand lizard.

**The Painted Lady butterfly in North-east England**—With reference to the Notes on the occurrence of the Painted Lady (*Cynthia cardui* L.) butterfly in Southern England (*Bull. amat. Ent. Soc.* No. 329), the National Trust Warden reported an influx of this butterfly in the North Northumberland coast in June 1980. I myself observed a single individual at Gosforth on the northern outskirts of Newcastle upon Tyne on 1st August and ten the following day (nine on the same Buddleia bush).

My previous record of the butterfly was one at Gosforth on 8th September 1976.—C. J. Gent (5382).

**Observations of rearing *Daphnis nerii* L.**—I have a few comments to make on the above paper (1980, *Bull. Amat. Ent. Soc.*, 39:9). I must have reared many hundred of *nerii* in both India and East Africa, and larvae have invariably had five instars, not four. Five is the usual number of instars in all Sphingid larvae, with the exception of those species that eat nothing but the egg-shell in the first instar, and these have six. I think that Mr. Smith has overlooked the 2nd instar, as the ocellus does not appear until towards the end of the 2nd instar (the pharate 3rd instar) when it appears as two blue-ringed white spots. These do not join up to form a proper ocellus until the 4th instar. The horn in the 3rd instar is still normal, black with the base yellow, and the very distinctive horn does not appear until the 4th.

I am unable to understand Mr. Smith's difficulty in sexing his imagines. Even if he was reluctant to handle his specimens, the male antennae are distinctly stouter than the female. If he did handle them, there is the usual sexual differences in the frenulum and retinaculum, apart from the different formation of the apex of the abdomen. And finally, all male Sphingids have a scent organ situated on the 1st abdominal semite. The orifice of the organ, which is a cavity from which protrudes a bundle of long scale-hairs, lies in the pleural membrane and a groove or fold extends backwards to the 4th abdominal semite. The hairbrush can often be made to extrude by bending the abdomen backwards.

Food-plants: *Acokanthera*, *Adenium*, *Carissa*, *Conopharyngea*, *Ervatamia*, *Helerrhena*, *Nerium*, *Picralima*, *Rauwolfia*, *Tabernaemontana*, *Thevetia*, *Vinea*, *Veacanga* (Apocynaceae), *Apodytes* (Icacinaceae), *Burttavya*, *Cinchona*, *Mitragyna* (Rubiaceae). There are also records of *Mangifera* (Anacardiaceae), *Jasminum* (Oleaceae), *Gardenia* (Rubiaceae) and *Bambusa* (Gramineae), which are almost certainly the result of misidentification. It would appear that the larva feeds on plants

containing alkaloids, although they are not retained into the imaginal stage. It has been reported that *nerii* larvae form a considerable part of the protein intake of some of the forest tribes of the Congo, the stomach contents being got rid of first by pushing a twig through the anus.

Incidentally, the larva figured in colour in South's *Moths of the British Isles* is in the pre-pupational colouring.—D. G. Sevastopulo.

**Bumblebees nesting in roof insulation material**—Towards the end of the summer I noticed busy activity of wasps (*Vespula germanica* Fab.) around the eaves and under the tiles of my house. Suspecting the presence of a nest I waited for the onset of colder weather and the ceasing of wasp activity, and went up in the loft to investigate. To my surprise there was no evidence of a wasp nest, but built *within* the roof insulation material I discovered an abandoned nest of *Bombus lapidarius* L. I was able to identify both species by dead specimens around the area of the nest.

It is reported that the almost symbiotic relationship between wasps and bumblebees is common and is frequently found. However, what I found interesting was that the bee should build a nest amongst the roof insulation. Obviously there is a parallel between the texture of the fibre glass insulation and the abandoned mice nests that are usually chosen for nest sites. I presume that this explains the phenomenon.

I hope this will be of interest to Hymenopterists in the Society, and wonder if such behaviour has been previously experienced, as I can find no record to that effect.—P. Schofield (6075).

**The Status of the Lime Hawkmoth in Yorkshire**—I note with interest the comments in recent Bulletins (Feb., Nov. 1980) on the status of the Lime Hawkmoth (*M. tiliae* L.) in Yorkshire, and perhaps I may be permitted to add my own observations.

South's 'single record for Yorkshire' was almost certainly already out of date by the time the 1948 edition was published. At the beginning of the Fifties *M. tiliae* was well established in the Doncaster area, larvae occurring frequently on Lime, and also on Elm and Birch.

I was under the impression that I had recorded my observations in the Bulletin at the time, but I have so far been unable to trace the reference.

I have no first-hand information from that area later than about 1955, but there is no reason to suppose that the situation has changed significantly. *M. tiliae* occurs frequently only a few miles from Yorkshire in this part of South Humberside, and every year for at least the last ten years larvae have fed on a large Elm tree which overhangs my garden in the centre of Scunthorpe.

Possibly the species is approaching its Northern limit at the Humber;

it would be interesting to receive further observations from members living North of this area.—P. W. R. Walter (1493).

**Nematode infection of Lepidoptera**—Referring to Mr. P. R. Grey's note (*Bull. amat. ent. Soc* 39:171) concerning helminth infection of a "looper" larva, I presume, like the Editor, that the worm was not a cestode ("tape-worm") but a nematode ("round-worm"). By a strange coincidence, within days of reading Grey's note I had a similar experience. A nematode, 62 mm long and 0.26 mm diameter, emerged from an unidentified geometrid pupa the larva of which was beaten from *Prunus spinosa* L. on 23rd May 1980 at Sant Julià de Lòria, Andorra (UTM grid ref. CH 7604, altitude 1000 m). Examination of the pupa failed to reveal the point from which the worm had emerged, but it was presumably through an inter-segmental membrane. The date of emergence of the worm was between 16th and 27th November 1980, by ill-chance a period when I was away from home. I submitted both the pupa and the parasite for expert examination in the hope that they could be a little more closely identified. It turns out that the pupa is that of a geometrid of the subfamily Larentiinae, no nearer identification being possible.

The worm is a nematode of the family Mermithidae, possibly a *Mermis* sp., a genus common in insects. The specimen is still in the larval stage, making it impossible to identify more precisely.

I am grateful to Dr. J. D. Bradley and Mr. David Carter for their examination of the pupa, and to the Department of Zoology, British Museum (Nat. Hist.) for the information about the nematode.—Patrick Roche (2965).

**Wildlife and Countryside Bill**—This Bill was issued on 25th November 1980 and has since had its second Reading in the House of Lords. Conservation bodies are seriously worried about the proposed legislation relating to Sites of Special Scientific Interest and general habitat protection which they consider to be inadequate. Some of the rates of loss were quoted in Lord Melchett's opposition speech, during the Bill's second Reading. For example, nearly 80% of Dorset's heaths have been lost since 1811 while in lowland Britain between 30-50% of ancient deciduous woodland has been lost since 1947. 4% of our 4000 SSSI's are being damaged or destroyed every year with 57 key sites alone having been seriously damaged since the publication in 1978 of 'A Nature Conservation Review'. The Bill fails also to deal with the enforcement of legislation which at present is undertaken mainly by the RSPB and the RSPCA. The third major omission is the exclusion of proposals for the setting up of marine nature reserves. Such was the interest shown in the Bill by the House of Lords that the debate took over 7 hours. The Bill will now go to Committee stage at which detailed amendments will be discussed.—Habitat.



## THE LEPIDOPTERA OF BARLASTON ROUGH CLOSE COMMON, STAFFORDSHIRE

### *PHYSICAL FEATURES*

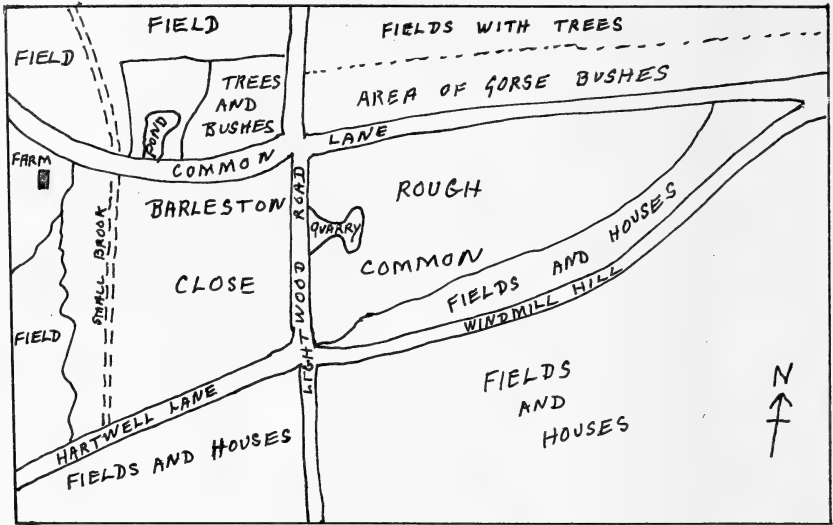
#### *Topography and Geology*

Barlaston Rough Close Common is somewhat irregular in shape and is divided into two unequal parts by Lightwood Road which runs in a north-south direction across the centre. To the west of the road is a large roughly square section of some 40 acres; east of the road is a much smaller section of some 13 acres, roughly triangular in shape. The total acreage of the land is approximately 53 acres.

The ground rises steadily in a north-easterly direction. Over the western part there is a rise of approximately 1 in 17 and a total rise of 100 feet from 625 feet in the south-west to 725 feet in the north-east. East of Lightwood Road there is a further rise of 100 feet, with a much steeper gradient 1 in 11. Moreover, the ground in this section is much more uneven, with numerous hummocks and hollows. Major physical features are provided by the disused sandstone quarry approximately  $200 \times 250$  feet in area, east of Lightwood Road and the small pond of approximately one-third of an acre which is situated at the northern edge of the western portion of the Common. A small pond in the extreme south-west corner has now been filled in with rubbish. A small brook runs along the extreme western edge of the common.

Harwell Lane, in the south, is the only road which runs along the edge of the common for any distance, elsewhere the roads tend to cut across the common. This is particularly true in the north, where a narrow strip of the common exists north of Common Lane. The north-east tip of the common consists of a large hollow bounded on the south by the construction of the road and houses above. In general, the common abuts onto fields or the grounds of large houses. The houses are not very conspicuous, being largely hidden by trees, although on the eastern edge where the ground is still rising, a number of houses appear on the Common Lane, and on the east by a high bank of earth formed during skyline.

The view obtainable varies greatly from place to place on the common. From the lowest ground in the south and west, the view is obscured by the surrounding low hills. It is necessary to climb to about 700 feet before the view begins to open through a gap in the hills to the south-west and Meaford power station, and the plain beyond becomes visible. West of Lightwood Road above the quarry, the view is much more extensive, extending for some distance westwards and northwards, as well as to the south-west. Whilst a slight climb of another 50 feet or so brings about an even more striking increase in the general panorama. Near to the top of the common, at a height of about 800 feet, there is an



extensive and impressive view in every direction, except immediately east. North-westwards, virtually the whole of the potteries are visible. Beyond the countryside stretches away into Cheshire, westward and southward it is possible to see right across Staffordshire to the Wrekin and the Longmynd Range in Shropshire.

Exposure over much of the area seems quite considerable, the prevailing winds apparently being from the south-west. The northern and eastern edges are probably most affected. Some of the trees east of the pond appear to have been wind-trimmed to some extent.

A large number of footpaths cross the common in all directions, although only five of these are confirmed rights of way. Some tracks have been made by horse-riding across the common over the years.

The land belongs to the local authority and lies in the area of the Staffordshire District Council. As a registered Common, the area is largely protected from major ecological changes and this protection was further strengthened by a management scheme drawn up in 1951, under which the Council undertook to do nothing to alter the natural features or aspects of the area, or interfere with free access to it, and any pressures which do exist are likely to result from this fact.

The soil is derived from the underlying sandstone, and is evidently fairly acid throughout. Over most of the area a fair depth of soil seems to be present, and this appears to possess something of the structure of a podsol. Thus above the quarry, which is probably fairly typical, the exposed erosion face shows a profile as follows:

Soil layer	Thickness (inches)
Surface covering of black raw humus ... ..	2
Upper layer of sandy, blackish grey soil with few pebbles	4
Leached zone of pale sandy soil with few pebbles, roots present ... ..	6
Deposition zone with more clay and less sand, reddish in colour, well rooted, but increasing number of pebbles below ... ..	10
Beds of sandstone alternating with pebbles ... ..	—

In general the soil is well drained, particularly the steeper slopes east of Lightwood Road, over the flatter portion west of Lightwood Road. However, there are large areas where the drainage is poorer, and this is reflected in the vegetation.

### Flora

The prevailing vegetation is that of the drier moor type, although species normally found under wet conditions e.g. Heath rush (*Juncus squarrosus*), purple moor grass (*Molinia caerulea*), mat grass (*Nardus stricta*), are found in some quantity, the predominating species are those of drier ground, such as Fescue grass (*Festuca ovina*), and Tufted hair grass (*Deschampsia flexuosa*). The last species enhances the appearance of the common with its profusion of silvery-purple flowers. Characteristic species such as Bilberry (*Vaccinium*), Heather (*Calluna*), and Gorse (*Ulex*), occur as scattered clumps, whilst several larger areas exist immediately west of Lightwood Road, and to the south of the quarry, where bracken (*Pteridium*), is completely dominant over parts of the lower, flatter ground to the west. The soil is damp enough for Bog moss (*Sphagnum*) to occur in the hollows. Here too, there is an increase in such species as Heath Rush, and the appearance of other species characteristic of the wet soils, such as *Cardamine pratensis* (Lady's smock) and *Deschampsia caespitosa* (Tussock grass). In places, near to the roads and houses, dumping of rubbish has evidently taken place in the past. Here the moorland vegetation gives way to an assemblage of weeds, among which Blackberry (*Rubus*), Willow herb (*Chamaenerion*), nettle (*Urtica*) and Yorkshire fog (*Dactylis*); the last two indicating the increased nitrogen content of the soil, are common. Scattered clumps of trees and bushes are found over the whole of the common. These are mainly of Hawthorn (*Crataegus*), Oak (*Quercus*), and Birch (*Betula*), in two places, east of the pond and between Lightwood Road and the quarry. Tree planting appears to have been carried out and the species are mainly Beech (*Fagus*) in the former area and Birch in the latter, a number of Birch trees have died, apparently of natural causes.

## BUTTERFLIES

*Satyridae*

- Wall brown, *Lasiommata megera* L., common some years.  
Speckled wood, *Pararge aegeria* L., scarce, last seen in 1967.  
Meadow brown, *Maniola jurtina* L., common throughout.  
Small heath, *Coenonympha pamphilus* L., common throughout.

*Pieridae*

- Brimstone, *Gonepteryx rhamni* L., scarce, males turn up from time to time.  
Large white, *Pieris brassicae* L., common throughout. Very common in 1979 in late summer.  
Small white, *Pieris rapae* L., common throughout, very common in 1979.  
Green-veined white, *Pieris napi* L., common throughout.  
Orange-tip, *Anthocharis cardamines* L., common throughout. Very common in 1980.

*Lycaenidae*

- Green hairstreak, *Callophrys rubi* L., common in the quarry area on the banks.  
Holly blue, *Celastrina argiolus* L., common in spring, only one brood a year.  
Small copper, *Lycaena phlaeas* L., common now after a few years of scarcity, Var *schmidtii*, taken 24th June 1976, by myself. See *Bull. amat. Ent. Soc.* Vol. 37, No. 318, p. 27.

*Hesperiidae*

- Large skipper, *Ochlodes venata* B. & G., common throughout. Very common 1976.  
Small skipper, *Thymelicus sylvestris* Poda, possible sighting in late summer 1977. This species is spreading across Staffordshire.

*Nymphalidae*

- Small tortoiseshell, *Aglais urticae* L., common throughout. Very common in 1976.  
Red admiral, *Vanessa atalanta* L., abundant some years, good years were 1973-75-76.  
Painted lady, *Cynthia cardui* L., common some years, good years 1973-76.  
Peacock, *Inachis io* L., common in late summer, also in spring some overwintered butterflies appear.  
Comma, *Polygania c-album* L., rare, only one seen in 1923 by B. Bryan, the only record, none seen since.

## MOTHS

*Sphingidae*

- Poplar hawk moth, *Laothoe populi* L., common throughout.  
Eyed hawk moth, *Smerinthus ocellata* L., not very common, odd specimens turn up from time to time.  
Elephant hawk moth, *Deilephila elpenor* L., common some years, caterpillars seen more often on willowherb, than the moth itself.

Humming-bird hawk moth, *Macroglossum stellatarum* L., rare. Only seen during the hot summer of 1976. Also seen in most parts of Staffordshire, Stoke-on-Trent in some numbers.

#### *Saturniidae*

Emperor moth, *Saturnia pavonia* L., no recent records but it has been known to occur there in the past.

#### *Notodontidae*

Puss moth, *Cerura vinula* L., fairly common, some years scarce. The moth mostly seen when at rest, also its striking caterpillar.

#### *Lymantriidae*

Yellow tail moth, *Euproctis similis* Fuessly, not very common. Odd specimens turn up, the best year for this moth was the summer of 1976.

#### *Noctuidae*

Heart and dart, *Agrotis exclamationis* L., very common.

Large yellow underwing, *Noctua pronuba* L., very common. Seen mostly at dusk, but can be disturbed during the day in long grass or bushes where it roosts.

Turnip moth, *Agrotis segetum* Schiff., a few seen every year.

Cabbage moth, *Mamestra brassicae* L., common, very common in summers 1975 and 1976.

Grey dagger moth, *Apatele psi* L., common. Caterpillars seen crawling on back of trees, the moth is found roosting on the back too during the day.

Chestnut moth, *Conistra vaccinii* L., common, seen every year since 1973.

The brick, *Agrochola circellosis* Hufn., fairly common, often seen every year.

The satellite, *Eupsilia transversa* Hufn., common, very common in 1976.

Brown-spot pinion, *Anchoscelis litura* L., common 1975-76, not so common now.

Burnished brass, *Plusia chrysitis* L., common some years. Best years 1973, 1975, 1976.

Gold spot, *Plusia festucae* L. not very common. I have only seen two moths, both in 1976.

Silver y, *Plusia gamma* L., common some years, depending on immigrants, best years 1973-75-76-80.

#### *Lasiocampidae*

Fox moth, *Macrothylacia rubi* L., a few seen some years but distinctly not common.

#### *Arctiidae*

White ermine, *Spilosoma lubricipeda* L. common some years, mostly seen resting on posts or trees.

- Buff ermine, *Spilosoma lutea* Hufn., common, seen quite a few times at rough close.
- Ruby tiger moth, *Phragmatobia fuliginosa* L., common, seen every year since 1973, very common in 1976.
- Garden tiger moth, *Arctia caja* L., scarce now, this moth at one time was very common, and the caterpillar was seen in some numbers, but since the early seventies it has become scarce, last seen in 1976.
- Cinnabar moth, *Callimorpha jacobaeae* L., fairly common. Seen quite a few times, also the chrysalis has been found on the ground among dead foliage.

### Geometridae

- Grey pug *Eupithecia castigata* Hubn., common most years.
- Silver ground carpet, *Xanthorrhoe montanata* Schiff., a few seen from time to time, last seen in 1977.
- Garden carpet, *Xanthorrhoe fluctuata* L., common throughout, mostly seen on the outskirts of the common.
- Chimney-sweeper, *Odezia atrata* L., seen from time to time, fairly common, very common 1976.
- Common pug, *Eupithecia vulgata* Haw., common throughout.
- Magpie moth, *Abraxas grossulariata* L., common all over Rough Close, also the caterpillars seen quite often, best years 1973-76.
- Clouded border moth, *Lomaspilis marginata* L., scarce, not seen since 1976.
- Scalloped hazel, *Gonodontis bidentata* Clerck., common all over Rough Close, also some dark forms seen from time to time.
- Scalloped oak, *Crocallis elinguaris* L., common, seen quite often.
- Swallow-tailed moth, *Ourapteryx sambucaria* L., very common, seen in large numbers at dusk. 1980 is the best year for this moth at Rough
- Brimstone moth, *Opisthograptis luteolata* L., common some years, less Close.  
common other years, but seen every year since 1973.
- Peppered moth, *Biston betularia* L., fairly common, seen every year, the typical form occurs, also some darker forms too, have been seen.
- Common heath, *Ematurga atomaria* L., scarce, but seen in small numbers since 1973, onwards.

### Zygaenidae

- Six-spot burnet, *Zygaena filipendulae anglicola* Tremewan, not very common, only in small numbers. Some years not seen at all.
- Five-spot burnet, *Zygaena trifolii* L., scarce, last seen in 1976, very few then.

### Hepialidae

- Ghost moth, *Hepialus humuli* L., very common. Seen at dusk flying over hedgerows, some times in large numbers darting up and down.

Common swift, *Hepialus lupulina* L., common, seen at dusk flying about, also at rest on posts and fences during the day.

#### *Pyralidae*

*Eurrhynx hortulata* L., common, seen most years, often disturbed in bushes.

*Sylepta ruralis* Scop., common, mostly seen on nettles, and on hedgerows.

#### Acknowledgements

My own records 1973 to 1980, and a few from the late 1960's. Some older records from the Atlas of the Lepidoptera of Staffordshire, parts one to five by Mr. R. G. Warren. Topography records from Langton Town Hall, Stoke-on-Trent; also information on the area from R. A. Tribbeck, Department of Chemistry, North Staffordshire Technical College, Stoke-on-Trent. It will be evident that the list of lepidoptera for Barlaston Rough Close Common, is incomplete, probably a few more species may be added to the list in future years.

Jan Koryszko (6089)

## A SECOND LIST OF THE FOOD-PLANTS OF EAST AFRICAN MACROLEPIDOPTERA

(Continued from page 55)

### PSYCHIDAE

*Clania cervina* Druce—*Annona squamosa* (Anonaceae): *Citrus* (Rutaceae).

### THYRIDIDAE

*Kalanga ansorgei* Warr.—In galls on *Myrica* (Myricaceae).

*Strigina clathrata* Hamps.—*Coffea* (Rubiaceae).

„ *rothi* Warr.—*Terminalia* (Combretaceae).

*Rhodoneura flavicilia* Hamps.—In galls on *Salix woodii* (Salicaceae).

*Banisia myrsusalis* Wlk.—*Achras*, *Manilkara* (Sapotaceae).

*Cecidothyris pexa* Hamps.—In galls on *Terminalia* spp. (Combretaceae).

*Tridesmodes ramiculata* Warr.—*Terminalia* (Combretaceae).

*Opula spilotata* Warr.—*Oryza sativa* (Gramineae).

### METARBELIDAE

*Lebedodes wichgrafi* Grnbg.—*Cordia sebastina* (Boraginaceae).

*Salagena obsolescens* Hamps.—*Eugenia*, *Psidium* (Myrtaceae).

### COSSIDAE

*Xyleutes capensis* Wlk.—*Pavonia* (Malvaceae).

„ *vosseleri* Gaede—*Cassia*, *Pterolobium* (Caesalpinaceae).

### AGARISTIDAE

*Heraclia superba* Btlr.—*Cissus*, *Vitis* (Ampelidaceae).

*Aegocera trimeni* Feld.—*Cissus*, *Rhoicissus* (Ampelidaceae).

„ *fervida* Wlk.—*Rhoicissus* (Ampelidaceae).

**NOCTUIDAE****Euxoinae**

*Agrotis ypsilon* Rott.—Lactuca (Compositae): *Nicotiana tabacum* (Solanaceae).

.. *segetum* Schiff.—Brassica (Cruciferae): *Triticum* (Gramineae).

*Lycophotia ignicollis* Wlk.—Solanum (Solanaceae).

**Hadeninae**

*Polia dipterigida* Hamps.—Lactuca (Compositae): *Oxygonum* (Polygonaceae).

*Xylomania natalensis* Btlr.—Glycine (Papilionaceae).

*Diaphone eumela* Stoll.—Albuca, *Ornithoglossum*, *Scilla* (Liliaceae).

*Cirphis loreyi* Dup.—Eleusine, *Setaria* (Gramineae).

*Borolia tacuna* Feld.—Grasses (Gramineae).

.. *torrentium* Guen.—*Zea mays* (Gramineae).

**Amphipyriinae**

*Perigea capensis* Guen.—*Bidens pilosa* (Compositae).

*Eriopus yerburyi* Btlr.—*Adantium* and other ferns.

*Spodoptera littoralis* Bsd.—*Spinacia* (Chenopodiaceae): *Hibiscus* (Malvaceae): *Solanum* (Solanaceae): *Lantana* (Verbenaceae).

.. *exigua* Hbn.—*Tetragona* (Aizoaceae): *Amaranthus* (Amaranthaceae): *Beta*, *Spinacia* (Chenopodiaceae): *Calendula* (Compositae): *Medicago* (Papilionaceae): *Polygonum* (Polygonaceae): *Nicotiana tabacum*, *Solanum* (Solanaceae).

.. *triturrata* Wlk.—*Triticum* (Gramineae).

.. *exempta* Wlk.—*Gossypium* (Malvaceae): *Solanum* (Solanaceae).

*Ariathisa excisa* H.Sch.—*Solanum* (Solanaceae).

*Chasmina tibialis* F.—*Hibiscus* (Malvaceae).

**Melicleptriinae**

*Chloridea obsoleta* F.—*Carduus*, *Pentzia* (Compositae): *Curcubita* (Curcubitaceae): *Arachis hypogaea* (Papilionaceae): *Leucadendron* (Proteaceae).

*Chloridea scutuligera* Guen.—*Helichrysum* (Compositae).

**Erastrinae**

*Eublemma exigua* Wlk.—*Gerbera* (Compositae).

*Aruza effulgens* Saalm.—*Rauwolfia mombasiana* (Apocynaceae).

*Ozarba punctifasciata* le Cerf—*Asystasia* (Acanthaceae).

*Amyna punctum* F.—*Triticum vulgare* (Gramineae): ?*Gossypium* (Malvaceae).

*Ilattia octo* Guen.—*Spinacia oleracea* (Chenopodiaceae).

*Thyatirina achatina* Hamps.—*Azanza* (Malvaceae).

*Tarache umbriger* Feld.

.. *discoidea* Hpfrr.

*Hibiscus micranthus*.



**Eutelianae**

- Eutelia subrubens* Mab.—Citrus (Rutaceae).  
 „ *leucographa* Hamps.—Myrica (Myricaceae).

**Stictopterinae**

- Lophoptera litigiosa* Bsd.—Bridelia cathartica (Euphorbiaceae).

**Sarothripinae**

- Pardasena virgulana* Mab.—Lantana (Verbenaceae).

**Acontianae**

- Maurilia arcuata* Wlk.—Combretum (Combretaceae): Monotes (Dipterocarpaceae): Myrica (Myricaceae).

- Arcyophora longivalvis* Guen.—Combretum (Combretaceae).

- Earias insulana* Bsd.—Ceratonia (Papilionaceae).

- „ *biplaga* Wlk.—Acacia karoo (Mimosaceae).

- „ *cupreoviridis* Wlk.—Gossypium (Malvaceae).

**Catocalinae**

- Egybolis vaillantina* Stoll.—Gossypium (Malvaceae): Prunus (Rosaceae).

- Nyctipao walkeri* Btlr.—Entada (Mimosaceae).

- Cyligramma latona* Cr.—Acacia (Mimosaceae).

- Anua tirhaca* Cr.—Viburnum (Caprifoliaceae): Combretum (Compretaceae): Erica (Ericaceae): Eucalyptus, Leptospermum (Myrtaceae): Osyris (Santalaceae): Daphne (Thymelaeaceae).

- Achaea finita* Guen.—Arachis hypogaea, Phaseolus, Pisum (Papilionaceae): Solanum (Solanaceae).

- „ *echo* Wlk.—Panicum (Gramineae).

- „ *lienardi* Bsd.—Rhus (Anacardiaceae): Maerua (Capparidaceae): Bridelia cathartica (Euphorbiaceae): Ptaeroxylon (Meliaceae): Eucalyptus (Myrtaceae): Citrus (Rutaceae): Pappaea (Sapindaceae): Sideroxylon (Sapotaceae).

- „ *catella* Guen.—Bauhinia, Tamarindus (Caesalpinaceae): Lonchocarpus (Papilionaceae).

- Parallelia algira*—Genista (Papilionaceae): Salix (Salicaceae).

- Grammodes stolidia* F.—Coriaria myrtifolia (Coriariaceae): Paliurus (Rhamnaceae): Tribulus (Zygophyllaceae).

- Mocis undata* F.—Derris, Tephrosia (Papilionaceae).

**Phytometrinae**

- Syngrapha circumflexa* L.—Eschscholzia (Papaveraceae).

- Phytometra orichalcea* F.—Bidens pilosa, Cichorium, Helianthus, Lactuca (Compositae): Raphanus (Cruciferae): Zea mays (Gramineae): Medicago Trifolium, Vigna (Papilionaceae): Phyllopodium (Scrophulariaceae): Solanum (Solanaceae): Daucus (Umbelliferae).

- „ *transfixa* Wlk.—Commidendron (Compositae).

- „ *acuta* Wlk.—Phaseolus (Papilionaceae).

*Phytometra limbirena* Guen.—*Becium*, *Salvia* (Labiatae): *Althaea* (Malvaceae): *Primula* (Primulaceae): *Verbascum* (Scrophulariaceae): *Solanum* (Solanaceae).

### Ophiderinae

*Pandesma quenavadi* Guen.—*Acacia* (Mimosaceae).

*Sphingomorpha chloreia* Cr.—*Sclerocarya* (Anacardiaceae): *Azanza* (Malvaceae).

*Calesia zambesita* Wlk.—*Dyschoriste thunbergiflora* (Acanthaceae)

*Pteronycta fasciata* Hamps.—*Gossypium* (Malvaceae).

*Serrododes inara* Cr.—*Jasminum* (Oleaceae): *Sapindus saponaria* (Sapindaceae): *Grewia* (Tiliaceae).

*Anticarsia irrorata* F.—*Gossypium* (Malvaceae).

*Anomis sabulifera* Guen.—*Althaea* (Malvaceae).

*Calpe provacans* Wlk.—? *Ophiocaulon* (Passifloraceae).

„ *emarginata* F.—*Ipomoea* (Convolvulaceae).

*Hypocala deflorata* F.—*Royena* (Ebenaceae).

### Deltoidinae

*Osericana gigantalis* Hamps.—Grass (Gramineae). In termite nests.

### URANIIDAE

*Chrysidia croesus* Gerst.—*Mangifera* (Anacardiaceae): *Terminalia catappa* (Combretaceae).

### EIPLEMIDAE

*Leucoplema dohertyi* Warr.—*Coffea* (Rubiaceae).

### GEOMETRIDAE

#### Oenochrominae

*Petovia dichroaria* H.Sch.—*Ochna* (Ochnaceae): *Vangueriopsis* (Rubiaceae).

#### Hemitheinae

*Pingasa abyssinaria* Guen.—*Schinus* (Anacardiaceae): *Carissa* (Apocynaceae): *Cussonia* (Araliaceae).

*Xenochroma candidata* Warr.—*Tamadindus indicus* (Caesalpiniaceae). In captivity.

*Metacincta aggravaria* Guen.—*Bauhinia* (Caesalpiniaceae).

#### Sterrhinae

*Traminda neptunaria* Guen.—*Acacia* (Mimosaceae).

*Scopula pulchellata* F.—*Plumbago capensis* (Plumbaginaceae). Flowers.

*Rhodometra sacraria* L.—*Rhus* (Anacardiaceae): *Anthemis* (Compositae): *Persicaria*, *Polygonum* (Polygonaceae).

D. G. Sevastopulo (5562)

(To be continued.)

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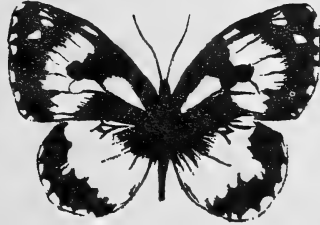
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The A.E.S. Annual Exhibition will be held at the Civic Centre, Lampton Road, Hounslow, Middx., on Saturday, 10th October, 1981, 11 a.m. to 5 p.m.

The Centre is well placed for access by road and from the adjacent Tube Station. There is ample free parking, refreshments will be available and leading Natural History Dealers are attending.

Maps and full details will appear in the August, 1981 A.E.S. Bulletin.

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by P. W. CRIBB

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The 20 pages are printed on one side only (A5 size). It may be used as a label list and those who collect and study European Butterflies will find two copies an advantage.

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S.36A

VOL. 40 NO. 332



AUGUST 1981

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



WORLD LIST ABBREVIATION:  
BULL AMAT ENT SOC

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**EDITOR:**  
BRIAN O. C. GARDINER, F.L.S., F.R.E.S.

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(Founded in 1935)

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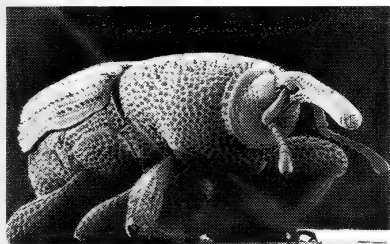
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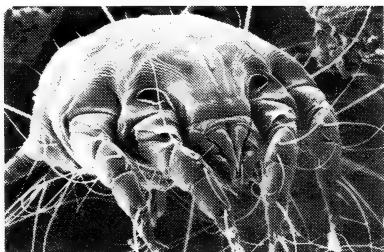
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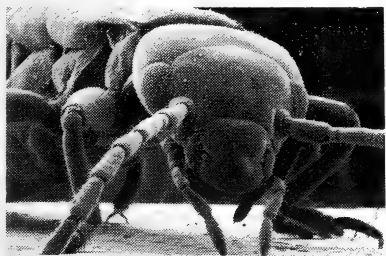
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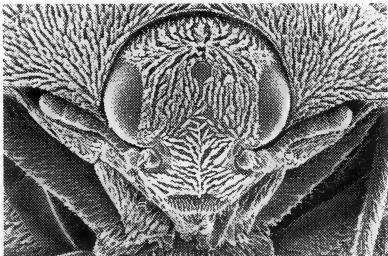
1. Maize Weevil (*Sitophilus sp.*) x180



2. Hedgehog Mite (Sub Order: *Sarcoptiformes*) x1920



3. Earwig (*Forficula auricularia*) x168



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# AES

BULLETIN

No. 332

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## EDITORIAL

From time to time both your editor and other members of Council receive comments about the contents of the Bulletin. Some former members have apparently resigned because they did not like the contents. On the other hand we have also gained members for the reason that they did like the contents. While I get comments that some articles are of little use or practicality I also get comments about the same articles saying just how useful they are! We are a general society and this is reflected in the Bulletin. For those who want only physiology, or lepidoptera, or systematics, then there are other journals which cater exclusively for those disciplines. I wish to point out however that the Bulletin contents reflect the general interest of membership as, with rare exceptions, the contents, apart from short news items and extracts from "Habitat", are all generated from manuscripts submitted by members. It must be presumed, therefore, that this is what members, and their colleagues, in the main want to see printed in the Bulletin. If members feel the contents should be changed then they should submit a suitable manuscript. This is a far more effective way of changing the contents than simply stating to someone else (usually not the editor by the way) that they do not find the present matter to their taste.

I should also like to thank all previous contributors who have submitted material correctly typed and draw the attention of future authors to the fact that it saves the Society funds and your editor much time if manuscripts are sent as a typed top copy. Double spaced and on one side only of the paper please.

However if this is not possible then clearly written items should also be on one side only of the paper and short notes and observations are always acceptable in any form.

For the information of members it is the editor's experience that carbon and xerox copies lead to "inaccuracies" in typesetting as a percentage of letters (sometimes whole words) are not always clear. Xerox copies in particular are prone not only to smudging, but even to complete erasure of portions of the text. There was an unfortunate experience a short while ago.

The year 1981-82 commencing with the issue of Butterfly stamps by the Post Office last May has been designated "Butterfly Year" and a committee based at the Royal Entomological Society formed to promote all aspects of Butterflies and their Conservation. Numerous displays and

exhibitions are being arranged by various bodies and it is confidently expected that a lot of goodwill and interest will be generated. While the most visual input is likely to have been—and we hope still is—the issue of four butterfly stamps, the more serious side is the four-day symposium on “The Biology of Butterflies” organised by the Royal Entomological Society of London and to be held in September this year.

One of the sad aspects of the butterfly year, however, is the failure of several publishers to ensure that standard books on British butterflies are in print. A search through several catalogues and several bookshops revealed only Robert Goodden’s “British Butterflies—A Field Guide”; W. J. Stokoe’s “Observer’s Book of British Butterflies”, and George Thompson’s “Butterflies of Scotland”. It also revealed a large quantity of pretty-pretty coffee table items about butterflies, moths, and insects in general, the majority with the text but a peg on which to hang often superb examples of photography but with little difference between them except size and price.

It has always been a puzzle to us why Messrs. Ward Lock & Co. never reprinted F. W. Frowhawk’s “Complete Book of British Butterflies”, the first and only edition of which was in 1934. It is in our view the best butterfly book ever produced and some of the second-hand prices we have seen asked for it would imply it is in great demand.

In view of the shortage and high second-hand value of certain other standard Entomological texts your editor wrote in January to a couple of well-known publishers to enquire if they intended to reprint certain items. Neither could be bothered to reply.

Curiously enough, however, we found that many foreign butterfly books were available and so were the standard reference books on moths, both British and foreign.

In honour of butterfly year we intend to devote the November issue entirely to the Rhopalocera. This will inevitably mean that some items will have to be held over until next year. To the authors concerned we apologise, but hope they understand the reason.

## **SOCIETY NOTICES**

### **ANNUAL EXHIBITION**

As already announced this is to be held on 10th October at the Hounslow Civic Centre, and details of how to get there are given by a map on our cover.

The Society wishes it to be known that it is doing all in its power to discourage large displays of, or any dealing in, endangered species. More detailed information on this subject is issued to all applicants for space at the exhibition.

## **SUBSCRIPTION INCREASE**

Inflation, sadly, is still with us and as from January 1982 the yearly subscription rate to our Society will be £4 Senior and £3 for Junior members. All new members will be charged £1 enrolment fee. Life membership fee is increased to £80.

These new rates will automatically apply to all new members joining from 1st September 1981. It would be appreciated if members paying by Bankers Order would write to their Banks NOW advising them that the next payment due on 1st January 1982 should be increased to the appropriate amount. Many members paying by Bankers Order overlooked the last increase and this created an enormous amount of additional work for the Treasurer and Assistant Treasurer, and also cost the Society a great deal in sending out reminders. Please note that next year's Bulletins will not be sent out until the correct amount is paid.

## **AES SLIDES LIBRARY**

Many members help the cause of insect conservation by giving talks to outside organisations on insects, so awakening an interest in this much which members can help the cause and for those who need suitable neglected group of animals. In the "Butterfly Year" this is one way in slides to support such talks the Society holds a small stock which can be borrowed. The slides are mostly of British butterflies and moths but these are the most popular of the insects and most likely to be of interest to uncommitted groups. Slides may be borrowed by application to Peter Cribb, 355 Hounslow Road, Hanworth, Feltham, Middlesex on payment of the necessary postage and, at the user's discretion, a small donation to the Society. Slides so borrowed must be returned immediately after use so that they are available to others. Members who do insect photography and have slides which may be suitable for supporting talks, although perhaps slightly sub-standard, are invited to donate them to the Society to add to the collection now available. Those who have already done so are thanked for their support and making them available to the membership at large.

## **ANNUAL REPORTS**

### **REPORT OF THE COUNCIL FOR 1980**

The Society has had yet another successful year, especially in view of the depressing national economic situation. The membership has remained relatively static with an increase of only 9 to bring the number in all categories to 1747. This figure allows for 310 new members enrol-

ling during the year, 248 lapsing and 36 members resigning or dying; obviously these numbers show part of the work load of the registrar. Our membership numbers have now passed the serial number 7000.

The council has met on six occasions through the year, with extra meetings for the conservation, finance and publications committees.

Four issues of our Bulletin were published, edited by B. O. C. Gardiner; these were supplemented by the Wants and Exchange List, exhibition notices, A.G.M. notices, Supplementary membership lists and an index. With the revision of postal charges the size of each mailing has become critical. On occasions the Bulletin has received criticism over content; it should be said however, that some articles attract praise too. It is surprising that out of a membership of 1700 much more attention is not paid to producing articles rather than letters.

The new publication agent, Mrs. L. Sokoloff, has settled into her new role and hopefully her house hasn't slipped too far down the hill with its mass of stored publications. The stock prices have now been rationalized and it is pleasing to say we have had favourable comments about our new publications; Practical Hints for Collecting, Studying the Microlepidoptera, Stick Insects (Revised and Enlarged), and Mantids.

Naturally with large Amateur Societies problems arise but some are easily avoided; perhaps the biggest time and money waster being members who fail to help themselves or the society by not notifying the registrar of address changes and especially those who continually send in a late or else the wrong subscription.

The A.G.M. was held at the Royal Entomological Society's H.Q., where we had a very interesting slide show by P. Cribb on Insects of the Mountains in Europe. Unfortunately the date coincided with the Dealers Fair at Leicester and the prospect of a bargain proved irresistible to a number of members, hopefully in future these two events will not coincide.

The Annual Exhibition at the R.H.S. Old Hall was a great success considering the fact that the hall was in use the day before for a flower show. The table allocation went well and was only marred by a few who failed to make it clear that they were dealing rather than exhibiting or those who failed to notify the number of tables required.

In order that we try to satisfy the wide range of requests another venue is being tried this year for the Annual Exhibition, this time with adequate free parking.

The Conservation Committee has been very active with the Wildlife and Countryside Bill. The study groups however have received support but have not communicated very much.



It is with regret that we must record the deaths of some of our members including W. L. Coleridge, C. O. Hammond, H. L. M. Hoskins, P. Sills and W. H. T. Tams.

The Council has awarded an Honorary Life Membership to Mr. Roy Stallwood our Assistant Treasurer since 1963, Past Bulletin Editor from 1954 to 1959 and one of the two Trustees of our Society since 1972.

S. A. A. Painter,  
Hon. Secretary.

## REPORT OF THE TREASURER

The year ending 31st December 1980 was one of mixed fortunes for the Society's finances, particularly with respect to the Income and Expenditure account. The cost of producing and despatching the Bulletin and administering the Society rose by nearly £1000 to £5926 due to inflation, the increase in Bulletin despatch costs being particularly disturbing. It is fortunate that income rose at a slightly higher rate to £6842 due to an increase in revenue from all sources, a significant proportion being due to the high interest rates prevailing and the maturity of one of the Society's longer term investments in Treasury Stock. In consequence the surplus of income over expenditure was improved slightly to £916 which has increased the General Fund reserves to £3931.

The Publications Trading account shows a fall in sales of £440 over the previous year—down to £4072. However, this was not due to a general reduction in sales, but because the previous year's sales were exceptional as a result of the launch of the *Dipterist's Handbook*. The Publications trading surplus for the year was £1300, and the Publications Fund stands at £11,360, made up principally of stocks of publications, but with sufficient liquid reserves to finance a number of future publications.

In spite of the generally satisfactory financial health of the Society, I regret that this report must close with a warning that members must be prepared for an increase in subscription rates for 1982. One major reason for this is that a number of items of office equipment are nearing the end of their lives; e.g., the Addressograph machine which is used to print Bulletin envelopes is now obsolete and will have to be replaced should any major failure occur. A further factor is that the recent increase in postal costs will almost certainly result in the total Bulletin costs exceeding subscription income this year, and with the current uncertain state of the economy it is essential that the Society does not eat into its slender reserves and risk being unable to finance essential equipment.

R. A. Fry,  
Honorary Treasurer.

**THE AMATEUR ENTOMOLOGISTS' SOCIETY  
INCOME AND EXPENDITURE ACCOUNT  
for the year ended 31st December 1980**

		1980		1979		1980	
		£	£	£	£	£	£
		<b>EXPENDITURE</b>					
1979							
£							
	<b>Bulletin Costs:</b>						
85	Editorial		80				
2400	Printing		2889				
868	Despatch		1383				
32	Indices		41				
			4393				
	<b>Membership Services:</b>						
165	Membership List		175				
45	Wants/Exchange Lists		43				
			218				
	<b>Administration:</b>						
266	Stationery and Notices		238				
140	Postage and Carriage		133				
520	Registrar's Fees		622				
243	Meetings expenses		144				
25	Study Groups Support		—				
19	Depreciation		35				
45	Insurance		43				
54	Sundry Expenses		44				
			1259				
34	Conservation		56				
<u>4941</u>			<u>5926</u>				
893	Surplus Income to General Fund		916				
<u>5834</u>			<u>6842</u>				
		<b>INCOME</b>					
	<b>Subscriptions:</b>						
	Ordinary and Affiliate	3717				3954	
	Junior	600				584	
	Life Membership Fund	41				53	
						<u>4591</u>	
	<b>Other Income (net):</b>						
	Donations	475				608	
	Enrolment Fees	157				146	
	Investment Incomes (gross)					233	
	Dividends, etc.	144				412	
	National Savings Interest	134				645	
						<u>294</u>	
	Advertising revenue	184				486	
	Annual Exhibition	330				72	
	Badges and Tie Pins	52				<u>852</u>	
						<u>6842</u>	



## PUBLICATIONS FUND

1979	1980	1979	1980
£	£	£	£
9697			
1867			
750			
<u>12314</u>	<u>13739</u>	<u>12314</u>	<u>13739</u>
7077	<b>Balance at 1st January 1980:</b> 9697		
2355	Add: Trading Surplus for		
	the year ... .. 1300	2440	
265	National Savings Bank		
	Interest ... .. 363		
	<u>11360</u>		
	<b>Creditors</b> ... .. 1629	7186	
	Loan Repayable by 1982	2157	
		531	
		<u>9874</u>	
			7045
			2694
			1197
			<u>10936</u>
			<u>2803</u>

**Investments:**

National Savings Bank

Investment Account ...

**Current Assets:**

Stocks at lower of cost

or valuation ... .. 7045

Sundry Debtors ... .. 2694

Cash at Bank ... .. 1197

10936

## STUDY GROUPS FUND

£	£	£	£
127	97		
(30)	74		
<u>97</u>	<u>74</u>		
9			
<u>106</u>	<u>171</u>		
		106	
		<u>171</u>	
			<u>20344</u>
<u>17909</u>	<u>17909</u>	<u>17909</u>	<u>20344</u>
	<b>Balance at 1st January 1980:</b> 97		
	Add: Surplus Income		
	for the year/Deficit ... 74	—	
		106	
			171
			<u>171</u>
			<u>20344</u>
			<u>17909</u>

**Current Assets:**

Debtors ... ..

Cash at Bank ... ..

171

**PUBLICATIONS TRADING ACCOUNT**  
for the year ended 31st December 1980

	1979	1980	1979	1980
	£	£	£	£
<b>New and Revised Publications:</b>				
Costs:				
Editorial	4	7	4512	4072
Printing	5154	913	3815	—
			1250	4072
<b>Selling and Other Expenses</b>	2064	920		—
<b>Decrease in value of Stocks</b>	—	1710		—
		142		—
	7222	2772		—
<b>Trading Surplus to Publications Fund</b>	2355	1300		—
	9577	4072	9577	4072

R. A. FRY, Hon. Treasurer.

**THE REPORT OF THE AUDITORS TO THE MEMBERS OF THE AMATEUR ENTOMOLOGISTS' SOCIETY**

We have examined the records of the Amateur Entomologists' Society, and in our opinion the Balance Sheet gives a true and fair view of the state of affairs at 31st December 1980 and of the Income and Expenditure for the year ended on that date.

R. W. WATSON, F.A.I.A., F.F.A.A., F.B.A.A., F.C.I.S.,  
F.Comm.A., F.R.E.S.

A. J. PICKLES, F.C.A.

Honorary Auditors.

Robert W. Watson & Co.,  
23/25 New Street,  
Lymington, Hants.

## **REPORT OF THE REPRESENTATIVE TO THE JOINT COUNCIL FOR THE CONSERVATION OF BRITISH INSECTS**

There have been two meetings of this council in the past year and Dr. Lonsdale and myself have attended one each.

There was considerable activity in many quarters last autumn when the Wildlife and Countryside Bill was published and many views (including those of the AES) were expressed. It was very disappointing to see that little notice had been taken of the JCCBI recommendations when the final draft of the Bill appeared recently.

The JCCBI representative on the Wildlife Link Committee (Dr. Paul Whalley) is pleased with the representation we have, and is impressed with the value of this committee, he recommends that membership is continued.

The Butterfly Year exercise seems to be emerging prematurely and although several sub-committees have been formed to get things moving there is disagreement over formalities. This could lead to grave problems unless the red tape can be cut, which is a pity, since everyone obviously wants it to be a success.

Survey work of the Heath Fritillary and Chequered Skipper butterflies is continuing, and the Large Blue is being bred at Furzebrook with a view to re-introduction at some future date.

It was suggested that the JCCBI should formulate a policy concerning farming and insect conservation as this is an important area of concern to entomologists.

Colin Hart

## **REPORT OF THE INSECT BEHAVIOUR AND ANT STUDY GROUP**

### **Membership**

The group started with a membership of 22 (20 AES and 2 subscribers). However after all the subscriptions were gathered in the group lost 5 AES members, making a 1980 start of 17 members. As the group had not advertised within the Bulletin for two years it was agreed that an advert of one whole page was to be made. A very good response was appreciated and made up for the 5 lost members plus one extra. The group had two tables at the Annual Exhibition where, on the actual day we gained another 4 members. Over the whole year the group's membership increased to 27, which is a very pleasing trend.

### **Field Meeting**

The group held one field meeting which had a record attendance of 8 people. Encouraged by the response to the 1980 field meeting the group hopes to hold two meetings in 1981.

### **Annual Meeting**

On 16.8.80 the group held its A.G.M. in the Council Room of the Royal Entomological Society's buildings. The council was voted to continue in its present form and the financial situation was £50.74, which was considered to be very good. It was suggested that the committee be increased by 4 if possible and these 4 would take up position as joint advertising secretaries. This was agreed to and would have to be actioned at the A.G.M. of 1981. For those under eighteen years their subscriptions would decrease from 75 to 50 pence. Foreign members unfortunately had to increase to either a £1.50 subscription or £2.00 depending on whether air mail or surface mail was required. The Annual General Meeting was a complete success and the 1981 A.G.M. will be held on 23rd May in the Council room again.

### **AES Annual Exhibition**

In 1980 the group had two tables at the Annual Exhibition where the group's funds gained by £5.00. The I.B.A.S.G. feel that the AES organisers of the exhibition did a very good job in acquiring the hall in such a short space of time. The I.B.A.S.G. is looking forward to the 1981 Annual Exhibition.

In conclusion, 1980 was the best year yet for the I.B.A.S.G. and it looks like 1981 could be heading the same way.

Malcolm Parsons

## **CONSERVATION COMMITTEE REPORT**

### **Committee Work and Representation**

The Committee has met twice during the last year, on 24th October 1980 and 27th February 1981. Members of the Committee have also represented the Society on the J.C.C.B.I. and at meetings connected with Butterfly Year. Of particular value in our representations has been the AES Conservation Policy, copies of which were circulated to all recipients of Insect Conservation News in May 1980. The most important of these representations has concerned the Wildlife and Countryside Bill, a document which promises little in the way of habitat protection and yet purports to protect several named insect species by making their collection illegal. Despite our work, we have achieved no worthwhile changes so far.

Another representation which draws on the spirit of our Conservation Policy has concerned Forestry Commission collecting permits. This control of collecting is partly based on requirements other than conservation, and some form of permit system seems inescapable. However, we the Commission's representatives are in no doubt over our concern over unnecessarily stringent, awkward and inconsistent permit procedures and we look forward to significant progress in the future.

The AES Exhibition is also subject to our Conservation Policy and, through the Council, we have ensured that the Society's long standing rules about the exhibiting of rare insects will be clearly explained in the relevant information sheets.

Another suggestion approved by Council has been the Society's intended affiliation to the British Trust for Conservation Volunteers.

### **Publications and Exhibits**

In addition to the AES Conservation Policy, we have published numbers 1 and 2 of "Insect Conservation News". This improved version of the old Conservation Group bulletin has been well received and its circulation is steadily rising. It includes news of individual sites, letters, matters of general interest such as the effects of Dutch elm disease on insects and news of field meetings. Publications in addition to this newsletter are being planned, perhaps including a leaflet for distribution to schools and libraries.

The theme of our stand at the 1980 AES Exhibition was isolation of habitats and we illustrated the dangers of extinctions of species at apparently suitable but isolated sites due to the lack of replenishment from nearby colonies.

### **Field Meetings**

We organised three field meetings; in Hampshire, Kent and north-east London. The interest of the sites was not matched by the attendance, although the London meeting merged with a large meeting of several societies at Walthamstow Marshes. At least three meetings will be held in 1981 and we hope that AES members will take advantage of the opportunity to meet other conservation-minded entomologists in interesting surroundings.

### **Individual Sites: Protection**

We continue to correspond with members and outside organisations over site protection and news of these sites is to be found in our newsletter. We have made particular efforts in the case of Walthamstow Marshes, where a local authority plans to turn one of the last sizeable wildlife refuges in London into a gravel excavation. In general, the destruction of habitats is reaching alarming proportions and, sadly, this even applies to sites where previous efforts have achieved apparent success. This has recently been true of Ditchling Common, one of the earliest cases on our books. We urge members not only to let us know about valuable unprotected sites, but also to remain vigilant at sites where protection has ostensibly been achieved.

### **Finances**

We spent £95.12 in the year ending 31st December 1980, of which £29.88 was met from AES funds. We entered 1981 with a further £4.78 advance from AES funds.

D. Lonsdale



## A NATIONAL SURVEY OF COLOUR VARIATION IN THE SPIDER *ENOPLIGNATHA OVATA* (THERIDIIDAE)

*Enoplognatha ovata* (Clerck) is a very common, easily recognised spider which occurs at high densities in patches of vegetation such as bramble clumps. It is of considerable genetic interest because it possesses a number of distinct colour varieties, a phenomenon unusual in British spiders. The three main forms have dorsal surfaces to their abdomens which are yellow, red striped or red. The rarity of vivid colours in spiders immediately raises the question 'What are they for in *E. ovata*?' All of its close relatives are brown, black and white pigmented, colours which presumably serve as camouflage.

One approach to answering this question is to try and find associations between environmental variables and the proportions of the various colour forms. These associations may give a clue to the significance of the variation. Attempts to detect such associations on a local scale have so far failed and it is possible that spiders are responding to environmental differences too small to measure.

Three years ago we initiated a countrywide survey of colour variation in this species. If there are links between variety frequencies and environmental variables such as temperature and humidity, they should emerge at a national level. To date we have samples from 160 Ordnance Survey 10 Km squares and a preliminary analysis has indicated significant trends. For example, the proportion of the yellow form is strongly positively correlated with the number of rain days but negatively correlated with mean July temperatures. Yellows seem to be favoured therefore in humid areas with cool summers. Reds, on the other hand, seem to be more common in areas with warmer winter temperatures.

It would obviously be desirable to obtain data from more 10 Km squares to see if the trends suggested so far are substantiated. If any reader is interested in assisting with this survey we would be extremely grateful. Further information on the squares already covered and the best sampling method can be obtained from: Dr. G. S. Oxford, Department of Biology, University of York, York YO1 5DD.

Dr. G. S. Oxford

### FRASS NEWSLETTER

This note is to inform members that there is published in the United States a newsletter concerned with all aspects of insect rearing and it is entitled FRASS. It is sponsored by the United States Department of Agriculture and an informal organisation known as the Insect Rearing Group.

"The editors welcome all information relating to arthropod rearing to keep the rearing community informed, and to promote its advancement.

It consists of comments, news and unpublished research on insect rearing as well as abstracts from publications and publication lists. Although the FRASS Newsletter has 400 subscribers only 23 are in Europe, so I am at present trying to increase contributions and distribution within Europe, thus improving communication between those involved in rearing insects.

If any members would like to receive FRASS, which appears twice a year and is circulated free, please send two A4 size stamped addressed envelopes, for the next two issues, to the European Co-ordinator, Amanda J. Neville, ICI Plant Protection Division, Jealott's Hill Research Station, Bracknell, Berks RG12 6EY."

### **THE THIRD MIDLANDS ENTOMOLOGICAL FAIR AND EXHIBITION, LEICESTER, 11th APRIL 1981**

Early morning rain and mist did nothing to dampen the ardour of the hundreds of enthusiasts who, once more, converged upon the now familiar Holiday Inn from all parts of Great Britain. Even the perennial football supporters on the London to Sheffield train seemed to share the same sense of occasion (will we meet them again next year, I ask myself?). However, for my money, Leicester won the Cup that day, whatever may have happened further north. A good bug bonanza takes some beating.

Trading of specimens, equipment, and books was lively as usual, but the effects of the recession were rather significant, and some sales fell a little short of expectation. An alternative explanation for slower buying was suggested (by me, I think) that the density of the crowd made it impossible for people to reach their back pockets at the peak period. Certainly, the hall was very well packed, especially before lunch time, and more so than last year because the separate "Oak Room" was not used this time. In that warm atmosphere, it was a joy to see the first "No Smoking" notices that any British entomological exhibition has ever displayed, to my knowledge. I do hope the AES will follow this welcome example, so that the thoughtlessness of the few are not allowed to spoil the pleasures of the many.

It is always interesting to compare the livestock/deadstock balance at Leicester in Spring with that of the AES in Autumn. Spring, clearly, is a more favourable season for displaying live insects, and their exquisitely-designed pupae, in greater diversity. From time to time, a wayward butterfly escapee entertained the throng by fluttering delicately overhead, while several mature pupae decided it was high time to see the world once more, and duly began to walk.

The social aspect of Leicester is one of the most rewarding. Colleagues and acquaintances from far and wide are often met in quick succession,

each one with contrasting interests and views to discuss. Often it is only in retrospect that one fully realises how enriching and informative these meetings can be. I, for one, tend to spend the return train journey to London busily writing down "things to remember" (including a draft of this report), while they are all still fresh in mind.

Long live Leicester, with the enthusiasm, vitality, and cordiality which have become integral parts of this popular annual tradition. I'm sure that everyone who attended will wish to join me in again thanking the organisers, and their colleagues, who worked so hard to make this event rewarding for us all.

Brian Wurzell (3718)

### COLORADO BEETLES

In May last year your editor published a light-hearted item entitled 'Colorado beetle-mania' and ended it by appealing for more information. (*Bull. amat. Ent. Soc.* 39: 100.) We received a very helpful and useful reply together with much information about Colorado beetles from Paul W. Bartlett of the Harpenden Laboratory of the Ministry of Agriculture, Fisheries and Food. He clearly is keeping a very keen eye on the beetle and helping to ensure it does not gain a foothold in Great Britain. Regular yearly accounts are published in the Journal "Plant Pathology", reaching thereby those who may be concerned in making sure it does not become established, but a Journal not likely to be seen by us amateur entomologists.

As Mr. Bartlett rightly points out we should not have wild caught Colorado beetles in our collections as any specimen encountered—or even suspected—must by law be reported at once to either the Police or nearest office of the Ministry of Agriculture, Fisheries and Food.

We publish below Mr. Bartlett's reply to our Colorado beetle-mania item and would like to thank him for his time and trouble in so doing.

### THE 1980 COLORADO BEETLE OUTBREAK

My attention having been drawn to an item on this beetle in the Bulletin of the Amateur Entomologist's Society (1980, Vol. 39 p. 100) your readers may be interested in the background to the Colorado beetle-spinach incidents so widely reported in the Press in May 1980. The reason why extensive publicity was necessary is I hope made clear in my narrative.

For many years Statute has required that the MAFF must be notified of any discovery of Colorado beetle, *Leptinotarsa decemlineata* Say in the United Kingdom, and since 1946 the Ministry has ensured that an annual report detailing all of these finds is published in a suitable

journal. In recent years this has been in Plant Pathology. None of your members should have a British caught *L. decemlineata* in their collection, unless it has been returned to them after MAFF investigation.

As you will understand it is usually people handling or using contaminated imports who find *L. decemlineata* in this country such as dockers, people selling or preparing food, Ministry inspectors, etc. These beetles can, very occasionally, be found in almost any import from Europe, but sometimes a particular commodity becomes heavily contaminated. This happened in May last year when *L. decemlineata* was found in spinach imported from Italy. Although only about 300 cases of spinach were involved they were widely distributed to wholesalers, greengrocers and shops, therefore local Plant Health and Seeds Inspectors (PHSI) went to every wholesaler and any retailer known to have had this spinach; the media was informed of the problem and they co-operated by giving the incident widespread publicity. Because of this publicity many more beetles were reported to us and it also ensured that the Italian Plant Health Authorities were well aware of our reaction to Colorado beetle. They assured us that they would increase their vigilance to prevent a recurrence of this problem.

On 16th May a Colorado beetle was received at Harpenden Laboratory which had been handed to the police in Derbyshire by a greengrocer, it had been found on South African grapes bought from Derby Wholesale Market. At the same time the local Inspector from Ormskirk reported that the two greengrocer customers of a Preston Market wholesaler had found beetles in Italian spinach. Seven beetles were later found there by the PHSI. They also contacted the supplier of the spinach, a firm in Spalding, who gave details of all the customers receiving this consignment. This information was communicated to local PHSI's who went straight to the wholesale market involved. By 10.00 it was clear another consignment was also contaminated and the Spalding firm gave me details of the recipients. Yet another contaminated consignment had also been distributed in the London area which proved difficult to locate. During that day Ministry inspectors found a beetle at Brentford Wholesale Market, 12 at two wholesalers in Manchester Market, 11 at Nottingham Wholesalers, 1 at Derby Market, 3 in a restaurant in Sale and one in a restaurant in Peterborough.

The publicity proved effective: immediately after Independent Television News "News at Ten" a beetle was reported from a house in Margate, and during the weekend others were reported from greengrocers in Highgate, London and Sheffield and from restaurants in Cardiff and Huddersfield. Finds continued usually on cold-stored spinach until 26th May 1980. A total of 54 live (21 male, 30 female, 3 not sexed) and one dead beetle (male) were found; 31 at wholesalers, 7 at greengrocers, 14 at caterers and 3 in private homes. As some of the spinach

was incinerated without inspection more beetles were most probably present.

By county were found:

Cambridgeshire ... ..	1	Lancashire ... ..	7
Cheshire ... ..	3	Lincolnshire ... ..	2
Derbyshire ... ..	2	Nottinghamshire ... ..	11
Greater London ... ..	11	South Glamorgan ... ..	1
Greater Manchester ... ..	13	South Yorkshire ... ..	1
Kent ... ..	1	West Yorkshire ... ..	2

As a routine all beetles sent to the Harpenden Laboratory are kept in a suitable controlled environment to induce egg laying. They are not allowed to mate during this period. However, over-wintered beetles are usually fertilized before diapause and the results for this group of insects are shown in the table.

How the spinach became contaminated will never be known for certain. Colorado beetles have often been found with non-host leafy vegetables particularly cauliflower, lettuce and endive and there are restrictions in the Plant Health legislation on the import of these. It is believed that the contamination occurs when the leafy vegetable is planted in a field where potatoes were the previous crop. The beetles diapause in the field and if there is a period of poor weather during the spring emergence the beetles shelter in the leafy vegetables and may then be harvested with them.

During May 1980 Colorado beetles were also found with Italian strawberries, timber imported from Portugal and on a ship, so that the total for the month was 70 live and 8 dead found. Altogether in 1980, 109 Colorado beetles were found associated with imports in England and Wales, 89 were alive. This was the highest annual total of live beetles for 28 years. A report for the year will be published in 'Plant Pathology' Volume 30 part 1.

Table. The fecundity of Colorado beetles found in England on Italian spinach in May 1980.

	Date beetle found	Period of egg laying		No. of Eggs laid	% hatch
		Start	Finish		
a ... ..	15.5	25.5	25.7	1586	63
b ... ..	15.5	25.5	31.7	1519	40
c ... ..	16.5	22.5	6.6	701	47
d ... ..	16.5	22.5	9.7	530	0
e ... ..	16.5	24.5	28.8	1014	31
f ... ..	16.5	26.5	31.8	2462	68
g ... ..	16.5	26.5	8.7	390	67
h ... ..	16.5	19.6	8.7	165	73
i ... ..	17.5	21.5	26.6	1555	56
j ... ..	17.5	26.5	15.7	1756	36
k ... ..	20.5	25.5	15.6	348	61
l ... ..	22.5	28.5	26.7	1015	39

Finally by the end of April 1981 16 live beetles had been found on imported Spanish celery and strawberries, French parsley and Portuguese timber. These were unusually early in the year. For a further review see EPPO Bulletin vol. 10 part 4 pages 481-9.

I hope that this information is of interest to AES members and that I have explained why publication in learned journals is not necessarily the only place to disseminate information of this nature.

Paul W. Bartlett

## BRITISH NECROPHORUS AND NECRODES BEETLES AND THEIR LIFECYCLE

### *Necrophorus* and *Necrodes* (Burying Beetles)

There are six species of *Necrophorus* beetles in Britain, all found beneath decaying carcasses. All have clubbed antennae, which aid in the location of food which consists of the carcasses of small vertebrates. They possess strong, horny wings to fly to food sources.

One species, *N. humator* Goetz is entirely black, having no orange bands or markings. The remaining five species possess orange markings, the shape and amount of which determine the species. The five species of striped burying beetles are: *N. vestigator* Herschell, *N. interruptus* Stephens, *N. investigator* Zett., *N. vespillo* L. and *N. vespilloides* Herbst. All are easily identified.

They are called burying beetles due to their habit of burying carrion for their forthcoming larvae to feed on. With three or four burying beetles burying a carcass it is possible to watch a small bird or mouse sink into the soil!

Most forms of carcass are fed on by burying beetles, including birds, small and large mammals, fish, and reptiles. Some species of burying beetle such as *N. vespilloides* and related species on the continent are commonly found beneath decaying fungi. Some have been recorded as feeding readily on larvae of blowflies, other Diptera and, perhaps to their detriment, *Geotrupes* beetle larvae.

I will proceed by describing each species separately.

Firstly, *N. humator* is the largest *Necrophorus* in Britain, a larger species *N. germanicus* is rarely found, although it is common on the continent. It differs from *humator* by the antennae which in *germanicus* are entirely black and shorter than in *humator*, also the coloration of the epipleurae in *germanicus* is red, whereas in *humator* the epipleurae are entirely black.

Fig. 1. *Necrophorus humator*, male.

Fig. 2. *Necrophorus investigator*, female.

Fig. 3. *Necrophorus vestigator*, female.

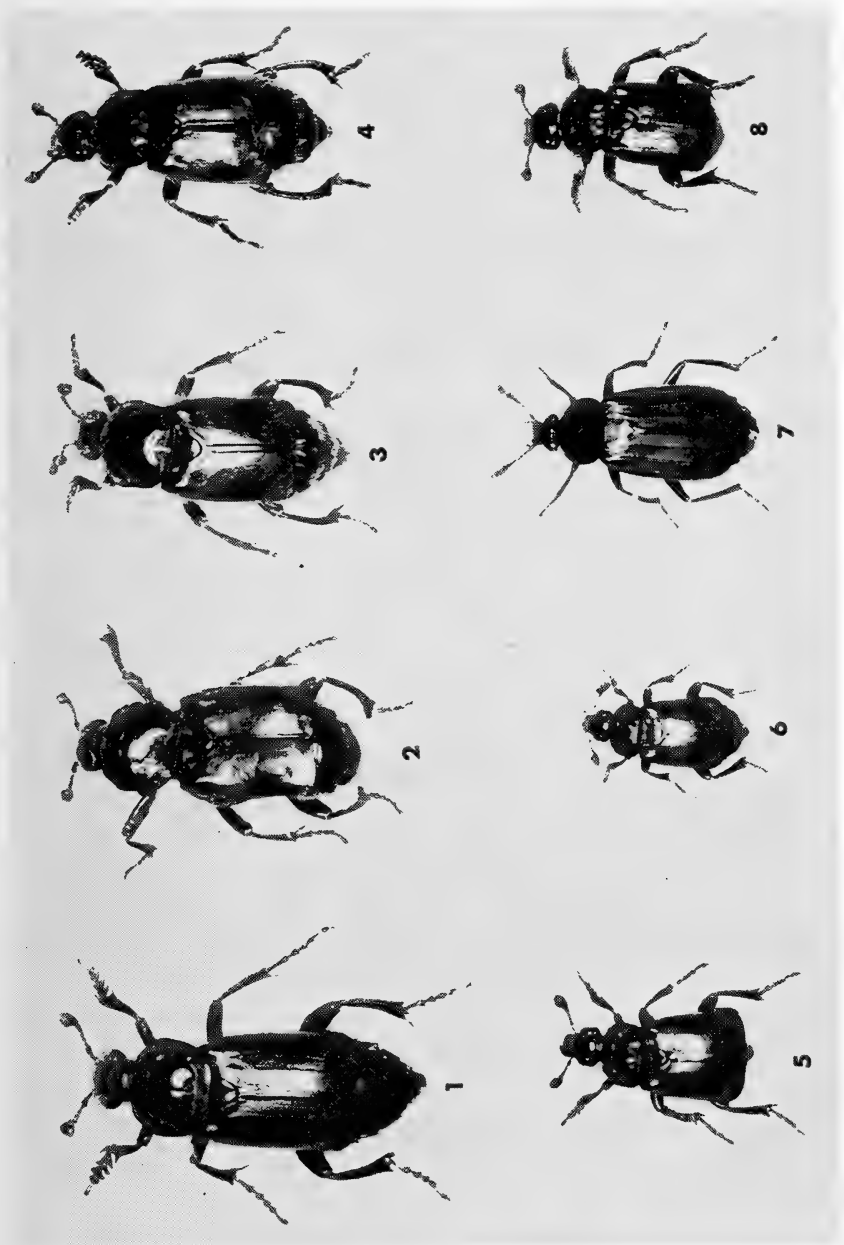
Fig. 4. *Necrophorus vespillo*, male.

Fig. 5. *Necrophorus vespilloides*, female.

Fig. 6. *Necrophorus vespilloides*, male.

Fig. 7. *Necrodes littoralis*, female.

Fig. 8. *Necrodes interruptus*, male.



The beetle is large at 28 mm and has been recorded up to 5 cms. It is found commonly throughout the British Isles beneath carcasses.

Secondly *N. vespillo* (15 to 20 mm) has both orange bands complete but is easily recognised by the hind leg tibiae which are very strongly curved. Also the trochanters of these posterior legs are long and pointed.

*N. investigator* (15 to 18 mm) is found more locally distributed than *vespillo*. My specimens come from Romney Marsh, Sussex, in Southern England.

The upper orange band is again intact in this species, but the lower orange band is interrupted at the suture by a wedge-shaped obstacle. At the apex on the underside there is a tuft of yellow hair, the rest of the beetle is pubescent, these hairs being black in colour. The anterior male tarsi are much dilated and are furnished with yellow brush-like hairs in this species.

*N. vestigator* (16 to 18 mm) is sometimes found in the Southern counties of England. It differs from *vespillo* in that the posterior tibiae are not curved, also the trochanters of the same legs terminate in only two short spines. The insect is very pubescent having hair on the head, abdomen and elytra as well as a yellow fringe on the front section of the thorax. All these hairs are light yellow in colour. The upper orange band of the elytra has two lobes dropping from the main band, the anterior band, on the other hand, is very much reduced and are like small furry sausages. The antenna club is red, and the rest of the antenna is black.

*N. interruptus* (12 to 18 mm). The anterior orange band in this species is interrupted by the suture, and the pubescence is not dark but yellowish in colour. This species is not common and as in *investigator* it is found in the Southern counties of Britain. The antennae clubs are more yellowish than red as in *humator*, for instance, and the stalk is black.

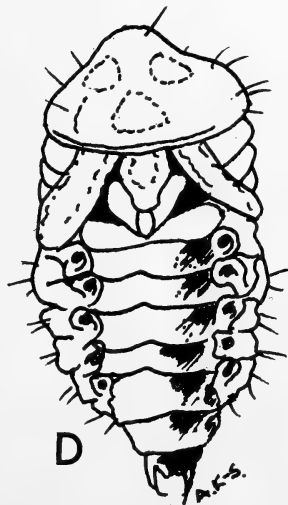
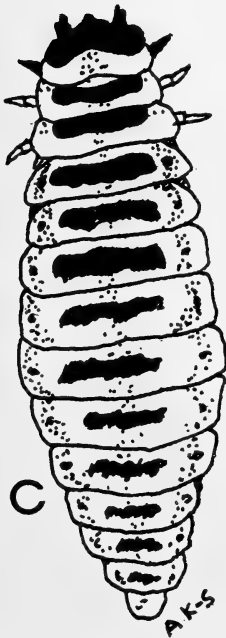
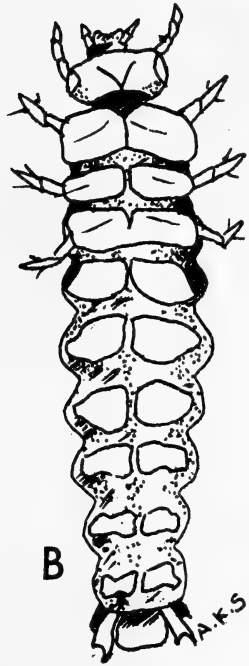
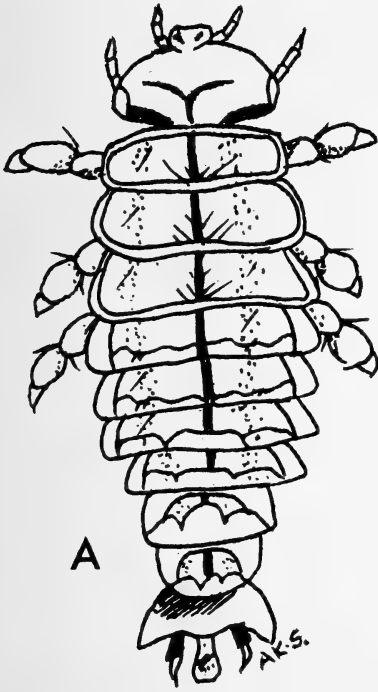
I think I should state at this point, that the length of the abdomen protruding from the base of the elytra depends on the amount of food consumed by the beetle. This is one of the characteristics not only of *Necrophorus* beetles but also of Rove beetles.

*N. vespilloides* (10 to 15 mm) has the antennae completely black including the club, in all other species of *Necrophorus* the club is reddish-yellow in colour. The first orange band in this species is intact, by this I mean the full width of the elytra. The second stripe, on the other hand, is very much reduced and is perhaps indistinctive, for the lower stripe is

Figs A-D. Early stages of *Necrophorus*.

- A. First instar, length 6.5 mm.
- B. Second instar, length 10.5 mm.
- C. Third instar, length 5.5 mm.
- D. Pupa.





simply two kidney-shaped discs on the lower portions of the elytra. *N. vespilloides* is one of the species found beneath decaying fungi.

The second genus dealt with here is *Necrodes* of which in Britain only one species is present. Unlike the *Necrophorus* species they have no club to the antennae and the antennae are not ten jointed.

*Necrodes littoralis* L. (13 to 23 mm). The overall shape and structure of *littoralis* is the same as the *Necrophorus* beetles. The antennae are black and thicken gradually towards the apex, the last few segments are reddish-yellow. The thorax is shiny, although the rest of the body is dull. The elytra are thickly punctured, each elytron has three raised lines with a strong tubercle behind the middle. The eyes are prominent.

The sexes vary considerably, the most evident variation being the posterior femora of the male, which are much thickened, and the tibia, being much curved as in *N. vespillo*.

This beetle is found on the banks of rivers or on the seashore, as its name implies (*littoralis* = "by the sea"). It is local in distribution but not uncommon. It is not only found on the seashore but inland, where it occupies carcasses. It was recorded by Bell (1873) "that they feed on Blowfly maggots along with *Necrophorus vespillo* and *Necrophorus humator* in Northumberland".

#### *The life cycle of the British Necrophorus*

The life cycle of the *Necrophorus* beetles is perhaps one of the most interesting and complex of all the Insecta, not only in Britain but in the world.

They locate carcasses by their acute sense of smell (their antennae are clubbed and extra sensitive); they reach their prey by their strong wings, which all these beetles possess.

Pairing of the beetles takes place at the carcass, the male feeds at first until a female arrives. If after a time no female has arrived at the carcass by the smell, the male will crawl to an elevated position on a stone or plant, when there, he raises his abdomen, the mandibles often touch the object the insect is standing on. When this is in progress the beetle stays on the object for several hours. It is thought the he is emitting a special odour to attract a female but the smell of the carcass may be enough.

When a pair find a carcass they first inspect it, they do not feed on it at first but just bite it here and there. Eventually they crawl underneath and begin to excavate the soil, cutting obstacles like grass roots with their mandibles until one end of the carrion begins to sink. The tunnel at one end is smaller than the carrion so it is folded over.

When a "Mortuary Cellar" larger than the passage grave has been formed, the excavation ceases. When this is complete the insect rolls the carrion into a round mass. It does this with its legs whilst its back is

against the wall of the cellar. After this all hair and feathers are removed to form a carpet on the cellar floor. In Fabre's popular description (1919) he notes that scales of fish and reptiles are left on.

The depth of the mortuary depends on the species which has buried it. *N. vespiloides* only buries slightly. *N. humator* buries seven and a half centimeters; most species bury their carrion less than this.

With laying eggs in mind the female makes a passage from the mortuary cellar. All along this passage the female lays her eggs in a depression left by the abdomen. *N. vespillo* lays 14 to 15 eggs.

*Necrophorus* beetles are usually found in pairs or alone, this is due to fighting for position on the carrion, the loser being driven away. Usually the female remains below ground but both of a pair remaining below ground is not unknown.

The female after oviposition goes back to the mortuary cellar and makes a small crater at the top of the carrion and begins to feed, it is the first time she has fed since excavations began.

After five days the eggs hatch and the larvae make their way to the mortuary cellar, where they crawl up the crater made by the adult beetle, guided by the odour.

All the larvae gather here and do not partake of the carrion, although they may touch it with their mouth parts. Instead they wait for the adult beetle to arrive at the crater. Then she feeds each individual larva on a drop of brown fluid from her mouth parts. The larvae are very persistent and they crawl up the mother's legs to get at the fluid. After six hours the larvae begin to feed themselves from the crater.

They are dependent on the mother again for a short time after their first and second moults. There are three instars of the larvae.

When it becomes time to pupate the larva bores out horizontally through the cellar wall to about 30 cm away, when it reaches this position it rotates for several hours to form a "pupal cell". This stage lasts about two weeks after which time the adult hatches out.

A. H. Kirk Spriggs (7094)

## BOOK REVIEWS

*Les Attacidae Americains (The Attacidae of America)* by Claude Lemaire. Part I Attacinae pp 238, 49 plates. Part II Arsenurinae pp. 199, 72 b/w and 4 cold plates size A4. Edition C. Lemaire, Neuilly-sur-Seine, 1978; 1980. Price Part 1 FF 250, Part 2 FF 350.

For many years now Monsieur Lemaire has been steadily revising the world species of the Saturniidae. Apart from the steady stream of short revisionary papers in various Entomological Journals we have had the magnificent 3-volume revision of the confusingly large genus *Automeris* and the definitive clarification of *Lonomia*. Now we have the first two

parts of the entire American region, which contains 850 of the 1200 described species in the family. The thoroughness of the revision is evidenced by the fact that these two parts of 437 pages of text cover only 131 species and include not only a photographic illustration, full-size, of these large moths, but also detailed genitalic and other diagrams and distribution maps.

The numerous forms and synonyms of the moths are given in full. That of *Dysdaemonia fosteri* alone fills nearly two pages and shows the extent to which naming and re-naming of quite trivial colour variation or regional forms has led to ever-widening confusion in the past.

Monsieur Lemaire has had the benefit of access to considerably more material upon which to base his studies than the earlier authors. The previous works of Draudt and Bouvier for instance, some fifty and seventy years old, did not have the material which has been collected principally since the end of the war in the process of the development of vast tracts of S. America. Much of this material was in fact collected owing to Monsieur Lemaire's known interest and in addition he has had access to the numerous types, formerly in the Hill Museum, which were not, for instance, seen by Draudt.

The first part of this work contains a general introductory section in which previous major works are discussed followed by a succinct appreciation of the Attacides distribution in the various subfaunal regions of the Americas. We then have an explanation amounting to nearly four pages on the criteria used in the classification put forward in this work. This is, of course, a controversial subject and not everyone will agree over the arrangement, particularly that concerning sub-genera and "groups" within a genus. Nevertheless, Monsieur Lemaire argues cogently for his reasons and is following on the precedent he has set in previous revision, particularly that of *Automeris* and its allies.

As with so many classifications, no account is taken of larval inter-relationships, wisely in this case, since so few of them are known or adequately described.

Under a short taxonomy section we have explained to us some aspects of the higher groupings and why they are being followed in this instance. Readers will already have noted the title of this work, Attacidae, not Saturniidae. This is not the author's whim. It is a decision of the International Commission on Zoological Nomenclature.

Dichotomous keys are given to families, genera and species. A discussion is given to each genus. Details are given of wing venation, antennae and genitalia. Distribution maps are given of the species and where appropriate the distribution of groups of species in a genus to the faunal sub-divisions. Large and detailed genitalia diagrams are presented for the majority of species.

For each species and subspecies the text is clearly laid out to a uniform format, using a mix of bold, italic and normal type combined with margin insets and footnotes in a smaller typeface. Throughout both volumes the procedure is the same. Under the name of the moth, with reference to plate illustration, we have the synonymy followed by the type(s). Both these give not just the author but the full citation reference. A very useful feature indeed and a confirmation of the care and thoroughness of Monsieur Lemaire's revision of this group of moths. We are next given the geographical range of the species under discussion. This is followed by a genitalia description, with diagram, then a description of the external features of the moth which is in turn followed by a critical discussion of the taxonomic position. Finally there is an *English summary of the preceding French text*.

There is little reference to the early stages. This is purely a taxonomic work on the adult moths. It provides a sound basis to identify the many species received from the American region and which are so often sent, not perhaps intentionally under false colours, but through lack of knowledge, as something else to what they actually are.

Even so in some genera (*Copaxa*) the females remain difficult, if not impossible, always to identify precisely. It is now up to the breeders of these fine moths to publish the life history and description of the early stages.

In Part I of this work the plates are half-tone screen blocks in black and white and show at least one example of each species. In the second part however, the plates are reproduced by a modern xerographic method and quite frankly it is not in our view of the same standard. The four colour plates on the other hand are excellent. Both parts contain a full bibliography and clear index. We would have liked to have seen a separate checklist of the species discussed. Perhaps this can be done in the final volume.

Like several other French published books, these volumes do not seem to be available from English book dealers. They must therefore be ordered direct from the publisher.

Brian Gardiner (225)

*A Handbook for Naturalists*, edited by Mark R. D. Seaward, assisted by Susan Joy and Frank H. Brightman, London, 1981 (a Constable Guide, published in association with the Council for Nature/Council for Environmental Education). 201 pp. Price £4.95.

It seems a daunting task to produce a handbook—and a near-pocket-sized one at that—on the entire subject of natural history, but this book really does merit its title. We are first given an historical review of natural history in Britain, and succeeding chapters lead us through a review of British habitats, guidance on field activities, a synopsis of

educational resources, an explanation of wildlife and the law and a list of natural history and wildlife conservation organisations (including the AES). The last of the eleven chapters lists books and periodicals with emphasis on identification guides. Conservation has a prominent place in most chapters.

The many contributing authors have obviously taken account of the very practical needs of the reader and there is a good balance between a general treatment of the subject matter and specific guidance on field methods. Wherever possible references are given for further reading and this emphasis on providing sources of specialized information is one of the Handbook's greatest strengths. Indeed, there are many examples given to illustrate the study of specific forms of wildlife and insects figure frequently among these examples. One such example comes in the chapter on fieldwork and equipment; it is the study of insect dependence on a single cluster of blackberries, recording visits by wasps, butterflies and other insects and searching for moth and beetle larvae inside the berries.

Having noted the several excellent features of this little book, we ought to ask which kinds of reader will find it most useful. It seems likely that the average entomologist, even in his early years, will require a more specialised guide on his chosen group of insects, and this requirement seems equally applicable to other specialised naturalists. The Handbook is not intended to satisfy these needs, but its reference lists will give access to books covering much of our fauna and flora (even though AES publications are not listed in chapter 11). The book is a 'must' for someone, in its own right, and that is the teacher. Here, perhaps, is the stimulus for a greater appreciation of wildlife in future generations and for conservation, nothing is more vital than that.

D.L.

*Advice for Young Naturalists.* Compiled by Mark R. D. Seaward, published by Council for Environmental Education, 1980. 24 pp ISBN 0 903158 175, 55 pence plus 15p p & p (available from CoEnCo Youth Unit, Zoological Gardens, Regents Park, London NW1 4RY. 33% discount for orders over 10 copies).

This booklet is the third edition of a Council for Nature publication which first appeared in 1965. Much of the information falls under headings similar to those of Mark Seaward's other publication, 'A Handbook for Naturalists', but the two are perhaps complementary. Although the 'Handbook' is itself a concise work, its style (and price) may commend it mainly to teachers and youth leaders. 'Advice for Young Naturalists' cannot, in 24 pages, give the same background' to the subject but it gives just as much reference information and also finds space for basic guidance on such matters as equipment. It is clearly

a booklet for the individual young naturalist. As in the 'Handbook', the AES appears on the list of natural history organisations but, again, the Society's publications do not appear on the reading lists.

Conservation is emphasised throughout the booklet and, as in the 'Handbook' the JCCBI code is listed together with the other British codes for naturalists. This emphasis is to be welcomed for some teachers, though content to *use* wildlife resources in education, have been too neutral when it comes to the encouragement of an interest in conservation. As Mark Seaward writes in the Introduction, "The future of our wildlife lies very much in the hands of today's young naturalists." (Or, at least, one hopes that some future for wildlife will still exist when those youngsters 'come of age'.)

*Butterfly Watching* by Paul Whalley with drawings by Richard Lewington. Published by Severn House Naturalists Library, price £7.95.

An entomologist by occupation, Paul Whalley's enthusiasm for butterflies has resulted in a delightful and thoughtfully written book which will give pleasure to many potential butterfly watchers as well as to those already enjoying this fascinating pastime. Complemented by fine colour plates, and Richard Lewington's carefully executed line drawings, the text is arranged to give a step-by-step guide to acquiring a more detailed knowledge of these beautiful and ephemeral creatures. Sections are included on the place of butterflies in the history of man, and in the animal kingdom; where to look and what species to look for; as well as suggestions for projects, societies to join, individual descriptions and a special section written by Heather Angel, the well-known photographer/naturalist, on the role that the amateur naturalist can play in helping to fill the gaps recording—a now somewhat neglected art. The final chapter on butterfly conservation shows clearly how the decline of some of our butterflies is related to the destruction of natural habitats. This attractively presented and enjoyable book deserves to occupy a special place on the library shelves of interested naturalists.

Habitat

*Keeping Spiders, Insects and other Land Invertebrates* by Frances Murphy. pp 96 Crown 8vo. Bartholomew, Edinburgh. Price £1.25.

This little book is a joy to read through. There are many illustrations, virtually all coloured, by Denise Finney, which add to a very clear text. It should appeal to a wide range of readers, since it gives a guide to keeping a variety of 'mini-beasts' that are encountered in a host of circumstances including curiosities in 'Pet' shops.

The chapter headings give rightly a guide to their content. They include Caterpillars, Ants, Mantids, Phasmids, Locusts, Millipedes and Centipedes and Land Snails. There is an extremely useful chapter on breeding and keeping food for these diverse creatures. As might be

expected and indeed wanted from an acknowledged expert on the subject, about a quarter of the book is devoted to arachnids, dealing with Mygalomorph spiders (these include the Tarantulas), Araneomorph spiders (a number of the unofficial immigrants are in this group—delivered with fruit, etc.) and Scorpions and Harvestmen. Detail included are how to tell if you have a geriatric spider. At the end of each chapter there is a useful reference book section, and sadly that is what they are since many of them are out of print. There is reference to the AES. Unfortunately at the time of printing our Mantid leaflet had yet to appear and our publication agent has since changed to L. Sokoloff.

This is a commendable book full of practical advice, it fills a niche, long empty, at a price that should allow it to be seen in places where the curious, interested and young seek information.

S. A. A. Painter

#### NOTES ON LEPIDOPTERA FROM GLASGOW

In the autumn of 1979 I collected a dozen or so caterpillars of Coxcomb Prominent (*Lophopteryx camelina* L.). These I found just about dusk, along an extensive hawthorn hedgerow not far from home. I collected the majority between the last week of September and the first week of October, and they looked almost full grown. After they fed for a while on hawthorn and lime leaves I soon had them going under to pupate. I provided peat for them to pupate in. However one of them spun a cocoon of bits of hawthorn leaves at the base of its container before I had the chance to renew the foodplant for it.

All the other larvae pupated without mishap in peat in flower pots and other containers. After about a month I took the cocoons from the peat and put them in various glass jars with fine-mesh curtain netting tied over each jar neck.

The first moth to emerge did so on 10th April and it was the one whose caterpillar had made its cocoon from leaves of its foodplant. A week later another emerged and within the next three weeks four more. I released two in the garden along with a Grey Dagger (*Apateli psi* L.) moth which had emerged on 13th May, the product of a larva which had pupated in a piece of Elder last autumn.

The Coxcomb Prominents look very fine in my collection with their fine serrated wings and the curious looking crest or "Coxcomb" on the thorax.

I noticed recently from the publication of "The Entomologist's Record", the occurrence of two larvae of the Elephant Hawkmoth (*Deilephila elpenor* L.) at Possil Marsh, Glasgow during 1979.

I would like to report my finding two more larvae of that species at the south end of Drumpellier Park on Sunday, 24th August 1980.



My friend and I went there that day and were searching for caterpillars, mostly on birch, oak and lime, at a sloping wood facing south. I found some eggs of moths on birch trees there and then we walked to the edge of the wood and I saw an Elephant Hawk moth larva feeding on a stem of willow-herb. It was resting about half way up the stem. My friend took a few photographs of the larva and then I took it from the plant. A few minutes later I found another larva of the same species on another willow herb stem just yards from where we found the first one. This second larva was a bit lower down the willow herb stem and was slightly smaller than the first. Both measured about 75 to 80 mm, and were obviously nearly full-grown.

Previous to this discovery I found some other interesting larvae from this same wood whilst there on my own.

On the evening of 12th August I discovered a larva of the Miller moth (*Acronycta leporina* L.) less than half grown on the underside of a birch leaf, but this proved to be parasitized by what looked like a species of *Apanteles* wasp for I noticed green oval shaped cocoons being spun by the grubs emerging from the Miller larva, which had fastened itself to the birch leaf by silk.

Two nights later at the same place and during very heavy rain I found another very interesting larva on a very small birch tree growing near oak trees and under the canopy of their leaves. It looked like a caterpillar of the family Acronictinae and the only species that compared with its description of markings etc. was the Sweet Gale Moth larva, *Acronycta euphorbiae* Fabr., but some markings didn't correspond. However after a diet of birch leaves this larva has now pupated—using a piece of rotted wood to spin a rough oval cocoon.

In 1980 there was a great influx of Painted Ladies (*Vanessa cardui* L.) in the Glasgow area. Usually I only see the odd one or so. However from late May until August I have seen more than I've ever seen in my life. I first saw them at Queenslie, where I work. The thistles growing in nearby fields were the attraction. They were quite numerous in late May and part of June, but their numbers seem to have increased threefold or more thereafter.

The butterflies were to be seen at almost every large patch of thistles between here (Queenslie area) and Bishop Lock which lies just beyond Easterhouse.

A few days ago I netted one near Bishop Lock amongst a thistle patch and many more gave me the slip; time of capture was 7.15 p.m. The butterflies were on a north-facing slope which was covered with thistles in bloom. Although north-facing, the slope caught the bright evening sun.

The next time out after them, I netted six. I caught the first just 300 yards or so from my house. Then I headed north-east and came across

them wherever there were thistles. The common thistle or field-thistle attracted them most.

I have seven of them in a row, on the setting board, and the largest measures 70 mm from wing-tip to wing-tip. The smallest is 53 mm. I continue to see Painted Ladies in the vicinity of my house right into November.

Frank McCann (6291)

## NOTES AND OBSERVATIONS

**New Entomological Periodical**—Members might like to know of a new journal that has commenced publication. It is titled *LITTERAE ENTOMOLOGICAE* and is to appear bi-monthly. Attached with each issue is a separate section, the *FORUM ENTOMOLOGICUM*, which is similar to "Insektenbörse" or a greatly extended version of our own Wants & Exchange combined with the advertising pages in the Bulletin. Indeed, we note the same advertisers in all three journals. As a start this new periodical is published in A4 size and is duplicated.

The aim is to be as international as possible and it may well be that more and more journals will become not only international in scope (as indeed is our own Bulletin) but also multilingual. This first issue is primarily in French but with substantial English, some Flemish, a little German and a sprinkling of Latin headings. Just why, however, advertisers in English should, in a Belgian journal, quote their prices in German marks, defeats us. The subscription is quoted as 700 FB or, for the *FORUM* section on its own, 150 FB. The Editor and publisher is Michel Grote, Rue des Viennes 250, B-4040 Liege, Belgium.—Editor.

**Painted Ladies in Cleveland County**—I first observed Painted Ladies (*Vanessa cardui* L.) flying on the sand dunes during the first week in June 1980 near Saltburn and Redcar on the N.E. Coast, and then spreading inland until they could be seen on moors, woodland drives, and throughout the industrial area of Teesside; odd butterflies flying in the centre of British Steel's Redcar Works. Eleven butterflies entered greenhouses at a local nursery.

During the early part of July I started finding larvae feeding on thistles in various places, the biggest concentration being at Redcar, on the sand dunes, where two hundred were found in three days. All were in various stages of growth from newly hatched to full fed. From the middle of the month butterflies were emerging in large numbers, fifteen seen feeding on one group of knapweed flowers. The butterflies were seen throughout July and the first two weeks in August, and then they vanished, except for occasional ones seen in other parts of the country. During the first week of September I entered a six acre field at Wilton a few miles from my home, and briefly glanced at a plant of spear thistle.

On the lower leaves could be seen the webs of two Painted lady larvae in their second instar. I started to search in earnest, and within two hours had found seventy larvae, in various stages of growth, most were found on spear thistle and also on common thistle. Throughout September and the first week in October I found between six and seven hundred larvae. The maximum on one plant was nine. Most of these larvae were brought home for I do not think the small larvae would have survived the cold weather. At the time of writing (October 1980) I still have larvae feeding, and large numbers of pupae from which butterflies are emerging every day. None of the larvae had been parasitised. During searching for the larvae in September, fifteen larvae of *Vanessa atalanta* L. were found on nearby nettles.—N. W. Harewood (825).

**Lime Hawkmoths in Yorkshire**—I have the following records of *Mimastilia* L., the Lime Hawk, in Yorkshire.

Town Moor, Doncaster.

1960 2 pupae—emerged 24.4.1961. 1 female, 1 male.

Town Fields, Doncaster.

1961 1 pupa—emerged 12.6.1962. Male.

Town Moor, Doncaster.

1972 1 male taken May. Fully fed larvae seen on poplar tree adjacent to some limes.

1970 I watched a schoolboy in early March taking a pupa from the foot of an elm tree on the roadside. He said he had found others in the same area at the foot of elms.

1971 Found four pupae in September within a few minutes of using a trowel under a lime tree in Sandall Beat Wood, Doncaster. Produced 3 females and one male in May 1972.

1975. Fully-fed larva taken in Town Moor produced a female on 20.5.1976.—Eric W. Smith (1207).

**First Impressions of the Scotch Argus**—The 24th August 1980 dawned clear, bright and cool, and I resolved to do some hill-walking that day. I was camped a couple of miles west of the Inveroran Hotel, near the Bridge of Orchy, Argyllshire. The previous night had brought with it the first frost of autumn, and conditions on the nearby peak that I could see from the hut, Stob Ghabhar, looked ideal for a stroll up to the long ridge connecting this peak to its sisters.

I set off very early (for me) about 9 a.m., and quickly reached the lower slopes of the hill. Flitting about in long marshy grass I soon noticed colonies of a medium-sized brown butterfly which at first I thought was a meadow brown. Something about its flight, which was weak and low, convinced me however that these were not meadow browns but a species that I had not seen before.

I walked up a little further to about 1000 ft. and another large patch of marshy grass I noticed these same butterflies. I followed one until it landed, then crept up very slowly until I could clearly see its markings. It was a newly emerged specimen, in immaculate condition, with a perfect, very fine white border seemingly painted on the edges of its wings. I could see at once that this was a male Scotch Argus, *Erebia aethiops* Esper, which I had only previously seen in drawings. It differed from the meadow brown in having numerous eye spots on its wings instead of just one, the front wings having a joined pair of eye spots plus one out on its own, and the hind wings having four eye spots arranged in a curve. Around each group of eye spots there was a large orange/red patch of scales, which contrasted against the very dark brown, almost black, ground colour of the upperside of the wings.

I followed a few more specimens which were disturbed by my approach. They often came to rest low down near the base of the grass stalks, and some individuals seemed to enjoy basking skipper-like with their wings half-folded such that only the hind wings were obvious. I soon discovered that they were easy to catch with cupped hands (I had no net with me) provided they were stalked carefully—once within the long grass they found it difficult to escape because their flight was so weak. On examination of the underside of the hind wing, I found a brownish grey, sometimes silvery stripe existed close to the edge of the wing, but otherwise this part of the butterfly looked like that of a gate-keeper but without any noticeable white dots.

I then continued up the south face of the hill to see how far up they could be observed, and I saw no sign of them above 1500 ft. above which the long marshy grass was not in abundance.

I managed to find in the grass more by luck than skill, two large yellow *aethiops* eggs, which looked like ribbed wall-brown ovae. These were kept carefully on tissue paper, and within a week they became speckled with brown spots. After 16 days (seems rather long), they hatched revealing tiny buff-coloured larvae with uniform creamy-coloured undersides. These I fed on grass—which type they ate I could not tell—but I gave them a good selection of about 10 different types of common grass and they seemed to eat steadily at least one of these grasses. However, these larvae, after feeding on and off (but mainly hibernating) up until December, eventually succumbed to disease whilst still only about 2-3 mm long. This may have been partly due to a certain amount of neglect on my part, as I was unable to clean out the airtight container in which I placed them as often as I would have liked.

These are my first impressions of the Scotch Argus. I am sure a few comments about this butterfly and its habits by a regular observer of the species would be welcomed.—R. D. Cope (5661).

**Hornets in Norfolk and Suffolk**—In respect to the recent interest in the occurrence of hornets, *Vespa crabro* L., I should like to record the finding of two queens hibernating in a rotten log in woodland on Saxlingham Common, Norfolk, on the 25th December 1980. Over the last three years I have found two other specimens in this county, and also in September 1980 a whole nest established in the roof of an inhabited house, Somerset.—Robert Harvey (6904J).

**A Squadron of Herald Moths**—I note the observation recorded by B. O. C. Gardiner (AES Bulletin, p. 15, Vol. 40) regarding hibernation of the Herald Moth (*Scoliopteryx libatrix* L.).

I should like to add that last November a friend brought me two perfect adult specimens found at Pocklington, York, which were taken from an assembly of eight found hibernating in a barn, in an old television cabinet on which roofing slates were stacked.

I was informed that the moths were all hibernating down one corner, lined up in 'formation' head to tail!—A. J. Gillery (3653).

**Some observations on the Pine Processionary Moth**—With reference to Mr. Stallwood's article under this heading (1979, *Bull. Amat. Ent. Soc.*, 38: 164-66) I would suggest that the large number of malformations was due to desiccation of the pupae. I make this suggestion for the following reason. Some years ago I was staying at one of the beach hotels north of Mombasa when there was an emergence of the Saturniid *Cirina forda* Westw. and I was struck by the large number of cripples that were clinging to the tree trunks. The food-tree *Sideroxylon diespyroides* (Sapotaceae) were growing only a few yards above high water mark in almost pure sand with virtually no grass cover, although the roots must have reached into the water table, so that the pupae had been formed in pure, sun-baked sand, and must have been badly desiccated.—D. G. Sevastopulo (5562).

**A Collecting Trip to Nigeria—1978**—I think I can add a name or two to Messrs. Ellis & Joy's article under the above heading (1979, *Bull. Amat. Ent. Soc.*, 38: 166-9). The yellow-spined black Saturniid larvae feeding on Caster were almost certainly *Nudaurelia dione* F. I have only one record of a species feeding on Sheanut, *Butyrespermum* sp. (Sapotaceae). This is the Saturniid *Cirina forda* Westw., the black and yellow larva is spineless and sparsely hairy.

Unfortunately there are two serious mistakes in the captions to the accompanying plate. Fig. A is *Papilio nireus* L., a black tailless species with a narrow greeny-blue band from mid-costa of the forewing to the inner margin of the hind-wing, the underside is rusty black with a white band as shown. It is difficult to imagine anything more unlike *P. phorcas*

Cr., which is black with a broad green discal band and long, spatulate, black tails. Fig. B is an *Amauris* sp., probably *damocles* Beauv., but it is difficult to be definite from a black and white figure and with the hind-wing partially obscured, and not a *Danaus*.—D. G. Sevastopulo (5562).

**Adventure to Darkest Africa, the Wilds of Sierra Leone**—I have one or two comments on Mr. Caswell's article under this heading (1979, *Bull. Amat. Ent. Soc.*, 38: 145-8 and 191-4). I can think of no Zygænid that would fit the description of the 'burnet' (p. 192) and suggest that it is more likely to have been a species of *Euchremia* (Ctenuchidae). I am also puzzled by the reference (p. 148) to a 'giant white coloured species, possibly *Salamis parhassus aethiops* . . . and these had lovely tails similar to Swallowtails.' *S. parhassus* is an iridescent pale green and its popular name is Mother-of-Pearl. Its congener *S. anacardii nebulosa* is white, but both species have only short, pointed tails.

Finally, there are no Humming birds in Africa, but plenty of Sunbirds, with which they might be confused.—D. G. Sevastopulo (5562).

**William Wood and his Index Entomologicus**—There appears to be some doubt and confusion over the various editions of this work and this short note is partly to put on record the facts as at present known to me, which are at variance with what seems to be assumed, not so much on strict evidence, but rather on lack of present published information. This note was inspired by a bookseller's recent offer for sale of a copy in which he stated in his catalogue as follows:— "An unrecorded and apparently unknown 1845 edition which is not in Hagen or the British Museum (Natural History) catalogue. It has the 54 plates as in the first edition and is NOT the 'Second Edition' (Wood and Westwood). Originally issued in parts, the 'First Edition' of 1833-1839 bears a title page with the date 1839—the 'Second Edition' is dated 1854."

Now it is fairly easy to discover why the above statements were made. If we look at the usual library catalogues we find listed only the 1839 and 1854 editions. If we look in the Dictionary of National Biography under W. Wood and under J. O. Westwood (editor of the later editions) we again find only 1839 and 1854 editions quoted under their lists of publications. It is only when we delve deeper that other editions appear.

A brief summary has revealed the following:—

1839. This was the first edition originally issued in parts (1833-1839) and appears to be the commonest in libraries.

1845. Possibly only a re-issue with a new title page but on later evidence should be interpreted as the second edition. Copies in library of the Royal Society, London, and Balfour Library, Cambridge.

1852. This edition really does appear to be scarce and unrecorded

and so far the only copy known to me is in my own library. It is called "A new and Revised Edition, with Figures of the newly discovered species, by J. O. Westwood, F.L.S., President of the Entomological Society, etc." and contains a chapter headed "Additions to the Second Edition". I interpret this last, coupled with the words "A new and Revised Edition", to mean that there had already been a Second Edition, which by inference, must mean that of 1845.

1854. Apparently similar to the 1852 edition but with slightly different wording on Title page; for instance Westwood is now "Late President of the Entomological Society". Also common in Libraries.

1854. Also published in this year was a "Supplement to Former Editions, 12s. 6d." This I have seen, but was it in fact published earlier in 1852? Its contents (but without the dated title page) are bound into my 1852 copy and the pagination of the supplement does in fact "run on".

However one interprets the 1845 edition there is no doubt that the 1854 edition cannot be the second edition. I would suggest 1845 is the second edition and the 1852 and 1854 editions are, as they state, "New and Revised". Incidentally when Westwood did his revision, William Wood was still alive but had been retired for some years, not dying until 1857.

If anybody has any further information I should be glad to hear of it. In particular about the 1852 edition and when the supplement was first published. In due course I hope to publish a more detailed bibliographical account of Wood and his Index.—Brian O. C. Gardiner (228).

**A new material for the construction of breeding cages.**—The most commonly used material for covering breeding cages is fine nylon netting and this is most suitable. However it perishes and requires a fairly robust framework if the cage is of any size. Recently I have had a new material brought to my notice which I consider would be of practical use for the construction of large cages. It is called 'Nicofence' and comes in various sized meshes, the smallest and most suitable for our purpose being '57' grade. The material is made of low-density polythene which is resistant to the degradation caused by u.v. light and comes in widths of 2 metres or multiples; the minimum length supplied is 2 metres. It is rigid enough to be bent into tubular shapes which hold their shape provided the diameter is not too large. It cuts easily and is intended mainly for the construction of tunnels, etc. for horticultural purposes. The only problem I foresee is that the mesh size is still not small enough to exclude the entry of small parasitic wasps (e.g. *Pteromalus* spp.) and if used outside for breeding this could prove a hazard. The material is supplied by Clovis Lande Ltd., Gaza Trading Estate, Hildenborough, Kent and costs around £1.50 per square metre.—P. W. Cribb (2270).

## REARING CRICKETS

### *Introduction*

Crickets are cheerful little insects well worth rearing for a number of purposes, either to listen to and record their various chirrupings, to use them as food for other pets, or as a means of preserving a rare species on the edge of extinction. One species, *Acheta domestica*, the Common House cricket, has been extensively reared in the past and a number of studies have been published on it. It is used to some extent as an experimental insect in laboratory studies but is mainly reared, often in very large numbers, as a food for birds, reptiles, small mammals and other insects. The main user for this last purpose being of course zoos. Other species of cricket have been but rarely bred and the life histories of many species are still unknown. Our British Field cricket, *Gryllus campestris* has very recently (Hadley, 1981) been reported on the brink of extinction and is therefore worth rearing for that reason alone and a good case can be made out for attempted re-establishment in suitable sites. Under feral temperate conditions not only do some species hibernate but the life cycle extends to two years. Tropical species, some of which have become established in specialised habitats in cold countries, have a succession of generations.

Crickets are comparatively easy to breed all the year round. If kept warm and given an extended photoperiod during winter they are continuously brooded and do not require any elaborate form of caging, nor constant attention and can be left quite happily supplied with food and water over weekends and even longer periods.

Most species are nocturnal and their chirruping, which is a mating call performed only by the males, takes place at dusk. Species such as *Gryllotalpa* like to live in burrows in the ground but a few like to bask in the sun. Some are wingless and even those with wings are often incapable of soaring flight. It has been said by some (Ragge 1965, for instance) that uncovered rearing containers may be used. I do not advise this as it is my experience that when really warm even nymphs can leap out of the average battery jar or aquarium tank, particularly if suddenly startled. It should also be remembered that covers not only keep insects confined; they keep other things out and prevent cross-contamination when several species are being reared.

### *Obtaining Stock*

Easier for some species than others. Crickets may either be collected in the wild, bought from dealers, exchanged with fellow enthusiasts or, rarely, obtained from your local greengrocer/supermarket. This last sometimes comes up with unknown but interesting foreign species. Wild collecting is probably not worthwhile unless you come upon a chance



colony. Municipal rubbish tips have today become the chief breeding ground of the House cricket *A. domestica*. This species is also that most commonly reared by zoos and commercial suppliers. The wingless species may be available from your local garden centre or any other local (preferably commercial) heated greenhouses.

### *Temperatures*

Normal room temperature is quite adequate for most species, but *A. domestica* does prefer it rather warm and can be taken up to 35°C quite happily. This incidently is also the preferred temperature of the Desert locust, *Schistocerca gregaria* Forskal. Apart from the more expensive chicken egg incubators, there are today many low temperature heating devices on the market, chiefly designed for the propagation of cuttings and tropical plants; the germination of seeds, or the heating of aquaria. They consist basically of a large tray, the floor of which contains the heating element, and above this are situated four standard size seed trays. Each of these trays is in fact of the right size to hold a medium sized plastic aquarium tank and these tanks make ideal containers for crickets. These heated trays give a running temperature of 20-25°C. At around 20-25°C allow about three to four months for the life cycle of *domestica* and 5-6 weeks only at 30-35°C. Should your crickets be slow and lethargic or not chirruping when sexually mature then the temperature should be raised. *G. campestris* has a lower temperature tolerance and a shorter life-cycle than *domestica* and with other species consideration should be given as to whether they are tropical or temperate zone species.

There appears to be no published work on the effect of constant elevated temperatures on speeding up the development of species which normally have a one or two year cycle. I would opine that it would do so very considerably and it might be possible to get two or three generations per year. This is certainly true of the British field cricket. It should be kept in mind that in the determination of insect diapause light periodicity is a far more important factor than temperatures and it is recommended that all cultures be kept under a 16 hour light 8 hour dark day/night regimen. Either tungsten or fluorescent light sources may be used and any proprietary brand of time switch of which many are now to be found on the market. A low intensity 40W bulb at a distance of 4-6 feet is quite sufficient.

### *Food and water*

Crickets do not require daily attention. They do require ready access to food and water. A few minutes two or three times a week should be quite adequate. The food should be supplied either in petri dishes or shallow aluminium foil pastry cups. Give only enough to last until the next feed is due. Too much will soil, but is acceptable if due to holidays

the culture has to be left to its own devices for two or three weeks. The amount of food to give is a matter of judgement and until experience is gained check the culture daily. Stale food should be discarded. For large cultures it is best to give several shallow dishes of food rather than one deeply piled heap. For small instars a cardboard ramp should be given leading up to the food unless a very shallow dish easily reached from ground level is being used.

If any vegetable matter is being supplied this should be placed in a separate container and not, as I have so often seen done, on the floor of the cage. Any leaves or root vegetables being supplied should be washed and dried first.

Water may be supplied by any of three methods, all of which are standard practise in laboratory cultures. For smaller cultures a cotton wool twist inserted into a narrow necked bottle of 25-30 ml capacity may be used. Secondly a wad of cotton wool in a petri dish or aluminium pastry cup may be used. This requires the cotton wool to be really damp and it should be topped up using a squeeze bottle regularly and changed weekly or more often if it shows signs of mould or other contamination. Thirdly a method specially suitable for very large cultures or holiday periods is the inverted 1lb jam jar over a wad of cotton wool on a petri dish. Should last the week out but not suitable in wildly fluctuating temperatures as this causes flooding. As with the food ensure that the crickets can readily reach the water by adding a ramp (see Fig. 1).

In their natural state crickets seem to be rather omnivorous and are quite capable of surviving for some time on entirely vegetable diets and

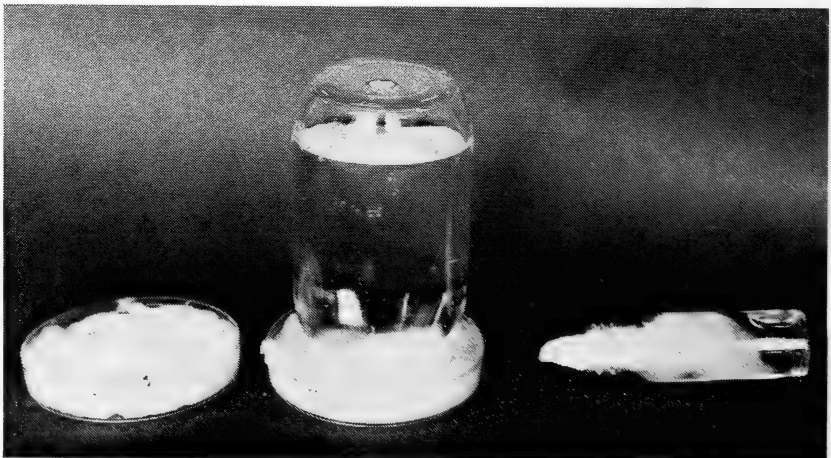


Fig. 1. Shows the various types of water containers that can be used.

damp grass and lettuce leaves have been recommended by Ragge as a food in captivity. Such a mono diet however is not suitable for the routine rearing of cultures through several generations. A number of studies have been done on the nutritional requirements of the house cricket in particular (Patton, 1967; Ghouri and McFarlane, 1958; Vago and Fosset, 1965) and these show that a balanced diet of carbohydrate, protein and vitamins are necessary. As a control diet these authors used proprietary brands of rabbit pellets which are of course a mix of vegetable matter (grass), protein and vitamins, etc. While it does seem that rabbit pellets, easily obtainable from any pet shop or animal feed supplier can be used for *Acheta*, *Gryllus* and *Gryllodes* their use on other species has not been proven but would be well worth trying, bearing in mind however, the fact that their composition will vary from different manufacturers and some brands contain antibiotics and other medicaments that, designed to ensure the health of rabbits, just might be inimicable to crickets and slow their growth or cause infertility. Concentrated poultry feed has also been successfully used. In the case of *A. domestica* practically everyone who has reared it has formulated his own diet. Some of these are quite complex and difficult to make up while others have been designed to determine the exact nutritional requirements of the animal. Some authors have also published their failure to rear certain species on a diet that is suitable for *domestica*. Often the diet used reflects not so much the cricket's preferences but the availability of local food supplies.

Table 1. Dietary formulations as used for cricket rearing by various authors.

	Ashby	Busvine	Gardiner (This paper)	Patton	Ghouri & McFarlane
Biscuit meal	50	—	—	—	—
Dried milk	5	10	20	15	37
Bemax	40	—	—	—	—
Dried yeast	5	3	6	5	5
Yellow maize meal	35	70	20	—	—
Wheat feed	—	20	40	35	2
Vitamix	—	15	—	—	—
Animal protein	—	5	—	5	—
Grass meal	—	5	10	—	—
Arachis oil	—	5	10	—	—
Corn oil	—	—	—	—	5
Vegetable supplement	Yes	Yes	No	No	No
Linseed cake meal	—	2	4	—	—
Salt	—	0.15	1	—	—
Casein	—	—	10	—	—
Soybean meal	—	—	—	20	—
Ground oats	—	—	—	—	3
Fish meal	—	—	—	—	20
Cane molasses	—	—	—	—	10
Vitamins etc.	—	—	—	—	3

Table 1 gives the formulations of various diets which have been successfully used in rearing a number of cricket species; while these diets, particularly the more complex ones, undoubtedly produce the largest animals in the shortest possible time and with the lowest mortality such effects are marginal and barely statistically significant and for all practical purposes a simple diet of poultry feed, rabbit pellets, or mixed baby food cereal seems to be quite adequate for three or four of the species. There is ample scope for the experimenter to try these also on the more difficult species. Guidance as to this is given in the notes on specific species section of this paper.

Whatever diet is used it requires to be ground up fairly finely for the smaller instars in particular. Both rabbit pellets and poultry feed can be most readily broken down if moistened first.

For routine rearing for scientific experimentation therefore it is advisable to use a complex diet which gives uniform insects of known physiological balance. For large cultures whose purpose is as a food for other animals, or just for fun, then it makes sense to use the cheapest obtainable food for the crickets. For many years I have used a modification of the formula of Busvine (1955), with the addition of casein powder but without either the vitamix or animal protein and with no vegetable supplement. This has proved ideal for a number of species. Its use is highly recommended for all breeding stocks, whatever diet be used for just raising crickets.

Feeding preferences and distribution of species reared is summarized in Table 2.

Table 2. Data on the cricket species known to have been successfully reared in captivity.

Species			Food preference	Distribution
<i>N. sylvestris</i>	...	...	Omnivorous	European
<i>G. campestris</i>	...	...	Omnivorous	European
<i>A. domestica</i>	...	...	Omnivorous	Cosmopolitan
<i>M. squamiger</i>	...	...	Unknown	Mediterranean
<i>G. gryllotalpa</i>	...	...	Vegetarian	European
<i>G. sigillatus</i>	...	...	Omnivorous	Tropical
<i>A. configuratus</i>	...	...	Omnivorous	Asiatic
<i>P. guttiventris</i>	...	...	Omnivorous	Asiatic
<i>G. bimaculatus</i>	...	...	Omnivorous	Cosmopolitan
<i>Teleogryllus</i> sp.	...	...	Omnivorous	Australian

### Housing Crickets

All sorts of containers have been used in the past ranging from 1lb jam jars through battery jars and aquaria tanks. Such glass containers

Fig. 2. General view from side of 14" × 10" plastic tank containing crickets (*G. bimaculatus*). The V-nicks in the flowerpots can clearly be seen.



are today considered too dangerous to use since accidents, usually while washing or carrying them, have resulted in serious injury. I would recommend today the use of plastic aquaria tanks and for most cultures a size of  $10 \times 14$  inches is suitable. For really large cultures—such as would be required if the crickets were being used as a source of food for birds etc. then large plastic water tanks of from 30 to 50 gallon capacity are ideal. Crickets are more able to walk up plastic than they are glass so a cover is needed but a coating of fluon around the top few inches of the tank prevents the majority from getting up. The most effective covering for the top is a simple  $1 \times 1$  inch wooden framework on which is glued a strong nylon or terylene netting. An open weave is best so as to allow plenty of air movement and the material that used to be known as mosquito netting is ideal, but make sure it is strong enough as the majority of similar materials on the market are made for lace curtains and are of very poor strength and quality.

The bottom of the tank should be lined with a layer of sand about  $\frac{3}{4}$  inch deep. This should be kept slightly moist. On top of this should be placed the housing for the crickets. Crumpled paper, folded cardboard and rolls of corrugated paper have all been used successfully in the past by various authors but I would recommend using inverted cardboard flowerpots along the sides of which v-nicks have been cut to allow the crickets easy egress and exit. Two or three such pots of different sizes should be nested inside each other. They appear to be sold in sizes of  $2\frac{1}{2}$ ,  $3\frac{1}{2}$  and  $4\frac{1}{2}$  inches in diameter and the two smaller of these are the most suitable for cultures. Do not overfill the tank. Room should be left to comfortably house the water and food containers and to allow them to be serviced without upsetting the flowerpots. A pair of nested flowerpots in a  $10 \times 14$  inch tank is quite adequate for a culture of 50-100 adult crickets and will comfortably house several hundred youngsters.

#### *Obtaining eggs*

Crickets lay their eggs usually in the soil or in crevices. The eggs are laid singly or in batches, depending on the species and the British Field cricket which is often said to lay single eggs under its natural feral conditions, usually in captivity lays them in batches. Crickets are rather long-lived insects and over a period of months the breeder of these animals may well expect to obtain a thousand eggs per female. It is quite easy to see how the numbers of a culture can get out of hand and overcrowded after a couple of generations.

If deprived of a more suitable site the crickets will lay either into their food supply, water bowl or the substratum of their cage. This is very unsatisfactory and a changeable oviposition container should be supplied.

Other authors have recommended damp cotton wool. This is not in my

opinion entirely satisfactory and a far better system is to supply a 3 inch diameter plastic flower pot filled with moist friable peat. On top of this is placed an inverted smaller cardboard flowerpot of the same type already advised for housing the insects. If you want to see the eggs, without disturbing them, then use a suitable glass or clear plastic container in place of the plastic flower pot, for the eggs are frequently laid by the ovipositor being inserted down the side of the pot. If a very large culture is being maintained, the effective egg laying capacity can be increased some threefold by using a 5 inch pot and inserting into it the 3 inch pot. Eggs are then laid at the three resulting interfaces.

The total number of eggs laid over a given time period will depend not only on the number of fertilized females present but also on the temperatures and light regime being followed, being greatest at higher temperatures and longer nights (since as already stated crickets are primarily nocturnal animals). At very low temperatures—15°C or less—particularly with the more tropical species, eggs may not be laid at all.

It is undoubtedly a mistake to allow either too many eggs to be laid or for a moderate number to be laid over an extended period. In either case the later laid eggs will often be on top of the earlier and hence prevent the proper emergence of the nymphs. It is best to be over-indulgent in the number of egg-containers used rather than parsimonious and to remove them regularly at least twice a week. With very large cultures, or when it can be seen that plenty of eggs have been laid then a daily removal should be done. No harm occurs to the culture if left for several days without an egg container although some wastage may occur by oviposition taking place in the water container etc.

The peat used in oviposition containers should be heat-sterilised in an oven to destroy potentially harmful organisms. The dry peat then needs a good overnight soak to restore its moisture content and it is preferable to prepare a good sized batch well in advance of its proposed use. The peat should be just moist and friable. This is something it is difficult to explain in writing, but if it appears at all dusty then it is too dry and if water can be squeezed out of it then it is too wet.

Removed egg-containers should be stored at the same temperature as the culture is being kept. Should the top show signs of drying out it should be lightly sprayed but cricket eggs are not so moisture dependent as are those of locusts. It is advisable to place the egg-containers in a large plastic box until the nymphs start to emerge.

While it does not do to allow too many eggs to be laid together, there is no harm in allowing newly hatched nymphs to join other older nymphs from earlier batches, but it is not recommended to add first instars when the existing nymphs in a container are larger than 3rd or 4th instar. This applies to the common and more gregarious omnivorous

and plant feeders, but probably does not apply to the carnivorous cricket *Tachycineta asynamorus*. There is as yet no reported evidence that these may be cannibalistic so there is ample opportunity for the enterprising cricket breeder to do some research on the subject.

*Notes on Specific Species*

*Acheta domestica* L. (The Common House cricket) is by far the easiest

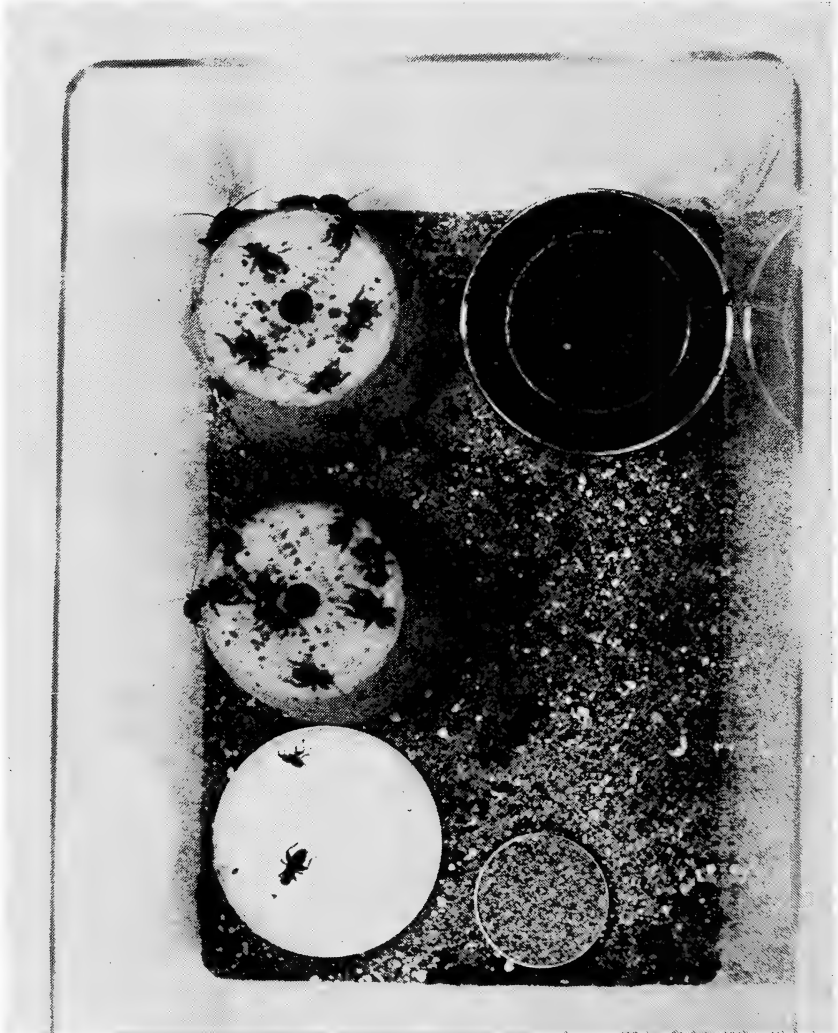


Fig. 3. View looking down into plastic tank of crickets (*G. bimaculatus*). The inverted flowerpots, the water and food containers and a double glass oviposition container are all visible.



species to both obtain and rear as it is produced on a large scale commercially. A cosmopolitan species which prefers to be kept rather warm, 25-35°C. A nocturnal animal which can be kept in crowded conditions and is capable of flight. Thrives on various diets, especially that of Gardiner, Rabbit pellets and poultry feed.

*Acheta configuratus* Walk. is a similar species to the above from North America, and should be treated similarly. Ghouri and McFarlane found it did best on Baby rabbit pellets.

*Gryllotalpa gryllotalpa* L. (The Mole cricket) is a very specialised burrowing insect which needs moist conditions. It has been reared under feral conditions on the continent but English examples have not been reared. It has a two year life cycle but I strongly suspect this could be cut to six months or even less if they are kept warm. Likes to live underground and should be supplied with at least a six inch layer of compacted and moist peat. The female nurses both the eggs and the young early instars and so, contrary to the advice given earlier in this paper, they should not be removed after laying. Since they have not been tried it is unknown if they will feed on the diets used for most other species. I strongly suspect however that they will. The young nymphs are known to feed on the humus of peat and they should also be given root vegetable (potato, carrot, turnip) preferably with roots adhering and are also known to feed on larvae of other insects (Ragge, 1965). A species that would be well worth rearing if for no other purpose than to publish a detailed account of its life history in English.

*Grylloides sigillatus* Walk. is a tropical species which has been bred in North America (Ghouri and McFarlane, 1958) and which should be treated similarly to *domestica* but has a slightly longer life cycle. Baby rabbit pellets recommended.

*Gryllus campestris* L. (The British Field cricket) is now very rare in England and unlike *domestica* likes to bask in the sun. Under feral conditions it is rather a solitary animal and likes to live in burrows, but in captivity it should be treated just like *domestica* when it has a rather shorter life cycle and does not mind crowded conditions. Thrives on the Gardiner diet.

*Gryllus bimaculatus* de Geer, a Continental species similar to our field cricket but with longer wings has been reared by Vago and Fosset (1965) and by me for several years and should be treated just as *domestica* but shows cannibalistic tendencies if kept short of food. Thrives on the Gardiner diet.

*Mogoplistes squamiger* Fischer (The Scaly cricket) is a Mediterranean litoral insect very rare in England and nothing appears to be known about its lifecycle. It is wingless and I would suggest treating it as *domestica*, and trying it on the Gardiner diet.

*Nemobius sylvestris* Bosc (The Wood cricket) is without hindwings and the forewings are much reduced. Like the mole-cricket it has a two year life-cycle, considerably speeded up by warmth and long-day photoperiod. It is also diurnal. Treat in all respect as *domestica* and although it lays eggs singly and not in batches it does not object to being kept in crowded conditions and like other species takes readily to the Gardiner diet.

*Plebeiogryllus guttiventris* Walk. is an Indian species which likes warmer than average conditions and should be treated therefore just like *domestica*. Successfully reared on concentrated poultry feed by Dakshayani and Mathad (1973).

*Teleogryllus* sp. (either *commodus* (Walker) or *oceanicus* (Le Guillou). An Australian species acquired from a female found in imported produce and not yet certainly identified. This cricket is basically a smaller edition of *bimaculatus* and has been successfully reared by me for some sixteen generations over the past four years. It thrives on the same diet and under the same conditions as have the other species I have reared.

### Conclusions

The crickets described in this paper have been reared for many years at the Department of Zoology, Cambridge, for both research and teaching purposes. They have also been reared both at home and in schools, to prove that it is just as easy to rear them under the average amateur's conditions as it is with all the resources of a University Department.

The diet which has been used, for many years, and is first described in this paper, is a modification of that first used by Busvine (1955) for one species only. It has been so successful that I would recommend it for all species which have not yet been reared, at any rate to try in the first instance. It produces uniform animals ideal for research and experimentation. My advice to anyone who would like to advance the knowledge of Entomology is to get hold of any cricket so far not reared and to work out their life-history. Surprisingly perhaps there still remains an awful lot to be discovered concerning the Orthoptera generally. This is undoubtedly due to the massive concentration of effort directed towards the study of a few pest species.

Brian O. C. Gardiner (225)

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## ADVENTURES WITH STAG BEETLES

I was pleased to see that Michelle Green had also noted the boom of stag beetles in this area (AES Bulletin, p. 18, Vol. 40). Before the summer of 1980 I couldn't remember having ever seen a male stag, so rare had they seemed, although an abundance of *Dorcus parallelipedus* had erupted from a rotting tree not far away. I was therefore overjoyed to find a male stag one sunny morning in June, sadly trodden on and quite dead. Its abdomen was disfigured, but the beauty of its antlers were still apparent, and I found myself wondering how anybody could so cruelly destroy such a magnificent insect.

However, this was only the beginning, for I soon found a very active male in the garden, and even one that had fallen upside down, unable to get up again so that it had unfortunately died. Such clumsy creatures seem to have a very large mortality rate. This specimen, perfect in every way, I kept, and soon achieved a female to go with it.

Such an abundance of stags is no doubt due to a boom of stags a season (up to five years) ago. This would explain the lack of beetles the year before and probably this year too, the stags coming on in waves.

But not only did I discover stags on the ground and buzzing through the air like sparrows, they also came from the ground. My father had been digging up earth at the end of our garden (shadowed by trees) and he uncovered the larva of *Lucanus cervus*, approximately an inch long. I did not want to return it to the ground because of the dangers produced by my father's excavations, so I chose to rear it.

There was a rotting tree nearby, but I knew not what it was, and I knew that stags prefer only certain species. To my astonishment, however, I soon found a small alcove as I dug down to the roots. Inside it were the remains of several stags, with crumpled bodies looking very old. This was a good sign, for I now knew that I had food for the larva.

Intrigued, I dug down, and after coming upon a nest of the centipede *Necrophloeophagus longicornis*, I uncovered a large, pale pupa,

undoubtedly a male. Unfortunately it was damaged by the excavations, but it had lost none of its beauty. I abandoned my own digging for fear of harming any more, and chipped away sufficient wood for my stag.

I generously filled a bucket with these carvings, put in the beetle larva and put on a punctured lid. At least, I discovered later, the woodlice enjoyed the carvings, which suggested that the larva did too.

A little later my father came upon a young male in the earth, which he gave to me. As autumn was by now halfway through I chose to keep him with the larva. This did not seem such a bad thing to do as stags were not cannibalistic and Grete Chapman also kept adult stags in similar conditions. (AES Bulletin, p. 95, Vol. 38). It wasn't far from hibernation, otherwise I would have let him go.

He settled down well, and soon became duller until he became senseless to external stimuli. I supposed he had hibernated, and on next inspection I decided to just make sure. I was shocked to find his body scattered across the bucket in a most mysterious manner. I could not see how, in the moist conditions, he could have dried up enough to break up that easily, so I could only deduce that the larva attacked him, whether he had died first or was just in a hibernation torpor.

I was wondering if maybe this is a well known thing that larvae attack adults in this manner, or is it just an isolated case? Surely the stag could be of no threat to the larva, for they do not compete for food. I wonder if anybody else has come across such mysterious activity or maybe supply an answer. Entomology must be the one science that that continually produces problems and mysteries from our own back garden.

Steven Gibson (6785J)

## NOTES FROM A REBORN ENTOMOLOGIST

I apologise for the title but if the President of the United States can call himself a reborn Christian I should be entitled to the above designation. I collected and attempted to breed lepidoptera as a young boy but the hobby waned as I ran out of spare time. I am now married with two small children and have resurrected this hobby under the guise of interesting and occupying my son and daughter. I still have much to learn (don't we all), but in the last two years I have noticed a couple of phenomenon worthy of comment.

### *Tiger moth defence mechanisms?*

On 21.9.80 the Ruby Tigers I was rearing began to emerge. When I disturbed them I noticed one of them blowing bubbles from its thorax apparently from between segments one and two on either side of the dorsal surface.

On 17.10.80 the Garden Tigers I was rearing began to emerge. When I disturbed these they appeared to separate the hairs on the dorsal surface of the thorax and exuded two droplets of liquid.

The only explanation I can think of at the moment is that this is part of a defence mechanism. If any member has any further ideas or knows of any mention of this phenomenon in the literature I would be pleased to hear from them.

### *Carnivorous Silk Moths*

*Antheraea pernyi*, the Assam Silk moth, served for my reintroduction to breeding lepidoptera. One day, whilst watching a full grown caterpillar feeding on an oak leaf I noticed an aphid become stuck to the caterpillar's head capsule just above the mandibles. The caterpillar bent over backwards in its attempt to get the aphid into its mouth. The aphid was gradually drawn in between the mandibles and disappeared. This caterpillar at least appeared to enjoy this little bit of sweet-meat.

### *Population explosion in the Lackey, Ma'acosoma neustria*

I built myself a moth trap as part of a university project and have used it on and off ever since. From 1970 to 1973 I did not catch a single specimen of the Lackey. In 1974 my trap was out three times during the flight period of this moth but I caught a single specimen on 6th July representing 1.59% of the catch that night. In 1975 my trap was out twice during the flight period of this moth but I again caught but a single specimen on 1st August representing 0.49% of the catch that night. My trap did not surface in 1976 to 1979 but 1980 saw it out twice. On 21st July I caught 29 representing 20.7% of the catch and on 23rd July I caught 34 representing 20.8% of the catch. Also this was the first year that I have seen the caterpillars. I collected half a dozen from an apple tree in my own garden and a further twenty from my sister's garden. She also assured me that she had removed a considerable number previously to protect her tree. (She had deposited them around the borough.) Also this same year another friend collected twenty or so for his own collection. This must represent a significant population explosion in recent years in this species. It is therefore unfortunate that I was not trapping in the last couple of years.

The Brown-tail moth *Euproctis chrysorrhoea* also appears to have increased significantly in the last few years in Welling. Until this year I had not trapped a single specimen here. This year however I caught one on 21.7.80 representing 0.7% of the catch and 9 on 23.7.80 representing 5.5% of the catch. Also the caterpillars were common locally causing some distress to some local inhabitants. I do however know that the numbers of this moth built up a few years ago when I started to find the caterpillars in increasing numbers.

R. A. Wright (6598)

## A METHOD FOR INSECT PHOTOGRAPHY

In these days of highly miniaturised and sophisticated equipment it is surprising how many people still stick to the idea that the studio is the best place for photographing insects. Many of us, of course, use our cameras for recording the results of our insect breeding programmes and so forth and in that case are forced to do the job under unnatural conditions. Aside from these activities, one really should aim at taking pictures of insects in the wild.

One of the biggest problems in close-up work is the slow shutter speed dictated by a small aperture of  $f/16$  or less and a film which is not "fast" enough (i.e. sufficiently sensitive to light) for the job. Even Kodak's Tri-X or Ilford's HP 5 rated at ASA 400 (27 DIN) often fails to give satisfaction when sharp extreme enlargements are required. Films can, however, be "up-rated"—that is, exposed at a higher ASA or DIN value than that recommended by the manufacturers—with a subsequent increase in development time to compensate for the decrease in light received by the film.

The problem with this system is that the more you develop, the larger become the individual grains in the film emulsion, with the result that you get a terribly "grainy" picture when the negative is highly enlarged. This may inject impact into a sexy subject aimed at increasing the sales of Slippon's soap, but it turns the hairs on a bee's thorax into knobbly, unsharp protuberances. A compromise is called for, and I have been using Kodak Tri-X film up-rated to ASA 800 to great effect. With monochrome (black and white) photography it is possible to print the final picture on a softer (i.e. lower contrast) paper, in which case both contrast and graininess are reduced.

Very close-up, portrait type pictures of insects are no longer the vogue, possibly because people have had ample opportunity of viewing insect torsos on TV. Instead many advanced insect photographers are striving to produce pictures in which just enough additional matter is included to give an idea of the insect's environment.

For this purpose some workers have used wide-angle lenses of focal length as short as 20-24 mm to produce pictures with a slightly distorted perspective but including even distant trees along with the insect. These are particularly effective in colour. The wide-angle lenses are, however, expensive.

A 100 mm short telephoto coupled to bellows or extension tubes is a fine combination as it enables the operator to keep well back from his subject. In deep grass, for instance, it is possible to approach an insect and photograph it without creating a strike force composed of  
Try setting up this nightmare in a studio! Flies gathered on *Angelica umbels*.



swinging grassheads. The fact remains, though, that for most amateur photographers working to a small budget the 135 mm telephoto represents the second purchase in the lens collection.

Drawing these points together, I developed a system based on the 135 mm lens fitted with extension tubes, used in conjunction with Tri-X film rated at ASA 800 (30 DIN), without recourse to a tripod in bright sunny conditions. Exposures of a constant 1/500th sec. are possible, with an aperture of f5.6 to f11 depending on the location. Providing the camera is focused accurately (often best achieved by setting the lens for its closest distance and then moving in on the subject until the latter appears in focus in the viewfinder), good results can be obtained. By setting the lens at the infinity position with a particular extension tube, it becomes possible to photograph a wild specimen with parts of its local environment also in focus.

The person who is hell-bent on becoming a first class insect photographer should aim at achieving his own style, but others will find it very instructive to study the high quality results that are nowadays portrayed as a matter of course in books about insects. In the latter case it is still better to attempt to photograph something unusual, or something common from an unusual angle rather than merely imitate what has already been done.



Bee beetle (*Trichius fasciatus* L.) feeding on wild geranium flowers.





Victim of the spider *Misumena vatia*, which lurks on flowers. 50 mm Macro lens. Tripod.

Once a roll of film has been exposed at ASA 800, the rest of the process is purely mechanical. I personally use a Paterson developing tank holding 500 ml of solution, even for 35 mm film, which requires a minimum of 290 ml of solution. Microdol-X (a developer giving fine grain even with fast films) is made up according to Kodak's instructions, which are included with the powder. The concentrated solution is

diluted as follows: 100 ml Microdol: 300 ml water, and the temperature adjusted to 24°C, provided the air temperature is 18-20°C. Solution temperature should be adjusted to 22°C if the air is at 22°C. The film is developed for 16 minutes, with agitation achieved by turning the tank briskly over and back twice every second minute, on the minute. After 16 minutes the solution is poured out and water at the same temperature poured in. This is left for a further five minutes, with one agitation (twice over and back) after two and a half minutes to avoid uneven development. When this final solution has been poured away, fixing is carried out in the normal manner. The resulting negatives are of fairly low contrast, even though the film has been rated at a higher value than normal.

If you use a different developer, you should increase development about 25% when increasing film speed from 400 to 800.

The membership fee charged by local photographic societies these days is very reasonable and the budding insect photographer will find it well worth joining, especially if the club has its own laboratory. Some member always has a developing tank he/she is willing to loan, so nobody is forced to have the job done, in an inflexible processing system, by a commercial laboratory.

The accompanying photographs have been printed from negatives obtained by following the above method.

Leigh Plester (2968)

## APHORISM

There is not a Fly but has had

INFINITE WISDOM;

Concerned not only in its structure,

but in its destination.

'TIS GOD

Who gives its lustre to an Insect's wing.

Lady Ellenor Fenn (1797)

## A SECOND LIST OF THE FOOD-PLANTS OF EAST AFRICAN MACROLEPIDOPTERA

(Continued from page 96)

### Larentiinae

*Xanthorrhoe poseata* Hbn.—*Lactuca* (Compositae).

### Geometrinae

*Zamarada nasuta* Warr.—*Dichrostachys glomerata* (Mimosaceae).

„ *mesotaenia* Prout

„ *delta* Fletcher

*Acacia* (Mimosaceae).

*Semiothisa simplicilinea* Warr.

„ *fuscataria* Mschl.

„ *procidata* Guen.

*Acacia* (Mimosaceae).

*Tephinda pulinda* Wlk.—*Acacia* (Mimosaceae).

*Cleora munda* Warr.—*Deinbollia* (Sapindaceae).

„ *nigrisparsalis* Janse—*Zea mays* (Gramineae).

*Ascotis reciprocaria* Wlk.—*Rhus*, *Schinus molle* (Anacardiaceae):

*Aberia* (Flacourtiaceae): *Acacia* (Mimosaceae): *Ziziphus*

(Rhamnaceae): *Citrus* (Rutaceae): *Salix* (Salicaceae):

*Pappea* (Sapindaceae).

*Eulycia grisea* Warr.—*Combretum* (Combretaceae).

## PYRALIDAE

### Galleriinae

*Galleria mellonella* L.—Wax in bee hives.

*Achroia grisella* F.—Wax in bee hives.

### Crambinae

*Chilo orichalcociliellus* Strand—*Zea mays* (Gramineae).

### Schoenobliinae

*Scirpophaga gilviberbis* Zell.—*Oryza* (Gramineae).

*Obtusipalpis pardalis* Hamps.—*Ficus* (Moraceae).

### Phycitinae

*Mussidia nigrivenella* Rag.—*Cedrela* (Meliaceae): *Physostigma*

(Mimosaceae): *Phaseolus* (Papilionaceae): *Parinar*

(Rosaceae): *Theobroma* (Sterculiaceae). In fruits.

*Etiella zinckenella* Treit.—*Phaseolus*, *Pisum* (Papilionaceae). In pods.

*Trachypteryx rubripictella* Hamps.—*Acacia karroo* (Mimosaceae).

### Pyralinae

*Sceliodes laisalis* Wlk.—*Lycopersicum* (Solanaceae). Feeding internally.

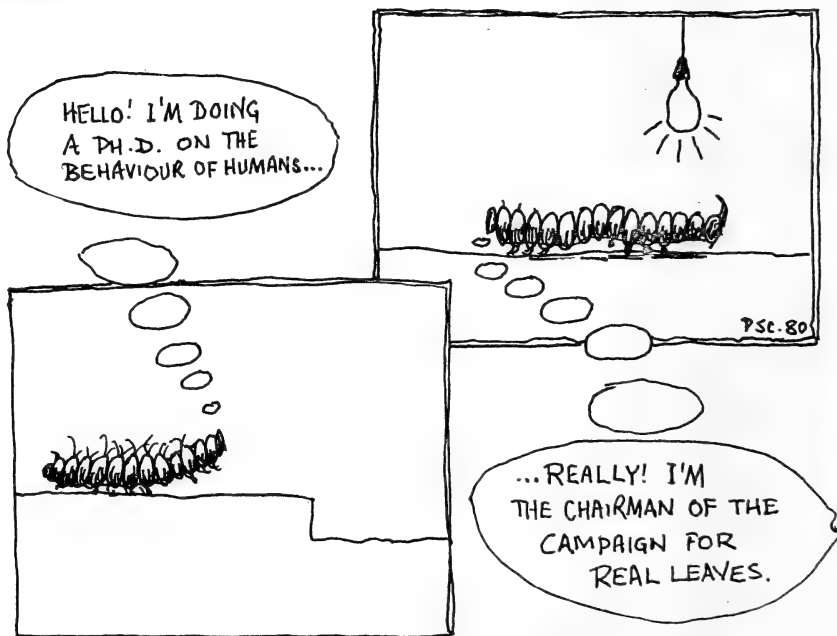
### Pyraustinae

*Filodes productalis* Hamps.—*Thunbergia* (Acanthaceae).

*Botyodes hirsutalis* Wlk.—*Ficus* (Moraceae).

- Margaronia negatalis* Wlk.—Ficus (Moraceae): *Dillenia indica* (Dilleniaceae).  
 .. *unionalis* Hbn.—*Olea europaea* (Oleaceae).  
 .. *baldersalis* Wlk.—*Rauwolfia* (Apocynaceae).  
*Nomophila noctuella* Schiff.—Grass (Gramineae): *Medicago*, *Trifolium* (Papilionaceae): *Polygonum* (Polygonaceae).  
*Phlyctaenodes massalis* Wlk.—Sorghum (Gramineae).  
 .. *frustalis* Zell.—*Pentzia* (Compositae).  
*Mecyna gilvata* F. — Putterlickia (Celastraceae): *Bolusanthus*, *Cytisus*, *Spartium* (Papilionaceae): *Cedrela* (Meliaceae).  
 D. G. Sevastopulo (5562)

(To be continued)



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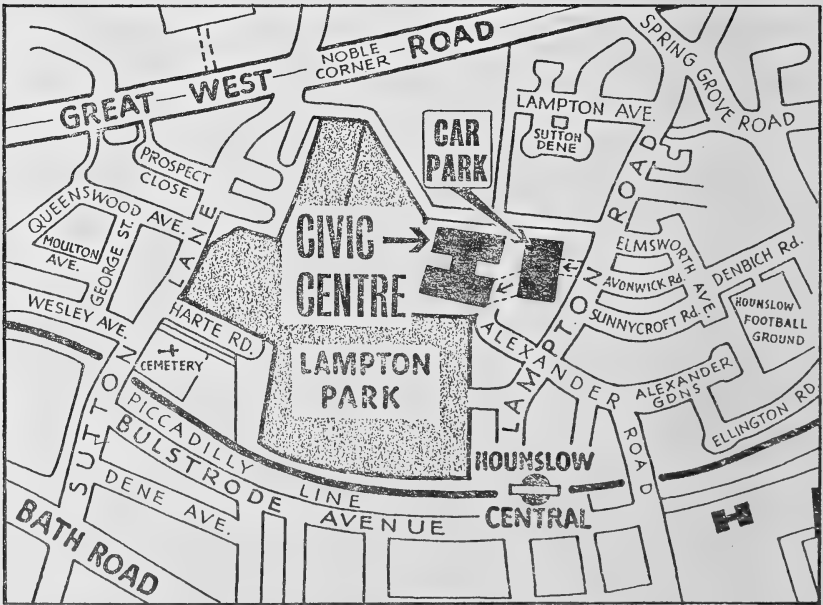
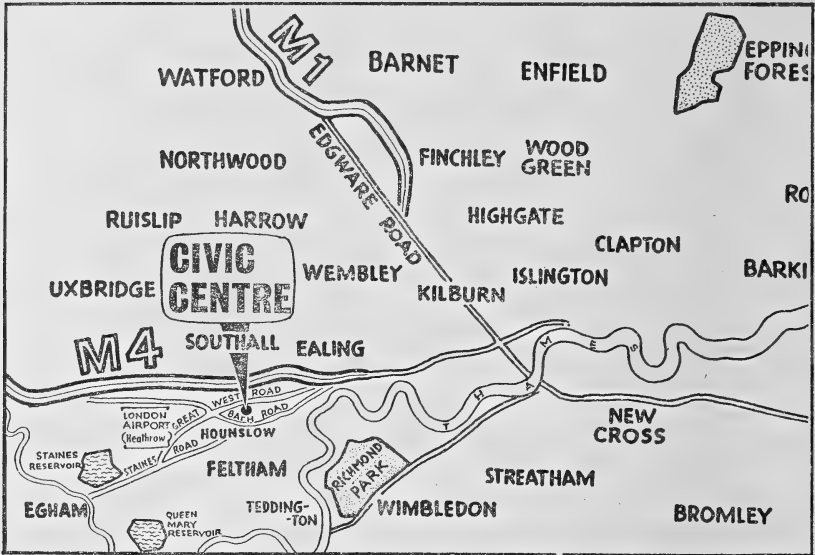
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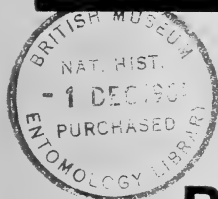


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VOL. 40 NO. 333



NOVEMBER 1981



**THE  
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SOCIETY**

**WORLD LIST ABBREVIATION:  
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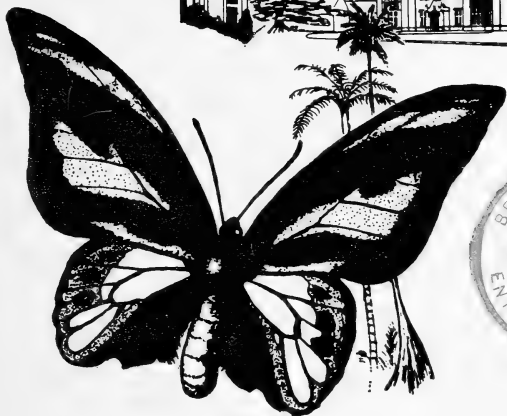
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**EDITORIAL**

In this "Butterfly Year" it is with great regret and much sadness that we publish, not so much an obituary, as a memorial notice, to the butterflies that are no longer with us. There now seems little doubt but that their demise from England was entirely due to habitat destruction, which in turn was brought about by changing farming practices, the introduction of insecticides, and the spread of myxamatoxis. An added factor has been our deteriorating climate

In bringing in a law prohibiting the collecting of Large blue butterflies the government was slamming the stable door after the horse had bolted. In our opinion the real law that should be brought in is one which would determine a long term of imprisonment and such a financial burden (in the form of a massive fine and automatic land confiscation) for anyone guilty of destroying, for any reason whatsoever, any designated habitat, such as SSSI's that it just would not be worthwhile so doing. At present speculators and developers often have financial incentives for such destruction. It is this that should be stopped. Sadly, at the time of writing, the unacceptable face of capitalism has used its muscle to win the day over the Wildlife Protection Bill and the preservation of such sites remains on a "voluntary" basis. Meanwhile SSSI's continue to be spoliated at an alarming rate.

During the past century we have lost four of our butterflies. Circumstantial evidence exists that more were lost before scientific recording began, since there are persistent rumours in the literature that species such as the Apollo and the Purple-edged copper were also once indigenous here. It is also likely that some of the now rare migrants as for instance the Long-tailed blue were at one time resident. While this cannot now be proved it does lend credence to the belief that England is losing a species every quarter of a century and that this loss is continuing, for some other species have not only become drastically reduced in numbers over the past thirty years but two or three of them are now so local and restricted in habitat that their future is surely in grave question. While we are now of course aware of this and measures for their protection are being taken, the continuous loss of their habitat to other activities continues and of course that great uncertain factor, the British Climate, must be playing its part and all the evidence is that it has greatly deteriorated compared to what it was when many of our butterflies were at their greatest extent of distribution, for one thing

that must be borne in mind is that many of the British butterflies are at the extreme limit of their range northwards. Nevertheless one species, the Chequered skipper, although once common in England and now lost to us there, remains common in certain localities in Scotland.

### **THE BLACKVEINED WHITE**

*(Aporia crataegi* Linnaeus)

**Obit AD 1926**

### **THE CHEQUERED SKIPPER**

*(Carterocephalus palaemon* Pallas)

**Obit AD 1978**

### **THE LARGE COPPER**

*(Lycaena dispar* Haworth)

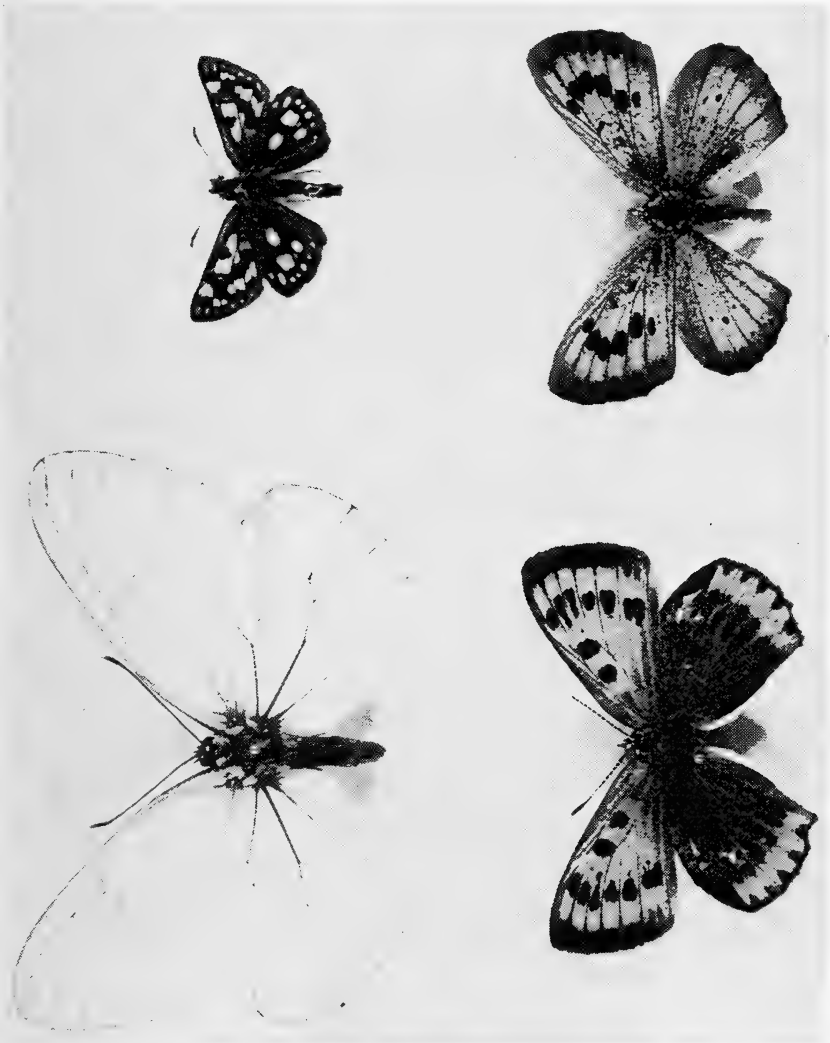
**Obit AD 1865**

### **THE LARGE BLUE**

*(Maculinea arion* Linnaeus)

**Obit AD 1980**





## THE BUTTERFLY AND THE SNAIL

As in the sunshine of the morn,  
A butterfly, but newly born,  
Sat proudly perking on a rose,  
With pert conceit his bosom glows;  
His wings, all glorious to behold,  
Bedropt with azure, jet, and gold,  
Wide he displays; the spangled dew  
Reflects his eyes and various hue.  
His now-forgotten friend, a snail,  
Beneath his house, with slimy trail,  
Crawls o'er the grass; whom when he spies.  
In wrath he to the gardener cries:  
"What means yon peasant's daily toil,  
From choking weeds to rid the soil?  
Why wake you to the mornings care?  
Why with new arts correct the year?  
Why glows the peach with crimson hue?  
And why the plums inviting blue?  
Were they to feast his taste designed,  
That vermin of voracious kind?  
Crush then the slow, the pilfering race;  
So purge the garden from disgrace!"  
"What arrogance!" the snail replied;  
"How insolent is upstart pride!  
Had'st thou not thus, with insult vain,  
Provoked my patience to complain,  
I had concealed thy meaner birth,  
Nor traced thee to the scum of earth,  
For scarce nine suns have waked the hours,  
To swell the fruit and paint the flowers,  
Since I thy humbler life surveyed,  
In base and sordid guise arrayed,  
A hideous insect, vile, unclean,  
You dragged a slow and noisome train;  
And from your spider-bowels drew  
Foul film, and spun the dirty clue.  
I own my humble life, good friend;  
Snail was I born, and snail shall end.  
And what's a butterfly? At best  
He's but a caterpillar drest;  
And all thy race (a numerous seed)  
Shall prove of caterpillar breed."

Gay.

## A DWARF FORM OF THE ORANGE-TIP BUTTERFLY

The occurrence of exceptionally small imagines of some species of Lepidoptera is well known. In many cases these small forms are not specifically named, but come under the simple term "dwarf forms".

Imaginal wing-span is generally a quantitative character being the product of the cumulative effects of a number of genes (human height is largely determined in a similar way).

It is easy to see how this works if a hypothetical example is considered. If a quantitative character such as size is affected by 100 genes which can either have a positive or negative effect, then an individual with 50 genes with positive value and 50 genes with a negative value will be of average size. If, however, an individual carries more than 50 genes with a positive value, a larger than average adult will result, whilst if more than 50 genes with a negative value are present, a smaller than average adult will be produced.

Such a system may give rise to dwarf forms of Lepidoptera by chance. If random gene segregation during gamete formation occasionally leads to the formation of a spermatozoan which carries a large number of genes with negative wing-span value, and such a spermatozoan chances to fertilize an ovum which also carries an exceptionally high proportion of negative wing-span value genes a dwarf form will result. However, it should be noted that this system would also be likely to produce unusually large specimens and a full series of intermediates between the two extremes.

In many instances the effects of genes may be modified by environmental conditions, and wing-span can be affected by factors such as an abnormal or limited supply of food as are the dwarf specimens of the Large Blue (*Maculinea arion*) encountered from time to time, which have lived with the ant, *Donisthorpia flava*, rather than the normal species *Myrmica scabrinoides* and *M. laevonoides* (Ford, 1957).

Alternatively, in some cases dwarf forms are the result of a simple genetic mechanism. These are dependant not on the chance segregation of certain alleles from a polygenic system, but on the alleles of one or two major genes. Ford (1957) notes that dwarf races of two butterflies occur on Great Orme's Head, North Wales. One of them, the Grayling (*Eumenis semele*), has a dwarf race named *thyone* Thompson, which has an average wing-span of 41 mm in the male and 43 mm in the female compared with 48 mm and 52 mm in normal males and females respectively. In the other species, the Silver-studded Blue (*Plebejus argus*), the dwarf race *caernensis* Thompson has an average wing-span of about

Table 1. Wing-length phenotypes, ranges and means for *Anthocharis cardamines* imagines from samples 1-12 (all measurements in millimetres).

Sample	Wing-length of parents		Number of Progeny				Wing-length range and mean (in brackets)			
	Male	Female	Male		Female		Male		Female	
			Dwarf	Typical	Dwarf	Typical	Dwarf	Typical	Dwarf	Typical
1	19.8	20.9	1	22	1	19	15.2	19.7-21.1 (20.4)	16.3	20.6-21.8 (21.3)
2	20.5	21.7	0	19	2	20	—	19.7-20.8 (20.3)	16.2-16.5 (16.35)	20.9-22.1 (21.7)
3	20.0	22.3	0	12	1	15	—	19.9-20.9 (20.4)	16.7	20.2-21.4 (20.9)
4	20.3	21.8	2	25	1	17	15.4-15.9 (15.65)	19.5-21.0 (20.2)	15.8	20.9-22.8 (21.7)
5	19.9	22.5	2	28	3	16	15.2-15.7 (15.45)	19.3-21.4 (20.3)	15.7-16.8 (16.3)	20.7-23.6 (21.8)
6	20.8	22.4	1	30	1	15	15.0	19.7-20.8 (20.0)	15.9	20.4-22.6 (21.3)
7	19.6	20.7	2	19	0	27	14.9-15.7 (15.3)	19.1-20.9 (20.3)	—	20.7-22.4 (22.0)
8	21.0	21.6	2	24	2	20	14.9-15.5 (15.2)	19.8-21.8 (20.3)	16.0-16.4 (16.2)	20.9-22.9 (22.2)
9	20.3	21.7	1	22	1	23	14.9	19.6-20.8 (20.1)	16.5	20.8-22.4 (21.5)
10	20.0	22.0	1	23	2	21	16.2	19.5-20.9 (20.0)	16.4-16.7 (16.55)	21.8-23.4 (22.6)
11	unknown	unknown	0	20	0	24	—	19.7-21.0 (20.5)	—	20.8-22.8 (21.7)
12	unknown	22.3	0	26	0	22	—	19.6-20.4 (19.8)	—	20.5-22.7 (21.9)

25.5 mm in males and 21.5 mm in females, against 29.5 mm and 25.5 mm in normal specimens. Ford speculates that as the dwarf forms of both species emerge some weeks earlier than do the normal ones they may be produced by a gene which speeds up development; their early emergence being due to the fact that larvae pupate early, before they have had time to attain their full growth.

This article describes work designed to investigate dwarfism in the Orange-tip butterfly (*Anthocharis cardamines*).

The natural occurrence of dwarf specimens of this species has been reported by Ford (1957). He recorded four specimens in which the average wing-span was 34 mm, whilst he states in normal *cardamines* the average wing-expanse is about 42 mm. These four were all captured with others like them, at one locality in Cumberland over a period of years, and no intermediates were discovered. Dwarf specimens have been reported from many other localities and Ford notes that it is said that, like the two previously mentioned species, the dwarfs appear in advance of the typical insects.

On 26th May 1979 a female Orange-tip was taken in the grounds of Keele University, Staffs. This butterfly had a wing-length (taken as the distance from the apical extremity of v8 in the forewing, in a straight-line to the basal joint of the wing) of 15.9 mm. This is exceptionally small when compared with a sample of 21 other female *cardamines* measured at Keele in 1979 and 1980 in which the wing-length ranged from 20.3 mm to 23.1 mm with a mean of 22.1 mm: and a sample of 32 females taken in Cheshire and South Lancashire in which wing-length ranged from 19.9 mm to 23.3 mm with a mean of 22.0 mm (Majerus 1979). Furthermore, although it has been shown that there is geographical variation in wing-length in *cardamines*, wing-length decreasing gradually with westward movement, this decrease being at least to some extent genetically controlled (Majerus 1979), the mean wing-length of females of the smallest race, *hibernica* Williams from Ireland, is 19.4 mm with a range from 18.2 mm to 20.4 mm, and thus much larger than the specimen in question.

The dwarf female was placed in a large cage with potted Lady's Smock (*Cardamines pratensis*) on which she subsequently laid 59 eggs. The eggs hatched and the larvae were placed individually in small plastic containers in which they were reared on Lady's Smock. (The larvae of this species are extremely cannibalistic and should always be reared individually.) Fifty-five of these progeny reached the adult state, and all had more or less typical wing-length, ranging from 20.7 mm to 22.8 mm with a mean of 22.0 mm in females, and from 19.6 mm to 21.0 mm with a mean of 20.2 mm in males.

Ten pairings between these progeny were obtained using the hand-pairing technique described by Clarke and Sheppard (1956).

From the eggs subsequently laid by each female a sample of 50 were selected at random and retained (except in one case when only 29 eggs were laid and all were retained). These ten samples (numbered 1-10) were reared together with a sample of 50 eggs collected from wild Lady's Smock in the grounds of Keele University (sample 11), and a sample of 50 eggs laid by a female taken in June 1980 at Keele (sample 12).

When the imagines emerged in May 1981 the wing-length of each was measured. The majority of insects had normal wing-lengths, however, in each of the samples 1-10 a small number of imagines were abnormally small. To classify the wing-lengths all males with a wing-length greater than 19 mm were classed as typical and those with a wing-length less than 16.5 mm as "dwarf". Similarly females with a wing-length greater than 20 mm were classed as typical, and those with a wing-length less than 17 mm as "dwarf". In neither males nor females did any imagines have wing-lengths between the limits of the classes. The number of butterflies in each class for each brood are given in Table 1, along with the range and mean for each class.

For the ten F, samples the overall ranges and means for each class, in millimetres, were:—

Dwarf males: range 14.9–16.2, mean 15.38

Typical males: range 19.1–21.8, mean 20.21

Dwarf females: range 15.8–16.7, mean 16.31

Typical females: range 20.2–23.6, mean 21.74

The imagines resulting from samples 11 and 12 all had wing-lengths in the typical range. As all the broods were reared under exactly the same conditions and there was very little variation in the speeds at which the larvae fed up, it seems that the dwarf forms observed must be genetically controlled.

The number of dwarf imagines in samples 1-10 is statistically small, but if the results of these ten samples are totalled, approximately 1/16th of the progeny are dwarf ( $X^2_1 = 0.11$ ;  $p > 0.7$ ) these being divided fairly equally between the sexes. This suggests that the dwarf form is controlled by two biallelic autosomal genes showing complete dominance, the dwarf butterflies being the product of the double homozygous recessive.

If this hypothesis is correct, then the dwarf form should breed true, and work is proceeding to try to verify this.

One further point is worth noting. From the research carried out to date I can find no evidence to support the suggestion, mentioned by Ford, that dwarf specimens of the Orange-tip emerge earlier than normal adults. As I have noted in my laboratory stocks there was very little variation in the feed-up times of larvae, and this was carried further in that the emergence times of adults varied little, there being no correlation between date of emergence and wing-length. Furthermore, during

1979 and 1980 four dwarf Orange-tips, three males and the female previously mentioned were taken at Keele out of a total of 197. These four were taken on 20th May 1979, 26th May 1979, 31st May 1980 and 19th June 1980. Again there is no suggestion in these data of dwarf individuals emerging early.

Michael E. Majerus

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### SOME OBSERVATIONS ON THE MARBLED WHITE

#### Introduction

The Marbled White (*Melanargia galathea* L.) is the only British species of *Melanargia*, a genus which is mainly centred on the Mediterranean. All are of rather similar appearance and opinions differ to some extent regarding species and sub-species.

Our own species *Melanargia galathea galathea* L. is so described by Higgins and Riley (1970), but by Howarth (1973) as *Melanargia galathea serena* Verity.

In Britain the butterfly is found mainly south of a line from the Wash to the Severn, but extending into the South Midlands with an isolated pocket near York, but does not go far into East Anglia. In most places it is confined to the chalk, although it has been recorded in other situations.

#### British Distribution

There appear to be two types of distribution in Britain:—

- (a) 'Restricted' (concentrated) colonies, and
- (b) 'Roadside' (spread-out) colonies.

The 'Restricted' colonies I have usually found in elevated areas such as hillforts and similar situations where the butterflies abound in hundreds within a comparatively small area, outside of which none is to be found. Such localities are 'Caesar's Camp' near Folkestone; at the foot of the Chiltern Hills at Great Missenden, Bucks, and at Woodcote, Goring-on-Thames, Oxon.

The 'Roadside' type is particularly noticeable in other parts of Oxfordshire, Berkshire and Hampshire, where the butterfly is present on the verges of roads in relatively small numbers but spread over a

distance of a mile or so at a time, but here again coming to an abrupt stop at certain points although the vegetation required appears to continue.

In the 1950's *galathea* was comparatively plentiful along the A31 to the East of Alresford, Hampshire but in 1968, when I came to live in the area, it had disappeared. However, in 1978 I found it a few miles distant quite commonly along the A272, by the roadside, East and West of Cheesefoot Head, one of the highest points in Hampshire, within, say, a distance of 2-3 miles, coming to an abrupt stop at each end. Observations in 1979 and 1980 confirm that the species is still there. So far I have not found any 'restricted' colonies in Hants, ie. where the butterfly occurs in great abundance, as at Folkestone etc., but several where it is to be found in reasonable numbers eg. Stockbridge Down and Hazel Down, near Andover where up to 50 individuals can be counted in half an hour.

### Habits

Unlike some Satyridae the Marbled White has a graceful flight and although this is fairly low down is given to a certain amount of 'sailing'. It feeds with wings widely spread, or partly open, and frequently rests in a similar manner. My own observations suggest that the butterflies feed mainly in the mornings. On one particular occasion I visited a Hampshire site (26th July 1979) at mid-day when the insects were busily feeding from Greater Knapweed (*Centaurea scabiosa*) and Field Scabious (*Knautia arvensis*), but on the next day at 3 p.m. hardly any were to be seen and these were resting with closed wings despite hot sunny conditions on both days. This habit was confirmed in 1980.

There is a tendency for individuals of a colony to stray at the end of their season. Blackie (1951) found that in Huntingdonshire *galathea*, on emergence in early July, is usually seen in 'restricted' areas, but spreading occurs in late July towards the end of its time of appearance. My own observations tend to support this view. I remember seeing one on Claygate Common, Surrey, in the 1950's far from a known colony, and in 1978 one turned up on the Buddleia in my garden in late August which is a few miles away from its nearest locality.

As with most butterflies there are periods of abundance and scarcity, but recent observations of my own suggest an increase in populations, at least in Hants, since 1978.

### Possible Reasons for 'Local' Distribution

It is difficult to see why a butterfly that feeds on grasses should have such a 'local' distribution, especially when one thinks of other grass feeders such as the Meadow Brown (*Maniola jurtina* L.) and the Small Heath (*Coenonympha pamphilus* L.) etc., which are so widespread. Various theories have been put forward which might be considered:—



- (a) Species of grass preferred by the larvae
- (b) Adult food sources
- (c) Micro-climatic requirements
- (d) Infestation by ectoparasites

### Larval Foodplant

Although the butterfly oviposits broadcast, it is conceivable that it has a preference for a certain species of grass.

Consultation of 15 authorities, from Stainton (1857) to Howarth (1973) has fourteen giving *Phleum pratense* (Catstail or Timothy Grass) as its favourite larval food and six giving *Dactylis glomerata* (Cocksfoot) as a second choice.

It appears to be a fact that a colony tends to change its location from time to time. Simes (1937) suggests that this might be the result of competition between different species of grasses, when a species favoured by *galathea* may be ousted by a less favoured but more vigorous species. This is helped by the fact that the butterfly drops its eggs as it flies, the result being a diminution of the colony and to cause the survivors to seek new territory. Mortality would therefore vary inversely with the quantity of suitable grass available. Although it does not clarify the situation much, I have, recently paid special attention to the grasses present at *galathea* sites known to me in Hampshire. So far in each case *Phleum* has been present, but as in many aspects of nature, little is conclusive, for it is said that *galathea* will feed on any species of grass in captivity. This, however, I cannot confirm as I have never reared the species.

### Adult food sources

One aspect affecting the distribution of butterflies I may be guilty of over stressing is that of adult food sources. I have made a special study of the subject over some years and am convinced it plays a greater part in choice of locality than one would imagine, especially to sedentary butterflies. As far as the Marbled White is concerned I have found Greater Knapweed and/or Field Scabious present in all sites where the butterfly is found. It prefers the former when both are present and although it will take nectar from other plants the attraction of Knapweed and Scabious is very great indeed.

### Micro-climates

The situations of colonies is an interesting point. Vere Temple (1953) is of the opinion that the species needs the heavy dew of the downs and commons that it frequents. A similar argument holds good for the Ringlet (*Aphantopus hyperantus* L.) although it does not form such localised colonies as *galathea*. Kirby (1896) suggests, however, that its local distribution in England is possibly caused by drainage. I have already mentioned its apparent preference for relatively high ground but this is contradicted in France where it appears to be common almost any-

where. Its affinity for chalk soil in England is obvious, but here again in the Gironde department of France it is common on the alluvium overlying the Tertiary rocks.

### Ectoparasitic infestation

The adult Marbled White is occasionally found to be infested to a greater or lesser degree by parasitic red mites, sometimes so heavily that the affected insect can hardly fly. Whether this infestation is a factor in *galathea's* distribution and/or change of locality is debatable. Apparently quite a few species of Satyridae are thus affected particularly *M. jurtina* and *Eumenis semele* L. (The Grayling) but other downland butterflies and some moths are similarly victimised. Stidston (1950) who found similar red mites on the moth *Tholera popularis* Fab. had them identified at the British Museum (Natural History) as larval forms of *Erythraeus phalangii* (Degeer) of the family Erythraeidae. A detailed account of the method employed by these mites is shown by Treat (1967) which indicates the debilitating, if not fatal, effect they must have on the host. Referring to red mites on Lepidoptera in America he writes:—

“Attachment is by a set of mouthparts firmly implanted in the host's body. These parasites are the larvae of mites belonging to the trombidiform family Erythraeidae . . . In a few days the larvae become engorged with the haemolymph of the moth (or butterfly). They then drop off and complete their complex development amid low vegetation at or near the soil surface . . . They do not seem to be specific with regard to host species or site of attachment. . . .”

A summary of observations on the subject of mite infestation, by a number of members of the AES was published in AES Bulletin Vol. 9 1950 pp. 57-59. It deals with ectoparasites on various insects as well as Lepidoptera, and anyone interested in the subject is recommended to read it.

B. R. Stallwood (1547)

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## NOTES AND OBSERVATIONS

**Clouded yellow in Hertfordshire**—My friend, Paul Montgomery, captured a male specimen of *Colias croceus* Geoffroy near Welwyn Garden City on 5th August last at 15.00 h. The butterfly was in perfect condition.—R. S. Ferry (207).

**Early appearance of the Orange-tip**—On the 21st February this year Mr. Gordon Wilson brought me a male specimen of *Euchloe cardamines* which he had found that morning on the curtain of the sitting-room of his house in Welwyn Garden City.—R. S. Ferry (207).

**An exciting occurrence at Kew Gardens**—On Friday, 14th August, a student gardener at Kew Royal Botanic Gardens observed a large butterfly flying around and settling on a group of *Asclepias* plants growing in the open. Closer inspection identified it to be a fat-bodied female Monarch, *Danaus plexippus* L., which was in the act of laying her eggs. The fact was quickly reported to the Herbarium and other sections and many were able to see this unusual sight. It is probable that the butterfly had escaped from the Butterfly exhibit in Syon Park nearby where live butterflies are on display to the public, the species including several exotic ones. The female had discovered the only group of *Asclepias* plants in the gardens (*A. incarnata*) and had deposited her eggs liberally on the underside of the upper whorls of leaves. It will be of interest to know how they fare. It must have known it was 'The Year of the Butterfly'.—P. W. Cribb (2270).

## A MONARCH IN THE WEST COUNTRY

On September 28th 1981 a very worn specimen of *Danaus plexippus* L. was caught in Gorran Haven, Nr. St. Austell, Cornwall. The butterfly was captured at approximately 4-00 p.m. about quarter mile from the coast line and was, at that time, in a very weak condition and died on the 29th September 1981.—B. W. Ofield (4825).

## BOOK REVIEWS

*Genitalias (Andropigios) e los Ropalocervas de Alava y su entorno ibérico Part III: Nemeobidae, Pieridae, Papilionidae, Hesperidae* by Fidel Fernandez-Rubio. A5 61 cold. plates + tp and indices 1981.

The Spanish Entomologists are continuing their steady publication of large scale photographic illustrations of the genitalia of their lepidoptera and this volume forms an extensive third part of the butterflies. It follows the same format, illustrations without description, as its predecessors reviewed in this Bulletin (Vol. 36: p. 51. 37: p. 131). The quality of the reproductions is somewhat variable. A very good reproduction is that of *Pyrgus armoricanus* on plate 36 while *Catopsilia florella*, plate 20 is rather on the light side and *Colias phicomone*, plate 21 is much too dark. It is difficult to say whether this arises in the

preparation of the original specimen or in the photographic reproduction. Viewing the coloured example depicted on the cover, it seems a pity that all could not have been done in colour. The illustrations of the genus *Pieris* are rather better reproductions of those in Shilap (1973, Vol. 1, No. 3) and it should be noted that the author retains the members of that genus in the traditional sense.

Brian Gardiner

*British Butterflies Wallchart, No. ENT3; the blues, coppers and hair-streaks*, by Joyce Bee. 760 × 600 mm. British Museum (Natural History), London 1981. Price £1.25 (£1.75 by post).

What can one say about a wallchart whose purpose is self-explanatory? Designed to be decorative, this one at any rate is also informative and accurate. Joyce Bee is to be congratulated on her artistry. All the species are shown life-size, the uppersides being depicted as if set specimens and as they are so often illustrated in standard text-books. The undersides however are shown settled on the appropriate larval foodplant or adult feeding plant. Both sexes are illustrated as well as a number of varieties of this most variable group. The whole is depicted on a feint seascape background (Lulworth Cove?) and the foreground has a firm depiction of the plants beloved by this group of butterflies.

In our view this chart is better than its two predecessors. Used in conjunction with any textbook on butterflies it will be a great aid to identification, for so many books today are either no longer illustrated in colour, or else have been done to such a poor standard as to be misleading.

Altogether an excellent production which should be on every lepidopterist's wall, preferably in an attractive frame.

BOCG

*The Mitchell Beazley pocket guide to Butterflies*, by Paul Whalley. pp. 168. 190 x 90mm. About 900 4-colour illustrations. Mitchell Beazley, London 1981. Price £3.95.

The author of this book is clearly a man of many parts. An expert on the moth family Thyrididae and an acknowledged authority and lecturer on fossil insects, he also has found the time to write several entomological books of a popular nature as well. This one in particular is useful being both vernacular and sufficiently scientific to be of interest to both the serious lepidopterist and the holiday-maker with an interest in butterflies. The size of the book, similar to that of a wallet, makes it just the shape to slip into one's pocket without being too bulky.

The coverage is of the 360 odd species of European butterflies eastward to the frontiers with USSR but excluding however the Atlantic Islands. It is therefore on a par with Higgin's and Riley's much more comprehensive "Field Guide" and includes several species not in that work.

All the species are illustrated in colour from paintings by Richard Lewington and there are 900 of these, for not only is upper and underside depicted but so are various forms and races. All, I am glad to say, are shown natural size, a real feat in a book of this small format. This has been attained by squeezing the illustrations between the  $4\frac{1}{2}$  pt type used for delineating the salient features of each species and it has come off very successfully. Not so successful is the use of a horizontal rule to separate species for this is done between the vernacular English and the scientific name.

Now the English name is to the left of the page and, level but to the right of this name, are some little round symbols delineating the habitats in which the species may be found. This prominent bold type line follows on directly from the text applying to the *preceding* species and to the eye seems to apply to the species above and not, as is intended, below it. Some thought should be given to this by the publishers in the next edition.

Apart from salient features there is a brief paragraph of descriptive, informative and distributional (within Europe) matter. It is a masterpiece of precis work.

An advantage of such an abbreviated work is how a brief skimming at once brings out some salient points. The most noticeable to us was the number of species with "Foodplant unknown". What a scope for the holiday-maker with an interest in butterflies! A little surprising however that this applies to *Vanessa indica*, since it is known to feed on giant nettle in Sri Lanka. Has this species now spread to Southern Europe by the way since 1970?

Other useful features of the book are the indication of species protected by legislation and a couple of pages of day-flying moths to help sort out the sheep from the goats.

A excellent potential Christmas present which should be carried by anybody visiting Europe and whose vision extends beyond its beaches and casinos. It only remains to say how sad it is that so few of these lovely creatures are now to be seen in Greater Britain. S.A.C.

*"Den lille gra." Oversigt og flyvetabel over danske dagsommerfugle, spindere, ugle og malere. 5 udgave. pp. 76 A5. Lepidopterologisk forening, Copenhagen, 1980. Not priced. [The little grey: A textbook of larger Danish lepidoptera.]*

This booklet lists all the Macrolepidoptera ever recorded in Denmark, under their scientific names, conforming to the systematics used by Karsholt and Nielsen (1976) and is intended for use by Danish lepidopterists. The name of each species is followed by an indication of the period of its flight in Denmark, the foodplants used, and an indication of its occurrence. Although the plants are given their Danish names there is a complete plant list giving the scientific names in an appendix

and there is also a glossary of Danish words with their English equivalents so that the whole text is comprehensible to the English reader. The index of insects is under genus and species. The booklet is of a practical size for field use but could have been improved by having space for field notes. As the pages are printed on both sides, it is not suitable as a label list.

PWC

### TRAVELS OF A BUTTERFLY

The woods, the rivers, and the meadows green,  
 With his air-cutting wings he measured wide;  
 Nor did he leave the mountains bare unseen,  
 Nor the rank grassy fen's delights untried,  
 But none of these, however sweet they been,  
 Might please his fancy, nor him cause abide.  
 This choiceful sense with every change doth flit;  
 No common things may please a wavering wit.

To the gay gardens his unstayed desire  
 Him wholly carried, to refresh his sprites;  
 There lavish Nature, in her best attire,  
 Pours forth sweet odours and alluring sights;  
 And art, with her contending, doth aspire  
 T'excel the natural with made delights;  
 And all that fair or pleasant may be found,  
 In riotous excess doth there abound.

There he arriving, round about doth fly  
 From bed to bed, from one or other border,  
 And takes survey, with curious busy eye,  
 Of every flower and herb there set in order;  
 Now this, now that, he tasteth tenderly,  
 Yet none of them he rudely doth disorder;  
 Nor with his feet their silken wings deface,  
 But pastures on the pleasures of each place.

And evermore, with most variety  
 And change of sweetness (for all change is sweet).  
 He casts his glutton sense to satisfy;  
 Now sucking of the sap of herb most meet,  
 Or the dew which yet on them does lie;  
 Now in the same bathing his tender feet;  
 And then he percheth on some bank thereby,  
 To weather him, and his moist wings to dry.

Spenser.

## A MIS-IDENTIFIED SPECIMEN OF *GONEPTERYX CLEOPATRA* (L.) FROM MALTA

When I was sorting out the insect collection of the Natural History Museum of Malta at Mdina, recently, I noticed a few butterflies sealed in air-tight boxes. A few still had dates attached to the outside, and I was impressed by the immaculate state of specimens which bore the label "Ghain Tuffieha, Malta . . . 1909", for example.

Mr. J. Vella-Gaffiero, the officer-in-charge of the Museum told me that they came from the days of the famous Maltese Naturalist Giuseppe Despott, who had been curator of the Natural History section in his time.

One specimen which attracted my attention was a female specimen of the *Gonepteryx* species, labelled "*Gonepteryx rhamni*, Malta". *G. rhamni* L. is included in the list of 'unconfirmable' species by Valletta (1971), and therefore I tried, unsuccessfully, to determine whether the identification was correct. Higgins & Riley (1973) base their separation of the two females of *rhamni* and *cleopatra* on colour, and the specimen was rather faded. Mr. Anthony Valletta, when contacted, kindly agreed to come over and amongst other things, ascertain the identity of the specimen.

Mr. Anthony Valletta identified the specimen as a female *cleopatra* on the basis of the curvature of the fore-wing. The importance of this identification is that it lends weight to the belief that *rhamni* never existed in Malta. It is not, however, absolute proof, as *rhamni* could have co-existed with *cleopatra*, with this specimen being (easily) confused with *rhamni*. Borg (1932) says that *rhamni* is "Frequent at Boschetto and along the cliffs near Casal Dingli", whilst *cleopatra* "is recorded by Dr. A. Caruana-Gatto as an occasional visitor". Dr. C. De Lucca (1950) says that "In my long time of collecting I have never come across one of them" (referring to the doubtful species in Borg's list). On the basis of my experience, I have found *cleopatra* to be frequent at Buskett (Boschetto), but confusion with *rhamni* is impossible, if one sees the orange-red flush of the male. Is it a case of *rhamni*'s habitat being taken over by *cleopatra*? Or was it a misidentification all along? I hope this information will help in reaching a definite conclusion.

I wish to thank firstly Mr. A. Valletta for kindly identifying the specimen for me. I also wish to thank Mr. J. Vella-Gaffiero for his help and co-operation during my stay at the Natural History Museum.

Charles Aquilina (5732)

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**THE FIRST RECORD OF ZIZEERIA KNYSNA TRIMEN 1862  
(=LYSIMON HUEBNER) FROM MALTA**

Whilst recently sorting out the insect collection of the Natural History Museum of Malta, at Mdina, I noticed a strange little butterfly. The case I was sorting contained the collection of Lycaenidae of the late Themistocles Conti, and a smaller differently-shaped specimen from the rest had attracted my attention. On examining the label, I read that the specimen was "*Cupido minimus*" (Fuessly) (The Little blue), and had been taken at "Wied Zembaq" by "Victor Portelli" during "Spring 1966(!), and that it was a male.

A quick look at Higgins & Riley soon clashed with this identification, and eventually (as was later confirmed), I tentatively identified it as *Zizeeria knysna* Trimen—The African grass blue. The specimen is a male and in fairly good condition, except that the upper margin of the right wing is scratched badly, and the head is contorted. But considering the mediocre storage conditions during the last 15 years the specimen is in a satisfactory shape.

Mr. J. Vella-Gaffiero, the officer-in-charge of the Museum, informed me that the original captor of the butterfly had emigrated to Australia, and so is not available to give further information.

Interestingly, this is not the only record of *Z. knysna* from Malta. Bonett (1978) captured it on the 12th March 1978 at Ghadira, and according to his paper Mr. Anthony Valletta had then told him that his catch was "a new species to the Maltese list". I am mentioning this because the late Mr. Conti, the owner of the specimen was an acquaintance of Mr. Valletta—and now it seems that he had not told Mr. Valletta about it! Mr. Valletta, on being contacted, was indeed unaware of the specimen's existence. Strangely enough, even the identification of *Cupido minimus* Fuessly would have made this specimen new to Malta, so it is difficult to understand why the owner or the captor did not publish the information.

The lack of information makes any conclusions drawn from the specimen unreliable—was the specimen fresh when captured? When exactly was it captured? The locality, Wied Zembaq, a branch of Wied Has-Sabtán in the south of Malta is a valley similar to the Ghadira saltmarsh (where the second specimen was captured) in that it is sheltered, humid, and has ample foodplants for *knysna* (i.e. *Medicago* and *Oxalis* sp.) (Edwin Lanfranco: personal comm.). To me, the fact that both specimens were captured on the coast of Malta would indicate them as migrants rather than accidental importations. If one considers the migrant hypotheses, then it would seem more likely that the specimen is the subspecies *Z. knysna karsandra* Moore 1865, which has a closer geographical range, but which needs an examination of the male genitalia



to distinguish it. This specimen is therefore ideal for such an examination since the later specimen captured in 1978 is a female.

It is a pity that the original captor of this butterfly is unavailable, since he would have certainly added many more details to our knowledge of this interesting occurrence.

I wish to thank above all, Mr. Anthony Valletta for kindly coming over to the Museum to confirm the identification of the specimen. I also wish to thank Mr. J. Vella-Gaffiero, Mr. E. Lanfranco, and Mr. J. Cilia for help related to this article.

Charles Aquilina (5732)

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#### GOSPORT OLD RAILWAY STATION AND ITS BUTTERFLIES

I read with interest the letter from David Rees (1510) regarding the rather rare appearance of the Painted Lady butterfly near Eversley, Hants. For the past five years my wife and I have had great pleasure in admiring this beautiful creature, admittedly only in two's and three's, in Gosport Railway Station.

The Station has been in a state of neglect for over twenty years now but does possess a large number of Buddleia shrubs (I have never counted them but there must be fifty or more). As well as the Painted Lady, Red Admirals, Peacocks and Small Tortoiseshells are all to be found on this virtual mass of Buddleias in late Summer. Incidentally, I have two Buddleias in my own back garden and all the above species visit us and that includes the Painted Lady!

Now it appears 60 private houses are to be built on this mini butterfly paradise, where also the Common blue, Gatekeeper and Meadow brown are also abundant. I have written to the Town Hall in protest and I hope many more local residents will do so but I feel it is a lost cause.

When I first fell under the spell of butterflies I read a book called "*Create a Butterfly Garden*" by L. Hugh Newman and turned our small back garden over to butterflies, including a fair sized patch of nettles. Over the past five years the Comma has laid on them four times, the Red Admiral three times and in 1979 a Small Tortoiseshell. I shall continue in this vein but what chance have our Garden Butterflies really got of surviving when nettles are being poisoned with weed-killer and delightful butterfly habitats like Gosport railway station are being destroyed?

Finally may I say that our Garden butterflies need our help now; we cannot assume they will keep turning up year after year. I'm quite sure many of my AES members know far more about butterflies than

I do but while out-and-out knowledge is one thing, constructive aid is what is wanted now. Let's all grow a few nettles, thistles etc. while we can, before it's too late.

J. H. Smith (6543)

### NOTES ON THE UNUSUAL BEHAVIOUR OF THE GATEKEEPER

I am very interested in the behaviour of butterflies, and particularly the highly specialised Satyridae, and the following observations on *Pyronia tithonus* L. may be of interest.

In 1970, whilst camping on the Biscay Coast in the province of Aquitaine in SW France my attention was drawn to several *tithonus* that were hovering, and occasionally settling, over a clump of *Yucca*, one of several clumps planted in the sandy soil outside my chalet. I investigated but could find no trace of the attraction. The blooms were dead and there was no sign of honeydew. Several other clumps were being paid similar attention by the butterflies.

Having made a note of the fact at the time I thought no more about it until 1979 when, in my garden, there are always a few *tithonus* feeding from marjoram and phlox during August. A few yards from the marjoram bed is a large clump of Pampas Grass (*Cortaderia argentea*) and I was interested to see the butterflies flying to the Pampas Grass in between feeding. Investigation on one occasion revealed one individual settled right at the base of the plant and well protected by the leaves. Although not related botanically, *Yucca* being a species of the Liliaceae and Pampas grass the Gramineae, they both have a similar habit, forming dense clumps and offer an obvious place of refuge from birds, which must be the explanation for this behaviour.

In 1976, at Alice Holt Forest, I came across another interesting incident. In one of the rides, settled on knapweed heads, each about one foot apart were eight *tithonus* with wings fully spread and oddly enough *all were females*. What this 'hen-party' were doing was problematical: none was feeding and one can only presume that they were trying to attract males, or merely sunbathing. The sight was so unusual I filmed the scene passing from one to another.

A final sidelight on *tithonus* is the lack of attraction that buddleia has for the butterfly. Although I have four varieties of buddleia in my garden *tithonus* feeds almost exclusively on marjoram and only on two occasions have I recorded an individual on buddleia, once in 1953 and again in 1980.

I think a lot could be learned from studying the behavioural patterns of even our common butterflies, which to me is one of the most fascinating aspects of entomology.

B. R. Stallwood (1547)

## ON AN ALLEGED SPECIMEN OF *POLYGONIA C-ALBUM* CAPTURED IN MALTA

When I recently was working at the Natural History Museum of Malta, at Mdina, I was amazed to see a specimen of *Polygonia c-album* (the Comma), exhibited in the Malta section.

Mr. J. Vella-Gaffiero, the officer-in-charge of the Museum told me that the specimen had been in a box-full of Maltese specimens prepared by a pre-World War II Director of Museums, a certain Mr. Baldacchino. And so, he had assumed the specimen to be a local one and had exhibited it along with the rest of the Maltese collection. On my advice, such a potentially unique specimen (if the specimen is authentic, this is the only existing specimen of *Polygonia c-album* which has been captured in Malta) was transferred to a separate storage-box where it would receive better treatment than in an exposed exhibition case. I took the opportunity of checking the specimen's identity with a copy of Higgins & Riley's *Field Guide* and having a look at the data labels.

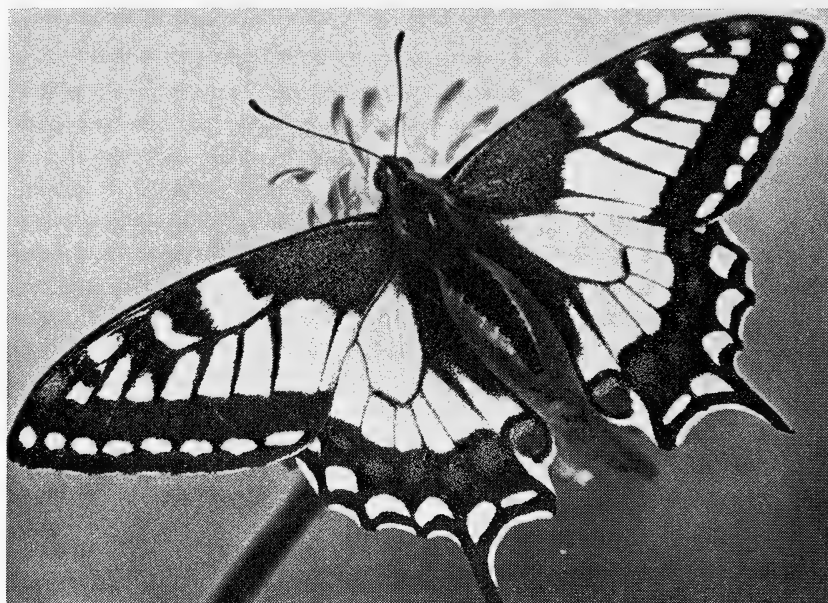
Here I was disappointed, for all the labels said was "*Polygonia aegea* Cr" (a misidentification) and "12-8-25 genera". Thus the proof of the specimen's 'nationality' was missing. My interest in confirming the locality from where the specimen had been captured is due to the list of butterflies of doubtful appearance in the Maltese Islands, published in Valletta's *Butterflies of the Maltese Islands*. Borg (1932) says that this butterfly is "Rare. Its larva feeds on thistles". De Lucca (1950) mentioning Borg's earlier list says that "In my long time of collecting I have never come across one of them" (referring to the whole list of unconfirmed species—not to *c-album* specifically). Did it occur or didn't it occur on Malta? An apparent omission on the unknown collector's part has added one more tantalising bit of evidence which increases one's interest but leaves you practically with the same uncertainty as before.

I wish to thank Mr. J. Vella-Gaffiero of the Natural History Museum of Mdina for his help and co-operation during the period I was employed by the Musuem and for the helpful information he supplied on the specimen.

Charles Aquilina (5732)

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Our largest resident butterfly, the Swallowtail (*Papilio machaon* L.)  
(Photo by Leigh Plester)

### OH, BUTTERFLY!

Child of the sun ! pursue thy rapturous flight,  
Mingling with her thou lov'st in fields of light;  
And where the flowers of paradise unfold,  
Quaff fragrant nectar from their cups of gold.  
There shall thy wings, rich as an evening sky,  
Expand and shut with silent ecstasy!  
Yet thou wert once a worm, a thing that crept  
On the bare earth, then wrought a tomb and slept!  
And such is man; soon from his cell of clay  
To burst a seraph in the blaze of day!

Rogers.

### POESY TO A BUTTERFLY

Behold! ye pilgrims of this earth, behold!  
See all but man with unearned pleasure gay:  
See her bright robes the butterfly unfold,  
Broke from her wintry tomb in prime of May!  
What youthful bride can equal her array?  
Who can with her for easy pleasure vie?  
From mead to mead with gentle wing to stray,  
From flower to flower on balmy gales to fly,  
Is all she has to do beneath the radiant sky.

Thomson.



## GREEN-VEINED WHITES AT WET MUD

Reports of congregations of butterflies at wet mud in tropical regions are legion. They are not so common from central and northern Europe, however. The main exceptions to this rule in Finland are the "Blues", *Lycaeides idas* L. and *Plebejus argus* L., which on most fine days during their flight season can be found gathered at damp places. I have even photographed them avidly imbibing moisture from some dog droppings decorating a stone!

While Britain suffered a more than averagely cool summer in 1980, Finland lay in the grip of its hottest, driest summer for fifty years. Butterflies were plentiful and places that normally retained moisture dried up. While driving along a dirt road in the Häme district (62°N) on 24th July I was surprised to see clouds of white butterflies rising up from the ditches, to resettle there as soon as the air was still again.

The insects proved to be Green-veined white (*Pieris napi* L.) and most of them appeared to be males. Upon being approached, some of them rose into the air, to scud down the ditch like flurries of snow, but by stooping, craning my neck and swopping a 100 mm lens between the two Olympus camera bodies I normally carry, I was able to obtain a series of both black and white and colour photographs.

One group comprised over 60 individuals (Fig. A): over 40 made up a second congregation, while 30 had gathered in a third situation (Fig. B). Smaller groups were also abundant. The air temperature was around 26°C and there was not a cloud in the sky.

Since they gathered at specific points, two theories came to mind: (a) the moisture at these points was sufficient to attract, through evaporation, any butterfly with *Pieris napi* attributes, (b) the presence of several individuals at one point, in a place which already attracted by way of its moisture, stimulated other individuals into landing precisely there. The second theory could be worth investigating.

When such phenomena occur, it is always well worth while (especially if you have monochrome lab. facilities of your own) sending off an article to the local newspaper. As I write regularly for one local publication, it was not even necessary to chat to anybody first and the day's petrol, as well as black and white film and printing paper costs, were soon taken care of.

Leigh Plester (2968)

### PHOTOGRAPHS:

Page 175: A. Small tortoiseshell (*Aglais urticae* L.) lit from behind, in typical sunning pose. Underside. (Photos by Leigh Plester)

B. The commonplace from an unusual angle. Small tortoiseshell (*A. urticae* L.) feeding from a thistle. Underside.

Page 177 (opposite):

A. Something over 60 individuals of the Green-veined white (*P. napi*) were present at this gathering. All appeared to be males. B. Close-up of a smaller group in a wetter ditch. The uppermost individual is in flight.



**THE FLOWER AND THE BUTTERFLY**

The lowly flower said to the winged butterfly,  
 Leave not me.  
 How different are our fates! here a poor prisoner I,  
 Thou dost flee.  
 Yet we love one another, and from men we may  
 Live afar;  
 And yet we are like each other, for we both, they say,  
 Blossoms are.

But thou art borne aloft; to earth, oh sad despite!  
 Chained am I.  
 Alas! with my soft breath I would embalm thy flight  
 Through the sky.  
 Ah no! thou flee'st too far; thou all the countless flowers  
 Fliest to greet;  
 I stand alone, to see my shadow turn for hours  
 At my feet.

Thou flee'st, returnest, flee'st, where bright like thee  
 Naught appears;  
 And so with each returning dawn thou findest me  
 All in tears.  
 Oh that with happy, faithful love we both may live,  
 Charmer mine!  
 Take thou, like me, root in the earth, or to me give  
 Wings like thine.

Witcomb.

**POESY**

See yonder butterfly distend its wing;  
 Emerged to life, now hails the vernal spring.  
 What dappled colours, and what gorgeous plume,  
 Its downy, asperated wings assume!  
 Now when it lays its eggs, see and peruse  
 The time, the spot, the place, and then diffuse  
 How butterflys all place their eggs upon  
 A leaf we never saw them feeding on:  
 Yet still the cabbage proves most wholesome food  
 Unto their offspring, and an unseemly brood:  
 A tribe of caterpillars, that we next  
 Must ruminare for an adjacent text.

Badcock.



## **SOME OBSERVATIONS ON CONTINENTAL BUTTERFLIES IN NORTH YUGOSLAVIA (SLOVENIA) IN JULY 1980**

Whilst so much of England was experiencing unseasonal wet weather in July 1980, my wife and I were lucky enough to be able to spend a peaceful week's holiday towards the end of the month at Lake Bohinj which lies sheltered amongst the south eastern foothills of the Julian Alps in the northern province of Slovenia. This province has strong cultural links with the old Austro-Hungarian empire as a result of which the Balkan influences are not as pronounced as elsewhere in the central and southern provinces. Furthermore, climatic conditions are generally similar to those in central and eastern Austria. Much of Slovenia is sub-alpine in character with extended areas of hilly meadow pastures and broad woodland lying on either side of the Sava River, a tributary of the Danube, which weaves its way south through the province. The Julian Alps comprise the most eastern region of the European alpine chain of mountains, and although they are not as well known as the majestic Swiss and Austrian alpine regions, they display an individual character of their own and are certainly worthy of the entomologist's and botanist's attention there being many local and interesting species to be found.

Our visit fell between 21st and 28th July and during the whole of this short period the weather was surprisingly settled with much sunshine and many cloudless days which enabled me to study butterflies in abundance in pastures around the lake within a broad altitude belt of 500 to 700 metres.

Hay cutting had barely started by the time of our arrival because of extended periods of rain which had persisted since early April, and so the meadows were still ablaze with sub-alpine flora. This idyllic scene was not destined to last much after the fourth day of our visit once the local farmers commenced the rapid task of clearing the meadows of the long overdue first major crop of hay! However, butterfly life was found to be unimpaired amongst pockets of rough waste ground and the higher summer pastures where cutting had not begun.

As the meadows were generally large sheltered clearings within extended regions of deciduous woodland lying on alkaline limestone soil, I found flora to be both rich and varied in nature with a corresponding concentrated quantity of butterflies in attendance. Both the presence of strong sunshine and the sheltered nature of the terrain provided ideal conditions for the close study of insects without undue effort and risk of disturbance.

In view of the general similarity of one area of meadowland to another and the general distribution pattern of most species recorded, I propose setting out my observations under family group headings as opposed to specific areas. I should also mention that my observations are not

intended to be exhaustive, and they may not be entirely representative of the species likely to be encountered so late in July as many of the recorded species are more commonly on the wing in late June and early July in a better balanced year.

### PIERIDAE

Due to the late timing of my visit few members of this family were recorded as being common. However, a limited number of *P. brassicae*, *P. rapae* and *P. napi* were frequently seen in desultory flight around road verges and low lying cultivated areas. These normally common species were surprisingly enough rarely encountered in the higher areas of meadowland.

During one early foray into a particularly attractive sheltered area of meadowland, fortunately situated close to the hotel where we were staying, my wife spotted a large distinctive white butterfly engaged in nectar feeding. This insect proved to be a fine male *A. crategi* which appeared to be freshly emerged. No further males were sighted throughout our visit, and only one female was found in the same patch of meadow five days later. This species is however, widely distributed throughout this region and is perhaps likely to be encountered more frequently during the first two weeks of July, although isolated specimens will be found as late as mid-August.

Amongst higher pastures I did find a very limited number of male *P. mannii* imagines all of which appeared to be worn and had presumably been on the wing for some days. This species is easily confused with *P. rapae*, and a close examination is required in order to identify it with certainty. The major feature of difference lies in the shape of the apical black border displayed by male imagines on the upper side of the forewings, which tend to be somewhat narrow and extend down to the outer margins to veins 4 and 3; furthermore *mannii* usually displays an extended area of dark powdery scales on the undersides of the hindwing. In other respects this species displays similar markings and coloration as are present with *rapae*. I did find in general that *mannii* tended to be slightly smaller than *rapae*, but I do not know whether this is a reliable feature to determine identification in the field.

During a visit to an area of high summer pastures in the Voje Valley lying to the north of the lake, I found a limited number of *A. napi bryoniae* male imagines present. This species which is often subscribed with specific status, is not usually found much below 1,000 metres and I was therefore, a little surprised to find this butterfly at an altitude of only 700 metres. The notable features of this sub-species are its pure white coloration and the firm black-edged veins with diffuse black marginal areas to the veins on the upper sides of both fore and hindwing. The undersides of the hindwing are generally creamy white with clearly etched broad green veins. This subspecies is generally considered

a true alpine butterfly and its distribution is restricted by altitude factors.

With the exception of one lone male *G. rhamnii* sighted on the first morning of our visit at the lake-shore, no further species were recorded.

### NYMPHALIDAE

Within this large family group I found two species of fritillaries to be particularly abundant and widely distributed throughout the region; these were *M. athalia* Rott. and *M. aurelia* Nickerl. Both species had reached their peak period of emergence and were invariably found in flight together in the larger open meadowland areas with a particular predilection for sheltered damp pockets of rough peripheral wasteground. *M. athalia* was easily distinguishable from *aurelia* whilst in flight as this former species was not only generally larger, but displayed a lighter fulvous coloration with the usual regular series of black markings on the upper sides of both fore and hindwing; whereas *aurelia* was smaller and displayed a general fuscous coloration on the upper sides of both sets of wings. I also noted *aurelia* often displayed a deep yellow or orange marginal band adjacent to the sub-marginal lunules on the undersides of the hindwing; such deeper tone of coloration was rarely seen on *athalia* imagines. The females of both species were often larger than their male counterparts and displayed similar coloration and markings, although *athalia* females often displayed slight colour contrast with a paler discal band on the upper sides of both fore and hindwing.

*M. aglaja* L. and *F. niobe* L. were frequently seen in full sunshine demonstrating their fast and restless flight habit interspersed with sudden stops to alight on larger flowering plants at which point I was often able to approach an insect closely without creating any undue disturbance. Both sexes of *aglaja* were usually present together and both displayed normal fulvous coloration and markings with rarely any significant variation. Amongst both male and female *niobe* studied I found form *eris* Meigen to be common. As the silver spotted form was rarely found, I concluded that form *eris* is probably the prevailing one in this region. Specimens displaying intermediate partially filled silver spots were sometimes found and appeared to be largely confined to male imagines.

During our first morning's visit to local meadowland close to the hotel I did find evidence of *M. diamina* Lang. as having been present in greater numbers with the capture of one worn male imago; later in the day two female imagines were found in good condition, but were clearly late arrivals. *M. diamina* is generally on the wing in June and often precedes *athalia*, although both species will be found in flight together wherever the habitat is suitable. It is particularly dark in colour with vestigial fulvous markings and the orange post-discal lunules on the undersides of the hindwing often display small round spots within, which do not appear on the hindwings of other similar species. Female

*diamina* imagines although less suffused in coloration than males, do tend to display more regular fulvous markings which are often pale yellow towards the discal and sub-marginal areas.

Occasionally the odd male *F. adippe* imago was found in flight with *aglaja* and *niobe*, and I found this particular species to favour the rougher areas of meadowland where small saplings and scrub were present. All imagines sighted appeared to display the usual silver spots on the undersides of the hindwing and in other respects were similar if not identical to the form found in England.

Amongst other Nymphalids only a limited number of *V. atalanta*, *C. cardui* and *A. urticae* were seen from time to time wherever there was an abundance of flora present. On most occasions however, such imagines as did appear were often chased away by aggressive *aglaja* males which clearly objected to any foreigner encroaching onto their chosen preserve!

#### SATYRIDAE

Because of the general sub-alpine nature of the terrain the *Erebia* group of species was not well represented in this region. In any event the earlier adverse weather conditions had clearly delayed the emergence of the few species which are probably present, and therefore, I was not unduly surprised to discover that only *E. ligea* L. appeared to be widely distributed, and as all imagines sighted were freshly emerged males, this species was only just appearing on the wing. This species is easily identifiable by the intermittent wavy white post discal band on the undersides of the hindwing and the display of chequered white and brown cilia on both fore and hindwings. The post discal band was well developed on the upper sides of both fore and hindwing and the two closely aligned apical ocelli on the forewings often enclosed a prominent white spot: I found in other respects little variation amongst specimens wherever they were found.

Apart from the limited number of *ligea* encountered I found two worn female *E. oeme* imagines fluttering around a shaded area amongst the higher summer pastures in the Voje Valley. This species was not recorded elsewhere and I concluded that possibly its appearance is restricted to levels above 700 metres.

Without doubt the most common Satyrid found in the larger meadowland areas was *M. galathea* L. form *procida* Herbst., which never strayed far away from open aspects with plenty of flora present. This form is notably very dark with the black markings at times so extensive that the white mottled markings are reduced to small spots. The females were larger and displayed less general density of colour. This form is widely distributed throughout the Balkans and southern Italy and is likely to be encountered as a common insect in alkaline regions in eastern Europe.

*C. arcania* L. was found in small numbers on higher ground amongst scrub and wasteground areas where it was afforded some shelter. Markings and general coloration appeared to be constant and no aberrations were recorded. In the Voje summer pastures I also discovered *L. maera* L. and *M. jurtina* L. around the edges of the adjoining woodland; neither of these two latter species were however, common and were probably freshly emerged imagines.

#### LYCAENIDAE

The most distinctive species of this large family was undoubtedly *H. virgaureae* L., and I was delighted to watch this fiery Copper flitting from flower to flower with such agility in the bright sunshine. There were a few female imagines of this species present and as the majority of males were in good condition, it was clear to me that this species had not reached full peak of emergence.

Amongst the "blues" the number of species recorded was in fact limited, and only *P. argus* L. and *L. idas* L. were reasonably abundant in sheltered pockets of wasteground. The latter species was largely confined to higher pastures and was widely distributed in the Voje Valley where individual males were particularly large with a forewing wing-span of 17 mm or more from apex to base. Furthermore, I noted that most males displayed not only narrow black marginal bands on the upper sides of the forewing but also sub-marginal black spots adjoining the black marginal band on the upper sides of the hindwing. The undersides were uniformly grey with well defined iridescent sub-marginal spots on the undersides of the hindwing: *P. argus* on the other hand was universally much smaller in size and displayed very broad black marginal bands on the upper sides of both fore and hindwing.

In the higher pastures in the Voje Valley *C. semiargus* Rott. and *C. minimus* Fuessly, was fairly common in the open meadows and were frequently attracted by patches of damp soil around the edges of paths and small tracks.

*A. agestis* D. & S. was recorded in small numbers in one small area of meadowland in the lower region of the Voje Valley. I was surprised not to encounter this common species elsewhere, and I concluded that it may in fact prove to be restricted in widely scattered colonies throughout northern Slovenia.

My most exciting discovery throughout this holiday was undeniably my discovery of a small but prolific colony of *M.alcon* D. & S. amongst meadow pasture near the village of Bohinjska Bistrica which lies a few kilometres down the valley from Lake Bohinj towards Lake Bled. Both sexes were sighted and I spent much time watching females egg-laying on young Cross Gentian (*G. cruciata*), which is one of its known food-plants. The eggs were meticulously laid in small batches around the base of immature clusters of flowers forming at the top of each plant,

and I noted that it was not unusual for more than one female to select the same plant on which to deposit her eggs. Whilst egg laying was in process, I was able to study the female at very close quarters, and on one occasion a female crawled onto my finger and then resumed egg laying with indifference! The males displayed only a light covering of blue scales on the deep brown base area of the upper sides of both fore and hindwing and no irregular spots were displayed whatsoever. The females displayed a deep brown coloration with the faintest of a blue flush around the basal region of both fore and hindwings; this was not however, a constant characteristic amongst all female imagines. The general coloration on the under sides of both sexes was pale brown with the usual series of sub-marginal and post discal spots ringed with a pale cream outer margin. This species was not encountered elsewhere, although its foodplant was widely distributed around damp wasteground areas. I concluded therefore, that this species is particularly local and probably exists as scattered colonies throughout this region.

Amongst the "hairstreaks" I only encountered a small colony of *S. spini* D. & S. flying around a clump of small juniper bushes growing in a rocky enclave not far from the hotel. This species is almost certainly widely distributed and is perhaps more frequently found in early July.

### HESPERIIDAE

There were few "skippers" apparently on the wing during this visit; this was no doubt largely due to the earlier abnormal weather conditions which may have adversely affected the general emergence pattern of most species in the area. However, I did record small numbers of *E. tages* L., *T. lineola* Ochs. and *T. flavus* Bruennich (*syn. sylvestris* Poda) as present in most meadow areas visited. I also found during the end of the week a limited number of *C. flocciferus* Zeller. buzzing around many flowers in the larger meadowland areas; all imagines appeared to be male and in good condition.

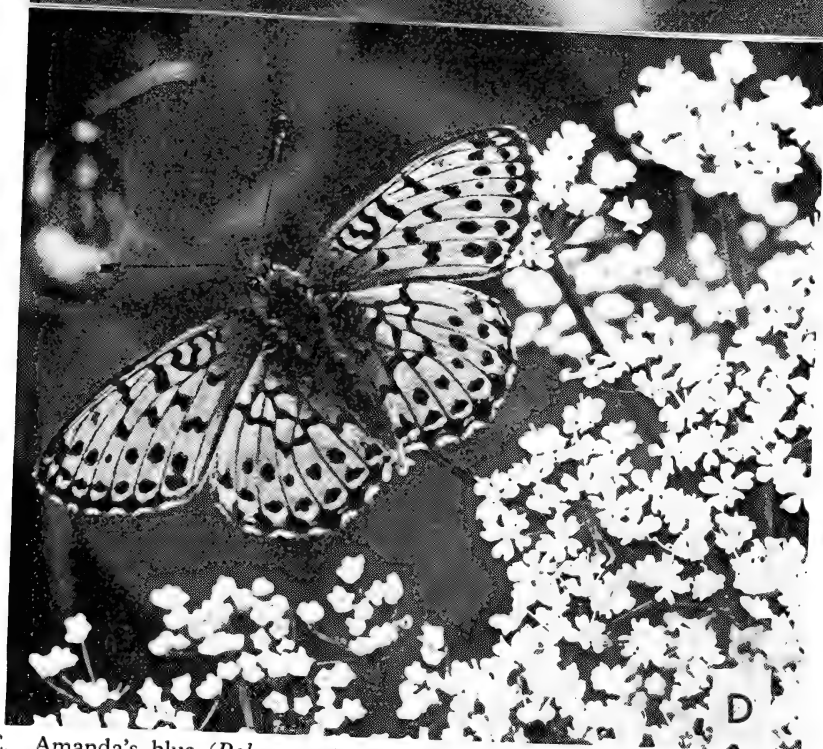
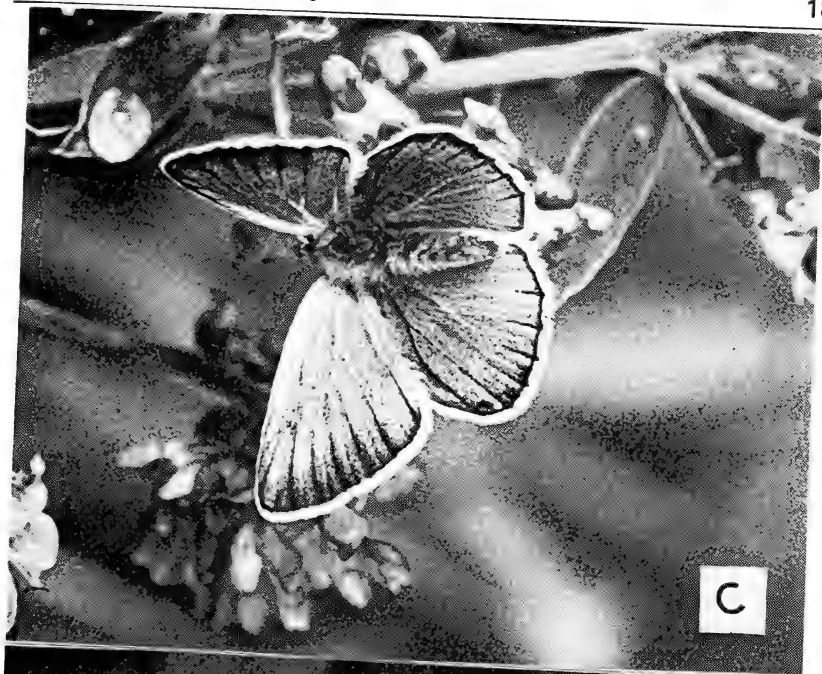
### Conclusion

The favourable weather conditions undeniably enabled me to study in the field many of the species which are widely distributed in Slovenia, and as this attractive region does not involve too strenuous exercise, I certainly recommend it as worthy of attention on the part of any entomologist who is interested in the study of alpine Rhopalocera in general. There are undoubtedly many other meadowland as well as woodland species to be found at periods of the spring and summer outside the time of my visit, which should not prove difficult or elusive to discover with a little patience and good luck!

N. F. Gossling (5169)

### REFERENCE

- HIGGINS, L. G. & RILEY, N. D. (1980). *A Field Guide to the Butterflies of Britain and Europe*, 4th Ed. Collins, London.



C. Amanda's blue (*Polyommatus amanda* Sch.), male, on vetch foodplant.  
D. Lesser marbled fritillary (*Brenthis ino* Rott.) on umbellifer.  
(Photo by Leigh Plester)

## SPAIN REVISITED — 1979

My last visit to Spain was in 1970 when I went there with Leo Coleridge and Alan Waters (vide *Bull. amat. ent. soc.* Vol. 30, Nos. 290/291) so when it came to considering a trip for 1979 we agreed that it should be Spain, we being myself, Ron Dyson, Russell Bretherton and David Lonsdale. Howard Phelps, who has regularly visited the area over the last few years, also agreed to join the party. On the 24th July Ron, Russell and I drove from Hanworth in my Commer Wanderer via Basingstoke (to pick up David) and Warminster (for Howard) to camp for the first night at Smithhaleigh camp site 8 miles outside Plymouth. We left there next morning to board the mv *Armorique* at Plymouth which sailed at 1 p.m. for Santander. The journey takes about 24 hours so we slept the night in reclining chairs which were obviously designed by the devil in co-operation with the air lines. Wiser passengers spent the night sleeping on the floor. The sea was as flat as a millpond and we arrived in Santander in a sea fog at 1 p.m. (local time). Disembarkation was very quick and we drove off via Torrelavega to turn south into the mountains at Unquera.

Our first area was to be this part of the Cantabrians where the range called the Picos de Europa juts out of the green rolling slopes. Most of the slopes carry plantations of eucalyptus and we drove up among these to stop briefly near the village of Buelles where we had a roadside snack and recorded *Gonepteryx cleopatra* and *Nordmannia ilicis*, also the Gatekeeper, *Pyronia tithonus*. This last butterfly was observed at every place we collected during our stay in Spain. Our next stop was at Potes where we made a few purchases before driving on up the San Glorio pass where we pitched camp for the night just below the top of the pass. As on previous trips we had brought all our food with us, a large ridge tent, with air beds, and sleeping bags. At this altitude the night was very cool—choughs and ravens circled the peaks above us and a shepherd was moving a large flock of sheep across the slopes. These support a variety of grasses above which grow bushes of a broom which appears to be very close to *Cytisus aetnensis*. Here flies the butterfly, *Erebia palarica*, which is only found in this area. It is the largest of the genus and in the morning we quickly found it flying along the roadside, most of the specimens being in good condition. It is stated to be on the wing at the beginning of the month so that we were fortunate on this occasion to have a late season. I also took some fine specimens of *Lasiommata maera* and in a damp valley there were both sexes of *Palaeochrysophanus hippothoe*, both past their prime.

As the sun neared its zenith we drove over the top of the pass to stop just below near a thicket of broom which covered the mountainside right up to the rocks. Here there were dozens of *E. palarica* bobbing about and in the heat of the day they started to settle on the flower heads,



mainly the field scabious, seeking the shade of the brooms. I observed one female ovipositing on the fescue grasses growing there and we took one or two females which laid quite happily on the same grass in cages. These eggs started to hatch by the time we arrived back in England. Also here there were several Marsh fritillaries, *Euphydryas aurinia*, of the typical form and in a damp area among the brooms I found a mass of *Succisa pratensis* and one female laying. After lunch we carried on down the pass to Riano. Here a dam has been built across the River Esla with the intention of forming a huge lake which will swallow the town and surrounding countryside. A new town is being constructed above the old and a new road but it appears that funds have run out and all is at a standstill.

We drove down the river valley below Riano and collected along the river bank just above the new dam. Unlike the mountains, here the insects were well up-to-date and we were too late for those species which Coleridge, Waters and I had taken previously. However Ron did find a small colony of *Laeosopis roboris* which were flying around some ash trees by the river and by agitating the saplings we were able to capture a few. They act just like *Quercusia quercus* and look very like it. The river here is teeming with trout and from the bridge I saw one monster which must have weighed in excess of ten pounds but fishing is strictly controlled. A little disappointed with this area, we drove back to camp for the night below the supports for a new road bridge just north of the town. In the evening sunshine there were a lot of butterflies on the ragwort including several *Heodes virgaureae*, the form here having small black spots on the upper forewing, and *Hyponephele lupina*. On the top of the pass the Marbled Whites were all *Melanargia galathea* but here they were replaced by *M. lachesis* with a smattering of *M. russiae*.

The next morning the sun quickly cleared the mists in the valley and we drove back up the pass to turn off into the mountains near Portilla de la Reina and explored along this road. This area was very rich in insects. In dry fields beside the road there were clumps of thistles and these were attracting a host of butterflies including *Issoria lathonia*, *N. ilicis* and *Strymonidia spini*, *Fabriciana adippe* of the typical form, *Vanessa cardui* and the pale summer form of *Melitaea didyma*. Also here were a few *E. palarica*. We moved farther along the road to where a stream ran down a valley to pass under the road. This valley was rich in vegetation and I saw both *Clossiana selene* and *C. euphrosyne*. *C. dia* was common and on a patch of *Adenostyles* flowers there were about a dozen male *H. virgaureae*. I walked with Ron up the valley towards the rocky scree at the end and netted *Erebia epiphron*, *E. meolans* and a few *Boloria pales*. Springs were gushing out of the side of the valley and I was able to refill all our water bottles here before we left.

We intended to try the Picos on the following day and drove back up *Erebia cassioides* flying in a dell just below the road. The specimens

towards the top of the pass. Here we spent a little time and I found here were much larger than those we were to take in the Picos. We discussed whether we should camp here for the night but it was agreed that we should go down to Potes, where some more shopping was undertaken (wine and bread), and we then drove on the road to Espinama where we came to the municipal camp site about two miles out. This was crowded but we were able to find a spot just above the river and settled in. Howard ascertained that the cable car which went up from Espinama to the Picos was out of action but it was possible to hire a Land Rover to take one up to the Refugio at Aliva, just below the Picos, by contacting the driver in the camp bar. This he did and the driver visited us to haggle over details. It was agreed that he would take us up next morning at 10 a.m. and collect us in the evening at 6 p.m. all for 500 pesetas each, which was cheap when we were able to appreciate what the journey entailed. Waters and I had climbed to the Refugio on our previous visit and it had taken us about four hours so I had some idea of what was in store. David decided not to come with us so next morning the four of us set off in the van in the company of a Japanese collector and his lady who were also staying in the camp. The track leads out of the village of Espinama and wends its boulder-strewn way at an angle of about  $45^\circ$  up the side of the mountain, through a series of hairpin bends to pass through a gap in the crags called Las Portillas. From here on the path is not so precipitous as it follows a water course across the mountain. The rough state of the road was well known to the driver who continually left it to drive straight across the mountainside to rejoin the road higher up. Often the vehicle was at an angle so acute that I felt that we would roll over. However we eventually arrived at the Refugio at Aliva, perched high on a grassy slope just below the bare perpendicular rocky sides of the Picos. The old Refugio had been burned and only its shell remained beside the new building. The driver agreed to pick us up again at 5.30 p.m. and we set off towards the Picos along the cattle track leading from the Refugio.

It was a very hot day and flocks of alpine choughs greeted us as we walked. We split up to explore the scree and I clambered up over the rocks to where clumps of a yellow *Genista*-like plant were growing amongst the scree. Here I soon found the small blue, *Agriades pyrenaicus*, flying swiftly among the stones and settling on the flower clumps. In 1970 I had taken only males but now both sexes were flying and I was able to take some examples. Also bobbing around the rocks were specimens of *Erebia gorge* and *E. meolans*, but no *E. lefevbrei* of which the local race *astur* is taken here. I think that we were perhaps shade of a huge rock to have lunch and compare notes. Above on the face of the crags a group of rock climbers were calling to each other and from where we were they looked like ants crawling slowly about. After lunch we went down to explore the meadows below the Refuge,

working along the fast streams coming down from the snows above. There were a few *B. pales* here and I netted one male *Parnassius apollo*. We eventually worked our way back to the Refugio to await the van. Here the nettles were thick with larvae and pupae of *Aglais urticae* and larvae of *Inachis io*. A large percentage of the larvae appeared to be affected by a virus and had collapsed into black squashy masses on the nettles. We collected some of the pupae of *A. urticae* and were joined by the Japanese collector. He had taken a lot of *C. phicomone* near the spot where the cable car terminates. As he was keen to take Apollos, I gave him my single specimen. Six o'clock came, seven o'clock came and still no Land Rover. As we had not yet paid we were not too worried and eventually a cloud of dust in the distance heralded its approach. The return journey was as breath-taking as the first, short-cuts and all, and we arrived, safe but shaken, back in camp to meet David and have supper.

The next day, 29th July, we left to drive back through Potes and then climb up the Piedras Lenguas pass towards the south. Before the pass we stopped to search clumps of everlasting pea, *Lathyrus* sp., growing along the road. On our previous trip we had found eggs of *Lampides boeticus* here and once again the flower heads were spattered with them. These were collected and during the trip they hatched and the larvae were fed on French beans, all pupating by the end of the trip, indicating how quickly each generation of this butterfly matures. The first imagines appeared on the 12th August, fifteen days after collecting the eggs. Our road took us at first south and then turning eastwards we stopped for lunch near Aguilar. By the roadside there was a boggy area where several blues were flying and settling to drink. Amongst them I took a single *Agrodiatatus ainsae*, a Spanish species very similar in appearance to *A. dolus*, and several *Everes argiades*, males. It would seem that a stop at any place in this part of Spain is likely to produce something of interest. We eventually came to the main Santander/Burgos road and crossing this we came to an area of heathland with pine plantations near to a small village. Howard had visited the area previously in springtime and thought it worth a visit. It proved to be a most exciting place for the Lycaenids and Satyrs. In the clearings and on the slopes above the pines there was a lot of wild lavender and this proved very attractive to the butterflies and burnets (*Zygaenidae*). The first notable capture was *Meleageria daphnis*, large blue males and the dark brown form of the female. These were now sitting about on the lavender heads as a storm was brewing. Large banks of cloud began to cover the sky and thunder rolled to the north as we got the tent out and began to a little early for it in view of the state of *E. palarica* lower down. Also flying here on the grassy slopes were plenty of *E. cassioides*, several of which wandered up over the screes. An occasional *Colias phicomone* dashed by and I was able to net two of them. We met together in the

pitch it in a small dell beside the road. Two foresters on horseback came along and indicated to us that the dell would flood if there was a storm so we hastily moved it up the forest path and pitched it in the lee of the pines. The ground was too stony to get all the pegs in so we tied the guys to trees and two felled logs which were piled by the track. We had started supper by the time the rain came but by next morning it had begun to clear and the sun soon shifted the mists from the valley and hillside.

The blues were still roosting and it was quite simple to inspect them before they started to fly. The majority were *A. ripartii* and *A. damon* but among them I found several *A. ainsae* which were so like the *ripartii* on the underside that it was necessary to examine the upper wings of every specimen. *L. coridon* here was quite a small race with the males having the underside lower wing much darker than our typical race. Also present were *Plebicula dorylas*, *P. icarus* and *P. escheri*. Both *M. russiae* and *M. lachesis* were opening their wings to the morning sunshine and *C. iphioides* and *Hipparchia alcyone* were beginning to fly. As the grass dried out we moved back towards the Burgos road and in an area which must have been quite wet in the spring I found a web of the Spanish fritillary, *Euphydryas desfontainii*, on the plant of a field scabious. Searching discovered several other webs in this spot and we were able to bring one or two home with us. Mine took to teasel, *Dipsacus fullonum*, in my garden and quickly formed a winter web where they rest at present. In the afternoon we drove via Burgos to the village of Monasterio de Rodillo where I had visited in 1970. Here there is a limestone escarpment below which there were fields thick with butterflies but we were greeted with ploughed land right up to the chalk and apart from a few skippers, *Muschampia proto*, and the Hairstreak, *Nordmannia esculi*, all was very disappointing. I climbed up and walked across the chalk scarp in the hope of seeing *P. apollo* which occurs here in a very well-marked form but had no luck. David was more lucky with his beetles on some waste land opposite the little church at the entrance to the valley. Towards the end of the afternoon we drove back through Burgos and took the road towards Soria arriving at the village of Abejar in the cool of the evening after a pleasant ride through thick pine forest which covered the mountains. Taking a road out of the village we climbed up into young pine plantations which overlooked a vast lake and here we pitched camp for the night. Nightjars filled the evening air with their churring and we saw an occasional bird silhouetted against the skyline.

Howard had information of a locality for both *Maculinea alcon* and *M. nausithous* in the vicinity and in the morning we took a long walk across the hillside towards this place. Along the way were strange sheep pens in which the sheep can shelter from the sun. These were large flat

structures with pantiles and the smell was quite appalling. We eventually reached the locality which was a valley full of flowers, damp and with a stream running down it towards the lake. I expected to find the plant *Sanguisorba officinalis* which is the primary foodplant of *M. nausithous* and some species of Gentian, the foodplant of *M.alcon*, but neither appeared to be present nor were the two butterflies. I walked the length of the valley without success. There were a lot of freshly emerged *C. iphioides* and one or two of a species new to me, *Aricia morronensis*. This butterfly is local and is associated with a large-flowered pink storksbill; the upperside is similar to *A. agestis* but the underside is browner and the spots are large and very dark. I took one beautiful female *A. adippe* of the form *chlorodippe* and slipped into the stream doing so. The water smelt foul and was obviously waste water from the village running into the lake. Quite common here was the Mazarine blue, *Cyaniris semiargus*, the imagines being very large and at first mistaken for a *Maculinea* species. The sun was now becoming very hot and we left the valley to walk back to the camp. I found several webs of *A. crataegi* on scrubby hawthorns along the way and we saw several migrating *Pontia daplidice* flying across the slopes which the sheep had grazed almost bare.

We then drove down through the village and along the road to Soria stopping a few miles out of the village to collect in woodlands beside the road and railway line. In the clearings in the woods there were four species of Hairstreak, *N. ilicis*, *N. esculi*, *N. acaciae* and *S. spini*, the Fritillaries *Argynnis paphia*, *M. aglaia* and *F. adippe* and one or two *Pandoriana pandora*. *Brenthis ino* was very common and also *C. dia*. There were large open fields in between the clumps of woodland and here the cranesbill, *Erodium cheilanthifolium*, grew thickly. The flowers were only occasional but the fern-like crowns of foliage carpeted small areas. We found *A. morronensis* commonly here and I was able to watch a female laying her eggs on the upper surface of the leaf fronds. As this was now 1st August and the butterflies were quite fresh it would appear that this species is double brooded, the eggs now being laid giving rise to the first brood next spring. As I walked back towards the road I met another collector and we conversed in French. He was an Italian and took me to be German but when Ron arrived and spoke in English we overcame the misunderstanding and finished the conversation in English. He was travelling north and had just stopped off on seeing me across the meadow. We had lunch in the shade of some pines by the railway crossing and it was now so hot that collecting became somewhat desultory. Later in the afternoon we drove back to the camp and just outside the village we found *A. morronensis* along the roadside. I disturbed a newly emerged *Nymphalis antiopa* sitting on a log beside the roadway but it sailed away out of net reach.

The weather was continuing hot with only light cloud and it was

difficult to appreciate that in this part of Spain the winter temperatures drop down to  $-20^{\circ}$ . On the morning of 2nd August we broke camp early and after shopping for necessities in Abejar we drove off on the road to Soria, a main arterial road but with an atrocious surface which kept our speed down to 40 m.p.h. The road continued south-west to Calatyud and Daroca and then south via Monreal del Campo to Torremocha de Jiloca where we came off the main road to Teruel to drive into the massif of the Montes Universales towards the village of Bronchales. We stopped for a short while on the top of a plateau of scrub-dotted limestone where a continual stream of *P. apollo* was moving across, travelling westwards into a breeze. Both sexes were present and were of the form found in these mountains, the females very large and heavily marked with large red spots and the majority of males having a red spot on the front edge of the forewing similar to *P. phoebus*. We left this rather bleak area and drove through Bronchales via a forest road towards the village of Griegas. The road leads through thick pine forest with fairly frequent clearings and we drew into one of these to camp. After unloading our gear we drove down to collect in meadows where I had been on my previous trip. Here we found *Lysandra coelestissima* in large numbers on the grasses together with *A. damon*, *A. fabressei* and *P. doyrilas*. *A. fabressei* is very like *A. ripartii* but the black spots on the underside are generally better defined and the white streak is missing. However several do have the white streak and I found a pair in copula, one with and one without. David had stayed up on the forest and found some beetles but throughout the trip Coleoptera were few and far between. Russell found a large oil beetle with orange/red bands at the abdominal joints and there were a few Longicornia on the flower heads. Back in camp we were plagued by thousands of minute midges which bit Ron rather badly on the arms and legs but did not seem to affect anyone else apart from the irritation.

Next morning was spent down in the meadows and in the pine woods above, which covered the stony slopes. Here I took our first *Erebia zapateri* and we found it to be fairly common in the woodland clearings. They were just emerging and were mainly males. There were thousands of *L. coelestissima* on the wing and Howard took a female of the blue form similar to *f. syngrapha* of *L. coridon*. In the damp parts of the meadows where a stream ran there was a dense growth of *Sanguisorba officinalis* but no *Maculinea*. The commonest butterfly here was *Brenthis ino* while along the pathside where banks of thistles grew there were all the large fritillaries, including *P. pandora* and *I. lathonia*. All the *F. adippe* were the form *chlorodippe*. *P. apollo* was also common and I was able to take several mated females for egg laying. After mating the female has a horny protuberance on the underside of the abdomen. These laid quite happily in a plastic box with pieces of *Sedum* in the bottom.

After lunch we drove to the village of Orihuela to get petrol and some bread and wine. Here we nearly suffered a disaster. Above the village we pulled into a small garage and filled up the tank. We then went down into the village to the shops and as we drove back up the hill to pass the garage the engine began to bang and black smoke poured out. There was virtually no power and I thought the cylinder-head gasket had gone. We crawled into the garage entrance and I looked down on the pump from which we had recently filled and read not 'Gasolina' but 'Gasoleo' (Diesel fuel) and realised what had happened. For the next two hours we drained the tank of its twelve gallons, jacked up on a ramp. In jacking up, the garage owner managed to fracture the exhaust pipe but eventually the mixed fuel was removed and we refilled with petrol. With many bangs and clouds of black smoke the engine was started and after settling up with the garage owner we drove back through the pine woods to collect in a hidden valley where I had once taken *I. iolas*. This is a beautiful spot reached by following the course of a stream back through a gap in the rocky slopes. There were plenty of butterflies here, particularly on the clumps of thyme growing in the clearings by the stream. *P. nivescens*, like a bleached *P. dorylas*, and *Heodes alciphron* were of particular interest, the latter being large and brightly coloured, *f. gordius*, the males having no purple reflections. We again found *E. zapateri* present, all males. It was a hot and exhausting day and we rejoined the midges in the evening where I did a temporary repair of the exhaust with the aid of an empty peach tin.

Saturday morning broke as hot as ever and we went down to the meadows again for a while but were disturbed by a large gathering of locals who arrived in a miscellany of vehicles including a tractor and proceeded to hold a barbecue beside the fountain spring on the hillside. After our own lunch we left and took the road towards Noguera where we were able to knock up a shopkeeper for provisions. Shops in the villages are difficult to find and this one was in the cellar of a house with no outside sign or indication. It was very cool there and contained wine in barrels, fruit, cheese and other foodstuffs. The old lady who kept the shop was charming and most helpful, despite our having roused her from her siesta. From Noguera the road winds down towards Albarracin and beside the River Guadalaviar. Turning off we crossed the river and took the road towards the village of Moscardon through a plain of wheat fields. The metalled road finishes at the village and from then on we were on a forest road of fine stones which winds up into the mountains beyond towards a village set high in the hills. Some distance before the top of the col we were able to pull off into a track where there was sufficient ground to pitch a tent. As I got out of the van I saw a group of *L. coelestissima* females on a clump of *Eryngium* flowers and one of them opened its wings to betray that it was the rare blue form. After we had pitched tent we spent the evening exploring the rough slopes

around. Above were pine clumps and below deserted terracing which was alive with butterflies now beginning to roost. With our appetites whetted by the blue female we spent the evening examining the thousands of roosting *coelestissima* and I found three further blue specimens in an area of a few square metres, bringing the total found to five for the trip. On the bare patches of the terracing I disturbed a Grayling-like butterfly which turned out to be *Arethusana arethusa* and further investigation produced several more of both sexes.

We were up early next morning, Sunday, 5th August, and were again able to examine the blues before the sun was strong enough for them to fly. I observed one which at first glance appeared to be deformed as one wing was larger than the other—I then realised that while the underside I could see was male, the protruding wing was female. An inspection of the other side confirmed that this was indeed female and as it opened its wings to the morning sun I saw my first live halved gynandromorph. I was able to photograph it before boxing it. As the sun became warmer we found *E. zapateri* flying amongst the pines and I was able to take a female, the underside being brown instead of blackish as in the male. Howard suggested that we might explore the top of the col and we drove up to explore the open land overlooking the village. The difference in altitude made quite a change in the insects on the wing—there were only male *coelestissima* flying and a lot of *A. damon* males and very little else. Earlier on a previous visit Howard had found *P. amanda* here but it was obviously too late now. We then drove back through the village of Moscardon to the valley just beyond the village where I had spent much fruitful time with Coleridge and Waters in 1970. The spring (fuenta) in the middle of the valley has become a tourist attraction and a vast throng of people were there with a permanent barbeque, car parking lots, etc. On our last trip we had sat here quietly to eat our lunch. This time we only filled our water containers and ourselves from the spring and left. However, at the end of the valley where the stream runs down through wooded clearings there was no one to disturb us and we spent a few hours exploring. Several *Limenitis reducta* were sailing round the shrub honeysuckles and on one of these I found a web of larvae of *E. aurinia beckeri*. Among the pines were more *E. zapateri* and on the slopes I took another *P. nivescens*. Here were the usual host of *L. coelestissima*, one or two *L. albicans* and *Brenthis hecate*; several female *Colias australis* were laying their eggs on Horseshoe vetch. On the slopes were groups of Bladder Senna, *Colutea arborescens*, the foodplant of *I. iolas* but the dried bladders had only frass in them and large exit holes. We had our lunch under a tall lone pine and David reported that a herd of cattle had recently charged through the area, startled by a sonic boom high overhead. However we had an undisturbed lunch and afterwards collected lower down near the road where some reforestation had taken place. There were dozens of butterflies here



flying over the grassy ridges between the small trees and congregating on the clumps of thistles. *A. arethusa* was very common, also *Brintesia circe* with a few *Satyrus actaeon*. The day was extremely hot and by 4 p.m. we were ready to leave to drive down the gorge of the river to Albarracin.

This area was very good on a previous visit earlier in the year but now it presented a parched landscape apart from the belt of trees along the river edge. We did not stop in Albarracin but drove through and took a stony dirt road to an upland camp site beside the caves noted for some prehistoric wall paintings. This proved to be a very pleasant spot with a spring coming out of the rocks where hundreds of honey bees were drinking. We camped under the pines and took a well earned rest. In the morning we struck camp, delayed for a while by a French entomologist and a German who had been collecting in the south with some success. After a brief stop for shopping in Albarracin, little changed since my last visit, we drove down to just below the tunnel where we parked. The slopes just above the river and the rocky ravines leading back from it are one of the localities for the large Grayling, *Chazara prieuri*, together with several other interesting species. These included the Satyrs *H. statilius*, *P. fidia*, *C. briseis* and *S. actaeon*. The commonest blue was *L. albicans* with hundreds swarming on damp patches by the river, all males, and females flying on the slopes above. Also present were *A. fabressei* and *Aricia cramera*. Bath Whites and Clouded Yellows kept flying across the slopes and quite a few *G. cleopatra*. *C. prieuri* were scarce but both Ron and Howard took specimens. The temperature rose very quickly as mid-day approached and we bathed in the river and ate our lunch in the shade of the poplars by its edge. After lunch I made my way up one of the dried-up gulches until I came to a trickle of water and here were hundreds of butterflies clustered on the muddy flats drinking. The commonest were the Skippers, *M. proto* and *H. comma*, and *L. albicans* but with them were all the Satyrs we had seen apart from *prieuri*, *I. lathonia*, *G. cleopatra* and *V. cardui*. One could have covered several dozen at a time with the net. I left the gulch and climbed up on the stony slopes where Thujas were growing and providing intermittent shade patches. Here were the remainder of the butterflies and I was able to take a fine female *prieuri* of the brown form *uhagonis* which I first took to be a large *H. semele*. It was sitting in the shadow of a thuja along with several blues and other satyrs and one had to disturb them to make them fly. Dehydration is a major problem in the furnace-like conditions that occur in these rocky areas as the sun reaches its zenith and the alternatives are to seek shade or the damp patches. In the evening we drove back towards Albarracin and camped in a free camping area beside the river. I collected some grasshoppers in the meadow by the road and tried to lure some of the big trout that hovered in the stream immediately below the tent but they

were a bit too crafty and ripped off the bodies of the insects without being hooked. This had been our hottest day for the trip and it stayed warm all night. Other campers were keeping fruit and wine cool by suspending them in the river.

In the morning, the 7th August, after a short stop below the tunnel once again, we started our northwards journey for home. This we broke at our previous camping spot just north of Burgos and spent an hour or so the next morning collecting, taking the same species as previously with the addition of both sexes of *S. actaeon*. It was a misty morning and we took the N.623 for Santander and made good time until we started the climb into the Cantabrians when we became enveloped in mist. The pass is a nasty one at the best of times and with almost nil visibility and a huge lorry both fore and aft it seemed positively dangerous and after a long haul up and a snaky long crawl down we were glad to come into the coastal hills where visibility was better. Howard had information of a good locality near the coast by the village of Novalles and we eventually came out on top of a pass overlooking the village and the sea. Here we made camp in the evening sunshine at the foot of a stone quarry where we had to use eucalyptus logs to anchor the tent as the ground would not take pegs. While I prepared supper the others explored the eucalyptus plantation below the road and discovered both *Minois dryas* and *Maculinea alcon* while Russell took the skipper *Heteropterus morpheus*. In the quarry I found a newly emerged Garden Tiger, *A. caja*, and several *E. quadripunctaria*, the Jersey Tiger, were flying. Recent rain made the undergrowth very wet and collecting was pretty uncomfortable. Also it was considerably cooler than it had been two days earlier.

In the morning we spent a short while again collecting among the trees but with little success and then left to drive along the coast into Santander to board the ferry back to Plymouth. We sailed at 3.20 p.m. and met some of the weather that was to culminate in the storm that destroyed so many racing yachts. The rough sea had its effect on several members of the party and David suffered most throughout the trip. Things calmed down as we crossed the Channel and we had an uneventful journey via Warminster and Alton after landing at Plymouth and I arrived back in Feltham around 11.30 p.m. after a diversion to get petrol at the only station open, on the M3 at Fleet. Russell and Ron still had to drive home from there in pouring rain and did not get home until the early hours of the next morning.

During the trip we covered more than 1,100 miles and recorded at least 127 species of butterfly, plus several species of burnet, and beetles yet to be sorted out by David. The initial cost for fares and transport of the vehicle, insurances and camping club fees, food and gaz was £140 each and the cost of petrol and miscellaneous items in Spain (wine, fruit and camp fees) came to a further £35 each. I had taken three new

species of butterfly and we had been able to explore and collect over a wide range of beautiful and exciting terrain.

P. W. Cribb (2270)

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### COLLECTING IN BRITTANY, FRANCE SUMMER 1980

Last summer I spent a family holiday in Brittany, staying in a number of country cottages which afforded many possibilities for exploring and collecting on a bicycle. I was principally interested in Coleoptera, Lepidoptera and Orthoptera but also in catching some reptiles and amphibians alive.

The Coleoptera of Northern France is not dissimilar to that of southern England but some species are found there which are not on our side of the Channel and there are several which are much more abundant than in this country. In the latter category I noted particularly the stag beetle, *Lucanus cervus*, of which I found six, three of each sex. Every specimen was either on a road or just by it, and two of them had been killed by a car when I found them. I should be interested in any explanation for their apparent attraction to roads.

One very abundant species in France which occurs in England, though I have never seen one here, is *Timarcha tenebricosa*, a large black Chrysomelid with a defence mechanism of bleeding around the mouth when alarmed. These were often found in hedgerows, especially on bramble leaves. Many smaller leaf beetles were also in abundance, including *Leptinotarsa decemlineata*, famous as the Colorado beetle, of which I have three specimens collected from near potato fields. I also found a number of large Carabids such as *Megadontus purpurascens* caught in pitfall traps, a species which I believe does not occur in Britain.

The group with which I was most impressed in terms of its variety and abundance compared to this country was the Orthoptera. I collected a male and female of *Tettigonia viridissima*, the great green bush-cricket, a very impressive insect when seen alive. One of my specimens bit me quite painfully when I picked it up in my fingers. The large and colourful grasshopper *Oedipoda germanica*, absent from Britain, was also in evidence in habitats such as grassy sand dunes. I also found a single *Stenophyma grossum*, the large marsh grasshopper, a number of *Conocephalus discolor*, the long-winged cone head, one *C. dorsalis*, short-winged cone head and some *Platycleis denticulata*, grey bush crickets.

Amongst the Lepidoptera I was fortunate enough to see in southern Brittany two specimens of *Papilio machaon*, the swallowtail butterfly, neither of which I was able to catch. I did, however, obtain some *Everes argiades*, the short-tailed blue which is very rare in Britain and some *Thymelicus lineola*, Essex skippers and *Melitaea cinxia*, Glanville fritillary which are species of restricted distribution in this country.

Of the other insects I collected some Diptera, mainly *Eristalis* hoverflies and one *Asilus crabroniformis*, a black and yellow robber-fly. The most common Hemiptera were various shield-bugs, Pentatomidae, and some pond surface-dwelling bugs. Some of the Odonata were very attractive, in particular the large green dragonfly *Aeshna cyanea* and some damselflies, *Agriion virgo*, which have brown tinted wings.

During the holiday I also captured one green lizard, *Lacerta viridis*, some wall lizards *Podarcis muralis* and two slow-worms, *Anguis fragilis*. The best area for lizards, and also for many insects, that I discovered was *Le Point du Petit Minou* on the coast near the city of Brest where I spent many happy days in pursuit of various quarries.

I wish to extend my most grateful thanks to M. Boeuf of Brest who gave me valuable assistance with the identification of my Coleoptera, Dr. Irwin of the Castle Museum, Norwich who permitted me to use the museum's books and collections to identify many of my insects and Mr. D. Tozer of the A.E.S. advisory panel who identified my smaller and more difficult Coleoptera.

Robert Harvey (69041)

## TENDER TASTE AND TOUGH TERRAIN

We can quote hundreds of examples of lepidoptera caterpillars which depend only on closely related foodplants. This is what we normally expect of them. We assume that such plants should have similar chemical and nutritional qualities, and should "taste" similar, if indeed we presume that insect larvae have a sense of taste comparable to that of vertebrates. For arguments sake, let us call a foodplant list of this kind a logical "botanical" selection.

How do we then explain why some lepidoptera species cherish, instead, a remarkable repertoire of botanically very distantly related foodplants—apparently illogical choices which miss out large numbers of more nearly related plant species in between the extremes? Are these exceptions to the rule, or should we try to formulate new rules? I suggest that some of these naturally evolved larval dependences upon distantly related foodplants may be the consequence of certain enforced restrictions of habitat usage on the part of the adult insects. Thus environmental pressures may sometimes over-rule botanical logic. Such a foodplant list may be called an "ecological" selection.

Some examples will clarify the idea.

Firstly, many British Noctuid moth larvae are given in South, 1961, as feeding generally upon "low-growing plants". The botanical diversity of these may be enormous, embracing ten to twenty or more different families, but we never realise that they all have rather similar growth forms, grow (often together) in similar places, and are equally accessible to the low-flying moths themselves.

Secondly, most of the world's Saturniidae are arboreal (tree-dwelling) in habit. Their larvae are thus often "trained" in the wild to accept a selection of botanically very contrasting trees which again may have in common only their similar size, growth form, and co-existence. If we think about it, we already accept this. We don't offer herbaceous Rosaceae foliage, like Meadowsweet or Strawberry, to captive Saturniid larvae usually found on trees in the Rosaceae family, like Plum or Cherry. We turn to other *trees*, if alternative greenery is required.

To my mind, two of the most remarkable butterfly examples of ecological foodplant adaption in Great Britain are the Green Hairstreak (*Callophrys rubi* L.), and the Holly Blue (*Celastrina argiolus* L.). Both species are arbustual (shrub-dwelling) in habit, almost regardless of botanical affinities, although ancestral *C. rubi* probably evolved through a botanical loyalty to the Leguminosae (Peaflower) family. Nowadays, however, *C. rubi* will eat well nigh anything bushy, woody, and deciduous, provided it grows in those dry, exposed, heathy places demanded by the adult butterfly. *C. argiolus* has disciplined itself towards lower-lying, better watered habitats, such as old hedges which border woods, meadows and gardens, and its larva has likewise adapted itself to a remarkably wide diversity of shrubs, including tough evergreens. With each of these species, therefore, diet has, to a significant degree, been dictated by habitat. Neither foodplant list has an over-riding botanical logic. One wonders how many generations it must have taken to develop such a wide range of tolerances.

To the serious lepidoptera breeder, the implications of ecologically-enforced foodplant selections could be interesting. Supposing, for example that *Ornithoptera* favour *Aristolochia* vines partly because the vine growth form happens to be compatible with the necessary flight behaviour of the adults? We then get to wonder what other *vines* may grow in the same countries, and the same habitats, never mind how unlike *Aristolochia* they may be in flower structure. What other climbing plants are native or growable in England anyway? We can but experiment—we have nothing to lose but our caterpillars.

Research into botanical and ecological foodplant adaptations could also be fruitful to the student of insect evolution. What clues do various dietary patterns offer as to the recent-ness or antiquity of the species themselves; or, in other words, is it reasonable to theorise that polyphagous insects must have been around longer than monophagous ones?

How often can we identify the changing environmental pressures which may have dictated the more unusual foodplant selections we have observed?

At this moment, I cannot think of a single *butterfly* in the world which has yet succeeded in associating itself with any of our more primitive *non-flowering* plants. Not one. Is this really so? Has not even one of the world's hundreds of tree-and-shrub-dwelling *Theclinae* species been forced, as yet, to sample a tough Pine or Juniper in some remote sandy wilderness? And if not, why not?

Certain moths, among their vastly greater diversity, have already bridged this gap. But not so many, and presumably these few must be comparatively recent departures from the norm, for most of them still have obvious relatives confined to the flowering plants. We cannot believe that any modern moths committed to mosses, lichens, ferns, or conifers, for their survival, would be evolutionally as old as their food-plants!

But what about some of the oldest living plants of all, the Clubmosses, Horsetails, and the strange *Ginkgo* tree? I bet there isn't even an enterprising moth alive today whose larva has yet stretched its jaws into such fossil foliage.

These are intriguing trains of thought. Any comments, criticisms, or additional data, from readers, would be received with much interest.

Brian Wurzell (3718)

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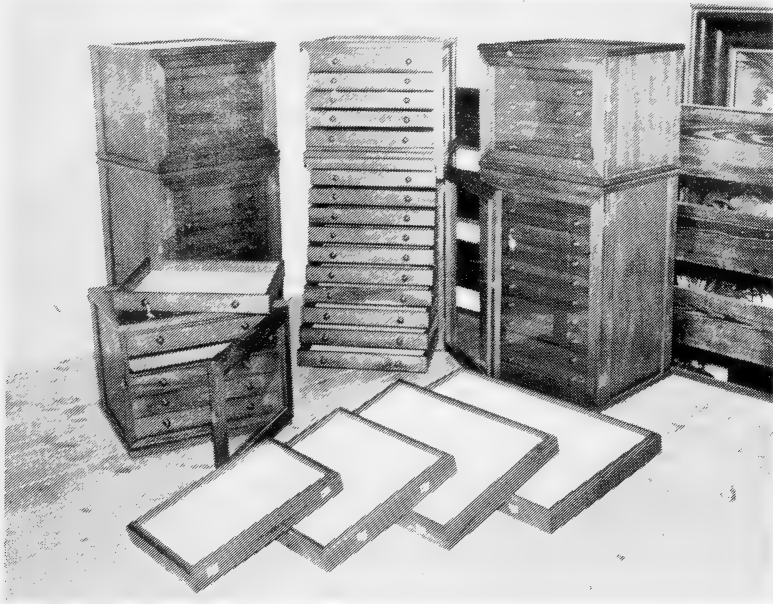
#### INTERLUDE

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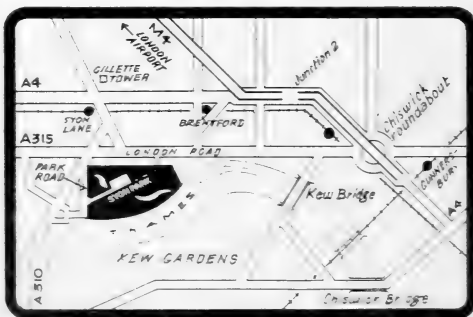
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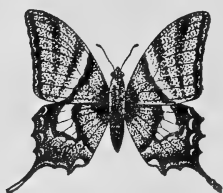
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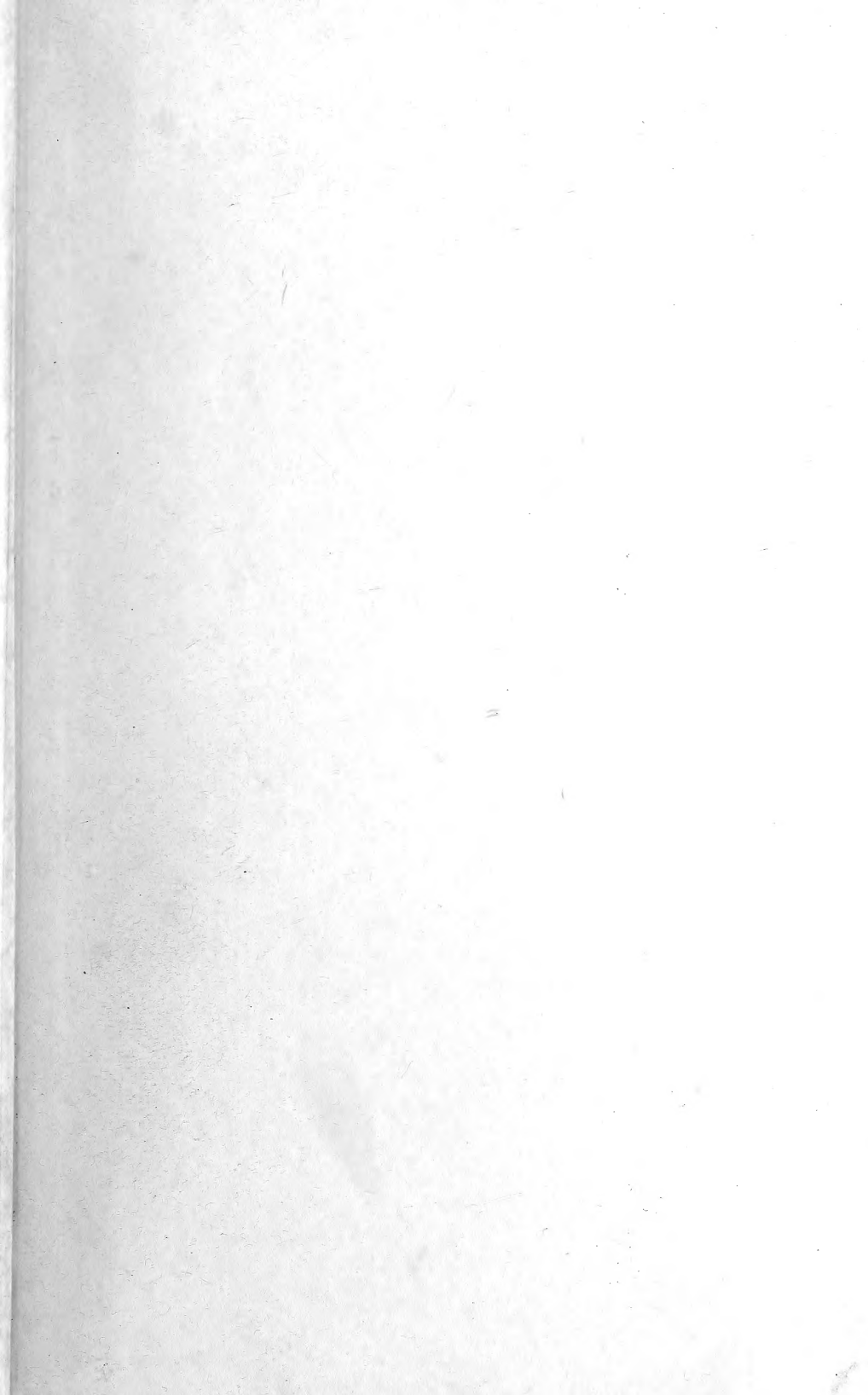
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