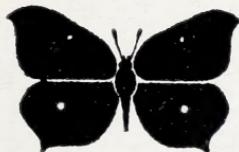


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VOLUME 39



1980

THE BULLETIN OF THE AMATEUR ENTOMOLOGISTS' SOCIETY

WORLD LIST ABBREVIATION:

BULL AMAT ENT SOC

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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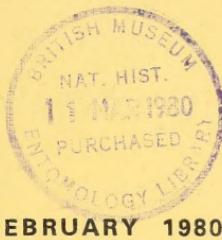
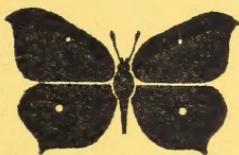
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BRIAN GARDINER FLS FRES

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(Founded in 1935)

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EDITORIAL

Sadly, as no doubt our members already know, for it was widely reported in the National Press, the Large Blue butterfly as reported by the Nature Conservancy, must now be considered extinct in Great Britain. But who knows. Have we not had the same report about the Rosy Marsh moth and then, a century later and a couple of hundred miles from its last reported habitat . . . Already rumours of *arion* near L . . . have reached us. But perhaps it is to be again in our grand children's time, as before . . . Meanwhile we live in hope.

Problems will arise this year with our annual exhibition. After 3 yearly changes of venue we thought we had found the ideal site in good old "Ally Pally" which all to whom your Editor spoke agreed was the best site yet. But the owners have decided to vandalise — beg pardon — "modernise" the place. This apparently means 18 months demolition/construction work which, when finished, will doubtless mean that only Arab oil magnates can afford to hire the place. Perhaps that is the idea. Inevitably these schemes always seem to give a savage upward twist to the inflation spiral. Meanwhile both it and Wembley are unavailable this year. Your exhibition committee is nobly doing its best, but it does look like "back to school" this year, which unfortunately will mean some curtailment of numbers on purely safety grounds.

NEWS FLASH

Annual Exhibition 1980 will be held on Saturday, 27th September 1980 at the "Old Hall", Royal Horticultural Society, Westminster, London, SW1. Further details in May Bulletin.

TO A GLOW-WORM

Beneath the hedge or near the stream,
A worm is known to stray;
That shows by night a lucid beam,
Which disappears by day.

William Cowper

Bright stranger, welcome to my field,
Here feed in safety, here thy radiance yield,
To me, O nightly be thy splendour given!

O could a wish of mine the skies command,
How would I gem thy leaf with lib'ral hand,
With ev'ry sweetened dew of Heaven.

Peter Pindar

Gem of the lone and silent vale,
Treasure of evening's pensive hour!
I come thy fairy rays to hail,
I come a votive strain to pour.

Mrs. Opie

When evening closes Nature's eye,
The Glow-worm lights her little spark,
To captivate her favourite fly,
And tempt the rover through the dark.

Montgomery

ANNUAL EXHIBITION, 1979

The Meeting was held at Alexandra Palace on Saturday, 15th September and the choice was fortunate. Due to circumstances beyond our control, we have suffered 3 changes of venue in 3 years making planning difficult and inconveniencing our visitors. The Palace suited us admirably with ample room for exhibitors, excellent free parking and a cost within our means. Most people agreed that this was an ideal setting for our Exhibition and every effort is being made to book for the future. This year the weather was perfect. An impressive number of members and friends attended and the inevitable Security Guards, realising it was far beyond their capacity to search the numerous packages arriving, preferred to trust our integrity.

Two Junior projects were outstanding. A. Kirk-Spriggs received the 'Ansorge Award' and J. Walters, the 2nd Junior Prize. After these, it was disappointing that only a few other Juniors entered. It was hoped that at this early date they would have an abundance of living material and this makes a first class exhibit.

Most of the leading Entomological Dealers and some general Natural History Dealers were present, offering a comprehensive range of books, equipment and dead and living material. The Society's publications were well displayed and the Wants and Exchanges Stall dealt with Members surplus goods. We omitted a special feature this year, waiting until we had assessed the facilities available and in place, P. W. Cribb gave a much appreciated 'Setting of lepidoptera' demonstration. Refreshments were available from the resident buffets.

A special vote of thanks is due to the Organiser, Bernard Skinner, assisted by Peter Cribb, Colin Hart and Eric Bradford whose meticulous planning contributed so much to the smooth running. Also the many Members, their families and friends for their hard work behind the scenes.

Some of the Societies present are listed below followed by details of the exhibits, compiled mainly from personal summaries.

**BRITISH BUTTERFLY CONSERVATION SOCIETY
BRITISH ENTOMOLOGICAL & NATURAL HISTORY
SOCIETY**

CONCHOLOGICAL SOCIETY

MONKS WOOD BIOLOGICAL RECORDS CENTRE

A.E.S. CONSERVATION GROUP. A series of colour prints illustrating the appeal of insects and emphasising the need to recognise their habitat requirements. (D. Lonsdale 4137 and P. W. Cribb 2270).

A.E.S. EXOTIC INSECTS GROUP. The wide range of silkmoths bred by Members, copies of the Journal and surplus material for sale.

BAYLIS, R. M. E. (5930) Collection of typical Mediterranean lepidoptera from Calella de Palafrugell, near Gerona, June/July, 1978, from the immediate fields and scrubland.

BRETHERTON, R. F. (4320) 11 Skipper butterflies (Hesperiidae) from Spain including Sandy Grizzled Skipper (*P. cinarae* Rambur ssp. *clorinda* Warren) S. de Albarracin, 1979, a new locality.

CARTER, T. (6178) Coleoptera from Lincolnshire, forms of the Large Heath Butterfly (*C. tullia* Hubn.) from its most southern English locality and colour range in the females of the Common Blue butterfly (*P. icarus* Rott.)

CHALMERS-HUNT, J. M. A perfect albino of the Meadow Brown butterfly (*M. jurtina* L.) from W. Kent, 1979.

CHEESEMAN, V. Mrs. (6386) Larvae of the Elephant Hawk-moth (*D. elpenor* L.), Buff Tip moth (*P. bucephala* L.) and cocoons of the Puss moth (*C. vinula* L.) from Mitcham Common, Surrey.

CRIBB, P. W. (2270) Record of 127 species of butterfly from a Spanish trip, 26.7. to 9.8.79, covering various localities in the Cantabrian Mountains, Burgos, Soria, Montes Universales and Santander. 13 species of particular interest were shown including 6 peculiar to Spain: Foster's Furry Blue (*A. ainsae* Forster) Oberthur's Anomalous Blue (*A. fabressei* Oberthur) Spanish Heath (*C. iphiodes* Staud) Chapman's Ringlet (*E. palarica* Chapman) Zapater's Ringlet (*E. zapateri* Ober.) Spanish Argus (*A. morronensis* Ribbe) and 1 N. African species with a few Spanish localities Southern Hermit (*C. prieuri* Pierret).

DERBYSHIRE ENTOMOLOGICAL SOCIETY. Type collection of butterflies and larger moths with notes on distribution in Derbyshire. Similar exhibit of micro-lepidoptera and distribution. Collection of Derbyshire Hoverflies (Syrphidae). In connection with Agriculture Development Advisory Service, photographs and captions illustrating the damage to bees by uncontrolled spraying.

DYKE, R. (4182) Local species of moths taken in Scotland, late July, including the Welsh Clearwing (*A. scoliaeformis* Borkh.) which was collected freely from Birch trunks, in daytime.

DYSON, J. A. (5784) Rhopalocera taken in the Gorges du Tarn, Massif Central, France, 29.7.78 to 1.8.78. *L. coridon* Poda. (Chalk-hill Blue butterfly) from Portland Bill, Dorset, showing forms of *obsoleta* and *caeca*.

DYSON, R. C. (91) Butterflies recorded from the Algarve, Portugal, 14.4.79 to 20.4.79. Of the 12 species, 9 were on the British List with 3 continental species, Scarce Swallowtail (*I. podalirius* L.), Green-striped White (*E. belemia* Esp.) and the Spanish Marbled White (*M. ines* Hoff.). Type specimens of 40 species of butterfly from the 127 recorded on the A.E.S. trip to Central and Southern Spain (see P. W. Cribb). Typically there were 6 species of Mountain Ringlet Butterflies (*Erebia* sp.) and 25 'Blues' (Lycaenidae), some confined to this corner of Europe.

GARDINER, B. O. C. (225) Live specimens of *Dipetelogaster maxima*, the World's largest bloodsucking bug.

GEORGE, A. M. (5397) Moths of the Ruislip and Northwood area of Middlesex. Variation in British lepidoptera. Larvae of the Fox moth (*M. rubi* L.) and Double Square-spot moth (*A. triangulum* Hufn.)

GOSSLING, N. F. (5169) Butterflies collected in Andorra, June/July, 1979 with supporting map, check list and notes on habitat. Included was an unusual aberration of *B. pales pyrenesmicens*, a sub-species of the Shepherd's Fritillary (*B. pales* Schiff.)

HADLEY, M. (5315) Interesting selection of worldwide Orthoptera (Grasshoppers and Crickets). Live Stag beetle (*L. cervus* L.) from Silwood Park, Ascot, Berks. Wealden macro and micro-lepidoptera, especially migrant species.

HALSTEAD, A. J. (6346) A comprehensive collection of British Sawflies taken mainly in Surrey. They covered all the families, Argidae, Cimbicidae, Diprionidae and Tenthredidae, the major family in this sub-order with some 400 British species. The brief notes on the species shown, indicated the more serious garden and agricultural pests.

HAMMOND, C. O. (F.R.E.S.) 8 of the original 20 colour plates prepared for the 'Dragonflies of Gt. Britain & Ireland', published by the Curwen Press in 1977.

HILLIARD, R. D. (99) The Great Oak Beauty (*B. roboraria* Schiff.) and larvae hibernating on potted oak. The female was taken at light in the New Forest where the species was common, in 1979.

HOUGH, M. An exotic papilio, the Orange Dog (*P. cresphontes* L.) found flying in Harrow, N. W. London.

JACKSON, F. A. Collection of Hoverflies (Syrphidae), from localities in Derbyshire, during 1979.

JAMES, R. J. (5005) Specimens, colour photographs and notes on breeding the Broad-bordered Bee Hawk-moth (*H. fuciformis* L.) A second brood of the White Admiral butterfly (*L. camilla* L.) bred in confinement.

JEWESS, P. J. (5428) Melanic larvae of the Pale Tussock moth (*D. pudibunda* L.), dark grey overall replacing the usual red, white and

yellow colouration. Also notes on this form.

KIRK-SPRIGGS, A. (Member of the St. Ivo N.H.S.). An outstanding project on the British *Necrophorus* and *Negrodes* (Burying beetles), large black insects, some with orange bands and strong fliers. They act as scavengers of animal carcasses. The exhibit included specimens, detailed pencil drawings and descriptions of the species shown. *FIRST JUNIOR PRIZE* (Ansorge Award).

LE PARD, G. F. (4162) An illustrated selection of insect folklore and traditions connected with grasshoppers, dragonflies, crab apples and house crickets. Collection of British moths set to show undersides.

MCCORMICK, R. F. (3375) & PENNEY, C. C. (3880). Lepidoptera bred from captured females or larvae collected in the field. They included the heavily striated ab. *zatima* Cramer of the Buff Ermine moth (*S. lutea* Hufn.) and the local pyralid moth *C. dentalis* Schiff. A selection of species taken this year and photographs of larvae and other stages.

MCLEAN, L. F. G. (3848) & MCLEAN, C. Some uncommon Diptera collected in 1979. Species included *Pocota personata*, *Psilota anthracina* and *Megasyrphus annulipes* (Syrphidae).

MORTIMORE, J. P. (5142) Helicomenism (spiral segment) in the Pine Hawk-moth (*H. pinastri* L.). Specimen and illustration.

NATIONAL COLLECTION OF BRITISH LEPIDOPTERA. (Watson collection) 10 drawers of varieties of the Small Tortoiseshell butterfly (*A. urticae* L.). These include most named aberrations and some produced by low temperature treatment. Several are figured in the recently published 'Aberrations of British Butterflies', by A. D. A. Russwurm.

PATEL, D. J. Mrs. (6550) The Specimen Silkmoth (*C. promethea* Drury) bred this year. Best fed on Birch in the U.K.

PICKLES, A. J. (5225) & PICKLES, C. T. Mrs. A selection of moths bred and caught during 1979 and some larvae being currently reared. The moths included the Dark Crimson and Light Crimson Underwings (*C. sponsa* L. & *C. promissa* D&S) from the New Forest and local species from Straun, Tayside. Among the larvae was the 1-album Wainscot, (*M. l-album* L.), from Portland, Dorset.

PRATT, C. R. (5965) Selection of Sussex lepidoptera. Of special interest was the ab. *obliterae* of the White Admiral butterfly (*L. camilla* L.) and the forms of the Annulet (*G. obscurata* Schiff.), ranging from white to dark grey.

REVELS, R. (3942) 65 colour photographs of British butterflies, their life histories and aberrations. Series of British butterflies showing the wide variation obtained by selective breeding over many years. Chalk-hill blue (*L. coridon* Poda.), Ringlet (*A. hyperanthus* L.) and Silver Washed Fritillary (*A. paphia* L.) produced extreme forms.

ST. IVO N.H.S. As in past years, we were delighted to see the scale of work carried out by this leading School Society. Insects of

many orders are being bred together with many other creatures ranging from amphibians and spiders to the smaller mammals.

SELDEN, P. A. (4115) Record of the butterflies seen on a trip to Ventimiglia, Italy, illustrated by typical species and photographs.

SKINNER, B. F. (2470) A type collection of British Footman moths (Lithosiinae). Some of the more interesting aberrant macro-lepidoptera taken during 1979. Short series of Blair's Mocha (*C. pupillaria* Hubn.) bred from a female taken at Swanage, October, 1978, Dotted Rustic (*R. simulans* Hufn.) from Gloucestershire and Dark Crimson Underwing (*C. sponsa* L.) from New Forest.

SOKOLOFF, P. (4456) Bred specimens of local macrolepidoptera, White-speck (*M. unipuncta* D&S), Vestal (*R. sacaria* L.), Yarrow Pug (*E. millefoliata* Ross.), Kent Black Arches (*M. albula* Schiff.) and the pyrale *E. extimalis* Scop. and plume moth *E. rhododactylus* Schiff.). Also aberrations and forms of various lepidoptera.

WALTERS, J. (5904 J) Detailed illustrations of Nepticulid mines (Pigmy moths with a maximum wing span of 6/7 mm) and his continuing work on the life cycle of the new Pug moth to the British List, (*E. phoeniceata* Rambur), with drawings and notes. Among other items, a greatly enlarged drawing of the ovum of the Brown Hairstreak butterfly (*T. betulae* L.) *SECOND JUNIOR PRIZE*.

WEALDON ENTOMOLOGY GROUP. Wealdon Guide to Spring species of moths in the area, prepared by M. S. Parsons (5983) and M. Hadley (5315), localities and photographs. M. Parsons reported on a entomological trip to N. Wales and exhibited lepidoptera with apterous females. C. Pratt had prepared a selection of Sussex lepidoptera including the rare Hoary Footman (*L. caniola* Hubn.).

R. D. Hilliard (99)

A SIMPLE EXPERIMENT ON MOTH DISPERSAL

During the spring of 1975, whilst running two mercury-vapour moth traps to collect females of the Angleshades moth (*Phlogophora meticulosa* Linn.) for breeding experiments into the control of larval colour variation, I took the opportunity presented by the running of the two traps to obtain some simple data on moth dispersal.

The traps were situated 590 metres apart, in the grounds of the Zoology Department (Trap 1) and the Botany Department (Trap 2) of Royal Holloway College, Englefield Green, Surrey. Both traps were set up in grassland, scrubland and isolated mature trees, and neither trap could be seen from the other.

The lights were on all night, and the traps were examined between 6 a.m. and 7 a.m. in the morning. A list of the numbers of each sex of all Macro-Lepidoptera species, common to both traps, was then compiled. Pairs of similar specimens, one from each trap, were then marked with black or grey cellulose paint, depending on the type of moth. The

TABLE OF THE NUMBER OF MARKED SPECIES RECAPTURED IN EACH TRAP

Species	Total Marked From Each Trap	Recaptures in Trap 1 of Marked Moths From		Recaptures in Trap 2 of Marked Moths From	
		Trap 1	Trap 2	Trap 1	Trap 2
POPLAR HAWK	6				
MARBLED BROWN	22	1		1	
LESSER SWALLOW PROMINENT	18	1			
WHITE ERMINE	12		2		
NUT-TREE TUSSOCK	4	1			
HEART AND DART	48		1	1	
FLAME SHOULDER	30	1	2	1	
LIGHT BROCADE	32		2	1	
ANGLESHADES	22	1			
TREBLE LINES	70		1	1	
HEBREW CHARACTER	22		2	2	1
EARLY THORN	14		3	1	1
SCALLOPED HAZEL	16	1			
BRIMSTONE	18			1	
PEPPERMINT MOTH	16			1	
TOTALS	350	3	11	9	5

marks were placed either on the side of the dorsal portion of the abdomen just behind the thorax or on the basal portion of the underside of the forewing, depending on the size of the abdomen of each species. (In general, Noctuids and other thick bodied species were marked on the abdomen, whilst Geometrids were marked on the wings, however, there were exceptions to this generalisation). Moths from trap 1 were marked on the left side, those from trap 2 were marked on the right hand side.

The marked moths from trap 1 were then released at a point between 50 and 75 metres from trap 2 at an angle of 90 degrees to the direction of trap 1. The marked moths from trap 2 were similarly released between 50 and 75 metres from trap 1.

The process was carried out every night between 6th and 21st May, and after the first night, all moth-recaptures were recorded.

A record of the number of moths marked and the data for moth-recaptures at each trap, and the trap in which the moth was initially taken is given in the Table. Only recaptured species are however indicated.

In all, 564 moths of 44 species were marked and released (282 at each site), and 28 moths of 15 species were recaptured. Of these recaptured specimens, 19 were Noctuids, 4 Geometrids, 3 Notodontids, 1 was a Sphingid and 1 an Arctiid. Two trends are notable in the results. Firstly, the 4 Geometrids recaptured were all taken at the trap nearest to where they were released, not in the trap in which they were originally taken. This figure is too small to be taken as providing exclusive evidence that these moths remain in a particular area if they are moved to it artificially from another area. However, they do indicate that the moths do not return to the area from where they were taken.

The second trend is more pronounced. Of the other 24 recaptures, 20 were in the traps in which the moths were initially. This seems to indicate that in the majority of cases these moths did return to the area from where they were moved. The duration of the experiment was too short to supply sufficient data on which to make a categorical statement in support of this indication, and further more extensive work is needed. Unfortunately, I am not, at present, in a position to carry this out, but I hope some member of the Society may be stimulated by this article to take up the work in the near future, and for this reason, I will mention one or two of the difficulties which may be encountered.

It is essential to ensure that the colour and positions of the paint marks are such that they do not make moths any more conspicuous to predators than they already are. Care should also be taken to ensure that the paint marks do not impair the insects' flight in any way. The place at which moths are released should also be varied slightly, because if the same spot is used repeatedly, birds are soon attracted to it.

Finally, I would suggest that measurements of wind speed and direction should be taken whilst the experiment is in progress, as it is feasible that there may be a correlation between wind direction and the

flight direction of male moths, as the sex pheromones of the female moths are wind carried.

Michael E. N. Majerus (4027)

OBSERVATIONS ON REARING DAPHNIS NERII L

This summer I had the great fortune to receive by post from Ray Adams of Las Palmas, Gran Canaria, twelve ova of the Oleander Hawk-moth, *Daphnis nerii*. Among all lepidoptera this to me was the one I have most wanted to rear. The ova arrived on the 18th of July, 1979. These ova are small for the size of the moth as with the Death's-head Hawk-moth *Acherontia atropos*, and apple-green in colour.

The first emergence of a larva occurred on the 20th of July and within 48 hours, nine of the twelve ova had released their larvae. The first instar larvae are pale green, with a longitudinal stripe of paler green running the full length of the body, from head to the large black horn.

The larvae were kept in a small transparent plastic box in an unheated outhouse. No attempt was made to duplicate the conditions prevalent in North Africa, where they occur most commonly. Food plant was *Vinca minor*, Lesser Periwinkle which abounds in my garden. South, in his Moths of the British Isles, lists *Vinca minor* as an alternative food-plant to *Nerium oleander*, though not from personal experience. I can confirm that this is an acceptable food-plant, as my larvae took to it avidly, chewing along the veins of the leaf and right through it.

The first moult took place on July the 27th. The larva has an apple-green colour, darker than the first instar, and the lateral line is blue with green spots on it. There is a blue eye on the third body segment with a darker annulus, the tail is still black. The head and anterior segments extend like *Dielephila elpenor*, the larva of which *nerii* closely resembles in shape.

In the third instar, the colour of the larva remains the same, except that the spots, which in the second instar were restricted to the lateral line, became now more widespread and are now silver, with blue-green around them. The striking change in this instar is in the tail, the end becomes very thin and green, while the proximal half becomes thick, with a black patch just before it thins.

The fourth larval instar is very beautiful. The large lateral eye on the third segment is bright turquoise, with a dark blue-black annulus; the spots on the body are silvery-blue and the lateral line is pale blue, but absent on the first four segments. The spiracles are black and the tail small and orange-brown. The body is still pale green. Growth is very rapid; by keeping a larva in the airing-cupboard, Mr. Bob Fredrick of the Livestock Group to whom I gave a larva, observed it pass through the final larval instar inside 24 hours. They become large, my first one to pupate achieved a length of ten centimetres.

The pre-pupal change is swift and spectacular. The larvae change from green to sepia, except for the first three and last segments which are brownish-yellow, the spots remaining silver. It stops feeding and moves around the cage. Some of these larvae I put in plastic half-pound margarine cases with a bit of damp tissue paper, and others I put in individual boxes with peat. Those in peat burrowed just under the surface, none burrowed at all deeply. Pupation took place from August 16th to August 24th, the slowest grower of the larvae died.

The pupae are a sandy-brown with dark brown around the spiracles and the abdominal segments are freckled with dark brown, the eyes are clearly marked and the proboscis is long and clearly marked in dark brown; the pupae are about 5 centimetres long. These larvae produced three male and four female pupae. They were placed on peat in a breeding cage in the top of the airing-cupboard, where the temperature is a fairly constant 86° F.

The moths emerged during the night on the 7th, 9th, two on the 11th and two on the 12th of September, three males and three females. The last pupa was stunted and deformed and failed to produce a moth. The sex of the imago I did not find easy to determine, but did the identification from the pupae. The abdomen of the female is probably marginally fatter, but I think it would be very difficult to make a sex determination from this. Both sexes at rest hold the dorsal surface of the abdomen concave, like the male *Mimas tiliae*.

The appearance of the imago stage of *Daphnis nerii* is well known from photographs, but none that I have seen published show the brilli-

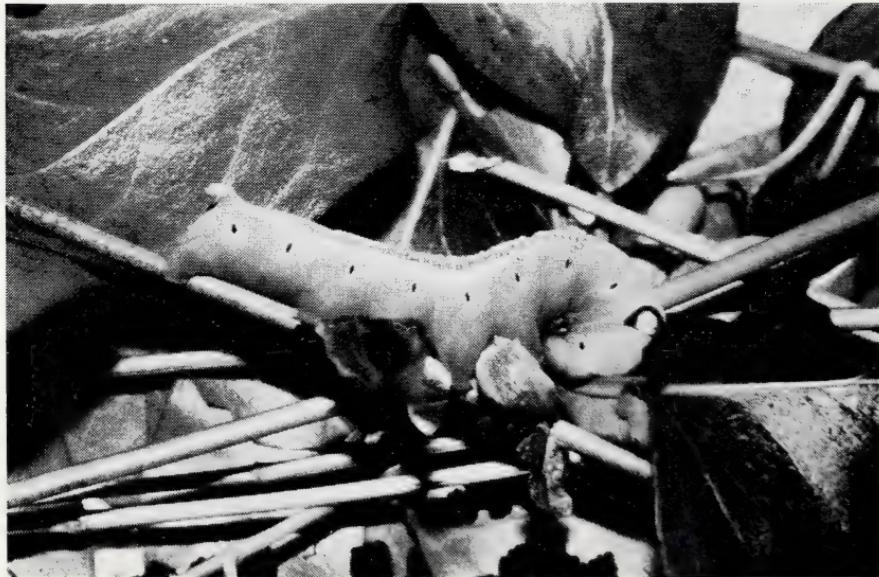


FIG. 3 Larva of Oleander Hawk (*Daphnis nerii*)

ance of the green of the newly emerged moth, nor the subtle graduation of colour. The illustration in Stanek's Illustrated Encyclopedia of Butterflies and Moths is one of the better ones, but much too blue and fails to show the abdominal shading as does Richard South's.

It was hoped that pairing might be achieved by keeping the moths alive at 86°F with force feeding, as they did not take nectar or sugar water themselves, but I had no success. No information seems to be available on the pairing of *Daphnis nerii*, though it was achieved by Robert Gooden in about 1970 and, I am told, has been done regularly in Guernsey.

J. A. D. Smith (5438)

COLEOPTERA IN BIRDS' NESTS

The earliest studies of insects from the nests of birds appear to have concentrated upon those species regarded as injurious to the host, such as some Hemiptera (blood-sucking bugs allied to the bedbug) and the Siphonoptera (Fleas). Around the middle of the Nineteenth Century coleopterists on the continent were recording the occasional beetle from birds' nests. Fairmaire (1825) described *Haploglossa nidicola* from the nests of sand martins whilst Erichson (1858) recorded this same species from a swallow's nest and another Staphylinid, *Aleochara villosa* Man., from a pigeon's nest.

Although British entomologists were undoubtedly collecting Coleoptera from bird's nests about this time, and possibly earlier, the first published record that I have been able to find is that of Waterhouse (1871 and 1871,a) when he recorded *Quedius brevicornis* (Th.) as new to Britain from the nest of a starling or jackdaw in an old hollow beech tree which had blown down. In response to this find Douglas (1871) published a résumé of the work of Cornelius (1869) who had recorded Coleoptera from the nests of eight different birds in Germany. Gorham (1886), in adding two species of Histeridae to the British List, remarked that "Gnathonci inhabit pigeons' and other birds' nests, and places such as towers where owls breed". Fowler, in his classic work on the British Coleoptera (1887-1890) referred to records of many species of several families found in the nests of birds. At the same time Bennett (1888) recorded how he took a specimen of *Coryphium angusticolle* Steph. (Staphylinidae) "from an old birds nest", and later (1888a) recorded *Nargus anisotomoides* (Spence) (Leiodidae) "from the nest of the wood wren". In 1896 Walker found several species of Coleoptera in an owl's nest in the bottom of a hollow elm.

Despite these early records the peak years of interest in the coleopterous fauna of the nests of both birds and mammals was during the first decade of this century, due primarily to the activities and interests of N. H. Joy. His earliest published record appears to be in 1904 when he found six species of Coleoptera in an old woodpecker's hole in a fallen

oak branch. During the following years he turned his attention to the nests of a wide variety of birds and summarized the records of his more unusual finds (Joy, 1906). Following Joy's discoveries Chitty (1906) recorded three rare species from a starling's nest in a hollow apple tree. About the same time Bedwell (1905 and 1906) was recording *Aleochara cunicularum* Kr. in the nests of sand martins and Day (1908) found *Haploglossa pulla* (Gyll.) (both Staphylinidae) in a great tit's nest. Bird's nests continued to reveal the occasional new species among the more notable being *Aglyptinus agathidioides* (Leiodidae) described by Blair (1930) from a moorhen's nest in Hertfordshire and, to the best of my knowledge it has not been recorded in Britain since. Throughout the 1930s Donisthorpe added records of many species from the nests of such birds as swan, jackdaw, heron, moorhen, house martin, etc. After the second World War Freeman (1945 and 1946) examined robins' nests and Spittle (1947-1949) collected beetles from the nests of heron, crow, sand martin, owl and waterfowl.

It was not until 1950 that a serious ecological study was undertaken in Britain of the insect fauna of birds' nests. Woodroffe (1953 and 1954) reviewed recent continental work, in particular that of Nordberg (1936) who listed 116 species of Coleoptera from nests in Finland. Woodroffe was primarily interested in birds' nests as "reservoirs of domestic and storage pests in Britain". He found that the "humidity conditions within a nest are of primary importance in determining the composition of the scavenging fauna". He further classified nests as "wet or dry according to whether they are exposed to, or protected from, rain or drainage water". His survey was restricted to "dry" nests. He describes, in some detail, methods used to extract the insect fauna and provides a list of 42 species of Coleoptera recorded, with explanatory notes on those species known to infest stored food products.

Examination of birds' nests is now a standard collecting method adopted by many entomologists. Walsh's (1954) statement that "dry birds' nests are too dry for beetles" is patently misleading to judge from Woodroffe's findings. However, he goes on to say that "nests in holes in trees and other damp nests are often very productive", and that "these are best examined just after the young have left". Walsh then lists 15 species of Coleoptera from birds' nests.

In December 1972 and 1973 I was fortunate enough to obtain a total of 22 heron's nests (Welch, 1974 and 1977). Herons are colonial birds and the same nest is rebuilt on successive years. Although it would not normally be possible to collect these nests death of the supporting trees following the outbreak of Dutch Elm Disease resulted in many of them being felled. Such an opportunity is unlikely to present itself again although these large heavy nests are not infrequently blown out of the tree-tops during Winter gales. Most birds construct a new nest each year and the removal of the old one should not disturb them. Even hole-nesting birds may use the same hole whether the meagre nest

material has been removed or not. However, many of the birds, particularly birds of prey are protected by law and interference with the nests of such birds as eagles and peregrine falcons, which use a traditional nest site could lead to prosecution. If in doubt, contact your nearest R.S.P.B. representative.

Undoubtedly the most important reference work for anyone contemplating the study of Coleoptera, or indeed any insects, from birds' nests is the work of Hicks (1959) together with his two supplements (1962 and 1971). In these he provides (a) an entomological checklist giving the insect species, reference and bird host, (b) an ornithological check list with lists of insects under each bird species, and (c) a comprehensive bibliography. Although Hicks' second supplement was published in November 1971 he acknowledges that his references are not complete up to that date, particularly in respect of eastern Europe and Asia. From my own reprint collection I find Hagvar's (1969) paper on Coleoptera in nests of Tawny Owl, and two of the references quoted by him, are not included. Neither is Claassen's (1964) list of Coleoptera from Sand Martin burrows, although his papers of fleas are listed. The reader will find references to the records of many more British Coleopterists which it is not possible to include in this account. Prof. Hicks informed me (*pers. comm.*) that by early 1978 he had about one hundred new references since his second supplement as published. However, he doubts whether he will be attempting another supplement.

There is still much to be learned, and many uncommon species of Coleoptera to be found in the nests of some of our commonest birds. Indeed, I have even recorded a few species from the nests of pheasant and partridge which consist of not much more than a slight depression scraped in the soil. I have already referred to an early continental record of *Aleochara villosa*. This staphylinid has been found in a variety of habitats but has always been rare. I am of the opinion that in the past, it may have been associated with dove cotes, possibly breeding in the accumulated droppings. I know of no record of this species in Britain for the past forty or fifty years. It would be of considerable interest to know of any continuously occupied large dove cotes or perhaps one could examine racing pigeon lofts. Rarely the nest occupants make themselves obvious as Leatherdale (1955) found when he collected approximately 150 specimens of *Trox scaber* (L.) (Trogidae) in a bedroom as they emerged from a jackdaw's nest via a ventilator in a disused chimney. More recently Owen (1976) has had great success with artificial nests. In a high proportion of the nest fauna it may be desirable to store the nests. These consist of plastic buckets, fitted with a lid and with a slot cut in one side, filled with material from a kestrel's and an owl's nest mixed with chicken dung. Over a six month period he trapped 150 beetles of 14 species including many unusual species, mainly Staphylinidae and Histeridae, normally only found in birds' nests. Williams (1979) has been less successful using a bucket containing pigeon dung although he

did catch one rare species, *Atheta taxiceroides* Munst. Owen also experimented with ammonium carbonate mixed with soil as a bait and attracted three nest species.

Experience has shown that it is best first to tease out most nests over a tray and hand collect the beetles as they run clear. Wet nests benefit from being extracted on a Tullgren funnel. Such apparatus can be improvised by placing the nest material on a garden sieve with an electric lamp above to drive the nest inhabitants down on to a tray or into a polythene bag or some other container. Where larvae make up a and await the emergence of the more readily identifiable adult Coleoptera.

R. Colin Welch

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NOTES AND OBSERVATIONS

Red-headed Chestnut (*Conistra erythrocephala* D.S.) in Derbyshire an error of identification.

Conistra erythrocephala Red-headed Chestnut — In his paper "Some Derbyshire Lepidoptera in 1975" (1979, *Bull Amat. Ent. Soc.*, **38**: 26-29), Mr. T. A. Collins records (*ibid.*, 27) the occurrence in Derbyshire between mid-June and 31st August 1975, of 14 of this exceedingly rare moth. With due respect, I feel sure that for a number of reasons this must be erroneous. — J. M. Chalmers-Hunt (1683).

Your Editor thanks Mr. Chalmers-Hunt for drawing his attention to this error. He has taken the matter up with Mr. Collins who has replied as follows:—

I have received several letters stating this was likely a misidentification since my article appeared in the February last *Bulletin*. Since I have now moved to Germany, I apologise to all those who commented on this article, for not replying to their letters sooner. It soon became obvious to me that I had wrongly identified the species concerned. At the time of writing the article (4 years ago, or thereabouts) it was the enthusiasm of youth which largely contributed to this error.

Mr. Chalmers-Hunt (1683) does not suggest a more suitable identification for the species; I should be much obliged if he would inform me of one.

I should be pleased if all replies to my above comments be sent to my Derby address from where they may be forwarded to me here in West Germany.

T. A. Collins (4228)

Some Notes from Glasgow:— Last September I collected two grey-dagger larvae, and decided to rear them to moths. I had read that they can be encouraged to pupate in hollowed-out elder branches and made two pieces about four inches long, and hollowed-out. When the larvae were ready to pupate I placed them in a plastic tub along with the elder shoots, the tub being first lined with tissue. I placed the lid on top and after about a day I opened the lid and I saw that one of the caterpillars had crawled into the thickest elder branch and only the last few segments of the caterpillar were showing. When I looked a few days later both had apparently pupated; I noticed that both had used different pieces of elder—they had one each to pupate in. I also noticed that the larvae had gouged out some of the pith to make the hollows larger for pupation and one of them had incorporated a part of the tissue lining in spinning up; this was adhering to the end of the elder branch. I kept the larvae in this for a few more weeks, the lid of the tub being placed lightly on top to allow air. After a while I transferred the pieces of elder to a jar with curtain netting tied over the top. Periodically throughout the winter and spring, I would place in the jar, dampened pieces of newspaper to give the pupae some moisture. A moth emerged in June this year, but from the other branch, two parasitic flies, which greatly resembled small bluebottles. These are still unidentified.. Also about June or July I found a cocoon composed of chewed bark a sloping fence post. This I cut out and kept at home—about a week later came a great disappointment—a parasitic fly emerged but this time an ichneumon fly. The place where I found the cocoon is about 2 or 3 miles from where I found the larvae the previous year. The cocoon was of a Grey dagger as I noticed the dead larva when I opened it after the fly emerged. It showed that this species is preyed on by at least two parasitic flies in this area; whereas I had not observed this to happen before. I suppose they are easy prey, the way they have the habit of sunning themselves and feeding on the leaves by day. I've also noticed them moulting on the upper surface of hawthorn leaves in the hedgerows, these being in about the second or third instar.

In April this year I found six very small Garden Tiger caterpillars on a road verge facing near Drumpellier Park on the road out from the housing estate of Commonhead. Most of the larvae were on dead grass stems near either dock or nettles which were growing below the hawthorn hedge along the road verge. The larvae were obviously living and feeding there just about a foot or so in from the tarmac of the road.

Some were also found further along on nettle, and one on sorrell. Of the six larvae, I got three moths for my collection, one died whilst pupating, one I gave away, and one is still in cocoon.

During the warm weather a month or so ago, various species of moth have been visiting the garden at night. I think the attraction is the flowers I'm growing which are delphinium, larkspur, petunias and various others such as poppies and marigolds. I secured four or five but have not identified them yet.

Frank McCann

Lime Hawk in Yorkshire — I note that in South's "Moths of the British Isles" the Lime Hawk-moth (*Mimas tiliae* L.) has only once been recorded in this country. I should like to add to the record that I captured a specimen, in a light trap, in York on the 9th June this year. This is the first time I have found this moth in Yorkshire.

A. J. Gillery (3653)

Beginner's Luck — After reading the article by M. and K. Eaves on their share of 'beginner's luck' Vol. 37, p.138. I thought I would write to tell of my share this summer. I have been collecting for about 3 years and before this year, I had yet to find any species of Lepidoptera which was in any way interesting. Whilst collecting in Great Ridge Woods, Wilts, with a fellow lepidopterist, I came across a fluttering male meadow brown which had a white band down the left forewing. This was presumably caused by a small deformation on the wing just before this strange marking. Another interesting male meadow brown turned up amongst literally clouds of species at Higher Houghton, Dorset. This specimen had the right hindwing completely white, but no deformation could be seen on the wing so could it be caused by a lack of coloured pigment. Again at Great Ridge Woods, two specimens of the Ringlet, form ab. *arete* were found where this species was extremely common. At my school, Milton Abbey in Dorset, I found a Dingy skipper with a long bar on the bottom edge of the forewings where the markings had joined, presumably unusual, as aberration in this species is generally infrequent. The next interesting aberration was caught at my home. Near Shaftesbury in Dorset. This was a female specimen of the Silver washed fritillary. Some of the black markings on the front edge of the forewings had suffused to form one large black blob. Miniature specimens of the following were found at various localities: Green-veined white; Common blue; Small skipper; Marbled white; Grayling. Different species of interest found were

- (a) Two colonies of the White Admiral, one at my home and the other at Higher Houghton, Dorset. 14th July and 5th August respectively.
- (b) A colony of the Essex Skipper at Codford in Wiltshire 3rd August, a county in which the species has been recorded few times. (Perhaps my best find this summer).

(c) Two colonies of the Lulworth skipper were found at Knowle Hills (in the Purbeck range) and on the cliffs of Holworth.

I rang up the Dorset County Museum, where no records of the butterfly from these two places could be found so they were added to the already known colonies of the species. I think in all I have certainly had my share of beginner's luck this year. I would be interested to know if any other members have found the meadow brown with notable white patches this year or in the past. Rupert Barrington (6023)

Leopard moths in Lincolnshire — I wonder if any other members of the Society have recorded sitings of the Leopard moth (*Zeuzera pyrina* L.). I have never seen a live specimen of the moth before, nor knew whether it was found in the area where I live, Frampton, Boston, Lincs.

On the 14th July 1979 a tattered female was brought to me. It was captured at Surfleet about 7 miles from where I live, laying eggs in Cow Parsley (of all things!) From the moth I have obtained about 100 ova and would be grateful for any hints of rearing the larvae. Two days later I found a dead female on a path along the side of my house. On the 26th July a live female was brought to me by a neighbour who had found it resting on his lawn near a lilac bush. — Neal J. Mowbray (5748)

Wasps, Aphids and Hornets — I was most interested to read the article by Dr. J. C. A. Craik on hornets in a moth trap (*Bull. Amat. Ent. Soc.* 38: 1979, 129-31).

In 1966 I was operating a Rothamsted light trap in a quadrangle enclosed by school buildings at Hatfield, Hertfordshire. The trap, which was run in conjunction with the Rothamstead Insect Survey, was automatically switched on daily 30 minutes after sunset and off again 30 minutes before sunrise. During the month of August, increasing numbers of wasps (*V. vulgaris* L.) were found in the nightly catches. This gave rise to considerable speculation as wasps are not exactly well-known for night flying. Moreover, neither of the two other traps in more open situations attracted a single specimen. The source of them was solved by the groundman on one of his weekly mowing sessions when he was considerably disturbed to discover that the single weeping willow by the pool was emitting a roar of sound. A close inspection revealed an enormous number of wasps feeding on the honeydew produced by a heavy infestation of willow aphids (*Tuberolachnus salignus* Gmelin), well known for the enormous quantities of honeydew they produce. It was obvious that some misguided individuals were drinking far too late after hours and the sudden switching-on of the light trap caused them to stagger drunkenly towards the light.

Dr. L. R. Taylor told me recently that large numbers of hornets were feeding on honeydew produced by very large aphids infesting a peach tree by the verandah of his villa in Corfu. Like Dr. Craig's hornets, they displayed no aggression whatsoever towards humans sitting nearby.

S. C. Littlewood

Disappearing Butterflies — I have for several months been recording at East Wretham Nature Reserve, run by the Norfolk Naturalist Trust, with fair results, and no surprises. That was until I made a visit on the 2nd September when I found to my surprise that all the Nymphalidae had disappeared, the Peacock (*Inachis io*) being the most numerous of this family, closely followed by the Red Admiral (*Vanessa atlanta*). The Large White (*Pieris brassicae*) and Brimstone (*Gonepteryx rhamni*) had also disappeared.

This disappearance occurred sometime between the 26th August and the 2nd September. I can state these dates because on the 26th I had seen my first Painted Lady (*Vanessa cardui*) and went back the following week to see if they would be more abundant, but they had also gone.

On the 26th all of the above mentioned butterflies had been feeding on a field of Lucerne numbering between 20-30 per square metre. The field was 6-7 acres approximately in size. It was surrounded by wood on the north and west sides. On the other two sides there had been Lucerne but this had been cut earlier, and during the week this field had also been cut, leaving clumps still standing around the edge of the field, so I would have expected some of these butterflies to have remained in smaller numbers, but the only sightings made on the 2nd were of a Peacock, a Brimstone and a Comma (*Polygona c-album*). There was no sign of death on a large scale and no evidence of spraying.

And so with the above a complete mystery to me, I contacted a locally well-known naturalist, who told me that he had only heard of this once before and thought that the disappearance was probably due to a thermal carrying them away, an explanation I did not find totally satisfactory.

I would now like to make a few points which have struck me over this incident.

1. That this exaggerated loss of the foodplant (Lucerne) only confirms how in other cases the loss of individual species can occur if their habitat is destroyed, and their extinction over a short period of time inevitable, and that all areas where rare species occur should be (a) protected by law and no industrial or agricultural work allowed; (b) that some of these areas should be purchased and run along the lines of R.S.P.B. reserves.
2. If a thermal carried away the Nymphalidae why did it not take Satyridae and Lycaenidae also, as they were still there in number (see complete list of all species at end).
3. That we need more knowledge on the behaviour of these insects so that disappearances like this could and would be understood, and armed with this knowledge we could conserve our present wildlife much better. And this must be done before we even contemplate introducing new species, as has recently been

discussed in previous issues of the Bulletin and raised by Chris A. Young.

4. Some method must be found to mark these insects in the way the R.S.P.B. ring birds, so as to help those studying their behaviour.

I would like to hear from any member who has experienced a similar disappearing act, and from anyone who has any ideas on how to mark butterflies and moths so we can produce the best system possible.

If anyone who is interested would write to me on these disappearings or for information on the marking scheme I would be most grateful.

The complete list of butterflies recorded at East Wretham on the 26th August and 2nd September:

26th — Small white (*Pieris rapae*) large numbers, Common blue (*Polymatus icarus*) large numbers, Grayling (*Eumenis semele*) large numbers, Speckled Wood (*Parage aegeria*) large numbers, Brimstone (*Gonepteryx rhamni*) large numbers, Meadow Brown (*Maniola jurtina*) large numbers, Red Admiral (*Vanessa atlanta*) large numbers, Painted Lady (*Vanessa cardui*) large numbers, Peacock (*Nymphalis io*) large numbers, Small Copper (*Lycaena phlaeas*) large numbers, Small Tortoiseshell (*Aglais urticae*) large numbers, Large White (*Pieris brassicae*) large numbers.

2nd — Small Copper large numbers, Meadow Brown large numbers, Common Blue large numbers, Brimstone one, Peacock one, Comma one.

C. P. Gunston (6578)

Some further notes on crabro and zonaria — I have recently read Mr. Stallwood's observations on *Vespa Crabro* and *Volucella zonaria*. I am a keen Hymenopterist myself, although I have never come across *zonaria* while knowing its link with *crabro* and other wasps.

But back in 1970 and 1973, being a non-entomologist then, I saw *zonaria* in each year mistaking it for a hornet. It resembled a wasp (common) but was larger. All that I did was avoid it as it flew more or less in a straight line. Then, in June 1979 I saw *zonaria* again, resting at the top of a forsythia, shading from the sun. At first, I dismissed it as a hornet, seeing only the large abdomen. Although taking another glance I realised several things all at once. It was a bright yellow, similar to *V. vulgaris* and *germanica*, not an orange-yellow. Also, the markings were black, thinner and fewer. Finally, the abdomen was too wide and short to be any form of social wasp. The wings, I remember, were held across the abdomen, not unlike members of Hymenoptera. Before the insect took to the air, I caught a glimpse of brown thorax and large eyes.

All sightings took place in my backgarden, on sunny days in Surbiton, a mere three miles from Chessington where Mr. Stallwood states a couple were taken in 1953. I hope my observations will be useful to Mr. Smallwood at least, if not to other AES readers also. —

Steven J. Gibson (6785 J)

SECOND EUROPEAN CONGRESS OF LEPIDOPTEROLOGY, KARLSRUHE, 8-12 APRIL, 1980

The Second European Congress of Lepidopterology will be held in Karlsruhe, Germany, 8-12 April 1980. Full details of this congress are available from the Congress Secretary, Dr. G. Ebert, Landessammlungen fur Naturkunde, Erbprinzenstrasse 13, Postfach 4045, D 7500 KARLSRUHE 1, Germany (BRD).

The main theme of the Congress will be the 'Conservation of Lepidoptera and their Biotopes'. A public exhibition on this theme will be on display at the Natural History Museum, Karlsruhe during and after the Congress.

BOOK REVIEWS

A Recorder's Log Book or Label List of British Butterflies and Moths
by J. D. Bradley and D. S. Fletcher. Published by Curwen Books, London
(1979) pp.136, price £2.00.

This book is primarily intended as a log book for Lepidoptera recording from a single locality in conjunction with the Monks Wood Biological Records Centre recording scheme. The nomenclature follows that of the Royal Entomological Society Handbook Vol. XI, part 2 (Kloet and Hinks, 1972) with corrections and additions.

Each species and subspecies which has been recorded as British is included. The type of habitat or region of each subspecies is indicated and each species entry is numbered from 1 to 2495 under the heading of the particular genus. Superfamily, family and suborder names are also included, as are the English vernacular names in the case of the "Macrolepidoptera" and some of the "Microlepidoptera". The listed order of species is the same as that in Kloet and Hinks except that *Cochylidae* precedes *Tortricidae* and *Olethreutinae* with the sequence of generic names reversed in the *Olethreutinae*. Synonymy is omitted unless the name is changed from that in the Kloet and Hinks list, where the previous name is given in italics.

Each entry has a ruled section for records and there are a number of blank pages in the back for notes. The size of the book ($7\frac{1}{2} \times 4\frac{1}{4}$ inches) and the water resistant cloth cover make it ideal as a field notebook. Since, although both sides of the pages are printed, names are not printed on the backs of others so a copy of the list can be cut up to provide labels for the collection. An index to families is also included.

There are few mistakes, although some entries appear to have been added as an afterthought . . . e.g. *Scoparia basistrigalis* is entry 1334a between entries 1334 and 1335 and lacks a ruled section for record entries. The provision of English vernacular names for the "Macro-lepidoptera", particularly where they are long-used traditional names

is no detraction, since they may well aid accurate recording, but the vernacular names given for some of the "Microlepidoptera" and also some adventitious species are reminiscent of the made-up names in the Heslop (1947) list. The numbered entries are particularly useful in the construction of ordered lists and in indexing and cross referencing.

A criticism of the book as a label list is that the reviewer prefers each species to be labelled by the full binomial name and not by just the trivial name under a generic name heading. This provision, however would have adversely affected the handy size of the book and some of the names, particularly of the "Microlepidoptera" would have then been too long to easily fit the allotted space in the collection.

This list has been awaited by British Lepidopterists since the publication of the Kloet and Hinks check list in 1973. It has been published at a very reasonable price and should be of considerable assistance to the recording lepidopterist.

P. J. Jewess

The Observer's Book of Caterpillars by David J. Carter, 159pp. 32 cold; numerous line illustrations by Gordon Riley, 12mo. Frederick Warne & Co. 1979, price £1.25.

How pleasing it is to see another book in the Observer series, to complement those of interest to entomologists, and indeed one that helps clear up some of the confusion about lepidoptera larva and others.

Whilst a book of this size could not hope to show the larva of all our lepidoptera, it covers the range. It will certainly fill a gap on many a bookshelf particularly where the young naturalist is concerned, since for many children the larva is the first introduction to entomology.

S. A. A. Painter

CASUAL OBSERVATIONS OF INSECTS ON THE ISLE OF SKYE — July 1979

I spent 10 days on the Isle of Skye, from the 9th to the 18th July, camping with a friend and walking or hitchhiking when possible around the island. My observations on insects were made during our travels, little serious collecting being undertaken.

On the 9th we crossed from Mallaig to Armadale and made our way to Broadford. The moorland between Armadale and Broadford was enlivened by *Lasiocampa quercus* L., the Oak Eggar and *Coenonympha tullia* Mill., the Large Heath. One *Pieris rapae* L., the Small White, was seen in Broadford. The following two days were spent walking to Loch Coruisk in the Cuillen and back via Glen Sligachan. Much to my delight I found my first *Carabus glabratus* Paykull., amid the heather in Glen Sligachan. A further specimen of this impressive beetle was found near Loch Coruisk. The only other species of beetle noted was a single *Pterostichus niger* Schaller, on the Glen Sligachan path. *L. quercus* L., was common in the glen, less commonly seen were *C. tullia* Mull., and *Lycophotia varia* de Vill., the True Lover's Knot moth. During our

short stay in the Cuillen we were fortunate to have virtually clear skies and brilliant sun.

Next stop was Portree which was reached on the evening of the 11th. Once the tent was pitched we explored the north side of Portree Bay. I was surprised by the numbers and diversity of the insect life in this area compared to anywhere else we visited on the island and I spent the following day doing some more serious insect recording. Five species of butterfly were recorded, *Boloria selene* Denis and Schiff., the Small Pearl Bordered Fritillary, *Maniola jurtina* L., the Meadow Brown, *Coenonympha pamphilus* L., the Small Heath, and *Polyommatus icarus* Rott., the Common Blue, all occurring infrequently. The fifth species was a great surprise being a single female *Vanessa atalanta* L., the Red Admiral, in perfect condition laying ova on cliffside nettles. Skye was the last place I expected to see this species. The only moths seen were a few *L. quercus* L., and one female *Hepialus humuli* L., the Ghost Moth, in vegetation near the seashore.

Dascillus cervinus L., was by far the most common beetle in the area, being found on paths and in the bracken. One unfortunate female of this species was found on the cliffside path, having been partly trodden on but still alive. She had attracted a dozen males who were vainly attempting to mate with her or one another! The common green tiger beetle, *Cicindela campestris* L., found sparingly on dry bare ground near the cliffs. On the exposed grass tops of the cliffs the brilliant purple variety of click beetle, *Corymbites cupreus* F., was found along with the weevil, *Alophus triguttatus* F., and the large active rove, *Staphylinus erythropterus* L. A couple of the common black carabid, *Pterostichus madidus* F., were found under stones near the seashore.

Portree Bay was the most entomologically rewarding area encountered during our travels in Skye. The relatively sheltered nature of the bay and the deciduous woodlands on its flanks appear to create a favourable local climate for insects and the area would probably repay further more intensive study.

From Portree we headed to our northernmost port of call, Staffin Bay, where the weather and our luck, began to turn bad. Nothing of entomological interest was seen at Staffin, the place only being memorable because of the Gannets in the bay and the late night raid by a local cat on our precious food supplies. Unnerved by the latter experience we made for Uig on the 14th and reached it in glorious sunshine. The only butterfly seen was *C. pamphilus* L., on the steep vegetated slopes behind the Uig village. The Cleg, *Haematopota* L., was very bothersome on the grassy pastures by the bay. The following day was also spent at Uig out of necessity as the incessant heavy rain and gusting wind ruled out any walking. We awoke the next morning to the sound of roaring water and on peering out of the tent found the stream a few yards away looking more like a river in spate and in danger of bursting its bank! Fleeing from Uig we made our way to Dunvegan but the bad

weather was unrelenting and after hitching lifts with people from all over Europe we were back in Broadford on the 17th.

The last straw was the emergence of the infamous midge in large numbers on the 18th. The mild wet weather apparently favoured their emergence and this was no local occurrence for, as we tramped from Broadford to Armadale we were continually bitten whenever we stopped for a rest or something to eat. As we left Skye a day earlier than we had planned we spent a day in the mainland port of Mallaig. On the hills behind the port where we camped I noted only a few species of beetle, *Carabus problematicus* Herbst., *Alophus triguttatus* F., and quite commonly *Pterostichus madidus* F.

Considering the weather and the nature of my visit to Skye I was surprised by the diversity of insects to be found and the considerable potential of certain areas such as Portree. I suppose we were lucky in many respects, especially with the midges. I know a climbing friend who drove from the Lake District up to Skye intent on some 'hard routes' in the Cuillen. However, on arriving and getting out of his car he was immediately attacked by hoards of voracious midges. He simply got back in the car, slammed the door and drove home non-stop!

I would like to thank Dr. N. L. Birkett, F.R.E.S., for lending me a comprehensive set of maps of the area and confirming the identity of some of the beetles and Andrew Kays for putting up with my company for a fortnight!

T. J. Bird (5988J)

COLLECTING NOTES FROM SOUTHERN SPAIN 1978/9

The following notes may be of interest to collectors, and help them have success should they collect in Spain.

I visited the Costa del Sol twice. Firstly in November, the end of the dry season, and again in February, the end of the wet season.

Although there were only typical European Lepidoptera, many species were common, including Painted Lady, Clouded Yellow and the Swallowtail. I found a fair number of large *P. machaon* L. larvae, most, however, had already pupated, and judging by the stripped fennel plants, there must have been a lot of them!

In November, between the skyscrapers of Torremolinos, on a square mile of dry waste land, I found many different species of Arthropod. These included six different species of Praying Mantis; Large Orb Weaver spiders; Giant Centipedes; Snakes and Lizards. I found few Scorpions, as they are often hidden below ground, and hard to find.

Behind the coastal plains are hills and mountains. Here in the dry grass you find many different insects, and possibly the best way to get about is to hire a horse for a day and ride into the hills.

A number of unusual 'fancy' Mantids were found in the hills, one being similar to a long-nosed Grasshopper, the other well camouflaged amongst leaves and dry grass.

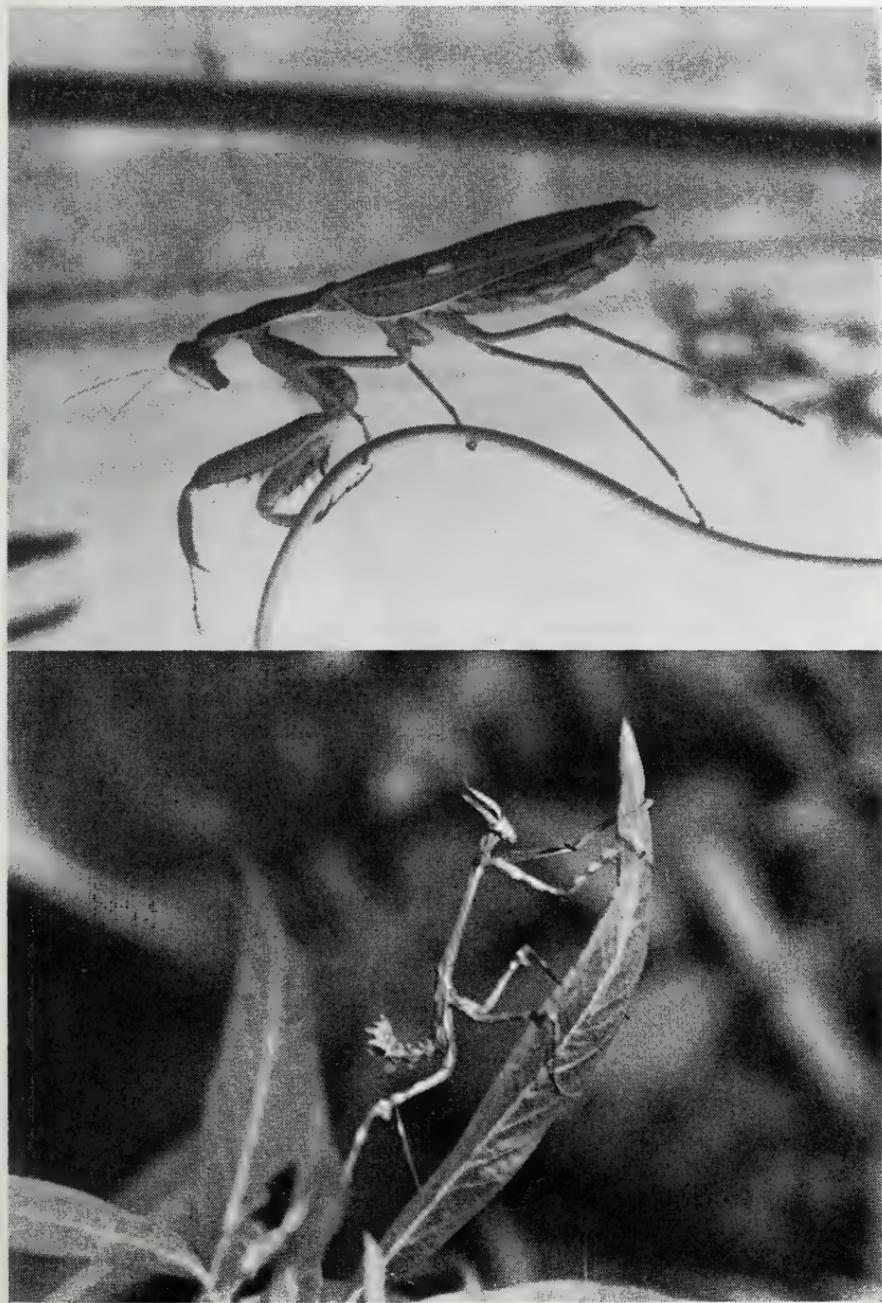


FIG. 4 Two Mantids from Southern Spain

On the second visit during February, when the wet or winter season was just ending, everywhere was fairly green, and the waste land was covered in weeds and grass, and it was impossible to find anything. Although the plants in flower were all tropical species, the green land appeared much more European, rather than tropical.

However, in the hills, although slightly greener and wetter, it was very much easier to catch insects. Additionally, both Centipedes and Scorpions were to be found under stones because they like wet ground and I found around 40 of them. I found one Centipede 8 inches long, although most were 3 - 5 in. I found a number of Praying Mantids, but not as many as before, but a fair number of *othecae*. A high percentage of these were found to be parasitised.

The weather was very warm, even though it was Spain's coldest month — about 65°F on average, not *too* hot, but compared with Britain covered in snow at the time, who's to worry!

In fact, on both occasions that I went, it was very cheap, being off-peak, not the school holiday season. Indeed it can cost as little as £100 for several weeks to go at such times.

I should like to acknowledge the International Property Club (Apto 374, Torremolinos) for making the arrangements. Simon Ellis (5659)

BREEDING THE BROAD-BORDERED BEE HAWK

This species *Hemaris fuciformis* L. presented a challenge as L. Hugh Newman stated in his book on hawkmoths "I have never attempted to rear the two Bee Hawks in captivity from the pupal stage but judging from their habits in the wild they would need both sunlight and flowers as well as growing scabious and honeysuckle and probably a large cage would be necessary to obtain pairings".

In 1977 a 4.8m x 7.3m x 2.5m high (maximum) cage was erected and covered with netting. This cage was planted with Honeysuckle (*Lonicera periclymenum*) as the larval foodplant and also Red Campion (*Silene dioica* L.), Valerian (*Centranthus ruber* L.), Bugle (*Ajuga reptans* L.) amongst other plants for the imagines to feed on.

In 1978 eight pupae, four males and four females were obtained. In the first week of June the imagines started to emerge and the first two pairs were placed in a small cage (approx. 60cm x 60cm x 80cm) used for pairing other British Hawkmoths. Small potted plants of Bugle and Honeysuckle were put in the cage which was placed in the sun. This proved unsuccessful, the moths remaining motionless on the side netting of the cage, so it was decided to release them into the large cage.

The moths immediately hovered round the flowers and started to feed, not on Bugle which the books indicate they preferred but on Red Campion which does not appear to be mentioned. This behaviour can be explained by the fact that Bugle is probably the commonest flower

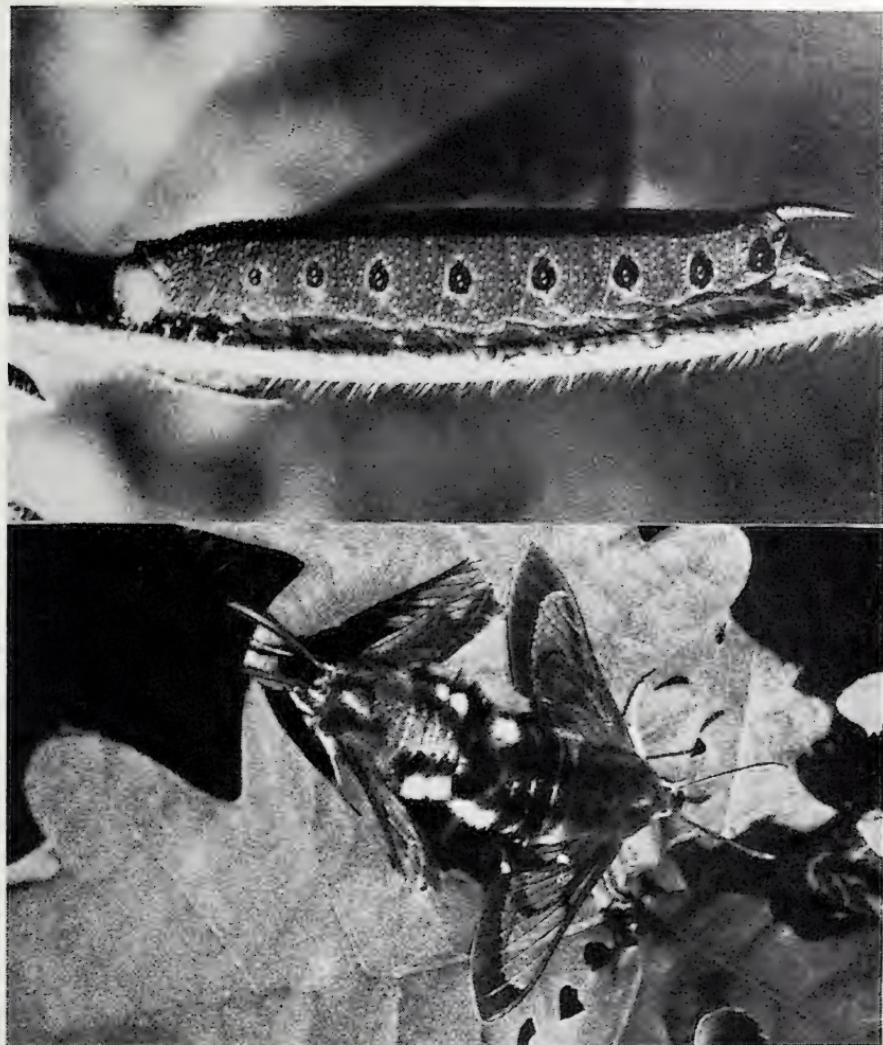


FIG. 1 Beehawks (*Hemaris fuciformis*) mating

FIG. 2 Larva of Beehawk (*Hemris fuciformis*)

and Red Campion a comparative rarity where the moths occur. After feeding for a few minutes the females flew to the top of the highest vegetation in the cage, a *Phellodendron amurense*, where they were joined by the males and pairings immediately took place. Subsequently the two other pairs emerged and paired in the same tree (the same tree was again successfully used for pairing in 1979). This behaviour could possibly indicate that in the wild they pair in the tops of trees.

The following day the females began to lay, whilst hovering, their pale green ova singly on the underside of Honeysuckle leaves. The

majority of the ova being laid on leaves in the sun. The main flight and egg laying period was in the afternoon, contradicting the books which say that the main flight period is in the morning. In fact they flew well into the evening.

This year the imagines did not start to emerge until between 21-25th June and then because of a cold spell the majority did not emerge until the first week of July, the main egg laying period being from the 4-7th July but continuing until the end of the month. The ova hatching in about fourteen days.

In 1978 the larvae were reared on cut Honeysuckle, wild and various cultivated varieties being used with equal success, and about one hundred pupae were obtained. This year it was decided that only growing foodplant would be used as far as possible, collecting the larvae when it was considered they were near to pupation. It was found that about 25% of the larvae were lost due to predation, mainly by spiders, but the average size of the pupae was larger than those reared on cut food.

I believe this is the first time that *Hemaris fuciformis* L. has been reared in this country.

I have now planted the cage with Devil's Bit Scabious (*Succisa pratensis*) Moench.) in the hope of obtaining livestock of the Narrow-bordered Bee Hawkmoth (*Hemaris tityus* L.) and am convinced that the same conditions will induce this species to breed in captivity.

Robin J. James (5005)

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SIERRA NEVADA, SOUTHERN SPAIN Summer 1978

After ten days of slow travel through France and Spain, in various weather conditions, and having met our friends Oriol Serrahima de Riba and his wife, we drew close to Granada. On the way we had collected continuously whenever possible, especially in the Pyranees where we had stopped for a few days and been quite successful.

On the eight of August we stopped about fifty miles north-west from Granada for lunch in a field: alongside a small stream butterflies were quite numerous. Extremely small *Pieris rapae* L. and Satyrids, including *H.alcyone* ssp. *vandalusica* Ober., *S.actaea* Esper. and *B. circe* ssp. *hispanica* Spuler were present.

The afternoon was spent looking at the Alhambra Palace, the gardens being magnificent with *Iphiclides feisthamelli* Dup. floating above oleander bushes; but there was no evidence of the hawkmoth usually connected with this plant. Later we drove out past Guadix, and camped the night in the hills, near many seemingly deserted beehives. On the

ninth day we awoke to the sound of bees buzzing all around the tent. After setting my butterflies, a walk revealed a nice specimen of the neuropterid *Nemoptera coa* L. with its fine elongated hind wings. *Lampides boeticus* L., *C. dorus* ssp. *andalusia* Ribbe, and *H. alcyone* were found. By the time another hour had passed we had all been attacked and stung by bees, and had decided jointly to vacate the area. We then set off for another part of the Sierra Nevada; stopped for lunch to find very distinctive *Lysandra albicans* Herr. and Schaff. flying freely up and down the hill sides, along with *Chazara briseis* ssp. *meridionalis* Staud. In the evening we found a fantastic camping spot at 1,800 metres, near Puerta de la Ragua, with a view across the plain to the other Sierras in the shimmering distance. It was extremely hot with limited shade only around the Land Rovers and tents.

I awoke to another scorching day, and set off to explore the area. In the neighbourhood of the tent *Arethusana arethusa* ssp. *boabdil* Rambur was flying in the shade of certain bushes, with *H. semele*. Along the tracks satyrids were extremely common, especially *Satyrus actea* Esper, *Brintesia circe* and *H. alcyone*. Occasionally a few *H. statilinus* ssp. *musaius* (?) were also seen. *V. cardui* L., *P.c.—album* L., *Argynnis lathonia* L., *Melanargia lachesis* Hub., *M. jurtina* ssp. *hispanula* Esper., *H. lycaon* ssp. *macrophthalmia* Fruh. and *P. aegeria* ssp. *aegeria* L.; all seemed to be reasonably abundant. Bird life was quite plentiful with many wheatears and finches. Once we had walked above the advancing treeline, (it would appear that if the forestation is not rapidly stopped, the complete alpine fauna of these peaks will be destroyed.), the Nevada Grayling, *Pseudochazara hippolyte* ssp. *Williamsi* Romei was present, slightly worn but common. These were difficult to catch due to their rapid flight and unwillingness to land. On the walk back to the tent *Coenonympha dorus* ssp. *andalusica* Ribbe were taken; although the specimens caught were very worn.

On the 10th of August we drove to and over the Col de la Ragua. Bee-eaters flew alongside the Land Rover, providing a colourful and spectacular aerobic display. Settled in large numbers on bushes of blue mint the previously recorded butterflies were present, along with *Heodes alciphron* ssp. *grenadensis* Ribbe; the large big-spotted race, and the *Cupido minimus* Fuess. Under a nearby rock a large yellow scorpion was discovered with various coleoptera. Once we were over the Col. the nominate race, ssp. *arethusa* of *Arethusana arethusa* was caught. A few *Pseudotergummia fidia* ssp. *paleia* Fruh. were also seen. In a small village around a mules' drinking trough, clouds of *C. minimus* Fuesslin and *Syntarucus pirithous* L. fluttered above and landed on the damp soil.

The next day, the 11th, was devoted to a search for *Agriades glandon*. One of the Land Rovers was driven up from the Col. de la Ragua to the summit of Puerto de la Lobo, from where we walked. Swarms of *Erebia hispania* ssp. *hispania* But. were present, the race being definitely

very different to my series from the Pyrenees. Occasional *P. hippolyte* were seen, but all of the numerous blues were found to be *Lycaides idas* ssp. *nevadensis* Ober., never *A. glandon*. A few of this area's race of *P. appollo* ssp. *nevadensis* Ober. were seen, slightly battered but seeming to be of uniform colour, and distinct from my Pyrenean specimens. Amongst the bushes some very large dark green cricket larvae were found, at least $2\frac{1}{2}$ inches long, and very noisy! *H. alciphron* was very common on the rocky peaks.

On the 12th August we travelled back down onto the plain towards Guadix, to a village called Jerez del Maquesado; where near a river *Zizera knysna* Trimen was abundant, with *C. minimus* and *S. pirithous*.

On the 13th of August we decided to tackle the peak of Penon del Puerto, 2,800 metres. After leaving the Land Rover at the end of the fire track we set off towards the snow. Insects were everywhere; *Iphiclides feisthamelli*, *Pandoriana pandora* Den. and Schiff, Marbled whites, arctids, *H. alciphron*, and most of the previously mentioned butterflies. It was very steep and hot, but with frequent drinks from the streams we soon left the scrub behind for the short green turf. Here small grasshoppers composed of several instars, jumped from under our feet in their thousands—an incredible spectacle. A very large *P. pandora* was caught along with several very small *Mellitaea parthenoides* ssp. *veletaensis* Ribbe, *Argynnis aglaja* L. and *Argynnis niobe*. At the base of the ice *Plebicula golgus* Hub. was at last seen, at about 2,700 metres. They seemed to be of two generations, mostly very old and worn, but with a few new specimens. One *Aricia ramburi* Verity, and one *A. montensis* ssp. *montensis* Verity were also caught. Surprisingly newly emerged *Aglais urticae* L. were seen flying over the snow/ice; on comparison with British specimens they have less black on the hind wings, and thinner blue/black borders to both wings. In the sky a pair of Golden Eagles soared with a few ravens.

We arrived back at the tent, after seeing a few *H. statilinus* on the way.

The next day was overcast, and the only specimens that seemed to be flying was *H. lycaon*, although some arctids were also present. Only males of *lycaon* were ever caught.

On the 15th August we left the area; we had intended to camp at Sierra de los Filabres, but it was solely desert with no water at all. We carried on to the coast, where we stayed for the next week, near Almeria, among the palm trees and salt marsh. This area was almost devoid of insect life except for *Pseudotergummia fidia*, and many different nocturnal coleoptera; e.g. *Elenphorus collaris* L., *Akis bacarozzo* Schrank, *Tentyria interrupta* Latr., *Pimelia bipuncta* F. and *Blaps gigas* L. *Papilio machaon* ssp. *hispanicus* Eller was found, but no difference was seen when compared later with French and Sardinian specimens.

On the 22nd August we left the coast for the village of Nigar; a

village famed for its pottery. It was in this area that I found one final new species—*Tarucus theophrastus* Fab., just as Manley and Alcard had described it, flying solely around its prickly food plant, and very tricky to catch.

After this we headed north towards France. On the border a series of *Pieris manni* Mayer were caught in the Province of Barcelona, near La Junquera.

Excluding the Hesperiidae, forty five species were recorded in the South of Spain, although at least seventy five species were recorded in the entire holiday.

Kurt D. Jackson (6134J)

THE SIERRA DEL MONCAYO AND CENTRAL SPAIN, July 1978

The Sierra del Moncayo is an isolated mountain range reaching 2,313m at its highest point, situated between Soria and Saragossa, and is the home of some rather interesting butterflies. The enterprising Dr. D. A. Chapman visited here in 1904 and subsequently described his adventures. (Chapman, 1904).

No doubt other British Entomologists have visited this part of Spain since those far-off days, but I have been unable to find any more recent accounts in the various entomological journals, and decided to visit the area in July 1978.

Arriving at Le Havre with car on 9th July it took me longer than expected to do the journey to the Spanish border using secondary roads. I found the French camping sites very good, stopping at Le Blanc the first night and at Miramont de Guyenne the second. On the 11th July I picked my way through the busy town of Pau and took the road to Spain via the Col de Portalet. While climbing the pass I spotted some *Parnassius mnemosyne* L. and was able to catch four in reasonable condition. After the dull wet weather I had experienced in France, the weather became warm and sunny and remained like that during my travels in Spain. That evening I camped near Torla and during a stroll with the net I spotted *Lampides boeticus* L., *Glaucopsyche alexis* Poda; *Plebicula amandus* Schn., *Lysandra bellargus* Rott., *Argynnis aglaja* L., and *Melitaea cinxia* L. The following day while heading for the Ordessa National Park in the Pyrenees I turned off the road and chanced upon an open area where amongst a profusion of flowers I found *P.apollo* L., *Melanargia galathea* L., *Melitaea phoebe* D. & S; *Mellicta parthenoides* Kef., *Glaucopsyche melanops* Bsdvl., (one specimen) and a small colony of *Maculinea alcon* D. & S. I decided to camp at this delightful spot and in the evening I was joined by two French couples on motor cycles who kindly invited me to share a couple of bottles of wine around a camp fire.

On 13th July I drove to Jaca and from that town I climbed up into the Sierra de la Pena where I collected some well-marked specimens of *M. galathea* which were larger than those seen at Ordessa. Also seen in

this mountain range were the following species:—*Celastrina argiolus* L., *P. amandus.*, *Lysandra arragonensis* Gerhd., *Pyrgus serratulae* Ramb., *Pararge aegeria* L., and *Brenthis ino* Rott. In the afternoon, under a burning sun I drove to Huesca and from there to Saragossa, and after finding my way through this busy city I camped near the small town of Borja. The following day I took the winding road to the Sierra del Moncayo. The lower slopes of the mountain were covered with a white-flowered cistus—a wonderful sight in the morning sunshine. When I had climbed the zig-zag road into a zone of beechwoods I spotted a species of *Erebia* flying along the roadside. I was rather disappointed to find that this was *Erebia triaria* de Prunner and not *Erebia epistygne* Hub. Bustillo and Rubio, the authors of the two volumes on Spanish butterflies state that *E. epistygne* ssp. *fuliginosa* Marten flies in the Moncayo range in July. This beautiful *Erebia* appears much earlier in the year in the Montes Universales in the Province of Teruel. My main object in visiting Moncayo was to capture this species. The only *Erebia* taken by Dr. Chapman at Moncayo between 12th July and 24th July 1904 was *E. triaria*. In addition to these species *Aglais urticae* L. and *Hipparchia semele* L. were flying in and out of the beechwoods in large numbers. Continuing my climb, I eventually reached the Santuario which is an old monastery and said to be at a height of 1,634m. The building is still maintained by the Ecclesiastical Authorities for students and as a hostel for summer visitors. I managed to find some shade for the car and set out to climb a rough path in the direction of the summit. Growing amongst the scrub were large clumps of *Erica arborea* and flying to the flowers of this heath were fresh specimens of *Paleochrysophanus hippothoe* L. The butterflies were never far away from streams which trickled down the mountainside. The Spanish entomologist R. Agenjo states that *P. hippothoe* from Moncayo should be referred to as ssp. *parrai* from specimens taken by Lauffer in July 1914. This race is said to be more brightly coloured than ssp. *mirus* Vty. from the mountains of Northern Spain and to have other minor differences. I have examined the ten specimens I took at Moncayo and although they appear to be brighter in colour, they do not appear to differ greatly from a series I took at the Puerto de San Glorio (Leon) in June 1976. *P. hippothoe* has not been found further south than Moncayo in Spain.

Continuing my climb I eventually reached a terrain of rocks and scree without seeing much except for a few specimens of *Aricia montensis* Vty. I enquired from two Spanish walkers who were returning from the summit whether they had seen any butterflies. They said they had seen none further up the mountain. As I was feeling rather exhausted from the heat, I decided to return. It would appear that butterflies were emerging late and that I was too early for *P. apollo* ssp. *laufferi* Bryk; and that *E. epistygne* was over or had not yet emerged. It would be interesting to hear of their captures from any other collectors who have visited Moncayo in July or August. In addition to the butterflies men-

tioned Dr. Chapman also took *Lycaena virgaureae* L. and *Lycaena alciphron* Rott. at Moncayo. While photographing some flowers on my return to the lower slopes of the mountain I was rewarded with a good view of that elusive bird the Wryneck.

I spent the next two days in the area of Soria and Sierra Demanda, and visited the isolated village of Canales to which Dr. Chapman travelled by train and mule cart during his collecting trip. I found only the usual common butterflies in the Sierra Demanda. I also explored the site near Abejar where *Maculinea nausithous* Berg. is said to occur. The area had been recently grazed and the only blue that I saw was *Cyaniris semiargus* Rott.

My next objective was to capture *Lysandra bolivari* Romei from the Madrid district which necessitated a long drive south. From Abejar I went by a minor road to Amazan which took me through a wild stretch of uncultivated country where I saw hawks, hoopoes and shrikes. On reaching Amazan I joined the busy Soria to Madrid road and had no further chances of bird watching. I reached the outskirts of Madrid in the afternoon and found the road to Arganda without difficulty. The countryside here was looking very burnt up and prospects did not look very promising for butterflies. However I explored the hills around the village of Campo Real and was pleased to find the lovely white *L.bolivari* flying in small numbers. They were difficult to catch as they searched for the odd flower that had not been scorched by the sun. I spent a couple of days here and obtained a short series of *bolivari*.

On 19th of July I drove to Cuenca and after a quick tour of this beautiful town, I found a good camp site in some extensive coniferous woodlands near Ciudad Encantada where I lay awake at night listening to a fine chorus of tree frogs. The following day I drove through Una and collected at a lovely site on the banks of a river near Tragacete. The beautiful sky-blue *Lysandra caelestissima* Vty., which is confined to Central Spain in the Provinces of Cuenca and Teruel was quite plentiful here and in fresh condition. Other butterflies on the wing included *Plebicula dorylas* Schiff., *Melanargia lachesis* Hub., *Hipparchia alcyone* D. & S., *H.semele*., *Colias croceus* Geoff., and *Colias australis* Vty. In the evening I took the steep road over the Puerto de Cubillo and drove along forest roads to the village of Griegos in the Montes Universales. Just beyond the village is a vast open area with plenty of flowers but the only butterflies I saw there were a few restless apollos. I drove on to Bronchales and called at the Hotel Ballester which is favoured by visiting entomologists but was informed that there were none stopping there at present.

The next day I visited a wide valley near Orihuela where *Vanessa cardui* L. was swarming, but I looked in vain for an aberration. I then went to a hilly area recently planted with pines near the village of Moscardon and found this to be alive with butterflies. *Lysandra arragonensis* Gerhd. was swarming, both males and females, and some of the

males were almost as white as the *L. bolivari* from Madrid. I was particularly pleased to find a few specimens of the very local blue *Plebicula nivescens* Kef. Amongst other butterflies were *M. lachesis*, *H. alcyone*, *C. croceus*, *C. australis*, and the two hairstreaks *Strymon ilicis* Esp., and *Strymon esculi* Hub. That evening I camped at La Losilla near Albarracin. This is an elevated, lightly wooded area famous for its giant boulders and pre-historic cave drawings. In the summer months the local residents find it an attractive spot for camping and picnics. The following day I visited the wooded hills above Moscaron where the following butterflies were flying:— *P. apollo*, *Limenitis reducta* Staud., *Argynnis adippe* D. & S., *A. chlorodippe*, *Pandoriana pandora* D. & S., *Agrodiaetus damon* D. & S., *Aporia crataegi* L. and *Brenthis hecate* D. & S. I experienced a few anxious moments here when I drove along a forest track and got temporarily stuck in some deep ruts. From this high ground there is an awe-inspiring view of a vast expanse of desolate wilderness with little sign of human occupation.

On the following day (23rd July) I explored the gorges around the ancient town of Albarracin. It was soon evident that not many of the big satyrids had emerged and I saw no sign of *Chazara prieuri* Pierret the speciality of the region. A few *Brintesia circe* Fab., one *Satyrus actaea* Esp., and one *Pseudotergumia fidia* L. were seen. I located the two bushes of *Colutea arborescens* where in 1976 I had caught *Iolana iolas* Ochs., and examined some of the seed pods. I found that the seeds had been eaten possibly by larvae of *L. boeticus* or *I. iolas* and the pods were empty. I decided to move on and made the 200 km journey to Soria in the afternoon and evening. The Soria district did not produce any new species. Taking secondary roads by way of Agreda and Ayerbe I drove to Jaca, partly to see new country but mainly to avoid the busy city of Saragossa. I then collected in some pleasant country near Sabinanigo where in 1974 I had taken specimens of *Meleageria daphnis* D. & S., but no luck this time. The following day I returned to my old collecting ground near Ordessa. I found the grass had been cut and there was a marked reduction in the number of butterflies. A notable capture here was a single specimen of *Melanargia russiae* Esp. I thought at first that it was a faded specimen but a closer examination proved it to be an aberration in which the markings are brownish-yellow instead of black and is similar to the aberration *flava* Ribbe in the species *M. lachesis* figured by Manley and Allcard in their book on the Butterflies and Burnets of Spain.

On 26th July, I crossed the Pyrenees by the Col de Portelet and had an uneventful drive through France to the port of Le Havre.

H. G. Phelps (4666)

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NEWS ITEMS FROM HABITAT

Save the Village Pond

The Campaign for Village Ponds organised by the British Waterfowl Association and Ford of Britain has closed but the campaign work will be continued by the British Trust for Conservation Volunteers. The campaign was launched in the Spring of 1974 to prevent the decline of Britain's ponds; the response was so great that the original campaign was extended from three years to four. Over 2000 ponds have been saved by the campaign and many more have been reclaimed by local volunteers. Records of ponds registered with the campaign will be handed over to the BTCV in the Spring of this year, as will the stock of the handbook 'Save the Village Pond'.

All enquiries concerning the campaign should now be addressed to the BTCV, Zoological Gardens, Regent's Park, London NW1 4RY.

Record Year For World Wildlife Fund

With net funds of £882,000 available for conservation, an increase of 45.8% over the previous year, the World Wildlife Fund UK, achieved a record income of £1,208,660 in 1978. Particular growth rates occurred in legacies and in donations for specific projects. Funds available for new projects are £248,000—of which one third—£82,000—is available for projects in the United Kingdom. The Council for Nature acknowledges the grant given by World Wildlife Fund for our work and for expenses incurred in preparing the Grey Seals group's Report.

Sheffield 'Nature Fair' Success

The 'Nature Fair' organised by the Council for Nature on 27-28th April proved to be extremely popular with the young people of South Yorkshire. Held at the Polytechnic Main Union Hall with over thirty exhibits from natural history societies, conservation groups and national wildlife bodies, it attracted 850 school children in groups on the first day and about 500 adults and children on the Saturday. Sir Neville Pratt of Inter-Action, held a large audience captive with his thrilling adventures in Africa using snakes to illustrate his story. Quizzes, paintings, films and competitions also provided additional interest to the displays. The Council for Nature are hoping to organise smaller 'Fairs' in the towns of Doncaster, Barnsley and Rotherham in the near future. A Project Report, financed by the Committee for Environmental Conservation will be available later in the year. The Council acknowledges all the help and support given by South Yorkshire County

Council and the very hard work put in by Ruth Jefferson, the temporary Youth Officer who had been engaged on the project since January.

More Nature Fairs

As a result of the successful 'Nature Fair' organised by the Council for Nature in Sheffield during April an extension of the project has been undertaken in the form of 'mini fairs' in other Yorkshire towns. Exhibits by local environmental societies and nature reserves will be displayed at Doncaster Central Library (off Waterdale) during library opening hours from Tuesday 3rd July—Saturday 7th July; at Barnsley College of Technology Old Hall from Thursday 12th July—Saturday 14th July, 10 am—5 pm Thursday and Saturday and 10 am—7 pm on Friday with a talk at 8 pm entitled 'Young People and Conservation'; and lastly at Rotherham Arts Centre from Wednesday 18th July—Saturday 21st July 10 am—5 pm except for Friday which will be 10 am—7 pm with a talk at 8 pm. Film shows and quizzes will be provided at Barnsley and Rotherham. Admission free and all are welcome especially young people.

Research and Management Papers

The Hertfordshire and Middlesex Trust for Nature Conservation have published a series of papers presented to their 1975 and 1976 symposia. Published together under the title "Research and Management in Wildlife Conservation", they cover a variety of topics, mostly associated with wetlands. Titles of the papers are: Freshwater Habitats: An Introduction; Tring Reservoirs National Nature Reserve; Some Effects of River Management on Biological Conservation; Meres and Mires in Cheshire; Aspects of Water Pollution Research and Conservation; Some Problems of Wet Grassland Management; The Work and Records of the Hertfordshire Natural History Society; Oak-Hornbeam Woodland and The Historical Flora of Middlesex.

This 54-page publication is now available from the Environmental Studies Office, Offley Place, Great Offley, Near Hitchin, Herts, priced 75p plus 19p postage and packing.

Ant Research and Maplin Sands

The Natural Environment Research Council have published two more research booklets. 'Ant Research 1954-1976' describes the work which is currently being done by the Institute for Terrestrial Ecology on ant populations, including species that live on heathlands, their distribution and density, and factors which influence this.

The second booklet is 'The Ecology of Maplin Sands'. which describes a three-and-a-half year scientific study of the ecology of the coastal zone between the Orwell estuary in Suffolk and the Kentish shore of the Thames estuary. The study emphasises the inter-relation-

ship between the processes of accretion and erosion on such coasts, water movement, sediment load and the flora and fauna. It has also indicated sites of most value for wild-life conservation and demonstrates factors to be taken into account in their management.

The former booklet is £1.20 and the latter £2.00 and they are obtainable from ITE, 68 Hills Road, Cambridge CB2 1LA.

The Institute for Terrestrial Ecology's Annual Report for 1976 is also available. The report covers research on summer drought, upland land use, management of grassland in country parks, the ecology of the large blue butterfly, research on trees, coasts, mountains, freshwater habitats, vertebrates and invertebrates and effects of pollutants. Price £3.50, the Annual Report is available from HMSO, 49 High Holborn, London WC1V 6HB and other Government bookshops.

HOST PLANTS OF GONOCERUS ACUTEANGULATUS (GOEZE) (HETEROPTERA: COREIDAE)

A recent tidying-up operation led to my browsing through some old AES Bulletins, including the special Silver Jubilee number. In his paper on Distribution, Range, and the British Fauna, Uffen (1960) cites the bug *Gonocerus acuteangulatus* (Goeze) as surviving "... on Box Hill far from its Mediterranean haunts, by specialization including restriction of the foodplant to Box (*Buxus sempervirens* L.)." The feeding habits of this species are not quite as simple as that. Certainly, in Britain, it seems to be confined to Box (and Box Hill Box at that), though Southwood and Leston (1959) say that "it must leave box at times for it is regularly taken in October on ivy flowers near Box Hill." That, I think, is probably just a case of "popping down to the local for a quick one".

Here, in Andorra, where Box is a dominant shrub around the 1000 metre contour line on the southern aspect of the Pyrenees, the bug is abundant on Box, and I have never found it on any other plant.

Stichel (1955-59) gives the foodplants of *G. acuteangulatus* as "*Corylus avellana* L., *Berberis vulgaris* L., *Rhamnus catharticus* L., *Frangula alnus* Mill., *Arbutus andrache* L., *Prunus spinosa* L., *Rosa*, aber auch auf *Quercus* und *Juniperus communis* L." Not, be it noted, any mention at all of *Buxus sempervirens*. Further, when an eminent Dutch heteropterist visited me in Andorra a couple of years ago, he seemed quite surprised when I showed him the bug on Box.

Using Stichel (*op. cit.*) as the authority on the distribution of *G. acuteangulatus* and Polunin (1969) for the distribution of Box, it is seen that the bug is recorded from all the countries in Europe in which Box occurs, and also from five countries (Netherlands, Czechoslovakia, Hungary, Poland and Western Russia) in which Box does not occur.

If Box were widely regarded as a major host plant of *G. acuteangulatus*, it is most unlikely that Stichel would have left it out—and it

is most unlikely that my Dutch friend would have shown surprise! So far as I am aware there is no morphological difference between the "buxophilic" English and Andorran insects and the "buxophobic" populations in other countries; but this difference in the breeding habits tempts one to consider the English and Andorran race as a physiological subspecies.

A further point arises concerning this insect/plant association in England. What was the origin of Box in England? Tansley (1939) draws attention to the opinion held by many that the plant was a Roman import, but he also mentions the conviction of Count Solms-Laubach that the Box Hill wood is a fragment of old native forest. The presence there of *Gonocerus acuteangulatus* would seem to provide strong evidence in favour of the Count's opinion. P. J. L. ROCHE (2965)

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AN ADDITION TO THE LIST OF MALTESE BLATTIDAE

The list of Blattidae of the Maltese Islands at present includes six species which have been recorded by various authors (Borg, 1939; Valletta, 1954 & 1955; Lanfranco, 1955; Baccetti, 1972). Of these, 4 species, *Blatta orientalis* L., *Blatella germanica* (L.), *Periplaneta americana* (L.) and *Supella supellectilium* Sey. are cosmopolitan, while the other two species, *Loboptera decipiens* (Germ.) and *Polyphaga aegyptiaca* L., have a Mediterranean distribution.

In this note the presence of a seventh species *Ectobius kraussianus* Ramme, is recorded. This is the first member of the subfamily Ectobiinae recorded from Malta. So far, all the records of this species have been from a single locality in Malta—Buskett, which is a semi-natural wood dominated by the Aleppo pine (*Pinus halepensis*). Adults and nymphs have been found in leaf litter and fallen pine cones, under stones and in the foliose lichen *Ramalina durieui* growing on Olive trees (*Olea europaea*).

The data for the insects is as follows: *Ectobius kraussianus* Ramme, 1923. Subfamily Ectobiinae **MALTA**—Buskett
2 adults, 1 nymph 24.VII.75 (from fallen pine cones; adults,
J. Marshall BM (NH) det., 1977)
1 adult, 1 nymph 5.VIII.75 (from lichen; adult, J. Marshall BM (NH)
det., 1977)

1 adult 7.IX.76 (from leaf litter)

1 adult 9.VIII.78 (under stone)

1 adult 11.IX.78 (from fallen pine cone)

All the material was collected by the author.

Ectobius kraussianus was previously known only from the island of Sicily (Failla *et al.*, 1972).

The author is indebted to Mrs. J. Marshall of the British Museum (Natural History) who determined the insects, and to Mr. A. Valletta who made the arrangements for their identification.

Stephen P. Schembri

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A PARASITIC WASP AND THE WHITE ADMIRAL

In early May, 1979 Vernon Shearer and I visited a woodland on the Hants./Surrey border and spent some time in searching for the larvae of the White Admiral, *Limenitis camilla* L. It was a very late spring and the larvae were only just out of their hibernacula. Of the seven larvae which I brought back with me, four produced almost immediately a parasite cocoon. This cocoon is shaped like a small grain of wheat and similarly coloured and is suspended on a silken thread hanging down from the shoot on which the larva had its silken pad. The larva in each case was not dead but had a shrivelled look and died shortly afterwards—the point of emergence of the parasite being at the stage when the larva had started to assume some green colouration after its winter rest, during which period the larva is brown and white.

The wasps emerged from the pupae after about a week and caught me unawares so that two escaped. However the remaining two were killed and sent to Dr. Mark Shaw at Reading University for his comments. The two wasps appeared to differ in size and appearance and he confirmed that one was a true parasite, the other a hyperparasite. The parasite he has now been able to identify as *Meteorus fragilis* (Wesmael) which is synonymous with *M. colon* Haliday in the most recent Kloet and Hincks check list. The specimen was a female. The species appears

to have a wide range of hosts. It would be of great help if members who are able to collect *L. camilla* larvae immediately after they come out of hibernation could keep a check as to any parasites emerging and send any material obtained to Dr. Shaw.

The White Admiral has a hazardous existence from the moment the egg is laid. Egg parasites occur, lacewings and their larvae, hemiptera and earwigs devour or suck the eggs and small larvae. Spiders are an ever present menace and even if they overcome all these problems they may fall victims to *Meteorus* or be eaten by insectivorous birds during their Spring search for larvae for their young. It is a wonder any survive but they do and give us the pleasure of seeing the adults sailing along the woodland rides and circling the branches above.

P. W. Cribb (2270)

THE BRIMSTONE BUTTERFLY ON THE ISLE OF MAN

I have among my notes for 1976 two records of observing the Brimstone butterfly (*Gonepteryx rhamni* L.) on the Isle of Man. The first was a female, sighted on the 10th August in Douglas on the eastern seaboard of the island, on a small piece of waste ground. The second was a male which was seen some 13 miles away at Glen Mooar on the west coast of the island some three days later. Dennis (1977) notes that the Brimstone has been recorded on the Isle of Man, but its occurrence there has not been confirmed since 1960. The Brimstone is a non-colonial species and is generally wide ranging in its habits, but it is not usually migratory, although Ford (1957) records the sighting of a number of specimens migrating near Tavistock. Dennis states that its distribution in Britain illustrates a very close parallel to those of its main foodplants, the Buckthorn (*Rhamnus cartharticus*) and the Alder Buckthorn (*Frangula alnus*). Allen (1969) records neither of these species from the island; however, Clapham, Tutin and Warburg (1952), whilst noting that the Alder Buckthorne is not found on the Isle of Man, fail to mention the absence of Buckthorne from the island, which, due to the way species distribution is recorded in their book would suggest that the species is present. On more recent visits to the island although I have searched for Buckthorn I have failed to find it, so if it does occur on there it must certainly be rare. Thus, the two records of the Brimstone for 1976 seem strange indeed. More so because I am sure that the individuals I noted can only have been two of many on the island that summer as I was there for just one week, and I must admit that Lepidoptera were not the prime reason for my visit.

I should also mention that neither specimen was taken, so although in both cases identification was definite, I could not say whether the specimens belong to the English subspecies *G. r. rhamni*, or to the Irish subspecies *G. r. graesi* (Huggins, 1956). Michael M. Majerus

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BRITISH ICHNEUMONIDAE — A PERSONAL VIEW ON COLLECTING AND CONSERVATION

It was not all that long ago that the emergence of an ichneumonoid grub amongst my livestock was, to say the least, unwelcome. However, this view was to be changed when my interest was aroused in the Summer of 1977.

Whilst on holiday in Dorset I came across a large nest of *Inachis io* larvae about 10mm in length. Before I started to box any larvae, a small fly caught my attention. It was on the upperside of a nettle leaf where it was frantically waving its antennae up and down whilst exploring the nettle stem. I watched for a few more moments and was completely fascinated by its behaviour. I captured the insect with my aspirator, deciding to observe it at close quarters. Unfortunately the ichneumon was dead when I arrived back at my caravan, the reason for which still remains a mystery. I kept the small ichneumon for further reference and indeed, it proved to be very useful.

The *io* larvae that I had captured two weeks previous were now approaching maturity. One morning whilst cleaning them I found an empty skin of one of the larvae and a small cocoon by its side. I kept both skin and cocoon separate and labelled them. By the end of the week I had a total of eighteen cocoons and a corresponding number of dead larvae. After a period of about 10-14 days the first of the cocoons had produced a small active ichneumon fly and within another two days five more had emerged. They were identical to the single specimen I had taken whilst on holiday.

I sent one of the specimens to Dr. M. Shaw at the University of Reading for identification. He in fact identified it as *Phobocampe confusa* —a common parasite of *I. io* and *A. urticae*. In addition he also added a small amount of biological data about the activities of the insect. It was this that prompted me to study the ichneumonidae much more closely.

I purchased a couple of Royal Entomological Society's Handbook for the Identification of British insects on the Hymenoptera Ichneumonidae and it immediately became evident that there was a lot of work necessary in order to build up the biological data that was missing from all the existing works on the subject.

I should like to point out to anyone who is unfamiliar with this order that there are over 2000 species in the British Isles alone, ranging

from the size of a pinhead to over 30 mm in length, which indicates just how much work is indeed necessary. Their method of survival depends entirely upon finding the correct host in which the female must deposit a single egg. These hosts range through all the other insect orders. In fact there are few orders of insects that have not been selected as host.

For example, the much prized *Apatura iris* has to be selected by a single ichneumon by the name of *Psilomastax pyramidalis*. If one reads the classic book "Notes and Views of the Purple Emperor", you will find that no indication of this parasite is mentioned. Surely any work of this size and stature should mention such an important aspect of the wild status of such a well known butterfly. The same state of affairs was reflected by Dr. M. Shaw in a short extract from the Entomologist's Gazette. He states (quite reasonably, I feel) that the recent conservation involving *Papilio machaon* in the Norfolk area, did not involve its parasite *Trogus lapidator* and indeed he stated "an unfortunate tendency in nature conservation, has sometimes been to regard the species, rather than the ecosystem, as a conservation target".

Should you take a view that the ichneumons are not an important section of our ecology system, may I quote from C. Morley who wrote "all moths and butterflies lay some hundreds of ova apiece and if each of these attained maturity, to go and lay another hundred, their numbers would so quickly increase that the plants upon which they subsist would steadily be extirpated". He goes on to give an example of a French naturalist in America who released a few gypsy moth adults and within a few years they had spread out causing considerable damage. Now if he had released a few ichneumon flies as an antidote they would have been confined to a more manageable area.

I think at this stage some readers may take the view that the rest of our ecology system could take their place. For instance, it seems quite logical to assume that birds and other animals would be quite adequately qualified to control any large fluctuations in the numbers of lepidopterous larvae. However, it must be emphasised that certain larvae are not only unpalatable but quite poisonous to birds and animals. For example, if adequate supply of food was available for the American Monarch butterfly in this country and it was introduced in sufficient numbers without its parasite, then it would take a prolific hold in our environment. This is due to the fact that inside the tissues of just two adults, there is enough heart poisons to kill a starling.

Going back to the point of conservation, consider the thought that insecticides were no longer allowed to be used commercially. The perfect solution would be to introduce the parasite needed to control the unwanted pest. i.e. *Ichneumon sareitonius* to control the turnip moth. Surely this is the true definition of the system called "ecosystem".

Returning to my particular interest, I should at present like to restrict my research to the larger parasites whose hosts are Sphingidae. I chose these for the comparative ease of identification of species. It

is my intention to study the life cycle of these particular parasites. For example, conditions required for pairing, oviposition, etc., and I hope to record some of my findings on film and in due course attempt to publish any information that I may collect in the AES Bulletin.

It is hoped that after you have read this article, it may stimulate an interest in this field or at least to prevent the destruction of any bred parasites. I would much appreciate any unwanted ichneumons to be sent to me which would help further research, or indeed, any information of reared parasites, no matter how trivial it may appear to you. I can only stress once more that any information collected can only benefit our poor existing knowledge on this subject.

B. Barr (6378)

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ON COLLECTING AND CONSERVATION

I have followed the recent debate in the A.E.S. Bulletin on collecting since joining the society. Whilst hoping that it continues at length, I would hope that it also will take a more practical direction. It is one thing to state an opinion, but another to suggest remedies for the problem, namely a declining number of insect species, specially Lepidoptera within the British Isles.

I consider that the present level of educated collection has little to do with this. Rather, I consider it to be due to the removal of marginal land, the increased use of herbicides and pesticides, and the general trend toward a more efficient intensive agricultural system. By following a policy in our own gardens of reducing horticultural efficiency and increasing ecological diversity, this can be, to a small extent, ameliorated.

Since moving into the Lodge at Stoke-Brunswick, in Sussex, I have endeavoured to follow such a policy. The Lodge has a sizeable garden, which due to its position below the brow of Little Homestall Hill, and the fact that the underlying soil is a surface water gley, is extremely difficult to manage as a typically neat artificial garden. Three years ago, in September, 1976, I decided to manage the garden as a "reserve", to attempt to stimulate the Lepidoptera population. The first step was to abandon the use of herbicides in the main, employing only simazine to remove incursive species from the paved areas. Only a small lawn was mown, and some other larger areas scythed about twice a year to reduce and prevent their reversion to natural oak scrub.

In 1977, the fruits of this policy began to appear. A fairly large number of Small Skippers (*Thymelicus sylvestris*) were observed on Field Scabious within the garden. All the common Pieridae were recorded,

with the Speckled Wood (*Pararge aegeria*), the Wall Butterfly (*Pararge megera*), the Common Blue (*Polyommatus icarus*) and a diverse range of moth species. The Meadow Brown (*Maniola jurtina*) was not observed until 1978, when it occurred in fairly large numbers, with a substantially increased number of Orange Tips (*Anthocharis cardamines*). Since 1976, the diversity of insect life in the "garden" has been higher than most of the other areas of cut, mown, sprayed and "tidied" ground within the school's 12 acres. In 1979, an added botanical bonus was provided, in the form of the Common Spotted Orchid, which appeared on an area of formerly typical lawn!

The diversity of the flora is inexorably bound up with the increasing diversity of Lepidoptera. A series of 1m² quadrats reveal the following herb species:

<i>Lotus corniculatus</i>	<i>Lamium purpureum</i>
<i>Leontodon hispidus</i>	<i>Primula vulgaris</i>
<i>Hieracium aurantiacum</i>	<i>Calluna vulgaris</i>
<i>Centaurea nigra</i>	<i>Achillea millefolium</i>
<i>Cirsium arvense</i>	<i>Ranunculus ficaria</i>
<i>Senecio jacobaea</i>	<i>Ranunculus bulbosa</i>
<i>Senecio vulgaris</i>	<i>Ranunculus repens</i>
<i>Bellis perennis</i>	<i>Hypericum spy</i>
<i>Campanula rotundifolia</i>	<i>Trifolium repens</i>
<i>Plantago major</i>	<i>Trifolium pratense</i>
<i>Plantago lanceolata</i>	<i>Lathyrus aphaca</i>
<i>Veronica chamaedrys</i>	<i>Cytisus scoparius</i>
<i>Digitalis purpurea</i>	<i>Dactylorhiza majalis</i>

This list correlates significantly with the food plants of many Lepidopteran species in the larval stage. As most butterfly larva are monophagous, the presence of the correct food plant is vital to the survival of the species. A high herb diversity must provide the better environment, as opposed to the low diversity provided by "lawn species".

The need for pesticide free marginal land seems to be crucial. Whilst in Ontario Province in Canada in 1978, I had the opportunity of collecting the butterfly species associated with roadside verge communities. Because of the depth of snow, salting is not carried, so no "saline splash" contaminates the verge, and because of the "soft shoulder" on all major roads, and the unmetalled nature of minor tracks, a diverse herb community exists, often turning into Arctic Willow Scrub, with some stag's horn sumac. The diversity of species was higher here than in the Moody Drive or the Samuel de Champlain National Parks. (This is not surprising to the field naturalist, as margins where different habitats intergrade are known to have higher ecological diversities). In addition to the high diversity of the verges as opposed to Forest-Lake ecosystems, they were also substantially more diverse than a West Sussex lane. This is due to West Sussex County Council's habit of mowing verges, some 1.5m back from the roads, and the intensive arable agricultural pattern of British farming, which involves a considerable use of pesti-

cides, usually carbamates which when applied as sprays, drift considerable distances.

If one compares the reduction in insect species since 1935, and the possible mortality, due to the rise in the use of organochlorines, organophosphate and carbamate insecticides, of our Lepidoptera, I am sure that, like myself, the open-minded entomologist will conclude that the worst excesses of Victorian "Collectomania" were of a lesser consequence.

The Rev. Morris wrote in his work on butterflies in 1899, when the large copper became severely reduced in number by the drainage and improved canalization of the Cambridgeshire fens, "I cannot but with some regret recall, at all events, the time when almost any number of this dazzling fly was easily procurable, either "by purchase" or "by exchange" for our cabinets". While lauding the process in improving the productivity of agricultural land, Morris writes "The entomologist is the only person who has cause to lament the change, and he, loyal and patriotic subject as he is, must not repine at even the disappearance of the Large Copper Butterfly, in the face of such vast and magnificent advantages". I have had this conflict brought home to me when collecting in the Ardennes. Here, especially in regions near Stavelot, many unproductive peasant mixed plots exist. Mulleins stand tall amid charlock in the hand scythed hayfields, and the impression is more of poorly kept allotments than an open air factory. However, we are conditioned to sneer at "peasant farming methods" in Europe, and whilst the average Belgian peasant may not win the R.S.P.C.A. Gold Medal for services to animal life, I consider he is doing far more for conservation than the average U.K. farmer. The memory of the Skippers, Marbled Whites and Browns of the Ardennes flying in profusion will permanently be a feature of that beautiful and peaceful countryside.

At the end of this brief article I have included some data obtained in August of this year. Whilst it cannot be regarded as anything more than an offering for discussion, it will perhaps provide food for thought.

N.S. Folkard (5764)

Species Recorded along Roadside Verge, Epsom Downs,

1979 (August)			3
Pieridae		<i>Aglais urticae</i>	
<i>Pieris brassicae</i>	5	<i>Satyridae</i>	
<i>Pieris rapae</i>	3	<i>Aphantopus hyperantus</i>	1
<i>Gonepteryx rhamni</i>	8	<i>Maniola jurtina</i>	5
Nymphalidae		<i>Lycaenidae</i>	
<i>Inachis io</i>	2	<i>Aricia agestis</i>	1
<i>Nymphalis atlantica</i>	1	<i>Polyommatus icarus</i>	6

Species Recorded along Roadside Verge, Ardennes,		
1979 (August)		
<i>Pieridae</i>		
<i>Pieris brassicae</i>	11	<i>Araschnia levana</i>
<i>Pieris rapae</i>	5	<i>Satyridae</i>
<i>Nymphalidae</i>		<i>Aphantopus hyperantus</i>
<i>Inachis io</i>	13	<i>Maniola jurtina</i>
<i>Nymphalis atlantica</i>	1	<i>Melanargia galathea</i>
<i>Vanessa cardui</i>	1	<i>Lycaenidae</i>
<i>Aglais urticae</i>	5	<i>Polyommatus icarus</i>
<i>Fabriciana adippe</i>	1	<i>Lysandra coridon</i>
<i>Polygonia c-album</i>	1	<i>Hesperiidae</i>
		<i>Ochlodes venatus</i>

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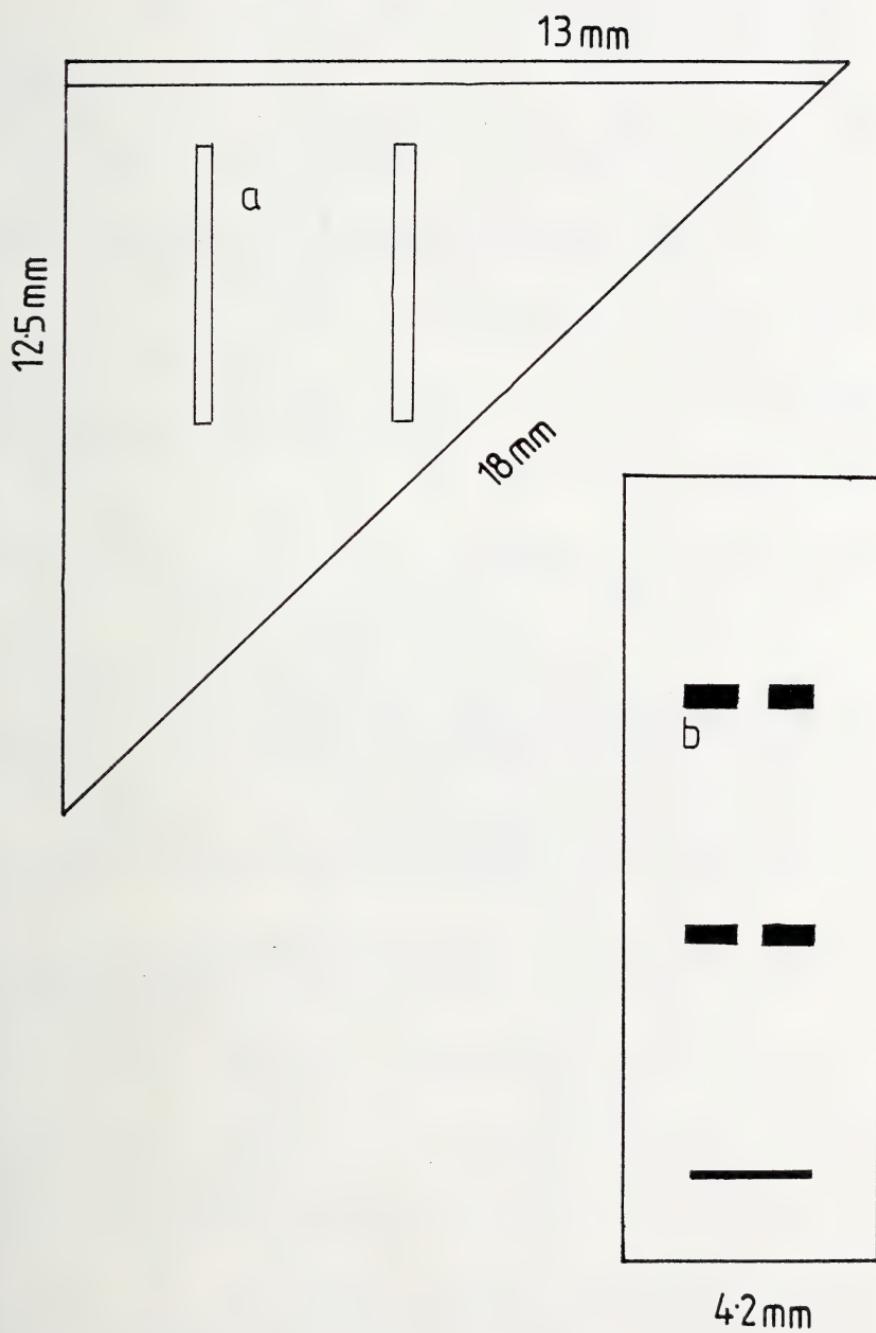
A SIMPLE AND CONVENIENT DESIGN FOR A SPECIMEN CONTAINER

In the past decade collecting has become unpopular. However for much scientific research obtaining specimens is necessary and unavoidable. This short note describes a very convenient container for specimens of lepidoptera, and any other insect that can be stored in triangular folded papers. The container is worn on the belt, in the figure 'a' designating belt loops. On the side perpendicular to the hinged lid, two clips, represented by 'b' in the figure, are used to secure a glass or plastic tube, suitable for collecting live immature stages of the insect. The triangular container can be made most easily out of plywood, or out of sheet aluminium.

Using such a container, with the empty triangular papers already prepared and inside it, allows collecting trips to be made with the least amount of baggage, making it much more practical to carry a camera mounted with bellows and a telephoto lens to record ecological information.

It must be stressed that this is not an original design: in Japan where insects and collectors are far more prolific than in this country many such containers are commercially available. However, such containers are rarely encountered in this country.

David C. Hockin (4361)



IN SEARCH OF EUROPEAN ODONATA — 1979

The following account is a description of two separate trips on the Continent which my wife and I made in 1979. The aim was to observe as many of the Western European species as possible in the time available to us and to make a representative collection. The first excursion was made to the Montpellier area in Hérault, France over the period 27th May to 1st June. We revisited this area between 25th July and 30th July and then travelled via Ivrea in Piedmont, Italy, to St. Moritz in the Graubunden Canton of Switzerland. One site was visited in the Austrian Tyrol *en route* from St. Moritz to West Germany. Finally, on 7th August, we collected at an excellent bog in Bavaria.

We are grateful to Prof. D. A. L. Davies for his advice and help in suggesting localities. Other localities were obtained from numerous papers which we consulted. A number of sites, however, were chosen after detailed studying of 1:50,000 maps with no prior knowledge of their richness for Odonata.

Localities visited:

(a) DEP. HERAULT, FRANCE

- 1) R. Hérault, near St. Bauzille de Putois. 27th May.
- 2) R. Lamalou, near St. Martin de Londres. 27th May.
- 3) R. Lez at Source. 29th May, 1st June.
- 4) R. Lez at Montferrier-sur-Lez. 29th May, 1st June.
- 5) R. Salaison, near Guzargues. 30th May.
- 6) R. Salaison, near Mas du Pont (Teyran). 30th May.
- 7) R. Salaison, lower course near Mauguio. 30th May.
- 8) R. Mosson, near Grabels. 31st May.
- 9) Viol-le-Fort, small concrete pond. 31st May, 26th July.
- 10) R. Hérault, south of barrage, near Causse de la Selle. 25th, 27th, 30th July.
- 11) R. Hérault, north of barrage, near Aubanel. 26th July.
- 12) R. Hérault, south of bridge, St. Etienne d'Issensac. 26th July.
- 13) R. Hérault, Gorges de l'Hérault, north of St. Guilhem-le-Desert. 27th July.
- 14) R. Vis, near Soutayrol (three sites) 28th July.

(b) DEP. GARD, FRANCE

- 15) L'Argentesese, stream almost dried up. St. Hippolyte. 28th July.
- 16) R. Crieulon, near Quissac. Above and below barrage. 28th, 30th July.

(c) DEP. BOUCHES-DU-RHONE, FRANCE

- 17) The Camargue. Canals, rice fields, temporary pools. 28th May, 1st June, 29th July.

- 18) Etang du Charnier. Canals, temporary pools off the Gallician to Mas des Iscles road. 1st June, 29th July.

(d) PIEDMONT, ITALY

- 19) Lago Sirio, near Ivrea. Alt. 271 m. 1st August.
 20) Lago di Campagna, near Ivrea. Alt. 237 m. 2nd August.

(e) ST. MORITZ, GRAUBUNDEN, SWITZERLAND

- 21) Lej Nair, boggy lake, Alt. 1864 m. 4th August.
 22) Lej da Staz (Stazer See), boggy lake, Alt. 1809 m. 4th, 5th August.
 23) Lej da Staz, bogs in adjacent forest. Alt. 1780 m. 5th August.

(f) FERNPASS, TYROL, AUSTRIA

- 24) Weisser See, mountain lake. Approx. alt. 1000 m. 6th August.

(g) SONTHOFEN, BAVARIA, GERMANY

- 25) Strausberg Alpe, bog near Strausberg Alm, Alt. 1200 m. 7th August.

SPECIES RECORDED

The numbers after each species give the sites at which it was found. Records based only upon the finding of exuviae are placed in parenthesis. An asterisk after a site number indicates that both adults and exuviae were found.

All records are based only upon specimens which were caught for examination. No sight records are included where critical species are concerned.

<i>Calopteryx haemorrhoidalis</i> (Van der Linden)	:	3
<i>Calopteryx virgo</i> (Linnaeus)	:	1, 10, 14, 20.
<i>Calopteryx splendens</i> (Harris)	:	3, 10, 11, 13, 20.
<i>Sympetrum fusca</i> (Van der Linden)	:	16, 20.
<i>Lestes barbarus</i> (Fabricius)	:	16, 17.
<i>Lestes viridis</i> (Van der Linden)	:	10, 16.
<i>Lestes sponsa</i> (Hansemann)	:	17, 18, 25.
<i>Platycnemis acutipennis</i> Selys	:	1, 4-8, 10, 16, 17, 18.
<i>Platycnemis latipes</i> Rambur	:	4, 10-13, 15, 16.
<i>Platycnemis pennipes</i> (Pallas)	:	20.
<i>Ischnura elegans</i> (Van der Linden)	:	3, 5, 7-10, 17-20.
<i>Ischnura pumilio</i> (Charpentier)	:	17.
<i>Pyrrhosoma nymphula</i> (Sulzer)	:	3, 5, 6, 8, 21.
<i>Enallagma cyathigerum</i> (Charpentier)	:	25.
<i>Coenagrion lindenii</i> Selys	:	3, 5, 6, 8, 10-13, 16, 20.
<i>Coenagrion mercuriale</i> Charpentier	:	3, 6, 8.
<i>Coenagrion scitulum</i> Rambur	:	9, 18.
<i>Coenagrion pulchellum</i> Van der Linden	:	3, 17, 18.
<i>Coenagrion puella</i> (Linnaeus)	:	3, 6-9.

<i>Coenagrion hastulatum</i> Charpentier	:	25.
<i>Ceriagrion tenellum</i> (Villiers)	:	16, 19.
<i>Gomphus vulgatissimus</i> (Linnaeus)	:	(1).
<i>Gomphus simillimus</i> Selys	:	10.
<i>Gomphus pulchellus</i> Selys	:	1, (5), 6.
<i>Gomphus graslini</i> Rambur	:	10.
<i>Orychogomphus forcipatus</i> (Linnaeus)	:	2, 10*, 11.
<i>Orychogomphus uncatus</i> (Charpentier)	:	3*, (4), (10), (12), 13, 14*.
<i>Boyeria irene</i> (Fonsc.)	:	10*, 11, (12), 13, 14*, 15*.
<i>Aeshna caerulea</i> (Strom)	:	23, 25.
<i>Aeshna juncea</i> (Linnaeus)	:	23, 25*.
<i>Aeshna cyanea</i> (Müller)	:	10, 25.
<i>Aeshna mixta</i> (Latr.)	:	(17).
<i>Aeshna affinis</i> (Van der Linden)	:	11, 16, (17).
<i>Anaciaeschna isosceles</i> (Müller)	:	18.
<i>Anax imperator</i> Leach	:	3, 6, 8-10, 16.
<i>Anax parthenope</i> Selys	:	17-20.
<i>Cordulegaster boltonii</i> Donovan	:	1, (3), 4, 14*, 25
<i>Somatochlora alpestris</i> (Selys)	:	23-25.
<i>Somatochlora arctica</i> (Zetterstedt)	:	22, 23, 25.
<i>Somatochlora metallica</i> (Van der Linden)	:	21, 22, 24.
<i>Oxygastra curtisii</i> (Dale)	:	(4), 10*, (11), 12*, 13.
<i>Libellula quadrimaculata</i> Linnaeus	:	24.
<i>Libellula depressa</i> Linnaeus	:	6.
<i>Libellula fulva</i> Müller	:	3.
<i>Orthetrum coerulescens</i> (Fabricius)	:	3.
<i>Orthetrum cancellatum</i> (Linnaeus)	:	9, 16-18, 20.
<i>Orthetrum brunneum</i> (Fonsc.)	:	15.
<i>Crocothemis erythraea</i> (Brullé)	:	9, 17-20.
<i>Sympetrum vulgatum</i> (Linnaeus)	:	23.
<i>Sympetrum striolatum</i> (Charpentier)	:	3*, 16.
<i>Sympetrum meridionale</i> (Selys)	:	10*, 17.
<i>Sympetrum fonscolombi</i> (Selys)	:	17, 18.
<i>Sympetrum sanguineum</i> (Müller)	:	16, 17.
<i>Leucorrhinia dubia</i> (Van der Linden)	:	25.

NOTES ON CERTAIN SITES

River Lez — sites 3, 4.

The river rises in the limestone garrigue country north of Montpellier. At its source it is rapid, shallow and calcareous with a muddy or sandy bed and much emergent vegetation. It is surrounded by the hills of the garrigue with its typically open community of heat-resistant aromatic shrubs. The sun-baked open patches of scattered rocky outcrops of limestone were favoured by *O. uncatus* during its maturation period and the rocky waters below provided ideal breeding habitat. To an odonatist used to British conditions, it was interesting to find the abundance of species in these fast, alkaline waters. Some species, such as *C.mercuriale*, *O.coerulescens*, and *C.boltonii*, are associated with small streams in acid—bog localities at home. A site like the Source du Lez in Britain (such as the source of a chalk stream) would hold few species indeed and certainly not these. It is probably the temperature and permanence of acid bog habitat which is responsible for its richness in

Britain—and not its pH. Similarly, *L.fulva* which we associate with sluggish muddy streams (and Broads) occurred in the Lez in profusion at the Source. Again water temperature accounts for the difference. Such a fast stream in England would be too cold for *fulva*.

C.splendens occurs here as the subspecies *xanthostoma* (Charp) and this was also the only site we found for the beautiful *C.haemorrhoidalis*.

Further downstream, the river was slow and muddy; some stretches being well shaded by trees. In such a spot, we obtained exuviae of the endemic *O.curtilii*—endemic that is to Iberia and S.W. France with outposts in Central Europe and, formerly, in England. The old Hampshire locality, the Moors River, very closely resembles this part of the Lez.

VIOL-LE-FORT, SITE 9

This site was a small concrete pond situated in the garrigue country at this village. When we visited it in July it had completely dried up but in May there was still some open water left. *C.scitulum* was emerging in good numbers on 31.v. together with *I.elegans* and *C.puella*. Anisoptera present were *A.imperator*, *O.cancelatum* and *C.erythraea*, the latter only seen on 26.vii.

RIVER HERAULT, SITES 10-13.

We were advised to try this river by Prof. Davies who succeeded in finding *Macromia splendens* (Pictet) here. We especially looked for *Macromia* but found neither adults nor exuviae. The ideal time for it is probably the end of June and early July and our visits unfortunately 'straddled' this. However, we found much of interest on this river which seems to be unmentioned in the literature. The Hérault rises in the Cévennes, near Mont Aigoul and flows South through the limestone, forming the typical gorges for which the region is famous. The flow is very variable owing to the numerous barrages built across it to power now disused waterwheels and, at Causse de la Selle, a modern H.E.P. station. Rocky rapids alternate with deep silty stretches of negligible flow.

All of the Gomphidae known from S. France were found along the Hérault between Ganges and the Gorges de l'Hérault, *G.vulgatissimus* and *G.pulchellus*, being early species, were only found on the Spring visit; while *G.simillimus* was almost over by the Summer visit but not out in May. The Hérault rises at a much higher altitude than does the Lez; and it was noticeable that while the Hérault was almost devoid of Odonata in late May the Lez contained hundreds. This was the reason we tried the Lez on the first visit when we had intended to concentrate on the Hérault.

G.graslini, strictly confined to S.W. France and Iberia, was present in fairly good numbers in July, females careering wildly across the water

dipping their abdomens in the water to release eggs. Both *O. forcipatus* and *O. uncatus* occurred on the river but we noted that, while *uncatus* prefers the fast, rocky, "white water" stretches, *forcipatus* favours the deep, more muddy, slower parts as do the *Gomphus* species.

C. virgo meridionalis Selys was commonest on the fast, shady stretches while *C. splendens xanthostoma* liked the slower, open stretches, colonised by floating vegetation.

Widespread on the river were the two Southern *Platycnemis* species, *P. acutipennis* and *P. latipes*. The former is orange with bright blue eyes while *latipes* is a porcelain-white colour. The latter follows *acutipennis* in its flight period but in July both occurred together and looked tremendously attractive fluttering over the river. Also widespread were *C. lindeni*, *L. viridis*, *O. curtisii*, and especially *B. irene*. The males regularly covered the borders of the river with their fluttering flight, entering rocky enclaves and searching under overhanging bushes in their search for females. These females are dimorphic. Form *brachycerca* Navas and the 'typical' form have anal appendages of about 2 mm and 6 mm in length respectively, (with no intermediates). Auguesse (1968) regards the 'typical' form as rare but this was not our experience. Form *brachycerca* was commoner but not more than twice as frequent.

In the vicinity of the river, and probably breeding therein, we took *A. affinis* and *S. meridionale*; the latter specimens were infested as is usual in this species, with red mites on the wing veins.

RIVER VIS, SITE 14

This river is fast and flows over a rocky bed. It is well shaded by bushes and trees along its banks. It flows into the Hérault near Ganges. There were far less species here than in the Hérault but the lack of diversity was well compensated by the immense numbers of individuals. *O. uncatus* was abundant; some large rocks in the river often had up to six males basking on them and using them as a base for feeding forays. *B. irene* was in enormous numbers and in-cop. pairs were everywhere. One 'trio' was found, i.e., a male-male-female coupling. Its exuviae were found on tree banks and moss on the rocks bordering the river. *C. boltonii* and *C. virgo meridionalis* were both fairly common.

RIVER CRIEULON, SITE 16

A barrage near Quissac has produced a large lake of moderate flow which contains strong populations of *L. viridis*, *L. barbarus*, *S. fusca*, *C. tenellum*, *C. lindeni*, *P. latipes*, *P. acutepennis*, *A. imperator* and *A. affinis*. Both visits were made late in the afternoon and no doubt more thorough surveying would produce many more species. Lieftinck (1965) found *M. splendens* on the Crieulon in 1964 in addition to the same Gomphidae we listed for Sites 10-13. The Crieulon would be my first choice for a visit to this region in the future.

CAMARGUE AND ETANG DU CHARNIER, SITES 17 and 18.

Three visits were made to the Camargue. It was difficult to get access to some of the most interesting parts; and strong winds on the May/June visits made a search for shelter essential. We easily found Little Egrets, Purple Herons, Marsh Harriers and Flamingos but the Odonata were more difficult! We had more success near the Etang du Charnier. Here the numerous drainage ditches and reed-beds were reminiscent of Norfolk and the Norfolk Aeshna, *A. isosceles*, occurred in good numbers here with many in-cop. pairs flying across the tracks. The strong winds made capture difficult and it took some time to secure a specimen. *L. sponsa* was recorded both here and in the Camargue—an unusual situation for a species normally found at altitude in the South of France.

Full records from these two areas are given in the table but species of most interest were *A. parthenope* (fairly common on pools near Stes. Maries de la Mer, *S. meridionale*, *S. fonscolombei* (abundant in July), *C. scitulum* (Charnier only) and *I. pumilio* (Charnier only).

IVREA, PIEDMONT, SITES 19 and 20.

We were unfortunate with the weather during our stay here. We were treated to overcast skies, violent storms, thunder, lightning and heavy rain. However we succeeded in finding *C. erythraea*, *I. elegans*, *C. tenellum* and *A. parthenope* on Lago Sirio near our lakeside campsite. Both *C. virgo* and *C. splendens* occurred as subspecies, (*padana* Conci and *caprai* Conci resp.) on Lago di Campagna together with *C. lindeni*, *P. pennipes*, *S. fusca*, *I. elegans*, *C. erythraea*, and *O. cancellatum*.

ST. MORITZ, SWITZERLAND, SITES 21-23.

We knew that *S. alpestris* and *S. arctica* had been found at nearby Silvaplana recently and decided to search the area for the breeding localities.

Our first day was dull and, apart from *S. metallica* on Lej Nair and Lej da Staz, we found little. However we used the poor conditions to survey the area while we prepared to wait for the first good day. Luckily the next day 5.viii was ideal.

Lej da Staz had large numbers of *S. metallica* and *A. juncea* and one *Somatochlora* caught hawking over the bog near the lake proved to be a male *S. arctica*. Further searching in the woods between Lej da Staz and Punt Muragl gave us two excellent sites.

A boggy clearing in the Pine forest at G.R. 7827/1528 had the required Sphagnum-bog conditions liked by *arctica*; and several males were taken in addition to a new species for me, *S. vulgatum*. Another clearing at G.R. 7872/1533 produced *S. alpestris*, *S. arctica*, *A. caerulea*, and *A. juncea*. The best bog-pool here was about 13 m. long, 2 m. wide and 15 cm. deep, vegetated entirely by a *Carex* sp. Males of both *S. alpestris* and *S. arctica* (especially *alpestris*) flew regularly low over the

pool about 15 cm. above the water, probably searching for females. Two females of each species were found here; their presence was noted by the 'rustling' of their wings against the sedges. They were never seen arriving.

Although they occurred together, *alpestris* seems to prefer the more open, 'marshy' areas while *arctica* favours the richer boggy flushes dominated by Sphagnum. In Scotland where we only have *arctica*, the habitat preference is very similar.

WEISSEERSEE, FERNPASS, TYROL, SITE 24.

Only visited while *en route* from St. Moritz to Bavaria. However, *S.alpestris* was found (during a brief sunny interlude in the rain) flying above a marsh associated with the stream which feeds this mountain lake. The only vegetation here was Eriophorum.

STRAUSBERG ALPE, SONTHOFEN, BAVARIA, SITE 25.

We obtained this site from a paper by Werner Schmidt (1962) in which he identifies it as a site for *Aeshna subarctica* Walker. We did not succeed in finding *subarctica* but did record several species not in his paper.

The bog is situated at the head of a small valley near the Hikers' Cafe at Strausberg Alm. It contains numerous pools and is dominated by Sphagnum, Eriophorum and Carex with Scrub Pine, *Pinus mugo* Tur. scattered about to provide shelter.

Both *A. caerulea* and *A. juncea* were very common as was *L.dubia*. A few *C. boltoni* occurred and I caught one female which had just captured a male *A.caerulea*. Both *S. arctica* and *S. alpestris* were present, flying in the Scrub Pine clearings. Smaller numbers of *A.cyanea*, *C. hastulatum*, *L. sponsa* and *E. cyathigerum* were found.

The males of *A. caerulea* were holding territory over the water from our arrival at 1030 till our departure at 1600. Possibly they were less common after 1400; but our experience suggests that the belief of Aguesse (1968) and Robert (1958) that the males only visit water around midday is incorrect at a site where the species is common and competition intense.

G. S. Vick (4942)

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FORESTRY CONFLICTS IN WALES

Following hard on the heels of a Report about the future effects of forestry on the landscape issued by the Institute of Terrestrial Ecology last November, two major controversies have erupted in Wales about plans to afforest large tracts of open moorland. Both cases add weight to the prediction made by the authors in the Report that coniferous forests in England and Wales are likely to cover more than double their present area by the turn of this century.

The problem, of course, is rooted in the fact that forestry proposals are not subject to normal planning controls; even areas designated as National Parks or Sites of Special Scientific Interest (SSSIs) are not immune to threats from afforestation as the row over the Brecon Beacons National Park shows. Here plans to plant sitka spruce on the Cnewr Estate, near Sennybridge are being opposed by the Countryside Commission and the Royal Society for the Protection of Birds, both of which argue that the proposals will alter the character of the wild and unspoiled areas of countryside and threaten its wildlife. As Reg Hookway, Director of the Countryside Commission, points out, it was the magnificent, high, spacious, wild and open spine of mountains in the Brecon Beacons that were the inspiration for the designation of the area as a National Park in the first place.

Further north a three cornered battle is being waged between the RSPB, the Nature Conservancy Council and forestry and farming interests over nine heather moorland sites valuable for upland breeding birds. One site, Llanbrynmair, is a particularly important site for merlin plover, hen harrier and the red kite. In 1977 the RSPB asked the NCC to designate all the sites as SSSIs, thus affording them a measure of protection against forestry. However, because the NCC delayed over taking this measure the threat against Llanbrynmair Moors has hardened. Its value as a grouse moor having declined, its owners offered the land to their nine tenant farmers. However, the only way the farmers could afford to buy their farms was to sell off the high moorland to private forestry companies. Stunned by this development the RSPB asked NCC to object, but having failed to designate the area SSSI the NCC could not withstand pressure from foresters. Instead of NCC appealing to the Secretary of State for the Environment it withdrew its objection to afforestation. Although the RSPB has itself now appealed directly over the NCC's head to the Secretary of State it now seems that Llanbrynmair Moors has been lost, with the other sites possibly to follow suit.

The only answer to these land use conflicts appears to be an effective land use strategy as proposed in the NCC's 'Nature Conservation and Agriculture' 1977. Until then sites will continue to be lost to the detriment of wildlife and the countryside.

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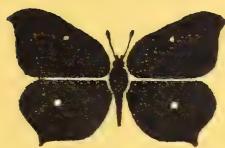
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EDITORIAL

It has become more and more evident that the government's left hand has now found out what the right hand is doing and the situation has now arisen where two separate Departments are now briefing, at our expense, senior and experienced counsel to argue their opposing cases in court, or before public enquiries. We reported one such case on page 54 of our last issue. There are two basic reasons for this dichotomy. Firstly, planning permission is not generally required to destroy a habitat. By "destroy" we do not of course necessarily mean "develop". Afforestation with conifers of open moorland is equally destructive. Secondly, monetary grants are frequently obtainable for habitat destruction. Often the returns of such destruction are either minimal, or very short-lived. Nevertheless it is a fact of life that if a grant from the taxpayer is available it will be claimed, whatever the circumstances, simply because it is there. We feel the whole system is very, very wrong and it is high time the politicians regularised the situation. Wild habitats and genetic pools of natural population are now so very short that we just cannot afford, environmentally or economically, to lose another acre. The only way the system can be changed is by constant pressure on the politicians.

LONDON WILDLIFE SANCTUARY DEFEATS £8,000,000 GRAVEL BID

Walthamstow Marshes are saved. On February 4th, 1980, the G.L.C. Minerals Sub-Committee unanimously and vigorously rejected the Lea Valley Regional Park Authority's application to extract some 1,027,000 cubic yards of terrace gravel from East London's last expanse of primary marsh and river meadow. The main reasons given were:

- i) That gravel lorries would further overload already congested city roads nearby.
- ii) That the overall environmental nuisance and danger would be intolerable to thousands of local residents.
- iii) That an under-privileged area could not afford to lose a recreational public open space of this size and quality.
- iv) That an ancient and unique wildlife heritage would be destroyed for ever.

This last argument was given particular emphasis, and we in the Save the Marshes Campaign were proud that our reports and photographs were fully appreciated as providing a definitive ecological coverage.

Because of this material, an alternative proposition to excavate only part of the area was rejected by an overwhelming majority on the grounds that any such newly created lake would destroy the surrounding marshland ecology by lowering the overall water table. In short, all our principal objections held.

Throughout the intense eight-month battle, we had received magnificent support. In addition to 15,000 petition signatures, and strong letters from eminent naturalists, conservationists, and research institutions nationwide, we eventually won the firm backing of both the Nature Conservancy Council, and the Essex Naturalists Trust, whose valuable reports to the G.L.C. on our behalf are very greatly appreciated. We warmly thank everybody for their help.

We hope that our fiercely determined strategies, and our final resounding victory, may be viewed as an encouraging precedent for urban nature conservation throughout the country. We must never forget that every local authority in Britain has a statutory responsibility to take wildlife conservation into account in its plans and activities. If solid wealth of ecological data can ever be presented as indication of neglect in this duty, such failings should be frankly exposed and challenged. By the same token, any local conservation group whose actions fall short of its preachings should be pestered mercilessly, until either forced to co-operate or shamed by its proven inadequacy. If the entire concept of "conservation" is to achieve maximum public respect, these two integrities are absolutely vital.

The Save the Marshes Campaign must live on, lest other threats arise. Walthamstow Marshes thoroughly merit designation as a local nature reserve, and we are now striving to achieve this in conjunction with an enlightened land management programme. To this end, close liaison will continue with the Nature Conservancy Council and all available publicity media.

Brian Wurzell

FRENCH INSECTS NOW PROTECTED

The French Minister of the Environment and the Minister of Agriculture . . . decree that . . .

1. . . . the destruction or removal of ova, larvae and pupae, and the destruction, capture, removal, or preservation for the purposes of forming a collection, of the following insects, whether living or dead, is forbidden. It is also forbidden to transport, peddle, utilise, offer for sale, sell or purchase them.

Lepidoptera

Papilio hospiton Gené

Papilio phorbanta Linn.

Parnassius apollo Linn. ssp. *arvernensis* Eisner

Parnassius apollo Linn. ssp. *meridionalis* Pagenstecher
Parnassius apollo Linn. ssp. *francisci* Le Cerf, Acheray & Raymond
Parnassius phoebus Fab.
Zerynthia rumina f. *honoratii* Boisduval
Pieris ergane Geyer
Colias palaeno Esper—female.
Boloria aquilonaris Stichel
Proclossiana eunomia Esper
Euphydryas desfontainii Godart
Salamis augustina Boisduval
Coenonympha tullia Müller
Coenonympha oedippus Fab.—Female.
Lycaena dispar Haworth—female.
Lycaena helle Denis & Schiffermüller—female.
Maculinea alcon Fab.—female.
Maculinea telius Bergsträsser ssp. *burdigalensis* Stempffer—female.
Lysandra bellargus (female) *coelestis* Oberthür
Zygaena rhadamanthus Esper
Zygaena vesubiana Le Charles
Pericallia matronula Linn.
Rhyparioides metelkana Lederer
Arctinia caesarea Goeze
Graellsia isabellae Graells

Coleoptera

Chrysocarabus auronitens ssp. *cupreonitens* Chevrolat
Chrysocarabus auronitens ssp. *subfestivus* Oberthür
Chrysocarabus solieri ssp. *bonnetianus* Colas
Carabus auratus ssp. *honoratii ventouxensis* Nicolas
Dynastes hercules ssp. *hercules* Linn.

Orthoptera

Prionotropis rhodanica Uvarov
Prionotropis hystrix ssp. *azami* Uvarov

Promulgated in Paris, 3rd August 1979

Minister of the Environment: Michel D'Ornano

Minister of Agriculture: Pierre Méhaignerie

In view of the numerous members of our Society who collect in France, I think the above should be brought to their attention and due respect paid to French law.

In view of the unexpectedness of one or two of the species listed, it should be remembered that not only is Corsica a part of metropolitan France, but so too are some very out-lying territories—for example, Guadeloupe and Réunion.

Geoffrey N. Burton

FIELD STUDIES COUNCIL

We have received this council's brochure for 1980. As many of our members will already know the council runs courses at nine residential field centres throughout most of the year. These vary very widely in content and cover all ranges of subjects to cover the interests of as wide a section of the nature-loving public as possible. Many of the general courses in photography, natural history, and ecology of a particular area could of course be of interest to some members of our Society. We list below those of a more direct entomological interest: —

Spiders in late September at the Drapers' Field Centre, Gwynedd.

Churchyard wildlife in early May; East Anglian Nature Reserves in mid-September. Both these at Flatford Mill, Essex.

An Introduction to Hover Flies in late June;

Insect Study for Beginners in late July;

Butterflies and Moths for Beginners in mid-August; these three are at Juniper Hall, Surrey.

Introducing Butterflies and Moths in late May is at the Leonard Wills Centre in Somerset.

At Malham Tarn in Yorkshire we have Flies, Midges and Gnats at the end of July and Invertebrates at the beginning of September.

Back in Wales, this time at the Orielton Centre in Dyfed, we have the Spiders of Pembrokeshire at the end of May.

Not so very far away across the border near Shrewsbury, the Preston Montford centre offers an Introductory course on Beetles in early June, followed by Spiders and their World later that month. In July there is Butterflies and Moths; August offers Wonders of the Insect World.

Slapton Ley in Devon, although with nothing specifically entomological, does offer no less than thirteen non-residential and inexpensive "Safari" courses which could be well worth joining for anyone on holiday in the area.

Details of all these and other courses can be obtained from the Education Officer, Field Studies Council, Preston Montford, Montford Bridge, Shrewsbury SY4 1HW.

Editor

COLLECTING SUCKING LICE (ANOPLURA)

Because sucking lice are ectoparasitic on mammals and also rather small, they are neglected by most entomologists. They are, however, of great interest, mainly because of their potential for transmitting disease organisms (as a consequence of their blood feeding habits) and for the evolutionary relationships that they frequently indicate between their hosts (Ewing 1933). Since these insects live on their hosts throughout their

life cycles (nits, three nymphal instars and adults), they can not normally be collected using conventional techniques.

Essentially, these lice can be collected in the following ways and in addition other ectoparasitic, commensal or phoretic Arthropods will also be found using these methods.

- 1: By examination of the host's nesting material.
- 2: By diligent searching on dead or anaesthetised hosts.
- 3: "Brushing."
- 4: By dissolving the tissue away from dead hosts using chemical agents that do not affect the chitinous exoskeletons of the sucking lice (or any other Anthropods that may be present).

The first technique is always extremely unproductive as lice never need to leave their host and therefore usually do not. This represents a contrast to the situation in the other ectoparasites (fleas, mites etc.) which are normally to be found in far greater numbers in the nest debris than on the host itself! In some ways this makes lice easier to collect since nesting sites are often fairly inaccessible. Any lice found in such nesting sites will be dislodged individuals resulting from host reactions (biting, scratching etc.) or a saturated population on the host, or (rarely) individuals that have died a natural death following mating or oviposition. Such nest material should be sifted through on a clean white surface with a strong incident light source, using fine forceps and needle probes. The remaining collecting techniques are much more likely to yield Sucking lice and are therefore considered below in more detail.

Since most mammals apart from pets object to handling or close observation they must be immobile before they can be searched as outlined in the second method above. Usually, then, an immobile host is a prerequisite. This can be achieved by collecting freshly dead mammals from the field, by shooting or chloroforming them (obviously less desirable in these days of dwindling wildlife), or by anaesthetising them. Any ectoparasites on a dead mammal will tend to leave their habitat as its body temperature cools (Westrom and Yescott, 1975). Sucking lice, being slow moving and reluctant to leave their source of welfare, are probably the last to leave. However, a mammal that has been dead for over 48 hours would be unlikely to yield any such lice (especially in warmer ambient temperatures where ousting or predation by the rapidly arriving saprozoites must also be considered). Hosts supporting winged ectoparasitic hippoboscid flies may lose lice faster than this following death as a result of 'phoresy'. In this condition of phoresy, the smaller, poorly dispersive ectoparasites cling on to a larger, better dispersive ectoparasite because the chances of re-infesting a new host are then better (Rothschild and Clay, 1952; Marshall, 1976).

Anaesthetisation of hosts requires some practice but works well when suitable dosages have been found. For a list of some useful anaesthetic

agents for the various mammalian groups, reference should be made to Twigg (1975). Generally, inhalent agents work fairly well, especially ether, but chloroform, being toxic, is easily administered in overdoses causing unnecessary fatalities. Small mammals trapped in the field are usually most conveniently transferred to a large cork-bunged jar with an absorbent base (similar to a large insect killing jar) onto which either has been poured. As soon as the subject becomes motionless it should be removed from the jar and placed on a sheet of large white paper for examination under a powerful light source. Since the effect of the ether lasts only a few minutes (varying according to host size), it may prove necessary to replace the mammal into the jar ten or more times and also to administer more ether before the entire animal has been scanned adequately. Any ectoparasites present may also succumb to the ether, so the base of the jar as well as the white paper should be examined for any dislodged material. The best method for searching for sucking lice on live hosts seems to be to carefully and methodically brush back the fur with a blunt needle in one hand and fine forceps in the other. Any such lice present are usually near the hair bases with their mouthparts close to the host epidermis and are frequently detectable because of their darkly stained blood-engorged guts and the red skin blotches they leave after feeding. Nits glisten when the hairs on which they are cemented are turned back, and, although they are small, they are thus easily found. First and second instar nymphs are sometimes harder to spot, but the use of a low power binocular microscope will aid in locating them, especially if it has a zoom lens. Sometimes, lice can be detected by gently blowing back the host fur but this usually requires a fairly well trained eye. Combing the fur back is another useful technique but works best on moribund subjects where the lice have ventured away from the hair bases because of cooling host temperatures. Rubbing pyrethrum powder into the fur of a tame, anaesthetised or freshly dead host renders the lice almost motionless and they can then be combed from their habitat with less resistance. Related to these procedures is the popular method of placing a dead host in a polythene or muslin (i.e. "louse-proof") bag, placing the bag in an air-tight container, and then administering a dose of chloroform to it. After a few hours the dead ectoparasites can be "brushed" from the dead host onto a white surface and others may be retrieved from the bag. "Brushing", the third technique listed above, is a rather misleading term since the host is not brushed at all, but rather rubbed and scraped vigorously all over, together with frequent violent knocking, the idea being to dislodge any ectoparasites present and collect them on a sheet below.

Unless extreme care and much time are taken in the collecting methods outlined above, the overall extraction will almost always fail to produce the total louse population actually present. For efficient, speedy, extraction Hopkins (1949) proposed using a dissolving technique on the host fur and then straining out the intact lice (the fourth method listed above).

Here, the host is skinned (no matter how crudely) and this skin is then air dried for a few hours. In this condition the skin can be kept for some time so long as the destructive forces of other organisms are kept from it. At any time after drying, the skin is cut into pieces of convenient size (museum skins can also be treated in this way) and each piece is then left to soak in a solution of cold 5% sodium hydroxide for about fifteen minutes. At this time the hair will have been softened (if it has not then the skin should be replaced into the solution until it has) so it can then be scraped away with a blunt knife or similar instrument. This partially dissolved hair is next placed in a beaker containing the 5% sodium hydroxide solution and that placed in a saucepan of water which is boiled until the hair has been dissolved completely, the process requiring approximately thirty minutes. The beaker contents should then be poured carefully through a fine 80 mesh wire gauze while still hot. Finally, the residue in the mesh is washed with a fine jet of water to remove any small, unwanted particles so that the remaining lice can easily be picked from the mesh with fine forceps.

A slight modification to Hopkins' technique has been used by Cook (1954) who noticed that a few lice remained stuck to the host skin after the hair had been scraped from it so that these individuals were effectively not extracted by that method. Also, the hair scraping itself took some time which was found to be an important factor when large numbers of skins were being processed. In his modified technique, the mammal is still skinned but the skin is then cut into small pieces and placed into Erlenmeyer flasks containing 50 ml. of a 3% trypsin solution buffered to pH 8.3 with 0.2 molar sodium hypophosphate and left for 36 to 48 hours at 37°C for the initial digesting phase. Following this, 10 gm. of potassium hydroxide and 50 ml. of water are added to each flask and the contents then boiled until all the hair and skin has dissolved. The flask contents are next filtered through a wire gauze as in Hopkins' technique. Any material removed from the gauze is usually best placed in alcohol on a petri dish under a binocular microscope for observation. The only real disadvantage of these two techniques is that valuable mammal skins cannot be processed since the skin and fur is completely destroyed. Otherwise, extraction efficiency is very high as the chitin of the lice and even their nits (and any other chitinous products present) is totally unaffected by any of the chemical agents used.

The washing technique as outlined by Lipovsky (1951) has certain advantages over the dissolution methods described above since the host pelage can be retrieved undamaged and the lice collected can be kept alive if desired. Using this method, the mammal to be examined is killed (if live lice are subsequently required then the method of host killing must not also kill the lice), placed into a sealed jar and then chilled for about 24 hours. After being returned to room temperature and then left standing for about three hours, 400 ml. of tap water and 2 ml. of commercial

liquid detergent (more for large hosts) are added to the jar which should then be shaken intermittently for 30 minutes in order to dislodge material. Examination of the detergent solution can then be carried out to retrieve any ectoparasites present. This procedure yields only about 20% of the Anoplura extracted by the dissolution techniques but because it is easier to carry out than that technique, Henry and McKeever (1971) introduced an improved washing procedure that increases this figure to about 90%. By this method, following the addition of detergent solution the sealed jar and its contents are agitated in a commercial paint shaker for 5 minutes. A few drops of 95% alcohol are then poured into the jar so as to reduce surface tension and break bubbles and the host subsequently removed before the remaining contents of the jar are suction filtered through filter paper. The jar is next rinsed with 95% alcohol and this filtered to complete extraction. The ectoparasites and other Arthropods strained from the detergent solution are consequently concentrated on the filter paper and can either be examined immediately or preserved for future reference. This improved washing procedure is presently in wide use since it involves no costly chemicals and no skinning and therefore requires little time, being highly efficient at the same time.

In all the methods described the utmost care must be taken to ensure that no false host contaminations occur as erroneous records are of no use to anyone. Therefore, all traps, bags, sheets and bench tops need to be kept scrupulously clean between each host examination and must also be isolated from other similar pieces of apparatus.

When Anoplura have been collected by any of the preceding methods they should be removed carefully with fine forceps and dropped into a small vial containing strong alcohol (preferably 90%) and labelled accordingly. The data label can be written in pencil and stored in the vial with the parasite(s) to avoid confusion from dislodged labels at a later date. Certain information is imperative on the label, this being: the host species, the host locality, and the date. Preferably, the following information should also be given: host gender, reproductive condition, approximate age, weight, and length (of the body, tail, ear pinnae, and hind foot—excluding claws), the particular part of the body from which the specimens were taken (if this was distinct), the name of the collector and of anybody that identified the host and parasite(s). Other data may be added as deemed necessary. If possible, the alcohol in the vial should be changed after two to three weeks as preservation processes will have diluted the original solution to some extent. Lice can be kept indefinitely in this condition but it is often more convenient to transfer them onto microscope slides as permanent mounts; staining procedures are not usually a necessity. Fairly high powered microscopes are often required to determine a louse to the species level but it is sometimes possible to somewhat "predict" the species present from the identity of its host since Anoplura are fairly host specific (Askew, 1973). A low power binocular microscope

will show the general features of sucking louse morphology. If a high power microscope is not available or identification proves difficult, the specimen(s) should be sent to a local or national natural history museum or other known specialist for this purpose.

Lance A. Durden (4336)

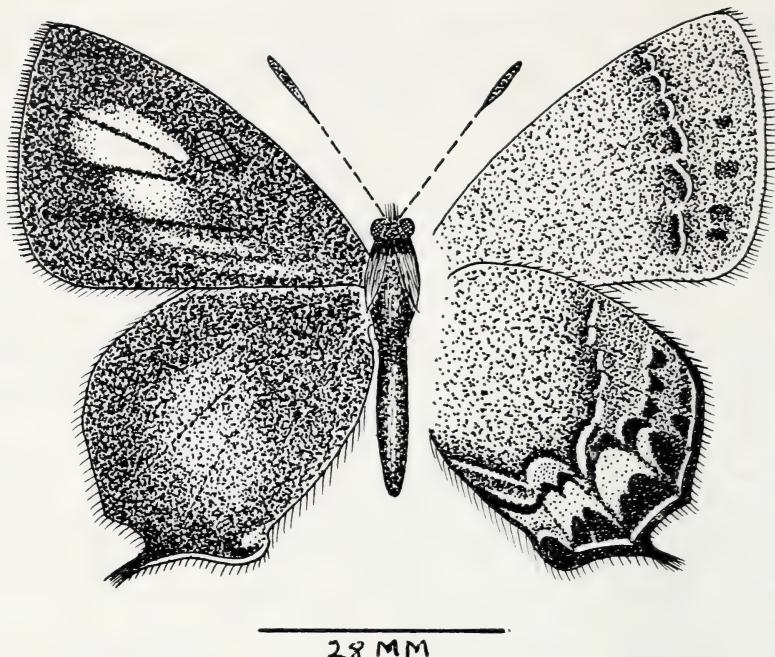
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PROTECTION AND EXTINCTION OF A STRYMONIDIA SPECIES IN JAPAN

This is an account of *Strymonidia iyonis* Ota et Kusunoki, a species which has become the subject of much discussion among butterfly collectors in Japan. The four species of *Strymonidia* in Japan are *S. mera* Janson, *S. w-album* Knoch, *S. pruni* L. and *S. iyonis*. This last named was discovered in 1957 at Shikoku Island, one of the four main islands of which Japan is composed. The species looks like a smaller *Nordmannia ilicis* Esper; the orange discal mark is well developed in the male but is reduced in the female, sometimes being almost immaculate. The male has a small oval sex-hair similar to that of *S. spini*.

The habitat of *S. iyonis* is restricted to the virgin forest of limestone regions. At first there was confusion that this species might be only a form of *S. v-album* Oberth., occurring in the highlands of Western China. However the type specimen in the British Museum proved that although very closely resembling each other in their faces, the genitalia were distinct. At present this species is endemic only in Japan. The first discovery was in a restricted area of Mt. Saragamine, Ehime Prefecture, Shikoku but within a few years the butterfly was completely exterminated by over-collecting, chiefly of the eggs and larvae. After that it was



Upper side (left) and Under side (right) of *Strymonidia iyonis*

our phantom butterfly for nearly a decade. At last, in 1969, on the other side of the Seto Inland Sea, the same species was re-discovered in the mountainous districts of Okayama Prefecture. The collection of imagines in June, however, was almost impossible because of the danger of being bitten by deadly vipers which are common in the area. Then large numbers of collectors started to go on a pilgrimage in winter in order to obtain the eggs. This time fortunately the habitat was not so restricted as on Mt. Saragamine, the extinct type locality. In addition it was not long before it was found that the distribution extended to adjacent Hiroshima Prefecture. In this locality *S. iyonis* lay eggs on two kinds of Buckthorn, *Rhamnus japonica* Maxim. and *R. yoshinoi* Makino. Though it preferred the latter for oviposition, according to our experiments *R. japonica* was more successful for rearing in captivity. Now the two species of Buckthorn growing on accessible slopes suffered considerable damage from numerous collectors and recently it has become more and more difficult to get eggs without the risk of falling headlong from the precipitous slopes where the shrubs still flourish. The butterfly here is unlikely to be eliminated as much of the terrain is totally inaccessible, except perhaps by helicopter.

In 1976 a further habitat was rumoured to have been found in Nagano Prefecture in the central part of Honshu, more than 260 miles from the



1. Mt. Saragamine, Ehime Pref. Shikoku
2. Okayama-Hiroshima Prefecture
3. Nagano Prefecture
4. Nara-Wakayama Prefecture
5. Kochi Prefecture, Shikoku

two previous areas. In the winter of 1977-78 the sad news was received that this habitat had been destroyed by the taking away of a great number of eggs and by the wholesale damage of the Buckthorns. It was a matter of shame for Japanese lepidopterists that a repetition of what had happened at the type locality should occur, again as the result of the activities of egotistical collectors. A conservation law was planned by the area council but it was too late as the specimens from this locality were being sold at £20 each by an insect dealer during 1978 and 1979 and many eggs must have been collected by someone despite the vulnerability of the insect. Judging from this and other cases, if we cannot arrange enough guardians for all-the-year-round surveillance, the conservation law may bring even worse results.

In 1977 a fourth locality was discovered with eggs laid on *R. japonica* on Mt. Obako, Nara Prefecture. The discoverers of this habitat have wisely been very cautious as to details. In the winter of 1978 its distribution was confirmed along the long border of Nara and Wakayama Prefecture but the population is extremely thin. There is the fear that the taking of eggs for breeding by only a few people here may lead to the population being unable to maintain itself. However this locality is at present not widely known.

In the same year, 1977, the fifth habitat was discovered at Kochi Prefecture, Shikoku, the species again appearing on the island just two decades after the first discovery and subsequent destruction. The discoverers are again wisely cautious about the exact habitat as the food plant, in this case *R. yoshinoi*, is not abundant and if someone should try, annihilation would not be difficult. Fortunately for the butterfly in this locality the Buckthorns are growing on a precipice. The specimens of this locality closely resemble those of the type locality. It is still under discussion as to whether the five localities provide different sub-species or not.

In conclusion, in Japan only a few butterflies have become scarcer from causes attributable to collecting, the decrease and extinction of *S. iyonis* being an example of an unusual occurrence. The most serious causes of the loss of our butterflies are development for building, etc., the clear-felling of virgin forests and the use of insecticides and herbicides. Unfortunately these aspects are seldom taken up by journalists while that of collecting is, giving a very distorted view of what is happening to our native insect fauna.

S. Kinoshita (5886)

NOTES AND OBSERVATIONS

Middle East Entomology — A natural history group, including entomologists has been started in the United Arab Emirates, and would be interested to hear from anyone visiting, working or interested in the area. Contact Mrs. D. Donohue, Emirates Natural History Group, P.O. Box 2687, Abu Dhabi.

Volucella zonaria common in North-East London — This most impressive and striking of our Hover-Flies has been frequent or common in the Tottenham area of N.E. London for as long as I can remember, certainly since the early 1960's. So much so that, but for other records occasionally appearing in our Bulletin, I would not have ventured to report it. Every August, it is a regular visitor to the Buddleias planted in local parks and gardens, and in the hot summer of 1976, it was not unusual to see ten or more at one time, in this area, zooming like heavy hornets from flower to flower. It is perhaps our most magnificent dipterous mimic of the Hymenoptera. — Brian Wurzell.

Wanted! — Notes and Observations — Your Editor is very short of these and would appreciate more.

BOOK REVIEWS

A field guide to the smaller British Lepidoptera edited by A. M. Emmet, pp.271; 8vo; The British Entomological and Natural History Society, London 1979. Price £9.00.

It can be given to few reviewers to opine on both the first and second editions of a work at an interval of thirty years and in the same journal. Although the word 'field' has been inserted into the title, this is the second edition of the work originally reviewed by me in 1949 (see *Bull. amat. Ent. Soc.*, 8; 56).

Naturally the first consideration is to see what, if any, notice has been taken of my comments in the first review. On looking back we see we made no serious criticism but we did draw attention to the *desiderata* in the information. One has only to open the two editions at comparable pages to realise how well these *desiderata* have been filled in. This is of course entirely due to the fruits of thirty years activity in the micro field by members of the British Entomological and Natural History Society now so ably assembled together under the able editorship of Maitland Emmett. Indeed often completely blank former entries are now filled in. A random choice of *A. paludana* well illustrates this.

Turning next to *Argyroploce*, that was, for the genus has now vanished from the nomenclature and its former 37 species are scattered far and wide, and were not all easy to track down, we find that from being one of the least documented of all, they are now on an equal footing with former better-known species.

The layout of the book is the same as before, the species, in bold type and numbered, with the previous number bracketed, and the relevant information given under the headings of O(va), L(arva), P(upa) and I(mago). There have been nomenclatorial changes thoroughly commensurate with the very large increase in biological knowledge, which has resulted in an increase of some 40 pages over the first edition.

The indices struck us as being particularly well laid out and easy to

follow, being of larger type and layout than in the first edition. The book is particularly well printed on good quality matt paper, with surprisingly few obvious errors for such complex matter, and adequately bound as a paperback in an attractive cover. We hope it will last as long as our well-used hardbook first edition has over thirty years. Rather surprisingly in view of the quality of this production, the actual printer prefers to remain anonymous, which, curiously, he also did in the first edition.

This book should be in the hands of all Lepidopterists, whether interested in micros or not. It is an invaluable work of reference and, besides, there are still gaps to be filled. May we hope the Society will now turn its attention to a revision of 'Scorer'?

BOCG

The Moths and Butterflies of Great Britain and Ireland, Vol. 9. Edited by John Heath and A. Maitland Emmet. Curwen Books, London. 1979. Pp. 288. 13 coloured plates. 4to. Price £25.00.

Although Volume 9 of this publication, it is the second to be published, Volume 1 having been published in 1976. It deals with the moth families Sphingidae, Notodontidae, Thaumetopoeidae, Lymantriidae, Arctiidae, Ctenuchidae, Nolidae, Noctuinae and Hadeninae. The first chapter by M. C. Birch is an interesting account of the eversible structures of these moths with some fine line drawings and a list of references concerning a subject which has only recently been investigated in any depth. The remainder of the text is a description of the moths, seven authors being involved — W. L. R. E. Gilchrist, the late C. G. M. de Worms, R. J. Revell, R. F. Bretherton, B. Goater, R. I. Lorimer and John Heath, each an expert on the group of moths dealt with. If we look at the section on the Sphingidae it will give us the sequence which is followed in the other sections of the book. Following the family heading there is a description of the typical imago, ovum, larva and pupa of the family and then a key to the species within it. The genera are then dealt with—first a brief description of the genus characteristics followed by the descriptions of the species within the genus. The scientific name is given, then the vernacular name, the synonyms and authorities and the type locality. The imago is described fully with reference to the Plate figure and similar species are differentiated; the life history describes the ovum, how laid, the larva and its colour forms for the various instars, foodplants used and alternatives, the pupa and method of pupation and the life and occurrence of the imago. Finally there is a note on distribution and a distribution map showing dot distribution provided by the Biological Records Centre of the Institute of Terrestrial Ecology. These maps include all records received up to May 1978 and for migrant species Mr. Bretherton has devised special maps to indicate the direction of migrations.

There are 38 colour photograph reproductions showing moths in natural settings and some larvae; these are well reproduced and in the

case of the larvae one would have liked to have seen more. The plates of the moths, shown in the 'set' position, are by Brian Hargreaves and are of a standard that one has come to expect from this artist and should enable the identification of all those species which can be positively named from their facies. Where a moth has differing forms these are also included and the data on each illustration is given on the facing page and there is a reference back to the text. This makes the book very simple to use.

The pages are quarto size which makes it too large for the pocket but most identification work is done at home so that this is no great disadvantage. The type face, the printing and the presentation cannot be faulted. The only problem that will face the amateur lepidopterist is in the use of the keys and in the descriptions of the imagines as these all include terms which are significant only if the terminology is understood by the reader. Such terms as 'orbicular stigmata', 'ante- and postmedian lines' are precise if you know what they are but in this volume there is no glossary nor sketch showing the wing patterns referred to. These are included in Vol. 1 of course but the person who buys Vol. 9 may not have this. The same observation may apply to future volumes and it might be worth suggesting that a separate insert be made available for use with all the volumes giving the necessary information.

Compared with South's 'The Moths of the British Isles' this book gives very much more information which is right up-to-date (e.g. *Orthosia cruda* which is dealt with by South in 19 lines here takes up 53 lines) and I consider that the illustrations are very much better for the purposes of identification.

The Editors and production team are to be congratulated on producing a volume which must be the standard reference work on these families for as long as was the original work by Richard South.

PWC

A Check List of British Insects by G. S. Kloet and W. D. Hincks. Part 4: Hymenoptera, second edition, completely revised, pp IX, 159. Royal Entomological Society, London 1978. Price £11.00.

It is always difficult to give a subjective review of what is, after all, a nomenclatorial list prepared according to the views and opinions of the author. In this case the revision of the first edition has been done by a number of authors, all well-known Hymenopterists of which Messrs Fitton and Graham, as signators of the introduction, should be mentioned as they would appear to be the main editors of this second edition. However this division of labour has resulted in some inconsistencies of which the most noticeable is the dichotomous spelling of the author Foerster or Förster. It all depends I suppose on the individuals view as to whether or no foreign alphabets should be transliterated or translated and there has been no supreme editor to pull the thing uniformly together.

There are, naturally, many changes since the original edition. Nowhere is this more evident than in the Chalcidoidea where the immense lists and endless synonymy of Walker have now been reduced to a semblance of order. The combination of multiple authorship and the desire to save cost has resulted in uneven treatment which, sadly, makes this list of less use to the inexperienced especially. For instance the older synonymy of the Aculeata is largely omitted. But it is just these older names most likely to be used by the tyro entomologist who has acquired an old 'Shuckard', 'Step' or 'Walker' by inheritance or chance purchase. On the other hand, perhaps because of the lack of revisional work, the author of the Proctotrupoidea has thoroughly investigated the synonymy. This in itself forms a sound basis for future more detailed studies. There are several instances of differing spelling as between this and the first edition. Which do we assume to be correct? There is no way of telling which is the spelling or which the typographic error and, when a variant spelling is used, the former should have been given as a synonym. It may be of course, however, that such differences are in fact mostly typographic! There are also a few unfortunate omissions: we found the genus *Nemeritis* but where oh where has *Canescens*, the commonest name of one of the most widely used teaching and research insects gone?

The stated aim of the Royal Entomological Society of London's "Handbooks for the Identification of British Insects" is "... to provide illustrated keys . . . together with morphological, bionomic and distributional information". This work provides *none* of those aims and therefore to include it under the "handbook" title seems to be misrepresentation under the trades descriptions acts.

The ever-increasing cost of lists such as this, which, being so difficult to both typeset and proofread, always inevitably contain errors and, due to cost-saving, have synonyms and cross-references omitted, must very soon bring their publication to a totally uneconomic level. Be this as it may any future corrected printed editions are unlikely to appear before another third of a century has passed and perhaps one may suggest that the correct place for these lists in the future is inside the "microchip". Cephax, Telex or the California Biological databank all seem suitable candidates. After all, errors and omissions can be updated promptly and data extracted instantly and a sight quicker than looking up a defective index. As we mostly have televisions, so I suspect our successors in the next decades will all have computor terminals instead.

BOCG

Pupa digging by Rev. Joseph Greene, M.A. pp.24, paperback. 8vo. Reprint edition. E. W. Classey Ltd., Faringdon, 1979. Price £1.50.

After reading this pleasant little book I was left with an impression of dichotomy which serves to enhance its interest rather than the reverse. The style is lively and conversational, especially so for the mid-nineteenth

century. This led me to wonder at its purpose, was it intended as entertaining reading or a source of useful material?

The old species names are no great disadvantage as most of them can be recognised or successfully guessed from the context. Though why a third of them start with capital letters I cannot think. Times have changed though, and many species The Reverend finds common are less so today. He finds *Chariptera (Dichonia) aprilina* "In the utmost profusion. I have found as many as twenty at one tree. This will be one of the first pupae found by the beginner: nothing can be easier." Meanwhile I struggle to find a singleton. I was perplexed by apparently alternating statements, on the one hand saying how easy and profitable pupa digging can be and then exhorting the digger to exercise care and have patience. Certainly I have had some success in 'digging' but not I feel enough to warrant recommending it as a full-time general collecting activity.

Judging by the furore caused by the original publication (the author was presented with a silver trowel by his peers as a testimonial of thanks) far fewer insect individuals and species were obtained in those days, which obviously increases the value of those that were. Perhaps, as we sit by our modern mercury vapour traps waiting for moths to flock in, we should re-examine the older entomological arts, like pupa digging, not so much as a general collecting method but as a way of finding species otherwise rarely obtained. I am surprised that the booklet was considered as good, personally I would describe it as 'interesting and useful' rather than 'celebrated.'

Mr Classey has made a good job of the publication, the price of £1.50 is reasonable for a minority interest booklet and the card covers are sufficiently rigid to support the pages. The book does not 'flop' as so many paperbacks do today. I would recommend it to all 'moth hunters' but principally to those who enjoy a good read. You will pass an hour or two of pleasant nostalgia with it.

CH

PUBLICATIONS NOTED

Butterfly Report of the West Sussex Wildlife Recording Group. Published by M. & S. H. Edwards, Lea-side, Carron Lane, Midhurst, 1980.

This useful little publication is xeroxed A4 size in an attractively designed green cover. The fruits of many peoples observations it provides an accurate and up-to-date guide to the butterflies of the area covered. It consists of maps of the area, three to a page, with the distribution dotted in the kilometre squares and brief notes. Perhaps wisely the exact locality of the rarer species are left blank.

Walthamstow Marsh: Our Countryside under threat. Produced by Save the Marshes Campaign, 1979.

This substantial duplicated production has been issued to forward the

campaign to save these famous marshes from total destruction and is a fairly full account, historical, economic, geographical and faunistic of the marsh. While this last is certainly by no means complete, the butterflies and moths are adequately covered by our member, Brian Wurzell, who is also responsible for the substantial flora section, and other insects are briefly covered by Harry Britton. Quite clearly however there is more than ample scope for Dipterists, Hymenopterists and Coleopterists to do some determined work on the marshes. From the bird list the ornithologists have been busy for some time and the near central location and ease of access of the marshes makes visits for Londoners quite easy.

This publication is illustrated with very useful maps and photographs and all who have contributed to its production are to be congratulated. It was produced for a purpose which it has fulfilled admirably for, as we report in detail elsewhere, Walthamstow marshes have been saved, at least for the present, for the vandals are ever with us. Apart from its original purpose this publication is useful in its own right as a sound ground basis for the study of and use of an area for leisure purposes.

POTAMON: Newsletter of the Society for the study and conservation of nature. Edited by Stephen P. Schembri.

This substantial duplicated newsletter, published in Malta, has as its aims "... to keep our members informed on Society activities, to provide an outlet for ideas and comments of interest to the Society, to include informative notes and observations of natural history interest."

In this aim it appears to us to succeed admirably, being well-produced, well-illustrated — of a higher quality than is usually associated with a duplicated method of reproduction — well laid out and both informative and interesting.

Although dealing with natural history in general, the issues we have seen contain a good deal of entomological matter. Amongst these should be mentioned a very good illustrated guide to the freshwater insects of Malta. Apart from *Berosus* species these do not really seem to be any different from those we are more acquainted with in England.

There is an amusing item about *Papilio machaon* L. In Malta they are not of course fenland butterflies. Another item deals with Teratology and a rather larger one on Velvet ants, which are not, naturally, ants at all!

Withs its aims of aiding conservation we recommend this publication to anyone holidaying in Malta and wish it every good fortune for the future.

Editor

NOTES ON BRAZILIAN BEETLES

Megasoma actaeon L.

My first introduction to *Megasoma actaeon* was when I was visiting a sugar estate in Alagoas. It was in a display case with many other beetles including other Scarabids, various Cerambycids, etc., all of which had

been collected in the cane field of the vast estate. Some of the Cerambycids spend their larval stages in galleries bored in sugar-cane stalks. The larvae of *actaeon* are known to live in galleries in palm trees and the fact that in Alagoas wild palms grow unhindered in the cane fields, tolerated on account of their edible oily nuts, probably accounted for the presence of *actaeon* on the estate. Apart from palms, the slightly bluish-tinted white grubs also burrow in the wood of various forest trees.

M. actaeon is attracted to light, and on one occasion in the Serra do Navio, in Amapa, after a heavy downfall of rain on a hot night, I found a big female on the wires of a fence near some flood-lights.

The next time I came across it was in the State of Paraiba, in a train approaching Campina Grande. It was late evening; all the windows of the carriage were open and the lights fully lit. A passenger sitting beside a window suddenly clapped a hand to his forehead and exclaimed that he had been struck by a stone and pointed to what looked like a lump of coal on the floor. Another passenger picked it up, but dropped it immediately and stamped on it hard with a booted foot. Going to see what the object was, I found it to be a large male *actaeon*, but now, unfortunately, somewhat out of shape. In its flight through the window to the lights of the train it had accidentally found a victim, whose head was now bleeding from a scratch made by the horny beetle.

However, *actaeon* also flies by day. From my garden in Pernambuco I once spotted what at first sight seemed to be a small bird flying with unnatural slowness in my direction, some 30 feet above ground level. As it approached, I realised it was a huge black beetle. Its swaying flight with outstretched elytra, transparent yellow-brown wings flickering in the strong sunshine, brought it above the garden, where it clung to a twig on a tall tree. With the help of a ladder and a long-handled net I attempted to capture it, and recognised it as a male *actaeon*; but it was just out of reach; and while I was trying a longer handle to the net, the beetle casually took off and wobbled away on its aimless flight.

Another time, at Cobe, in Paraiba, during a very heavy flood of the Rio Paraiba (not to be confused with rivers of the same name in Alagoas and in other more southerly States of Brazil), huge quantities of logs, small trees, clumps of grass and debris were washed down by the furious spate and piled up against the piers of a railway bridge. This flotsam harboured an assortment of rodents, snakes, lizards and insects, all interested only in saving themselves from drowning, and amongst them I came across a fine, large-horned male *actaeon*, $3\frac{1}{2}$ inches long and 2 inches wide — slightly above average.

The habitat of *actaeon* is the northern part of South America, but in Brazil it seems to be confined to the northern and north-eastern regions. As far as I know, the southernmost limit appears to be the State of Alagoas, some 10 degrees south of the Equator. The largest specimens, in Brazil, are those found in Pará and Amazonas.

Callichroma auriconium, L. and *Callichroma velutinum*, Fabr.

Once, on a July morning, just before the end of the rainy season, while walking along with a butterfly net on an overgrown track near Belem I was fortunate enough to catch a *C. auriconium* in flight. The track, one side bordering a tidal rivulet, was edged with scrub and tall grasses; the other side was flanked by heavy forest. After a heavy shower, all the foliage was wet and fresh-looking in the strong 11 a.m. sunlight. Because of the down-pour only a few minutes before there were no butterflies to be seen, but, flying at a height of some 8 feet above the path close to the forested side, came whirring along what looked like a large *Pepsis astrata*, the spider-hunting wasp. It was easily captured with a single swing of my net; but, to my surprise on dealing with it, very gingerly, because *astrata* packs a formidable sting—it proved to be not the big wasp I had expected, but a beetle—and a most elegant one, indeed. It was a splendid Cerambycid. Its slender body was 2 inches in length; its long legs, head, thorax and antennae most shiny-black; elytra were velvetty-black with iridescent coppery stripes near each side and over the whole length of the suture. These stripes, as the insect was moved about in the sunlight, changed from burnished copper to various shades of green. The hind-legs were very long, flattened, and the antennae were twice the body-length. The insect was, in fact, a *Callichroma auriconium*.

In size and shape *auriconium* resembles *C. velutinum*. (Both belong to the Callichromini tribe, and I have come across both in Para, near Belem and Amapa.) The colouring of *velutinum* is different, the stripes on the elytra being iridescent blue, changing with its position in relation to light, to green and gold.

In their larval stages both these Callichromini, like other Cerambycids, are, of course, wood-borers. They live in various species of fig trees, especially *Ficus benjamina*.

Members of the Callichromini tribe seem to have a strong predilection for scented flowers. Hence they can be found in the springtime moving about busily, in clusters of perfumed blooms, (in close proximity, and indifferent to sundry bees and wasps which are also revelling in the sweet-smelling pollen), but seldom very far from forests, woods or plantations.

Personally, I have met with both *auriconium* and *velutinum* only in the State of Pará and the Territory of Amapá though I have seen or caught various other species of *Callichroma* in Pernambuco, Minas Gerais and Goiás.

T. C. Hanson (5242)

INSECT FAUNA OF THE MEXICAN RAINFOREST

There can surely be few of life's experiences more frustrating than that of finding oneself in a rich and exotic collecting zone without a net! This happened to me not so long ago when I lived for six weeks on the edge of an extensive zone of tropical rainforest at Palenque, in southern

Mexico. Now how, you might well ask, could any sane person possibly allow such a thing to happen? I must in all fairness place the blame squarely where it belongs, that is to say upon the perversity of fate, for my net chose to vanish, mysteriously and without trace, on the very eve of my departure for New York. (Naturally it turned up the minute I arrived home, several months later.)

During the course of a three-month tour of the National Parks of the United States, I saw and photographed a great many mouth-watering forms of Lepidoptera, but was unable to collect owing to the near-total ban that is (quite rightly) imposed upon such activities within the Parks. I was particularly impressed with the richness of the Papilionid fauna of the Great Smoky Mountains in Tennessee, where the warm and humid summer months produce a great show of such striking forms as the Spice-bush Swallowtail (*Papilio troilus* L.), the Tiger Swallowtail (*Papilio turnus* L.), which exhibits considerable sexual dimorphism, and the very large Pipe-vine Swallowtail (*Papilio phileenor* L.). Equally spectacular was a Nymphalid known as the Red-spotted Purple (*Basilarchia astyanax* Fab.).

I had timed my arrival in southern Mexico to coincide with the end of the rainy season, but evidently Chac, the Mayan rain god, had not been reading the right books, for the forest was thoroughly saturated at least six days a week during the entire course of my stay. The Palenque rainforest luxuriantly swathes the slopes of the Tumbala Mountains in the state of Chiapas, and as time progressed I grew increasingly aware of the reason why this most fascinating of all our planet's biomass is known as *rainforest*.

Wildlife at Palenque is exceedingly rich, but as this Bulletin is concerned only with insects and their kin, I must restrain my enthusiasm. Mexico, incidentally, is an ideal country for a holiday, for although it may seem a long way to go, once the initial expense of air travel is dispensed with, the cost of living can be ridiculously cheap. For instance, I paid no more than the equivalent of 30 pence a day to keep my tent dry beneath a palapa, which is a jungle hut consisting of a thatched roof and absolutely nothing else (ideal for fresh-air fiends). Such simple accommodation is also ideal for arachnologists eager to come to grips with their coveted subjects, for the thatched roof contained any number of very large Ctenid spiders of the genus *Cupiennius*. (Fig. A) Few of my neighbours were inclined to share my appreciation of the charms of these attractively patterned spiders, and unsportingly proceeded to batter them with rocks and loud screams whenever they put in an appearance. Once I even found a hard-bodied Argiopid (*Gasteracantha cancriformis*) alive and well in the cooling ashes of my camp fire! The black and white body of this spider, bristling with sharp spines, strongly resembled the bizarre and thorny shapes of the various *Micrathena* species that hung on their webs in and around the forest edge. Vivid orange or bright yellow, daubed with spots



Fig. A. A female Wandering spider (*Cupiennius* sp.) Carrying young on her back. Leg-span is 3·5 in. From Palenque, Mexico (Photo by D. Yendall)

and speckles of black, these really lovely spiders always look as if they have been freshly coated with enamel paint. And yet, in spite of such spectacular colouring, it is possible that their outlandish appearance may serve as a form of camouflage, for although one particular spider in the centre of its web was glaringly conspicuous to me, an American visitor to whom I pointed it out was quite convinced that the spider was nothing more than a bit of old, withered leaf caught in the web.

I did not really go to Mexico equipped to collect, as my main concern was photography, but at Palenque conditions were so glorious for collecting, and the entomological scene so rich and varied, that it was quite impossible to restrain from picking up whatever came along. The chief attraction of Palenque lies in its ancient Mayan city, a small part of which has been nobly restored by the archaeologist Alberto Ruz L'Huillier. Many of these Mayan buildings make excellent hunting grounds for the entomologist : I found, for instance, the caterpillar of an unidentified *Automeris*, or Bull's Eye Moth, actively circumambulating one temple, and beneath the jutting limestone overhangs were numerous chrysalids. On the grassy and wildflower-speckled slopes of the unrestored pyramids

were invariably many butterflies, playing and feeding in the brilliant sunlight. Most of these colourful creatures seemed to shun the rainforest interior, for I never saw them anywhere but in the open. Lacking a net, I devised in desperation a method that worked with far greater success than it deserved — a gravity-powered chemical spray : in reality, a can of Zippo lighter fluid held upside-down! Wielding this clumsy instrument rather like a continuous emission laser beam, I was able to gun down a fair number of insects.

Amongst the lovers of open space and sunlight were some Pierids, the vivid yellow "Sulphurs". One particular species, subsequently identified as *Eurema elathea* Cramer, spanned more than an inch. Though not as vividly hued as some members of the genus, this species is distinguished from its kin by the broad dark brown margins on all wings, and the white hind wings. Like so many Mexican butterflies, this Sulphur also ventures into the southern states of the U.S.A. .

Danaids were also much in evidence. The Queen Butterfly (*Danaus berenice*) is smaller than *D. plexippus*, a more sombre orange and less elaborately patterned, but a striking insect nevertheless, with white dots scattered over the elegant forewings.

One of the most common Nymphalids here was the Fatima Butterfly (*Anartia fatima* Fabr.), its dark brown colouring relieved by dots and bands of yellow and red. Widespread in Mexico and more southerly countries, it is rare in the United States. Completely different in colouring — though a close relative, as its venation shows — is the White Peacock (*Anartia jatrophae*). As with so many species in Mexico, very little is known of its life history .

I must confess that the Long-tailed Skippers had me initially non-plussed, being of so highly aberrant an appearance that it was some moments before I even associated them with the Hesperiidae. I encountered two species, each with a wingspan of nearly $1\frac{3}{4}$ inches (45 mm), and bearing tails $\frac{1}{2}$ inch (13 mm) long. The ground colour in each case was of a deep chocolate relieved only on the forewings by markings of a brassy hue. In the Long-tailed Skipper (*Eudamus proteus* L.), (See Fig. B) these markings consist of an irregular scattering of large specks, whereas in the Eryciles Skipper (*Eudamus eryciles* Latreille) they form two thin and metallically glittering lines on each forewing. I was able to photograph the former by bringing it into my tent — rather cramped for a working studio, but it did make photography a realistic proposition without incurring the risk of losing active specimens.

Many of the American visitors to this region (and quite a few Mexicans too, who should have known better) were almost permanently high on a powerful hallucinogenic drug obtained by eating a local mushroom (*Psilocybe cubensis*) known affectionately as the Magic Mushroom. Indeed, many of these people had little or no interest in either forest or

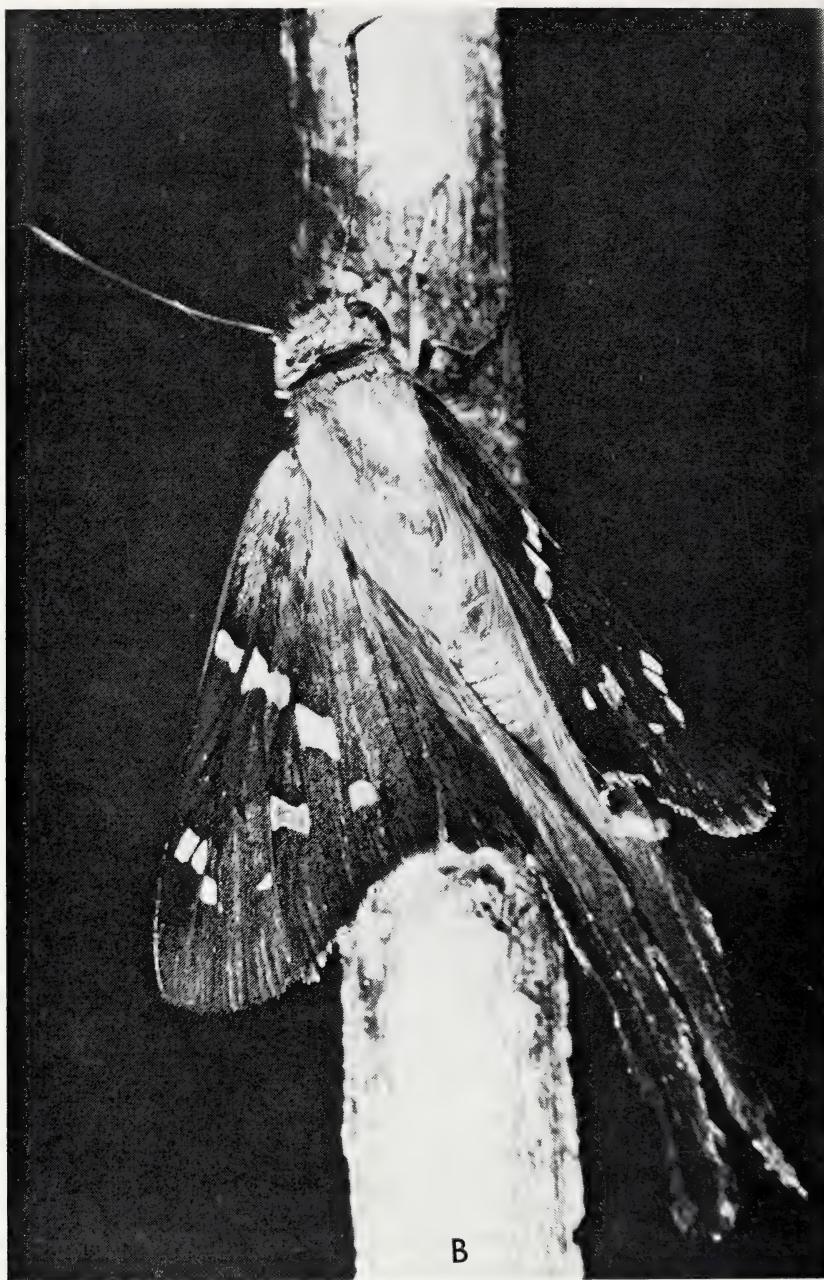


Fig. B. The Longtailed skipper (*Eudamus proteus*). From Palenque, Mexico
(Photo by D. Yendall)

ruins, and had come here solely to sample these wretched fungi. Now it is not for me to condemn or condone such behaviour, though I always felt that there was more than enough to keep one entertained in the rainforest without the need for stimulants providing instant spiritual enlightenment. Eventually, however, I relinquished wisdom to the call of curiosity, and sampled the Mushroom myself, excusing such weakness on the excellent grounds of scientific enquiry. Under the heady influence of this potent narcotic the subject rapidly acquires totally different concepts of time and reality, sometimes accompanied by alarming hallucinations. And so, when a huge and beautiful blue and orange butterfly flapped past me and alighted upon a tree trunk, I could not quite make up my mind whether it was real or not. Lacking a net, and with senses still number and reeling, I crept up and astonished both the insect and myself by seizing its body successfully between forefinger and thumb. (I subsequently found this a very effective method of securing these magnificent Brasso-lid butterflies). This particular species was *Caligo uranus*, only one of several that occur in this region. Members of this genus are commonly known as Owl Butterflies, on account of a pair of huge "eyes" and feather-like markings on the underside of the wings. There is some doubt as to their effective mimicry of the eyes of owlish birds for, when perched on a tree trunk with both wings opened in alarm, it is apparent that both "eyes" are hidden from a predator; and when viewed side on, with folded wings, only one "eye" is visible at a time. Generally crepuscular, they may sometimes be seen flying at other times of day. My largest specimen, six inches (150 mm) across the wings, was presented by a Mexican family, wishing, no doubt, to humour the "insane".

Transparent as glass, but delicately tinted with black veins, and softly shimmering with an exquisitely ethereal shade of pink and the merest suggestion of green, rather like *Haliotis* pearl shell, the small Ithomiid butterflies often fluttered slowly through the forest, always low to the ground, and seemingly indifferent to the daily rainstorms. This near-incessant rain was a sore trial at Palenque. It seemed that every time I set out into the forest with my cameras I would be swiftly driven back by a sudden driving deluge. At such times I was obliged to retire to my palapa and console myself with a delightfully inexpensive but nonetheless potent bottle of tequila, a beverage that, I found, always helped to while away the tedium of an exceptionally rainy day.

I made a number of abortive attempts to take pictures by available light. In the deep forest perhaps as little as 1% of the light level present above the crown ever reaches the forest floor, so very long exposures are called for. Unfortunately, this introduces reciprocity failure, a defect that requires a very considerable compensatory increase in exposure time, the factor of which can only be determined by guesswork and experiment. One picture of a *Caligo* at rest was badly underexposed, but by duplicating and overexposing the transparency I was able to make an acceptable,

though rather grainy, copy. Certainly there is no substitute for electronic flash under these conditions. Lacking a ringflash, I tried to photograph my insect subjects by the light of twin flashguns, but the humidity made even this difficult, and more often than not only one of the duo would fire.

The magical metallic gold colouring of the Tortoise Beetles (Cassidinae) can be preserved only through the medium of photography. Soon after death, shrinkage of the integument alters the structural balance of the layers responsible for the glorious colours, so that they disappear completely.

Lacking a mercury vapour lamp, I resorted to the next best thing : the platform lights at the local railway station. These bright lights attracted a great many insects that I would otherwise never have seen, and that were in the habit of crash-landing upon the concrete platform, sometimes only stunning but often killing themselves. Chief amongst these were a considerable variety of really enormous and colourful examples of the Sphingidae. Regrettably, most of those collected were eventually spoiled by mould, so never identified. It was here, too, that I found all of my Belostomatids (Giant Water Bugs) ranging from the medium-sized *Lethocerus griseus* and *L. medius*, $2\frac{1}{2}$ inches (65 mm) long, to the gigantic *Belostoma colossicus*, $3\frac{1}{2}$ inches (90 mm) long and with a wingspan of $5\frac{3}{4}$ inches (145 mm).

But by far my most exciting find was that enormous and superbly coloured Longicorn known popularly as the Harlequin Beetle (*Acrocinus longimanus*). (Fig. C.) I encountered only one of these really magnificent insects, fortunately being ideally placed at the time of its arrival, which happened to be on the trouser leg of a local peasant. This unappreciative gentleman promptly brushed it off in disgust, and was about to stomp the offending creature out of existence when I intervened, and, by now in the centre of a knot of wide-eyed Mexicans, placed it reverently into my rucksack. The dimensions of this pink and grey beetle were truly impressive : body $2\frac{1}{2}$ inches (65 mm) long; antennae $4\frac{3}{4}$ inches (120 mm) long; and the forelegs an unbelievable 3 inches (77 mm). The mandibles were quite formidable, and easily capable of drawing blood. Its flight was slow and cumbersome, the elytra springing open and followed by a pause before the insect, with a loud whirring sound, rose slowly and vertically into the air, rather like a toy helicopter. I kept it alive for a week, but it would accept no food whatever, and suddenly died.

The local Mexicans were all quite convinced that I was mad; who else but a *loco gringo* would spend his time accumulating bugs and spiders, and then spend hours gazing at such inconsequential things through a lens? The local chickens took a greater interest in these matters, but purely from a gastronomic viewpoint, I regret to add. One day I stood a tray of Belostomatids outside to dry in the sunlight (sometimes the rain stopped). They had all been thoroughly steeped in alcohol to halt decomposition, but although after a week of this treatment they no longer

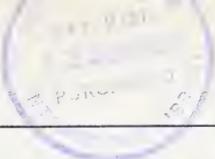


Fig. C. The Harlequin beetle (*Acrocinus longimanus*), perhaps the world's most spectacular longicorn. From Palenque, Mexico (Photo by D. Yendall)

stank of rotting fish, they were still of enormous interest to the chickens. At any rate, having cunningly waited until my back was turned, several of these depraved birds immediately attacked my Giant Water Bugs with gusto and swiftly reduced them to a tangle of dismembered limbs and broken bodies. Perhaps the flavour was too strong for them after all, for they never actually ate any of them. Chickens, however, are only a relatively minor threat to the collector in tropical Mexico : the ants are far more rapacious.

When I erected my tent on the earthern floor of the palapa there was not a trace of ants. Plenty of spiders and wasps, but no ants. Within a week there was a thriving colony hard at work tunnelling beneath my sewn-in groundsheet. Every day there would be fresh holes bitten through the nylon fabric, and through these the foraging workers would enter in search of food. Foremost on their list, of course, was my insect collection. I lost a number of very choice butterflies in this way, the heads, legs and antennae being neatly amputated and carted away. The ants possessed some degree of consideration, for they always left me the wings. For two weeks I fought a constant battle against these pests, but in the end I had to admit defeat, and moved. It took them exactly two days to find me again.

Next, it was the turn of the Army ants, whose devastating column of destruction aimed itself directly at my tent. Fortunately I discovered them before they managed to penetrate the interior, but even so the fly sheet resembled a black and moving wall. For several hours I was engaged in chemical warfare, and eventually managed to divert the column, which appeared to be endless. After that close call I always kept a large supply of kerosene on hand, for intriguing though I find Army ants, I prefer to study them in their own environment and not from the comfort of my bed.

But perhaps the greatest menace to the collector in this hot and humid region is mould. As the fungal spores are everywhere in the atmosphere, and as it is almost impossible to dry thoroughly any specimens (short of smoking them over a slow fire — if you can get the wood to burn), it is very difficult to prevent the ingress of these insidious plants. Butterflies were the least affected of all, whilst fat-bodied moths and wasps were particularly susceptible. It was necessary to repaper and soak the entire collection in alcohol once a week; but in spite of this regular treatment a number of specimens were so badly infected that they were ruined.

An acquaintance, who made a return visit to this area six months earlier in the year, reported that whilst reptile life was considerably more apparent, there were fewer insects and spiders in evidence. During the six weeks I spent at Palenque I collected a total of 23 butterflies, 15 moths, 24 beetles, 4 wasps, 21 miscellaneous insects, 10 arachnids and numerous ants. Given nets, and more sophisticated apparatus than that devised on the spot, the count would have been considerably greater. It

helps, too, from a photographic viewpoint, to be more aware of the peculiar problems pertaining to such exotic locations, and next time I shall be better prepared and hope to achieve vastly improved results, both as regards picture quality and quantity.

David Yendall (3670)

THE CONTROL OF LARVAL COLOUR VARIATION IN THE ANGLESHADES MOTH (*PHLOGOPHORA METICULOSA* L.) AND SOME OF ITS CONSEQUENCES

PART 2 : THE MAINTENANCE

(Continued from Vol 38, page 178)

The frequencies of the different colour-types which occur naturally in the Ringwood area were then investigated by analysing data from samples taken in this area from September 1975 to October 1978.

The results of this investigation showed that on average, in the third instar, approximately 85% of larvae were green, 11% were olive, 3% brown, and the three yellow colour-types, together less than 1% of the population. In the fourth instar, on average, about 41% were green, 45% olive, and 12% brown, the three yellow colour-types totalling about 2%. In the fifth instar 16% were green, 18% olive, 64% brown and again the three yellow colour-types totalled about 2%.

Whilst these percentages for a particular season were fairly constant from year to year, seasonal variations within a year were noticeable. The green larval form in all instars, became rarer during the winter, reaching a minimum in May, but recovered during the summer to reach a maximum in September. Conversely, the brown form became commoner during the winter and rarer in the summer. In the third and fourth instars, the olive form exhibited variations in frequency, similar in direction to those of the brown form but not as extreme. In the fifth instar the variations in the proportion of the olive larval form were similar in direction to those of the green form, although again not as extensive. The overall proportion of the three yellow forms remained relatively stable throughout the year in all instars.

Experiments were then designed to determine firstly why this species exhibits so much larval variation and secondly, the cause of the seasonal variation in the colour type frequencies. Many of these experiments served only to indicate which selective agencies have little or no effect on the natural frequencies of the larval forms, and except to list these, I will not discuss them further here. They were non-random mating (see Sheppard, 1952, Ford, 1964); larval predation by hedgehogs; larval predation by carabid beetles. It was also ascertained that ova destined to produce olive fourth instar larvae were no more viable than those destined to produce green or brown fourth instar larvae.

The experiments which gave positive results of one sort or another were designed to investigate:—heterozygote advantage; death due to viral disease; death due to hymenopteran and dipteran parasitism, and bird predation. I will deal with each of these individually.

(a) Heterozygous advantage is the term used when a heterozygotic form is at a selective advantage over either of its homozygotes due to increased vigour of growth, fertility, etc. Without discussing the theoretical basis of the evolution and genetic mechanisms leading to heterozygous advantage (see Ford, 1964 pp. 87–90) it may be noted that he there considered that the most general basis of genetic polymorphism of the type we are dealing with here is a balance of opposed advantage and disadvantage such that the heterozygote is favoured compared with either homozygote as originally suggested by Fisher (1930).

This phenomenon was investigated with respect to genes A, B and C. The results indicated firstly that a^+a is not at an advantage over the homozygote aa . (whether a^+a is at an advantage over the homozygote a^+a^+ was not determined). Secondly, it was found that the heterozygote $b'b^o$ was at a very slight advantage over both the homozygotes, $b'b'$ and b^ob^o . It is envisaged that this advantage could help to maintain the constancy in the frequencies of the green, olive and brown colour types from year to year, but this does not explain the seasonal variations in the frequencies of these forms. Thirdly, it was found that c^+c is at a definite advantage over the heterozygote cc . Evidence indicating whether c^+ is at an advantage over c^+c^+ has not yet been obtained, because as c^+ is completely dominant to c , these two genotypes are indistinguishable in the phenotype. However, I believe it will prove to be so. If this is true, then it is suggested that the frequencies of alleles c^+ and c in the population are maintained in balance principally by heterozygotic advantage.

(b) Viral disease. One of the most common causes of death in laboratory stocks of Lepidoptera is that due to viral disease, and Ford 1955 states that, without a doubt, virus disease constitutes the most serious menace to many species of Lepidoptera. Any breeder of butterflies and moths will be familiar with the symptoms of viral infection which usually develop in the later larval instars. The infected larvae become limp and pass liquid from both the mouth and the anus. The condition seems to be fatal in all cases once the symptoms become apparent, and death usually follows within 72 hours, (personal observation). The excreta are highly infective, and, consequently, rearing larvae in crowded conditions, or failure to remove frass from rearing boxes, tends to spread an epidemic.

The experiments carried out were designed to test whether larvae of different genotypes showed different susceptibilities to viral disease when exposed to infected larvae. The results showed that larvae which were homozygous recessive for gene C were more liable to infection than those with c^+ in their genotype. It is thought that this difference in susceptibility

is due to the differential behaviour of larvae with c^+ compared with those without this allele. 3rd instar larvae, being positively phototactic remain in the upper herbage layers during the day, whilst those which have cc in their genotype move down to the low herbage layers at dawn, only moving back to the higher herbage layers at dusk to feed. As larvae in the 4th and 5th instars, when they are most infectious, also spend the day in the low herbage layers, it is thought that the greater amount of time spent by cc larvae in the proximity of 4th and 5th instar larvae may be the cause of the differential selection. The result of this selection in favour of c^+ should be to cause an increase in the frequency of this allele; however, as the frequency of the alleles of c^+ and c remained fairly stable between September, 1975 and October, 1977, it seemed probable that some other selective agency was opposing this by favouring the allele c .

There was no indication in the results of the experiments that viral disease selected differently with respect to any of the other four genes described.

(c) Insect parasitism. Apart from virus diseases, probably the most serious menace to which many species of Lepidoptera are exposed, is that due to parasitic insects. These belong to two super-families, the Chalcidoidea and the Ichneumonidea. The second of these is again divided, between the true Ichneumons (family Ichneumonidae) and the closely related Braconids (family Braconidae).

The results obtained from samples of larvae taken from the wild showed that, as with viral disease, only the genotypes based on gene C were affected by differential selection. In this case, it was found that larvae with c^+ in their genotype were more susceptible to parasitic attack than those with cc , possibly because larvae with c^+ in their genotype remain in the upper herbage layers during the day and may thus be more exposed to attack. Calculation of the strength of the selective forces for and against c^+ due to viral disease and parasitism respectively, virtually balanced one another out.

(d) Bird predation. By far the most important selective agency that was found to affect the larval colour types differentially was bird predation.

It was found that, in a natural habitat, ground feeding birds such as starlings, blackbirds and song thrushes, take more green than brown larvae in winter, the reverse being the case in summer. The relative proportion of olive larvae preyed upon being intermediate between brown and green both in winter and summer. This selection is thought to be the principle cause of the seasonal fluctuations in the frequencies of the green, olive and brown colour-types. However, the situation was complicated by the discovery that some of the birds hunted using searching images. This means that the birds tended to hunt for prey of a type that they had recently found, even to the exclusion of others that seemed more obvious, thus making use of the experience they had just gained. The tendency to find prey using searching images is the basis of what Clarke (1962) termed

"apostatic selection" which maintains that predators preferentially search for and eat the most common forms of a polymorphic species. Allen (1972) notes that under such conditions the rarer forms, even if relatively conspicuous, should be protected from predation and hence be maintained in the population.

The results of a long series of experiments on bird predation suggest that apostatic selection may be instrumental in maintaining the year to year balance of the various colour-types, particularly in the fourth and fifth instars, although the evidence is as yet not completely conclusive. Furthermore, the fact that birds hunt using searching images may be one of the principle reasons for the evolution of the larval colour system in *P. meticulosa*, as the existence of a number of different forms will be an advantage as birds would have to form searching images for more than one form. The maintenance in the population of the three relatively rare yellow colour-types is almost certainly attributable to apostatic selection.

Throughout this study, the equipment used was virtually all of a type that a serious amateur entomologist would either have, be acquainted with, or could make at little expense. In fact the only items of equipment which I had not previously used in some form or another, when entomology had been purely a hobby to me, were the colour chart, which I made up myself, and a thermostatically controlled cabinet for rearing larvae at particular temperatures, and a substitute for this could easily be made up with a heater and thermostat in a glass fish tank.

Thus, apart from a small amount of specialised knowledge of genetics, which as I have said may be gained and understood with ease if considered from the basic principles outlined by Ford (1945, 1955) the results forming the first part of the study could have been obtained by any reasonably careful and conscientious breeder. The results and principles contained in part II of this article do require rather more specialised knowledge, but by and large the hypothesis upon which the experiments were based are also conceptually simple, and the methods used in the experiments require little more than time and care to ensure that they are suitably controlled so that they produce reliable and unbiased results.

When I began this study, I did not expect the system controlling the colour variation in larvae of *P. meticulosa* to be as complex as it proved. Possibly the use of this system to illustrate the basis of, and the ease with which, work of this type may be carried out will deter some people by its complexity. However, there is no reason to suppose that other polymorphisms will be as complicated, and indeed the majority of known larval polymorphisms involve only two or three forms, rather than the six in *P. meticulosa*, and in very few is the controlling mechanism known. For example, why does the instar in which larvae of the Elephant Hawk-moth (*Deilephila elpenor* Linn.) change colour, from green to brown, vary. I am sure that if all those amateurs who have bred this species had

kept records of the larval stage at which colour changes occurred in two or more consecutive broods and notes on the rearing conditions used, I would not be citing this as an unsolved problem.

I sincerely hope that this article inspires some members of the Society to systematise their breeding to some extent, and to publish their results in the Bulletin.

Finally, I would like to thank all those people who have aided and advised me during this study, particularly the staff at the Zoology Department of Royal Holloway College, and all those members of the AES Behaviour and Ants Study Group who provided me with data on *P. meticulosa*.

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ITEMS FROM A LEPIDOPTERIST'S DIARY IN 1979

Spring was late this year and both wet and cold following a winter of frost and snow here in Surrey. Swallows and Martins arrived late and one wondered what effect it would have on the insect fauna. The following are noted from my diary.

3rd May. Sun fitful and weather cool but in my sheltered garden I see a flash of wings in a pool of sunlight and there settles a Speckled Wood

while above a pair of Holly Blues fly in courting dance to be joined by a third.

13th May. At last a misty still day with the sun breaking through at 11 a.m. On the Lady's smock growing on the bank in my garden several Orange tips fly with Small whites while later in the day I observed both Small tortoiseshells and Brimstones. In my breeding cage I have an emerged female Emperor moth and two males arrive to fly around her.

27th May. In a wood near my home at Alford I was able to confirm the presence of the Duke of Burgundy and counted six specimens. Also present were Wood Whites, Pearl-bordered and Small Pearl-bordered fritillaries, Small skippers, Dingy skippers, Grizzled skippers and Brimstones. The Wall butterfly also put in an appearance.

Early June. On the Downs near Guildford, Common blues sitting on the grasses with rain pending. Found a colony of Small blues.

Throughout June. Large whites very common, up to twenty at a time being seen on rhododendrons. A large field of charlock next door might be the attraction.

23rd June. At Harting, Sussex. Small copper seen, newly emerged. Visited locality for Silver-studded blue. Within half an hour I observed fifty specimens.

6th July. On North Downs counted hundreds of Marbled Whites and saw Adonis blues, Large, Small and Dingy skippers and Green hairstreak.

6 – 10th July. Brown hairstreaks, bred from eggs collected in the winter, emerging. I understand that the butterfly is on the wing often until October and I observed one last year in my garden in the 3rd week of August.

8th July. Ringlets, White admirals and Silver-washed fritillaries all on wing today.

12th July. Dark Green fritillaries common on North Downs and Marbled whites still common.

15th July. Comma (summer brood) and Small coppers observed.

21st July. Weather unsettled but a visit to local woodland rewarded by the sight of a male Purple Emperor.

30th July. Chalkhill blues on the wing on the North Downs. (Throughout June, July and August I observed Silver-washed fritillaries, White Admirals and Commas commonly but the disappointment was the scarcity of Wood Whites. Last year there were hundreds but this year I was lucky if I saw as many as four on a trip. Meadow browns, Small heaths and the Vanessids (Peacocks and Small Tortoiseshells) were quite common; also Gatekeepers. The big success was the Common blue which appears to be on the increase. I am trying to establish it in the garden and have sown vetches and clovers and other wild flowers and grasses and hope to see it established there next year. Throughout August Purple

Hairstreaks have been chasing around the oaks but not in the quantities of the last two years.

3rd September. Red Admiral on *Sedum spectabile* in garden. Recent weather poor and generally the season a disappointing one for butterflies, yet I have recorded 37 species this year and 23 of these in and around my garden.

R. P. Hardman (5993)

SOME THOUGHTS ON THE EXTINCTION OF BUTTERFLIES

The section of Lloyd's Natural History on butterflies, by W. F. Kirby, were issued in six parts during 1896 and I believe some of the statements made there concerning the possible occurrence in England of certain butterflies, now confined to the European Continent, deserve further consideration. For instance, included in the section on Weaver's fritillary (*Boloria dia*) which, the author states, had been taken in England from time to time, is the following paragraph: —

"During the last fifty years several species of butterflies have become actually or very nearly extinct in England, and others formerly not uncommon, have become much restricted in their range. It is probable that this process has been going on for a long time, and that some of the species included by older authors, but now removed from our lists, were species already disappearing when the study of Entomology first commenced."

It is also stated in Part two of the butterflies that the Niobe fritillary (*Argynnis niobe*) was occasionally captured in the south of England, and that a butterfly called the "Straw mat fritillary" (*Melitea pyronia*) had been taken at Peckham in 1803.

In Part four the Alcon blue (*Maculinea alcon*) is said to have been included in the British lists on the strength of one specimen. The locality and date are not however stated.

In Part five he goes on to say that the Purple edged copper (*Lycaena hippothoe*) was recorded by all the older writers on Entomology as British, and that in 1859 and 1892 it was found in many out-of-the-way places in Sussex. He also states that the Scarce copper (*Lycaena virgaurea*) had been found by many older writers in the marshes of Cambridgeshire and Huntingdonshire, frequenting the flowers of Golden rod in August. The last recorded specimen was said to have been taken at Cromer but no date given.

So, perhaps during the eighteenth and nineteenth centuries, the Niobe fritillary, Weaver's fritillary, purple-edged Copper, Scarce Copper, Sooty Copper and perhaps even the Alcon blue and many others which are now found throughout Europe and are absent from the British Isles became extinct. But why? The Coppers must have been greatly affected by the drainage of the fens, but perhaps there was a climatic change that affected

these species. I wonder whether these species were also becoming scarcer in Europe at the same time. After the "little ice age" which lasted between (approx.) 1550 and 1850 the milder winters may have encouraged Virus attacks on certain butterflies' caterpillars.

Matthew Gandy (6160J)

BREEDING THE WHITE ERMINE: A PRELIMINARY TO RESEARCH IN ECOLOGICAL GENETICS

In Great Britain the genus *Spilosoma* (Arctiidae: Arctiinae) is represented by three species: *Spilosoma lubricipedu* L., the White Ermine, *Spilosoma lutea* Hufn., the Buff Ermine, and *Spilosoma urticae* Esp., the Water Ermine. Whilst the Water Ermine is restricted in its distribution to fens and marshes in the south of England, the other two species are very much more widespread, occurring throughout the British mainland.

This paper briefly describes the development of the immature stages of the White Ermine, as a preliminary to a study of geographic variation of this species.

The White Ermine is a very variable species, both in wing colour, ranging from white through buff to grey and even black, and the number and arrangement of spots on the wings. Thirty-one forms have been described and listed in an unpublished British Museum (Natural History) manuscript. The genetics of the White Ermine has briefly been studied by Federley (1920) and Lempke (1946).

Species with a widespread distribution have little opportunity for forming distinct geographical races. For such to occur populations generally require to a greater or lesser extent isolation over a sufficiently long period to allow the expression of the differing selection pressures. Thus isolation restricts the flow of genes between populations, total isolation requiring absolute discontinuities in the distribution of the species.

In the case of the White Ermine isolation would appear never to be total. The species is common throughout continental Europe, spreading into Northern Africa. The moth has been recorded throughout mainland Britain, although it appears to become less common in the north of Scotland. No records exist for the Orkneys or Shetlands, neither has the moth been recorded from the Outer Hebridean islands. Populations are present on most of the islands forming the Inner Hebrides. From such a distribution pattern it is to be expected that gene flow will be most restricted between the mainland of Britain and the Inner Hebrides, and continental Europe. Partial isolation, and hence restriction of gene flow, is expected between populations that are widely separated geographically, i.e. populations in Cornwall and northern Scotland.

These hypotheses will be tested in later work, the purpose of this paper is to draw attention to the need for livestock from stated geographical

localities: I would be grateful for any stage of the White Ermine, from any area, but especially from the north west and north of Scotland, the Inner Hebrides, western Wales, southeast England and any European sources. Populations will be bred and crossed to determine any genetic differences, resulting from different selection pressures.

For such a common moth the descriptions of the immature stages are very incomplete, see for example South (1908). A more detailed account forms the basis of this paper. A pair of moths of typical colouration were found *in cop.* on the cliffs south of Collieston, Aberdeenshire, on the evening of June 23 1979. The resultant ova were laid later that same evening and up until June 25. The ova were a very pale yellow colour when first laid, deepening to an opaque green prior to hatching. The larvae hatched from July 5 to July 7, twelve days after being laid. During the period these specimens were bred, they were maintained in an unheated room, thus being very close to the conditions experienced in the wild.

Allan (1949) states that the larvae are "Almost omnivorous; eats most 'weeds' and garden plants", South (1908) mentions the foliage of low-growing plants. Throughout this study the larvae were fed Hawthorn leaves, *Crataegus monogyna*. On hatching the larvae were pale green, tufts of hair later sprouting from single 'warts' at the interface of the segments. A pale yellow line was present running the length of the larvae's backs. The spiracles were pale yellow, and connected together by a faint white band. Later the body colour deepened to grey-green, in some individuals to grey, the tufts of hair becoming rufous. In the penultimate instar the body colour changed to deep brown, the spiracles turning white. The line running down the larvae's backs widened and either remained pale yellow, or, more commonly changed to red-brown. The tufts of hair at the segment interfaces became coarser and the colour changed to black-brown. Prior to pupating the larvae spun brown coloured cocoons. The first larva pupated on September 4, the second September 7, and the remaining individuals between September 12 to 17. Thus the larval development time was about seventy days. The White Ermine is thus a particularly suitable subject for the proposed research. It is easy to breed and has the required distribution and abundance patterns. To those interested in this type of research the important work to read is Ford (1976).

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ASSEMBLING THE VAPOURER MOTH

During the summer of 1978 I received two full-grown larvae of the Vapourer moth, *Orgyia antiqua* L., which had been found in the back garden of a house in Hampstead. Just twenty four hours later one of the larvae pupated and was transferred into a breeding cage. Two days later the other also pupated. Not long after this the first moth emerged, a wingless female, greyish white in colour. After emergence she remained clinging to her cocoon, head up and her body pulsating rhythmically at about 120 per minute. At this time the weather outside was mild with dull sunlight and a gentle breeze blowing—just the weather for assembling.

As the female is incapable of flight, 'assembling' is an essential part of its life cycle. The female 'calls' the male by releasing a sexual attractant in the form of a pheromone which cannot be detected by the human nose. This pheromone is carried downwind where it is detected by the males. Their large feathered antennae pick up one or more of the tiny molecules of which the pheromone is constructed. These molecules, of which there are millions, are dispersed by the breeze and when they are picked up by the male he will start to fly upwind into the path of the scent. As he approaches the female so the number of molecules striking his antennae per unit of time will increase. Adjustment to the flight path is made by contrasting the number of molecules striking each antenna in a given amount of time, e.g. if at a given moment the moth is receiving more molecules on his left antenna than on his right, it will know that it must alter course to the left. On reaching the female he releases his own aphrodisiac scent which will register on the female's simpler antennae and she will know that the stranger in her midst is a male of her own species and will permit him to mate with her.

I do not know whether a detailed study has been made of the pheromone of this species but it must be similar in chemical structure to that released by the female Gypsy moth, *Lymantria dispar* L., which has the formula $C_{27}H_{46}O$, a complicated hydrocarbon molecule. The pheromone is volatile and will vaporise very quickly in bright sunlight and so moths tend to assemble at dusk or dawn when there is generally a layer of cool air on the ground surface. The other disadvantage of bright sunlight is that it causes upward convection currents which carry the pheromone upwards instead of outwards to the waiting males. This was why I was glad to see that the sun was rather dull and hazy that day.

Books portray a type of cage for use when assembling, consisting of a perforated zinc tube with a funnel at each end with openings large enough to allow the entry of a moth. This equipment is only needed when it is necessary to leave the female unattended. Males enter the ends of the cage and are unable to leave, the cage acting as a sort of moth trap. All I did was to place the female in the breeding cage in the garden. I was not very confident of securing a male as I had not seen any in the area before and I was some 15 miles distant from where the larvae had

originated. Although the pheromone is very potent it could hardly be expected to attract males from more than a distance of two to three miles. Even so, I had waited only ten minutes when I was rewarded by the sight of a male flying in large circles round the garden. Within a few seconds he had located the female and after a brief inspection he entered the cage. Although I had heard reports of males flocking in their tens to a virgin female, no more appeared. Twenty minutes later the female had deposited her eggs in neat rows all over the outside of her cocoon.

Two days later the second moth emerged, also a female and wasting no time, I took her outside, her scent gland fully extended. Within ten minutes a male arrived and as I did not have a male in my collection, I decided to catch it while fresh. Pleased with my catch, I wandered towards the house and came face to face with a second male. Wondering just how many males she could attract, I caught the second male and waited for more. By now the sky had become overcast and hopes for any more males were diminishing. However, two others did arrive and taking the best of them I released the other three. Obviously one of these must have found its way to the female as I found a mass of eggs covering the surface of her cocoon on my return an hour later.

Kevin Samuels (6340J)

SOME DIFFICULTIES IN IDENTIFYING EAST AFRICAN BUTTERFLIES

While Africa's winds of change still raged further south, in Kenya the rains continued half-heartedly, but unseasonally, into the normally dry months of July and August 1979. As a result, not only were the birds still in colourful breeding plumage but butterflies were particularly abundant.

African butterflies, however, present problems of identification unparalleled in Europe and one quickly learns that seeing is not always believing.

Swallowtails and charaxes often fly fast and high, avoiding not only capture but also clear observation. Both of these groups contain many similar species but a short list of likely candidates can be formed by consulting Williams' Field Guide to African Butterflies and referring to habitat and distribution details. Field notes, or better still photographs, can be compared with specimens in the Nairobi Museum collection but the public display is far from complete and is sadly short on information other than names and foodplants.

The real difficulty faced by lepidopterists travelling in Africa is the bewilderingly common occurrence of mimicry and several of the commonest butterflies are subject to it. With good reason, *Papilio dardanus* is called the Mocker Swallowtail. The large cream and black tailed male is encountered in many parts of Kenya but the female occurs in no less than a hundred forms, many of which are close mimics to Danaid butterflies.

Thus, an apparent observation of an orange Danaid could be *D. chrysippus*, the African Monarch, or a black and white one could be *Amauris niavus*, the Friar. But both could be a female *P. dardanus*!

To add further complication, Nymphalid butterflies of the genus *Hypolimnas* are guilty of the same deception, the female of *H. missipus* having forms similar to the two forms of *D. Chrysippus*, and both sexes of *H. deceptor* and *H. dubius* are similar to *A. niavus*.

Another family exhibiting colouration warning of their distastefulness is the mainly African Acraeidae. *Acraea* species are often red or orange although there are some clear winged species. Mimics of the coloured species include a Lycaenid, *Mimacrea marshalli*, Nymphalids of the genus *Pseudacrea* and a swallowtail, *Papilio cynorta*. Some *Pseudacrea* species are so similar to certain *Acraeas* that they are only distinguishable from the structure of the hind wing cell.

These are by no means all of the examples of mimicry to be found in Kenya but the species mentioned, both mimics and models, are for the most part widespread and common.

If mimicry is an evolutionary convergence of colours and patterns, then the opposite — variability — also occurs widely in Africa. Some species, especially the females, occur in several distinct forms not controlled by mimicry or constrained by geography. The advantage that this gives to the species as a whole is that if a predator learns to like a particular colour or shape, other forms survive. Predators must 'dine around', however, or there would be no need for so many varieties as in *P. dardanus*, for example.

Several butterflies show such difference between the sexes as to appear to be separate species. Two field observations illustrate the point:

1. Orange with black veins and margins. White apical band on upper forewing. Overall like a large Admiral. Expands 2½–3 in.
2. Dull orange with brown markings and veins. Tapered forewings. Expands 2–2½ in.

These two insects, differing in colour, pattern, shape and size, were seen on a subsequent occasion, mating. They do not appear in Williams but the Nairobi Museum reveals them as *Bebearia mardania orientis*.

Seasonal dimorphism, which affects a number of common Pieridae, would be the straw to break the lepidopterist's back but a short stay visitor is unlikely to come across both wet and dry season forms on one trip.

In spite of the difficulties, the following species were positively identified on a tour of Kenya in August 1979. Most were observed in and around the garden of the Turtle Bay Hotel at Watamu on the coast 60 miles north of Mombasa. At the time of writing, two observed and photographed butterflies remain totally unidentified.

Field notes and photographs were used; not a single specimen was taken.

PIERIDAE

Dixei spilleri Spiller (Spiller's Sulphur). Abundant on coast.
Leptosia alcesta Cramer (African Wood White). One male on coast.
Eronia cleodora Hubner (Vine Leaf Vagrant). One on coast.
Colotis ione Godart (Purple Tip). Locally abundant on coast.
Colotis hataera Gerstaeker (Crimson Tip). A few on coast.
Colotis eucharis Fabricius (Sulphur Orange Tip). A few males on coast.
Colotis calais Cramer (Topaz Arab) A pair in coastal hedgerow.
Colotis evenina Wallengren (African Orange Tip) Abundant by Mara River, Masai Mara Game Reserve, S.W. Kenya.
Colotis vesta Reiche (Veined Orange). One on coast.
Colotis euipe Linnaeus (Smoky Orange Tip). Common on coast.

NYMPHALIDAE

Bebearia mardania Orientis. Several of both sexes on coast.
Euphaedra neophron Hopffer (Orange Banded Forester). Several on coast.
Phalanta phalantha Drury (Common Leopard). One in coastal grassland.
Precis sophia Fabricius (Little Commodore). Pair in coastal hedgerow.
Charaxes bohemani Felder (Large Blue Charaxes). One on coast.
Byblia ilithyia Drury (Joker). Locally common on coast.

PAPILIONIDAE

Papilio dardanus Brown (Mocker). Males common in many areas.
Graphium philoneo Ward (White Dappled Swallowtail). One on coast.
Papilio ophidicephalus Oberthur (Emperor Swallowtail). Pair in garden of Mara Serena Lodge, Masai Mara Game Reserve.
Papilio nobilis Rogenhofer (Noble Swallowtail). One male in grassland near Mara River, Masai Mara Game Reserve.

LYCAENIDAE

Hypolycaena philippus Fabricius (Purple Brown Hairstreak). Two on coast.
Zizeeria knysia Trimen (African Grass Blue). Locally abundant in many areas.

DANAIDAE

Danaus chrysippus Linnaeus (African Monarch). Widespread and common.
Amauris niavus Linnaeus (Friar). One on coast.

Having been charged by rhinoceros and elephant, stuck half way across a crocodile haunted river and smacked in the ear by an unidentified flying hawkmoth, the author can thoroughly recommend Kenya as adventurous lepidoptera country and a do-it-yourself camping safari as an exciting and relatively cheap means of getting around. There is still plenty of scope for improving the documentation of African butterflies, and plenty of the more obvious mammals and birds for light relief!

The author would welcome contact with anyone interested in the area, its fauna and/or the possibility of expeditions.

Steven V. Shelley (6510)

NOTES AND OBSERVATIONS

Wingmarking of Lepidoptera—In reply to C. P. Gunston's fourth query (*Bull. Amat. Ent. Soc.*, **39**: 1980, 19-20) the following notes might be of interest.

I have marked Lepidoptera at intervals for several years. Both enamel paint and nail varnish are frequently recommended for marking moths, but I have found these substances unsatisfactory for quick marking of a large number of lepidoptera. The paint or varnish tends to remove scales from wings, or hair from the abdomen and can impair flight.

Spirit markers (e.g. Platignum "Vari Line" marker) have proved a useful substitute. Small marks can be made on the edges of the wings of most moths except those with very shiny wings, such as *Pleuroptya ruralis*. Since the "ink" soaks into the wing, the mark is almost permanent. Marks made in this way appear to cause no damage, and as they are small and non-shiny they are less likely to attract birds than are some paints. I have recaptured moths with such marks intact three weeks after their being released.

P. Hatcher (6232J)

Food and Feeding Habits of Adult Butterflies—With reference to the article by B. R. Stallwood in *Bull. Amat. Ent. Soc.*, Vol. 38, page 144.

Whilst serving in the army in West Malaysia, mainly in the southern state of Johor, from 1965 to 1967, on more than one occasion I saw papilionids feeding on bare rock, in full sunlight, where there were some patches of moisture. They were presumably obtaining minerals which were leaking out of the rock. There did not seem to be sufficient moisture on the rock for some of the butterflies and from time to time an individual would raise itself high on its legs, draw the abdomen forward between the legs and squirt a jet of liquid from the tip of the abdomen onto the spot where it had been applying its proboscis and then continue feeding. On one occasion there was about twenty butterflies consisting of several species of *Graphium* and at least half of them were acting in this way.

On another occasion I was sitting down on a path in the jungle at mid-day and in partial shade when a male nymphalid, *Vindula dejone erotella* Butler landed on my bare left arm and acted in the same manner. At such close range I could plainly see the jet of clear fluid squirt from the tip of the abdomen.

D. Hall-Smith, Lt.-Col. (Retd.) (4954)

New Humberside beetle record—Last year, in late April, I found several specimens of *Platyrrhinus resinosus* (Scop.) at Laceby, near Grimsby, S. Humberside. As I could find no record of the species being found in the county. A further expedition this year, on the 6th April, shows and was informed that this was the first recorded finding of the beetle in the country. A further expedition this year, on the 6th April, shows that the original colony has grown, and the beetles are now to be found in several other trees in the surrounding area.

J. Hunter (6860)

Diptera in flowerbeds—On the 4th April 1978 a gardening friend brought me three dipterous pupae. He told me that he had sown sweet peas in the garden and when they come up had covered them with wire as a protection against birds.

He lost the lot however, and on digging around where each plant had been, had found hundreds of these objects and could I tell him what they were.

On the 6th April I went round to this garden in the hopes of getting some more. I certainly saw hundreds that had been squashed, but did manage to unearth another 65.

These were placed on damp soil in a flower pot and enclosed in a cylinder with a muslin top, and placed in a sheltered spot in the garden.

Between the 10th and 24th April 51 specimens emerged, 33 male and 18 female of *Eristalis pertinax* (Scop.). On April 25th and 26th I had one on each day of *Helophilus pendulus* (L.).

Frank L. Hatcher (1441)

Grease—I have observed that moths killed by ethyl acetate in a Robinson trap and then kept dry for several years in tubes without naphthalene sometimes go greasy. Whilst not proving the falsity of Mr. MacFadyen's suggestion (*Bull. amat. Ent. Soc.*, **38**: 106-7), this would indicate that neither naphthalene nor pinning is necessary for greasing to occur. I do not know the cause, but suggest that the drying out of retaining membranes may make them more permeable, leading to the release of lipids after death. The amount of lipid available, and so the extent of greasing, will depend on the state of the fat stores of the insect before death, as well as more basic factors such as sex and species (I have known Tortricidae to be affected, so body size is probably unimportant). This would account for the observation that not all members of an apparently identical series are always affected. Finally, I suggest that warmth may aggravate the condition, since it would make the lipids more fluid, and therefore more likely to seep out of the insect.

P. J. Johnson (5828)

Whites by the Hundreds—On a warm sunny afternoon last August 1979, I went for a walk round Moddershall, Staffordshire, a few miles from my home. I was walking on the outskirts of a wood and I saw Wall Browns and Small Coppers basking in the sun. As I walked on I came into open fields and I saw Large Whites and also Small Whites in great numbers. As I looked across the fields to my surprise it looked as if a white cloud had settled on the fields as the butterflies flew up and down over hedgerows. I watched for about twenty minutes then moved on. There must have been hundreds of them. There were more whites in my garden too. I wonder if other members saw anything like it in their areas. I would be interested to know.

Jan Koryszka (6089)

Colorado beetle-mania—A recent editorial in the Proceedings of the Royal Microscopical Society stated that "It is normal for scientists to present their views through the pages of learned journals" (as opposed to dissemination in the popular press, that is). The context of the Royal Microscopical Society's protest had nothing to do with Entomology, but we do think they have a point for exactly the same state of affairs appears to exist as regards the reporting of the Colorado beetle.

Time after time when specimens are found in Great Britain there is a great hoo-ha in the media, both Television and the National and Local press, and a great silence from the Entomological journals. Can it be that entomologists do not find these beetles but newsmen do? How many coleopterists amongst us actually have a British caught *Leptinotarsa decemlineata* say in their collections? Why are the popular press reports so vague, wooly and misleading? Where exactly for instance were the beetles found, what was their sex ratio and why above all were they inhabiting such an unlikely foodplant as spinach on which they are alleged to have been imported. What too are the total numbers found? An interesting quote on this in one national daily states that "60 have been found . . . 54 of them nesting in a single batch of spinach . . . 29 in various parts of the country . . . a further 25" Such have been the popular reports in early May of this year. Could perhaps a coleopterist member let us have a more accurate rendering of this latest infestation.—Editor.

Saruman's change of venue—This well-known firm has moved yet again. This time to St. Mary's House, Bramber, which is an historic listed house in its own right. The Butterfly Museum is to be housed in the Burgess Hall adjoining and both will be open to the public. Fuller details of the move were given in the Evening Argus of 21st February last and we thank our member Mr. P. K. Atkinson (5566) for forwarding a copy to us.

Early Scottish Common Heath moths—I should like to note that on the 10th April, 1980 I observed two Common Heath moths, *Ematurga atomaria* (L.), at Bonally, in the Pentland Hills, near Edinburgh. These insects would normally be most unremarkable, but this date appears to be unusually early. South (*Moths of the British Isles*, Vol. 2, p. 312) gives the months of flight for this species as May and June, with a further appearance in August. It looks as if, after our comparatively mild winter, the entomological season may be significantly early, certainly when compared with last year.

Andrew D. Liston (6983)

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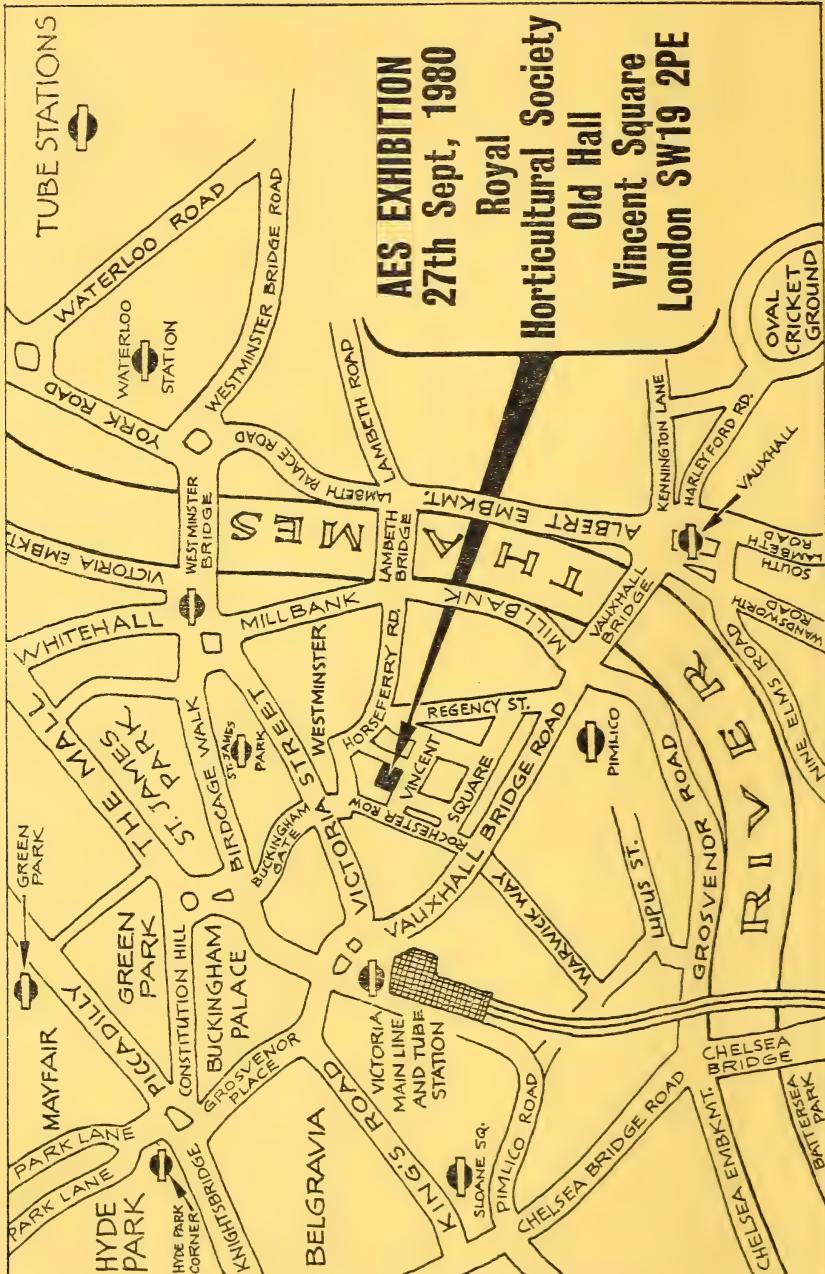
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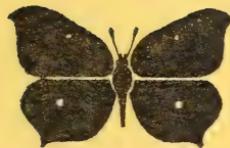
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VOL. 39 NO. 328



AUGUST 1980

THE
BULLETIN OF
THE AMATEUR
ENTOMOLOGISTS'
SOCIETY



WORLD LIST ABBREVIATION:

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EDITOR:
BRIAN GARDINER FLS FRES

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(Founded in 1935)

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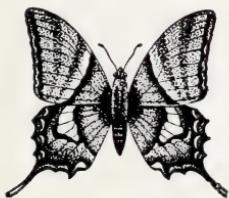
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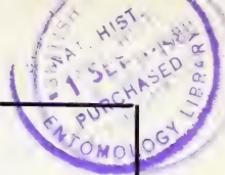
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REPORT OF COUNCIL FOR 1979

This report brings to a close another decade in the life of the Society. The last ten years have seen 4 Secretaries, 5 Treasurers, 3 General and 4 Bulletin Editors, and 3 Exhibition Secretaries. Only the Advertising Secretary post, so ably filled by Mr. Hilliard since 1957, has survived the decade unscathed. Thirty-six members have, from time to time, served on Council and 16 are still "in post". On 31st December 1969 membership number 4503 was issued. Ten years later, member No. 6952 was enrolled. Any Society can be justly proud of enrolling 2449 new members in ten years. Membership turnover is, however, high, especially amongst the junior members. On 31st December 1979 the Society had 1738 members comprising 8 Honorary, 16 Life, 37 Affiliate, 344 Junior and 1333 Ordinary members. During the year we enrolled 327 new and re-instated 6 members, but lost 239 through non-payment of subscription, resignation or death. This represents a net gain of 88 over the year.

Two significant changes occurred in the administration: Mr. N. Cooke moved to Scotland, and had therefore to resign his post as Hon. Treasurer, after seven years in office. His place was taken by Mr. R. Fry. Our Registrar, Mrs. Keen, resigned in October in order to take on full time employment. Mrs. Keen was our first Registrar, and efficiently tackled the problems of re-arranging the Society's administration. Mrs. W. Fry has now taken over as Registrar. To Nicholas Cooke and Wendy Keen the Council extends its sincere thanks for all the work they have done for the Society, and wishes them every success in the future. Four issues of the Bulletin were published in 1979 under the Editorship of Mr. B. O. C. Gardiner, containing 196 pages of text. The "Dipterists Handbook" was published early in the year—representing the Society's most ambitious publication to date: 255 pages of text written by well-known authorities on the Diptera, and edited by Alan Stubbs and Peter Chandler. A 12-page supplement to the 1978 Membership list was also published in November.

Council met on six occasions during the year, and the AGM was held at a new venue, the rooms of the Royal Entomological Society. This meeting was presided over by Mr. Taylor, and Mr. P. Mitchell gave a talk entitled "Insects in Camera", which featured many excellent colour slides and a cine film of Silk moths. The Annual Exhibition also moved, this time to the "Palm Court" of the Alexandra Palace, a spacious, if somewhat cavernous, venue. Unfortunately, building work precludes

our use of this hall next year, and the Old Hall of the Royal Horticultural Society has been secured.

The three study groups continue to function, and their reports appear elsewhere. Council decided to wind up the Conservation Group as from 31st December 1979, and form a new standing Committee to co-ordinate the Society's policy on insect and habitat conservation.

Dr. I. Watkinson retired from Council in 1979 and Mr. Shearer handed over responsibility for the Wants & Exchange list to Mr. Painter. Council records, with much regret, the death of Baron C. G. M. de Worms (No. 260), a member for forty years, and a former Trustee of the Society.

Paul Sokoloff,
Hon. General Secretary

REPORT OF THE TREASURER FOR 1979

In my first annual report, I am pleased to be able to record that the Society's finances were restored to a reasonably sound basis in the year ended 31st December 1979 as a result of the policies initiated by the previous Treasurer. The Income and Expenditure Account produced a surplus of £893, which has restored the General Fund reserves to £3015. The Publications Trading Account recorded a surplus of £2355 due to a significant increase in sales, and the generous assistance of the Royal Society and the Nature Conservancy Council in supporting the most ambitious printing schedule the Society has ever undertaken. The Publications Fund reserves now stand at £9697, represented largely by stocks of publications, but with sufficient liquid assets to support a number of new publications which are being planned.

Looking at the Income and Expenditure Account in a little more detail, although subscription income rose significantly, the surplus was also heavily dependent on such items as increased income from the Annual Exhibition and enrolment fees, and also on members' individual donations. The effects of inflation were also significant although they are not all immediately evident because of differences between 1978 and 1979. For example, although the cost of printing the Bulletin rose only slightly, the actual increase was over 10% when account is taken of the reduced number of pages in the 1979 issues. Similarly, although despatch costs were down, this was also due to the reduction in pagination and the fact that a complete membership list was issued to all members in 1978. On the administrative side costs were up significantly, due mainly to the fact that this was the first full year in which the Registrar's fees have had to be met. An additional factor was the increase in accommodation and travelling expenses associated with the Annual General and Council meetings. Hopefully, travelling expenses will be somewhat reduced in the current year due to the appointment of members who live nearer to London.

The Publications Trading Account for 1979 reflects once again the dramatic financial impact brought about by the publication of a new handbook—the Dipterist's Handbook—which accounted for almost half the total publications income. Overall the sales of handbooks contributed over £4000 out of a gross sales turnover of £4512.

Looking towards the future, the major financial problems will undoubtedly arise from the costs of printing and despatching Bulletins and membership lists, which accounted for almost two-thirds of the General Fund income last year. I sincerely hope that subscription rates can be held at their present level for another year, but with inflation at its current rate this will very much depend on the number of subscriptions taken out, and on income from other sources.

Finally I should like to record my appreciation for the voluntary assistance given by the Assistant Treasurer, Mr. Stallwood, in dealing with subscription renewals, and also to Messrs. Watson and Pickles for taking on the task of auditing the Society's accounts.

R. A. Fry,
Honorary Treasurer

REPORT OF THE J.C.C.B.I. REPRESENTATIVE

The only meeting which I could attend was moved to a new date. The letter informing me of this was never received and so I was unable to attend the meeting which was held on 6th March 1980.

Some progress has been made with the Countryside Bill in suggesting a more rational approach to protected species. Unfortunately these are only suggestions and opinions differ widely between the J.C.C.B.I. and the Department of the Environment.

The Council for Nature was wound up at the end of 1979 but a wildlife link committee is to be formed from organisations concerned with Man's Effect on the Environment.

A survey of the status of the Glanville Fritillary (*Melitaea cinxia*) was carried out in 1979 and more surveys of other species are planned for 1980.

C. Hart

CONSERVATION GROUP REPORT

Membership and subscriptions

Membership of the Group remained disappointingly small during 1979 with only 38 subscribers. As usual there was a fairly high turnover of new and lapsed members.

Finance

The 1979 accounts showed a considerable increase in donations from members and, with the addition of bank interest, the income was £48.25. Routine expenditure amounted to about £59, and £30 of this represented re-usable items. A special expenditure of £73 on exhibition equipment,

now the property of the Society, wiped out the Group's balance and left a deficit of £34.35, this latter figure representing the Society's contribution for the year.

Committee meetings

The Group's Committee met in March and November and as usual discussed local conservation projects, field meetings and exhibition matters. Two special items were the proposed legislation on vulnerable and endangered insects and the new arrangements for conservation within the Society. Other items discussed included plans for an insect conservation poster and conservation handbook, the use of M.V. traps in an Open University course, Forestry Commission and local trust collecting permits and co-operation with other organisations.

Publications

Group Bulletins were produced in February and November 1979 and gave details as usual of local news and field meetings as well as more general items such as the winding up of the Council for Nature and reviews of books and leaflets.

AES Exhibition

The Group's exhibition stand was based on the theme "Small is Beautiful" and consisted of illustrated examples of the way in which insects' beauty, fascination and ecology exist at a small scale but nonetheless require the concern of conservationists. The use of the new exhibition equipment greatly enhanced the display.

Sites of interest and field meetings

Members of the Group continued to carry out local work, both as individuals and as members of other conservation bodies. At Walthamstow Marshes in London, our member Brian Wurzell was one of the leaders of an excellent local campaign which opposed plans to develop gravel workings in a site of great ecological value and interest to naturalists. Since the end of 1979 the news has come of the campaign's well deserved success. We also noted the successful opposition of drainage plans at Amberley Wild Brooks in Sussex, while the energies of Peter Cribb have again warded off ecological damaging plans for the management of Ditchling Common. In Wales, the response of the Nature Conservancy Council to the published account of the interest of and threats to a valuable site has led to possible plans for habitat protection; a credit to a younger member, Matthew Gandy, who wrote the account for our Bulletin. On the Surrey/Hampshire border the continued efforts of David Keen have helped in the planning of projects designed to minimise any ecologically harmful effects of the restoration of the Basingstoke Canal.

Four field meetings were held during 1979 and proved to be of great interest to those who attended them. The sites were Perivale Wood Local

Nature Reserve in Middlesex, Noar Hill Nature Reserve and Odiham Common in Hampshire and the Basingstoke Canal on the Surrey/Hampshire border. The meeting at Odiham Common was the best ever attended Group field meeting.

New arrangements for conservation within the AES

For many years, efforts have continued to bring conservation more within the central interests of the amateur entomologist, but it was felt that the existence of a small Group with limited status did not favour this aim. Eventually it was decided that, from 1st January 1980, the Group should be replaced by a direct involvement of the AES in conservation. All the Group's activities will continue, including the publication of a bulletin which, under the name "Insect Conservation News", will be available to all AES members who wish to pay a subscription to it. We hope that, through the activities of the newly ratified AES Conservation Committee, of the AES representative on the J.C.C.B.I. and of the newly appointed "Habitat Conservation Officer" that the interests established by the old Group will not only continue but will become more widely appreciated.

David Lonsdale

REPORT OF THE EXOTIC ENTOMOLOGY GROUP FOR 1979

1979 closed with the EEG membership role the highest ever achieved—a total of 254, comprising 149 full members from the AES and 105 subscribers.

An annual meeting was held during 1979 on 16th June at St. Ivo school, St. Ives, Cambridgeshire, thanks to the efforts of Henry Berman and the kindness of the headmaster. We were well represented at the AES annual exhibition and were pleased with the extra space allocated to us, and our fine position inside the entrance ensured that we were the first stand that people came to. Our thanks to the organisers for that. This year we recruited 25 new members at the exhibition and were well supported by members with livestock exhibits.

The newsletter remains the focal point of the EEG and our thanks are due to Brian Morris for producing another four quality products. Material in the newsletter has ranged from the notification of a hybrid between the Spanish moon moth (*G. isabellae*) and the American moon moth (*A. luna*); notes on a new Phasmid from Thailand; details of structure and life history of the New Zealand funnel-web spider to the account of the successful breeding of the Death's head hawkmoth, *A. atropos* in captivity.

Financially 1979 was a difficult year, and it was with reluctance that we had to raise our subscription and membership rates for 1980 to £1.50 for AES members and £2 for subscribers.

C. J. Eschbacher

**THE AMATEUR ENTOMOLOGISTS' SOCIETY
INCOME AND EXPENDITURE ACCOUNT
for the year ended 31st December, 1979**

		EXPENDITURE		INCOME	
		1978	1979	1978	1979
		£	£	£	£
Bulletin Costs:					
58	Editorial	...	...	85	Subscriptions:
2281	Printing	...	...	2400	2394 Ordinary and Affiliate
947	Despatch	...	...	868	377 Junior
56	Indices	...	...	32	23 Life Membership Fund
		—	—	3385	... ...
					4358
Membership Services:					
522	Membership List	...	...	165	Other Income (net):
57	Wants/Exchange Lists	...	...	45	462 Donations
		—	—	210	26 Enrolment Fees
				
					475 157
Administration:					
188	Stationery and Notices	...	...	266	Investment Incomes (gross)
121	Postage and Carriage	...	...	140	169 Dividends etc.
170	Registrar's Fees	...	...	520	102 National Savings Interest
96	Meetings Expenses	...	...	243	16 Bank Deposit Interest
—	Study Groups Support	...	...	25	... ...
21	Depreciation	...	...	19	231 Advertising Revenue
32	Insurance	...	...	45	77 Annual Exhibition
116	Sundry Expenses	...	...	54	49 Badges and Tie Pins
		—	—	—
					3926
					566
4665	Conservation	...	...	1312	Excess Expenditure to
	Surplus Income (1979) to	...	...	34	
	General Fund	...	...	—
		—	—	—	
					—
4665		—	—	—	5834

BALANCE SHEET AS AT 31st DECEMBER, 1979

PUBLICATIONS FUND

1978 £	1979 £	Balance of Fund:	1978 £	1979 £	Balance of Fund:
6106		1st January, 1979 ...	7077		
795		Add: Trading Surplus for the year ...	2355		
176		National Savings Bank			
		Interest ...	265		
7077		Creditors ...			
962		Loan Repayable by 1982...			
			750		
8039				12314	
					8039

STUDY GROUPS FUND

1978 £	1979 £	Balance at 1st January 1979	1978 £	1979 £	Current Assets:
217		... Add Surplus Income for Year/Deficit ...	127		Debtors ...
(90)				Cash at Bank ...
			(30)		
127				154	
27		Creditors ...			
				
			97		
154			9		
				106	
13514					13514
					17909

1979 £	1978 £	Investments:	1979 £	1978 £	Investments:
2176		National Savings Bank	2440		Investment Account ...
		Investment Account			
		Current Assets:			
		Stocks at lower of cost or valuation			
		Sundry Debtors ...			
		Cash at Bank ...			
			7186		
			1558		
			934		
				531	
					9874
			12314		

PUBLICATIONS TRADING ACCOUNT
for the year ended 31st December, 1979

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 on 31st December, 1979 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. Wagoner Auditors

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

REPORT OF THE INSECT BEHAVIOUR AND ANT STUDY GROUP

At the start of 1979 the I.B.A.S.G. started with a membership of 15. It was a fairly good start but we did realise that the Group had to increase its membership but how was this going to be accomplished. We, of all the groups, for obvious reasons, have the smallest amount of money so we are limited in our activities. Our main advertising was to come later in the year. Through listening to my local radio station I found out that, free of charge, local groups could be advertised. I then wrote to Radio Medway and got myself a booking in one of their studios. Even though I did not hear the recording on the air someone must, as I did get quite a bit of response and a few members. This seems at the moment to be the most productive form of advertising at our disposal so I shall be going there again in 1980.

The group held its annual general field meeting at Bedgebury Pinetum. Though it did not have such a good response as I was expecting, with last minute cancellations, enough did turn up to hold it. I was hoping a larger number of AES members would come but the lack of interest was quite surprising. The weather was not all that was hoped for but quite a bit was learnt. I must add at this point that if any AES member is interested in attending any field meeting that is held by the I.B.A.S.G. then please write to the secretary M. M. Parsons.

For the first time in five years the I.B.A.S.G. had a table at the annual exhibition which was a great success. The Group's funds benefited by £6.75 and increased its membership by one.

In conclusion I must say that 1979 has been one of the best for some years. The Group will be holding another field meeting in 1980 which will be notified through the Wants and Exchange list.

M. M. Parsons

A NEW LAND FUND FOR WILDLIFE—A CONTRIBUTION TO THE WORLD CONSERVATION STRATEGY

Five nationally important sites, all rated of Grade I importance to nature conservation, have recently been purchased using loans from a new Land Fund set up by the Society for the Promotion of Nature Conservation. The Land Fund which has been established with a substantial loan of a £4 million from an anonymous charitable Trust, makes loans available primarily to the 42 county Nature Conservation Trusts which are associated with the Society to enable them to take the rapid action often needed when important sites come on to the market.

The establishment of the new Land Fund makes a significant contribution to the recently launched World Conservation Strategy which call on countries to adopt site preservation programmes to protect "representative samples of ecosystem types".

Of the five sites which have been purchased three are wetland areas

including parts of the Ouse Washes (Cambridgeshire), Upton Fen (Norfolk) and Tealham Moor (Somerset).

The Ouse Washes are the largest area of regularly flooded freshwater grazing marshland left in Britain. The Cambridgeshire and Isle of Ely Naturalists' Trust received £15,000 from the SPNC Land Fund towards 28.5 acres of Washes which means the Trust gains virtual control over the Common Wash, an internationally important feeding ground for Bewick swans, widgeons and pintails and a summer breeding ground for black-tailed godwits among many other species.

A £10,000 loan was made to the Norfolk Naturalists' Trust which enabled them to purchase Upton Fen, further grants also being obtained from the World Wildlife Fund, the Countryside Commission and the Norfolk County Council. The site contains the main British populations of the Holly-leaved Naiad (*Najas marina*) and other rare plants such as wintergreen. It has strong populations of swallowtail butterflies and probably represents the conditions which have been found in other Broads before the recent decline in the variety of flowers and associated fauna.

A further loan of £10,000 was made to the Somerset Trust for Nature Conservation to help them acquire a small but significant reserve on Tealham Moor in the internationally important wetlands of the Somerset Levels. Apart from land recently acquired by the RSPB and small parts of Shapwick Heath National Nature Reserve, no similar parts have nature reserve status.

Of the two other sites assisted by the SPNC's Land Fund one is a woodland and the other a limestone pavement. Collinpark Wood is typical of the damp lime woodland once widespread in western Britain and has been designated a Grade I site. It is a fine example of coppice with standard being predominantly small-leaved lime and sessile oak with a good sprinkling of wild service trees. It was to have been purchased by the Nature Conservancy Council (NCC) but lack of funds made this impossible. An SPNC Land Fund loan enabled the Gloucestershire Trust for Nature Conservation to ensure that this valuable site was not lost.

With the aid of the Land Fund the SPNC has bought, at short notice and at auction, 105 acres of limestone pavement and pasture at Souther-scale Scar, Yorkshire which has been described as one of the top three limestone pavement sites in England. This purchase is typical of the immediate aid which the fund can give when urgent action is needed to protect an area. The site has since attracted grants from the World Wildlife Fund, the Countryside Commission and the Yorkshire Dales National Park. It is expected that the Wildlife and Countryside Bill planned for introduction by the Government in the Autumn will give greater protection to these upland limestone areas.

The variety of places to which loans from the Land Fund have been

made in the last six months provides an indication of its importance to the furtherance of nature conservation which can only increase as pressures on wildlife increase.

ANDRICUS QUERCUSCALICIS—THE "KNOPPER GALL"

The phenomena of foreign species of animals and plants being introduced to an area previously outside their distribution range and subsequently establishing themselves is not new (witness the Grey Squirrel and the Sycamore tree in this country) and does not apply only to the higher forms of plants and animals. In this country now an insignificant little wasp, *Andricus quercuscalicis*, Burgsdorf (Hymenoptera, Cynipidae), with a complicated life-history is apparently extending its range each year after being added to the British list in 1961. In the West Midlands it has been recorded from Sutton Park and the Sandwell Valley in the last twelve months. In order that it may become better known, I feel that some account of its biology is worth giving.

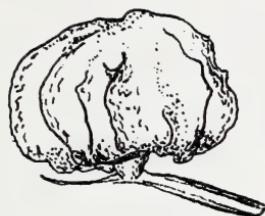
Life History

A. quercuscalicis belongs to the group of Cynipid wasps which cause galls to be formed on oak trees and is one of four in the group which gall acorns. In common with its relatives it has an agamic and a sexual generation appearing at different times of the year and producing different galls. The sexual generation develops in small, bud-like galls (Quinlan) formed on the catkins of the Turkey Oak, *Quercus cerris* in spring or early summer. The adults emerge, probably in late April or early May, and after pairing, the females lay eggs, presumably in the female flower heads of the English Oak, *Q. robur* or Durmast Oak, *Q. petraea*. The presence of the egg, or eggs, causes abnormal growth of the acorn tissue resulting in the cup being almost hidden in the folds of material (see figure), which forms irregular ridges all round the acorn. This gives the gall one of its common names of "ridged acorn gall", although it is also known as the "knopper gall". Normally the top of the gall is open and the larval chamber is formed from a small thin-walled inner gall at the base of the cavity. Only one larva is present in each gall although sometimes two or three galls are formed in the same acorn cup. When first formed they are bright green and slightly sticky and spongy but by mid-October they are brown and hard. They drop from the trees as normal acorns do and the following spring the agamic generation, consisting entirely of females emerges to lay eggs on *Q. cerris* and begin the whole process again. It may be that all or some of these females remain in the galls on the ground for more than one year as in two of the other acorn-galling species one spends at least two winters in the gall, the other between three and eight.

Distribution

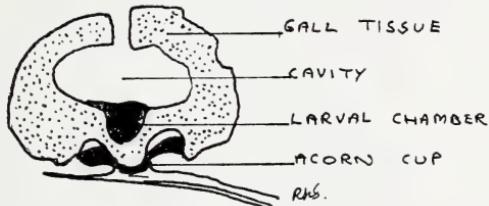
Eady and Quinlan (1963) added this species to the British list but I

ANDRICUS QUERCUSCALICIS 8



ACORN GALL.

(AFTER EADY AND QUINLAN)



CROSS SECTION

have in my possession specimens said to have been taken in Nottinghamshire in 1910. The donor described them as "very rare galls which had only been found in two places this century". It is now said to be "locally common in many southern counties". I have positive records from Nottinghamshire, Staffordshire, Warwickshire, West Gloucestershire and Oxfordshire (Vice-counties 56, 39, 38, 34 and 23 respectively). No doubt it is present in many other areas.

It is curious that in the list of British Hymenoptera the authors do not mention *A. cerris* Beverink, the name once given to the sexual generation, as a synonym of *A. quercuscalicis* as was their practice with other "doubly named" Cynipids having alternating generations, nor do they show it as a separate species. Unless the sexual generation is capable of spectacular migration each year it must surely be presumed that the presence of the agamic generation implies inter-alia the presence of the sexual generation.

It will be of great interest in future years to plot the spread *A. quercuscalicis*, assuming that it continues.

Ecology

Apart from being dependent upon the Oak tree, and having alternating generations the majority of gall-inducing Cynipids also share the characteristic of being subject in the larval stage to attacks by other parasitic wasps belonging to the Chalcidoidea. Askew (1961) notes many of the relationships thus formed although the subject species was not

mentioned as its presence was not then evident. The three factors principally governing a gall's parasitic complement are given as time of appearance, position on tree, and form. *A. quercuscalicis* appears at the same time as other galls but its position and form are unique. The other three species galling acorns all form internal galls, and no other hard galls assume a similar shape. The fact that the small inner gall is thin-walled and not very well protected from the top may mean, however, that some Chalcids could accidentally discover it, particularly as the gall cavity would seem to be ideal shelter for small invertebrates. The subject of host-selection is, though, a very complicated one and it is not appropriate to discuss it here. Not having examined any galls of the sexual generation I am unable to comment upon its possible attraction to other organisms.

It is unlikely that any effect will be apparent on the regenerative powers of affected trees in view of the enormous number of acorns produced in the lifetime of any one individual, although infestation can be very heavy.

One of *A. quercuscalicis'* closest relations, *A. kollari* was introduced to this country, in the nineteenth century, because it was useful as a source of tannic acid in the dyeing trade. It is now very common and widespread and also produces galls of alternate generations on *Q. cerris* and *Q. robur/petraea*. Its sexual generation gall is attacked by three species of Chalcids, all members of the genus *Mesopolobus*, whilst its agamic generation gall (known as the Marble gall) is attacked by twelve, of eight different genera, as well as providing food and shelter for four other Cynipid species.

Summary

There would seem to be an interesting field of study available with regard to the distribution, rate of spread, acquisition of parasites and other natural enemies, effect on Oak trees, etc., of this species. It also demonstrates that in an environment supposedly imposing increasing strains on wildlife, it is possible for new arrivals to thrive. As it is only the very prominent acorn galls which have brought this tiny creature to notice, it may well be that others are undergoing the same process completely unnoticed.

P. R. Shirley (5621)

[The above article first appears in "Sandnats" and is reprinted for a wider audience by permission of the author.—Editor.]

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THE NATIONAL PARK OF LES ECRINS, DAUPHINE AND THE MOUNTAINS OF LURE—1978

Following the successful venture to the Massif Central in 1977, I was encouraged to arrange a further French sortie for 1978 with a view to visiting once again the high mountains of the Dauphiné where I had been on several occasions with W. L. Coleridge and my late father, H. J. Cribb. Both Ron Dyson and Russell Bretherston were ready to join me and Dr. David Lonsdale and a friend agreed to make up the party. At the last moment the friend had to drop out and his place was taken by Darryl Stewart, an author of natural history books in Canada, who was visiting his country of birth for a few weeks. We made a rendezvous at Hanworth on Monday, 24th July, and drove down to Ramsgate for the 3 p.m. hovercraft to Calais. Our first stop was to be the home of Ron's friends who lived near the village of Fère en Tarde nois, about 180 miles south-east of Calais on the edge of the Champagne country. We had a hectic drive, slowed by numerous road diversions, to arrive at 11 p.m. at the large house situated beyond a small forest on a hillside, reached by a narrow road in the pitch dark. Supper was still waiting for us and we had a pleasant meal, getting to bed at 1 a.m. Next morning we were away about 9.30 and drove via Dormans and Troyes, stopping near Bar sur Seine for lunch. Just north of Dijon we stopped again and collected for the first time. This is part of the Plateau de Langres and in the grassy meadows by the road there were hundreds of Marbled White, *Melanargia galathea* L., amongst which were a few females of the form *leucomelas*. Other species seen included *Coenonympha arcania* L., *Mellicta athalia* Rott., *Colias australis* Vty., *Thymelicus actaeon* Rott. and *T. lineola* Ochs. The day was quite hot as we drove south via Seurre to camp for the night in a pleasant municipal site by the River Seille at Louhans. Large chub cruised in the shallows and I saw a kingfisher plunging after small fish by the weir. Next morning we broke camp early and after crawling through heavy traffic in Bourg en Bresse and Pont d'Ain we drove via Voiron to Grenoble. Here we diverted to the suburb of Domène, east of the town, to an area of marshland known to Russell and once the haunt of *Lycaena dispar* L. and *Maculinea teleius* Brgrstr. However, on reaching it we found it extensively drained and cultivated for market garden purposes. There were a few spent female *Colias crocea* Geoff. in the meadow area and a lot of *Polyommatus icarus* Rott. but little else. Things change from year to year and marsh habitats are fast disappearing everywhere and their butterflies with them. A storm threatened as we ate our lunch and we then drove back through Grenoble to take the mountain road towards La Grave. As we climbed it started to rain and this increased in intensity as we arrived at the village. The camp site is below the village on the edge of the River Romanche, a turbulent torrent of snow water, and is in a tree-dotted flat area where one camps "sauvage". Facilities are a

water supply and two toilets. In torrential rain we pitched the tent, getting soaked for our efforts, and ten minutes later the rain stopped, not to return for our stay in this delightful spot. The area is now a National Park and includes the whole of the Ecrins massif with the peak of La Meije dominating the scene above La Grave. The slopes all around abound with butterflies and flowers and most of the climbs are easy ones.

On the 27th the sun was brilliant as we started our first sortie, to climb the path leading up to the rocks and scree below the Meije glacier. The path winds across the meadows and then up a rock-strewn gully to the flowery alps just below the rock chaos under the glacier. The low meadows were alive with *Erebia euryale* Esp. and *Coenonympha iphis* Schiff. (=*glycerion* Bkh.). As I had previously taken these species here at the end of June, it was clear that the season was very late and subsequent finds indicated that we were at least two weeks too early for the late July species we had hoped to see. Along the path both *P. icarus* and *Lycaeides idas* L. were flying with a few *Cyaniris semiargus*. I took one or two *Aricia laloue* Geyer and two other blues, *Plebicula escheri* Hüb. and several male *Polyommatus eros* Ochs., the latter rather like a small Chakhill blue, *Lysandra coridon* Rott. Farther up we added *Agrodiatus damon* Schiff. of both sexes flying over Sanfoin, its foodplant. Ron netted one single *Parnassius apollo* L. and both Marbled Whites and Black-veined Whites, *Aporia crataegi* L. flew beside as we climbed. Fritillaries were represented by newly emerged *Mellicta parthenoides* Kef., *Clossiana titania* Esp., *C. euphrosyne* L., *Brenthis ino* Rott. and *Melitaea diamina* Lang. After about two hours steady climb we reached the higher alpine meadows where there were a few *Erebia cassioides* Howenwarth, *E. epiphron* Knoch. and a large *E. melampus* Fuessl. Higher up on the scree I took a single *E. pandrose* Bkh. and netted and identified two high altitude fritillaries, *Boloria pales* Schiff. and *B. napaea* Hffsgg. There were large clumps of *Geranium pratense* growing in the hollows and here were several specimens of the sooty blue, *Eumedonia eumedon* Esp., the geranium being its foodplant. I also caught a single male *Palaechrysophanus hippothoe* L., the purple-edged copper but the race here is without the purple suffusion from which it derives its name. At this altitude, around 7,000 ft. the small blue, *Cupido minimus* Fuessl. was common and I saw one or two *Maculinea arion* L. of the small dark mountain form. *C. iphis* was replaced by *C. gardetta* de Prun. (=*satyrion* Esp.). A few *Colias phicomene* Esp. raced across the slopes and there were both male and female *Pieris bryoniae* flying but these were past their best. On the path on damp patches we recorded both of the high mountain blues, *A. orbitulus* de Prun. and *A. glandon* de Prun. This is a favourite place for these two butterflies, especially as the sun reaches its zenith. Collecting at this altitude is tiring work but I scrambled up over the rocks to the

scree to see if the rock-frequenting Erebias, *E. pluto* de Prun. and *E. gorge* Hübn. were yet out but none was flying despite the hot sun and I assumed that we were too early. After lunch the group made its way down towards the valley and David and I crossed over on a log bridge which spanned the gorge leading down from the glacier and entered the larch woods which lie below the Lac du Puy. On previous visits I had found the delicate blue butterfly, *Aricia donzeli* BdV. (= *nicias* Meig.) here, flying under the larches where there were clumps of geranium. Like *E. eumedon* this butterfly lays its eggs on the geranium flower heads. We found it still there and in perfect condition, a further indication of the late season. David found the woodland more prolific in beetles than the open slopes had been, taking mainly Cerambycids and *Cetonia* spp. On the rocky areas several *Lasiommata maera* L. were sunning themselves in the last of the day's sunshine. During the day we had recorded 43 species of butterfly including such unlikely congeners as the Silverspotted skipper, *Hesperia comma* L. and the Chequered skipper, *Carterocephalus palaemon* Pall., butterflies separated by months in Britain. The passage from the bottom of the valley at about 4,000 ft. to the screes is like the progression through the season from summer to early spring, where the Orange tip, *Anthocharis cardamines* L. was just freshly emerged. In the evening we wandered up to the village where much had changed since my last visit. The Hotel de la Meije of happy memories had been demolished and replaced by flats and a new cable car telerifique rises from just below the village to the peaks adjacent to the Lac du Puy to which I had climbed on my last visit. Shops abound, catering for a large tourist movement through the village to the passes above. The camp site had expanded all along the north bank of the Romanche and no camping is now allowed across the river in the park.

Friday, the 28th promised to be as hot as the previous day and we drove up the pass via the Col du Lautaret to the valleys below the Galibier. Here at 8,000 ft. the snow lay thick along the roadside and in the little valley where I had taken *E. cynthia* Schiff. and *E. aurinia debilis* Obth. in earlier years there lay a carpet of deep snow. The slopes were clear and masses of gentians were coming into flower. However the only butterfly on the wing here was the fast flying pierid, *Pontia callidice*, which was quartering the slopes. These were freshly emerged and extremely difficult to net, seldom settling. As it was obvious that little else would be seen here, we drove back down to just above the Lautaret to collect below the roadside. Quite a few *Euchloe ausonia simplonia* BdV. were coming up the slopes and a few *Parnassius mnemosyne* L. females which had passed their best. One subsequently laid four eggs for me. At a trickle by the roadside there was a swarm of blues drinking, the majority being *A. glandon* and *A. orbitulus* with



Photo 1. In the Mountains of Lure: Darryl Stewart, David Lonsdale, Russell Bretherton and Peter Cribb. Lunch in fine weather.



Photo 2. Ron Dyson and Russell Bretherton recovering after the storm at La Grave.

a few *A. allous* and *C. semiargus*. The Erebiæ *E. meolans* and *E. alberganus ceto* Hübn. flew among the grasses, the latter all spent females. *C. gardetta* was common and I netted a few *E. aurinia debilis* which were settling on a bare patch left by the receding snow. After lunch we went down to the Col and collected on the north-facing slopes which were thick with a carpet of *Vaccinium* spp. This area is the haunt of *Colias palaeno* L. and the blue, *Vacciniina optilete* Knoch, both of which feed on the leaves of *Vaccinium* when larvae. Only a few freshly emerged specimens were observed and these were accompanied by a few erratically flying *B. pales*. The Erebiæ were represented by a few *E. cassioides*, *E. euryale* and *E. epiphron* and large numbers of *E. pharte*. I also took two newly emerged *E. pandrose*. In a rocky gully by a torrent Russell discovered a few *Oeneis glacialis* Moll (= *aello* Hübn.) which were settling on the rocks and then skipping off to make a circuit before returning to the rocks again. When settled they act like the Grayling, *Eumenis semele* L., dropping over sideways to mask the shadow. The terrain was very difficult and we managed to take only one or two specimens. It had been another hard day in the field and we were glad to drive down to the camp at 5.30 to bathe our feet in the river and have our cooked evening meal.

The next day dawned as hot as ever and we collected individually on the slopes above the camp. I climbed up across the meadows where *Fabriciana niobe* L., *Mesoacidalia aglaia* L. and *C. titania* were flying and scrambled up a scree where I spotted some large dark *Erebia* flying. Eventually I was able to catch one and it turned out to be *E. montana* de Prun. (= *goante* Esp.), a species I had only taken previously on the Simplon. I then climbed up above the scree to upland meadows where *P. eros* Ochs. was very common and a few *C. phicomone* were flying. Soon I was joined by Russell and Ron who had come up an easier track. These meadows are very attractive and were alive with butterflies despite the late season. *E. cassioides* was now quite plentiful, probably emerging each day, and there were a few *E. epiphron*. After mid-day I came down by the way I ascended but the *E. montana* were no longer active in the heat of the day. I did record one *Hyponephele lycaon* Kuehn, a butterfly which replaces *M. jurtina* at these altitudes. In the afternoon sunshine I walked with Ron along the path beside the Romanche to show him the area where *P. apollo* breeds but none was yet on the wing. We found an adder just killed by a passing vehicle and a small colony of *A. nicias* in a clearing among the larches. Several *Heodes virgaureae* L., the Scarce copper, flew along the path and one or two male *Satyrus ferula* were sitting on the rocks above the path. These large black butterflies look like huge Ringlets, *Aphantopus hyperantus* L.

During the afternoon David had found some larvae of *E. ausonia* feeding on *Biscutella* sp. growing on the edge of a gully above the camp.

An evening shower had damped the meadows as he and I went up to see if we could find any more. As we came over a ridge we could hear marmots calling and were able to watch them scampering down the slope to their burrows. They are large furry animals, about the size of a badger, and their piercing whistle of warning rang around the mountains. Lower down I did find a lot more of the larvae feeding on a cabbage-like crucifer.

Sunday, the 30th, was the day for leaving La Grave and we broke camp and drove up to make a final exploration of the area around the Col du Lautaret. The same species as we had seen previously were on the wing at the top of the pass but when we started to descend on the road to Briancon we came on an area of limestone near one of the old road tunnels. I spotted an Apollo flying beside the road so we stopped. We found the slopes above and below the road alive with *P. apollo*, all males and newly emerged. There were one or two *P. mnemosyne* females and both sexes of *C. phicomone*. A storm was now forming over the Galibier so we drove on into torrential rain which followed us through Briancon and on down the Durance valley. Russell knew of a hidden valley near the village of Roche de Rame. The road rose at a very steep angle up the face of the cliff for about two miles, about 1 in 8, and the van crawled up in bottom gear. At the top we passed through a hamlet called Pallon and off the road to the village of Freissinieres we found the valley which lay between a rushing river and a clear gentle stream in which Grayling were swimming. By the river was a pine wood and here there were several groups camping. We drove in, disturbing a cloud of blues on the damp path, only to be informed that one needed permission from the local Maire. After some discussion it was agreed that we might make a brief stay and with the sun now shining once again we made camp. That evening we ran our M.V. cold light over a sheet and in addition to attracting a large number of Geometridae we had an audience of French campers who were quite intrigued at what was going on.

The next morning the sun was as hot as ever and we went out to explore the slopes on the north side of the valley. Much of this was covered with grass and scrubby bushes but farther up was a gully of rocky scree and I made for this. The slopes were alive with butterflies and during the day we recorded a total of 54 species. The first discovery I made was that both *S. ferula* and *S. actaea* were present, the latter being about one-third smaller but otherwise very similar in markings. An *Erebia* was also skipping over the scree and I at first thought it was *E. aethiops* L. but the habitat seemed wrong and my second guess that it was *E. neoridas* Bd., a new species for me, was correct. It was quite common but all were males. Four or five species of *Pyrgus* were present and the blues included *P. escheri*, *P. dorylas* Schiff., and *Meleageria daphnis* Schiff. Ron took a fine female of this last species, it being of

the blue form. On some plants of *Gentiana cruciata* I found a spattering of the eggs of *Maculinea alcon* L. which appeared to have been laid quite recently but I did not see the butterfly. *P. apollo* was flying everywhere and I was able to take a few females which had the copulatory sack on their abdomens, indicating that they were mated, and these laid me a lot of eggs later. I saw one specimen of the Southern Swallowtail, *P. alexanor* Esp., as it settled on the wild lavender but was unable to reach it before it sailed off down the slope. In the gully where there were some bushes of *Prunus mahabel* I found *A. crataegi* laying eggs and a search disclosed eggs on almost every bush. *H. lycaon* was common but there were a few specimens of *M. jurtina* flying with them and both *L. maera* and *L. megera* L. Farther on the valley passed into a pinewood and here were both *E. ligea* L. and *E. meolans* and a few *E. euryale*. Russell took a very worn specimen of *Limenitis populi* L. which was flying by the poplars nearer the river and I took one *L. reducta* along the woodland glade. One of the wood whites I netted turned out to be *Leptidea duponcheli* Stdgr., the summer brood, but the remainder were *L. sinapis*. The Marbled White was common everywhere but among them Ron took a single specimen of *M. russiae* Esp., a species we had taken commonly on the Causse Noir in 1977. All the big fritillaries were present, *M. aglaia*, *A. paphia*, *F. adippe* and *F. niobe*, the last named including several of the silver-spotted form as well as the more common *f. eris* which lacks the silver. Just emerging were *Mellicta parthenoides* and *M. athalia* while on the slopes there were several female *Melitaea didyma* laying eggs. The form here was quite variable, many having very dark upper wings. I found a pupa which subsequently produced a male so the emergence period is quite long. This valley was certainly well worth the long climb up to it and we were reluctant to return to the camp for our evening meal. Even then the damp patches by the stream were thick with blues, skippers and a few others. The commonest blue was *Lysandra coridon*, all being males. The commonest of the skippers was *H. comma*. A net would have covered several dozen at a time. For water we used the stream which seemed quite unpolluted which was more than could be said of the river – the camp privy consisted of a platform out over the stream with a post to hold on to for support.

The next morning we had decided to spend on the slopes again but clouds coming up over Les Ecrins meant that little was on the wing and by mid-day we had returned and packed camp to leave for our last collecting area, the Mountains of Lure which lie to the south-west of Sisteron. We drove into heavy rain near Embrun, stopping for lunch by the vast man-made lake of Serre Ponçon. Some years ago when staying in Barcelonette with my father we had driven to the edge of this lake while it was still forming. The road then disappeared into the lake out of whose waters the tops of trees were still showing. Now there was a

big car park by the lake where we lunched. Seagulls hovered over the waters and there were a few Gatekeepers, *Pyronia tithonus* L., skipping about among the bushes. By the time we reached Sisteron the sun had returned and we stopped to make phone calls home before driving south turning off the N.75 onto the D.946. Beyond the village of Valbelle les Escoffiers we stopped to collect by the road in some lavender fields which were in full flower. Butterflies swarmed here on the blossoms, *Iphiclides podalirius* L., *Papilio machaon* L., all the large fritillaries, dozens of *C. australis* and a few *C. crocea*, blues, skippers and *Zygaena* spp. A new blue was the brown *Agrodiaetus ripartii* Freyer which has a white stripe on the underside like *A. damon* but not so well defined. On the edge of the rough slopes by the fields I disturbed a Grayling-like butterfly which turned out to be *Arethusana arethusa* Schiff. and later found several more. Here we saw our first *Gonepteryx cleopatra* L. flying with *G. rhamni*, both freshly emerged. A further addition to the score was *Quercusia quercus* L. which was flying round some stunted oaks above a rocky stream below the fields and there were a few worn *Nordmannia ilicis* on the lavender. We wandered about the fields, which also swarmed with honey bees, for a while and then drove on into the Foret de Jabron where was found a flattish area among the pines and just off the road where we were able to pitch our tent. Later that evening after our meal we set up the MV light and were treated to a vast invasion of moths, mostly Geometridae, some of which were huge. A solitary Pine hawk, *H. pinastri* L., thudded onto the sheet and Russell boxed a few interesting noctuids. The night was very dark and warm and ideal for moths. Here the stars seemed larger and brighter than one ever sees them in London and earlier we had been treated to a marvellous sunset. David set some tin can beetle traps around the tent and in the morning his three tins produced over two dozen large Carabidae as well as many smaller ground beetles.

On the morning of the 2nd August we broke camp and drove up the narrow winding road through vast forests to the summit of the Montagne de Lure. All along the road we saw butterflies already on the wing and reached the summit in sunshine but with a cold wind blowing. We found this area one of limestone pavement and scree with grass growing in the crevices but otherwise bare. This is the haunt of a localised Erebia, *E. scipio* Bois, which we had hoped to find. We had not been here very long before David and Darryl were approached by a man who had arrived in an estate van. He turned out to be a forest ranger who informed them that the collecting of butterflies was not permitted. It appeared that there was a three month old edict from the headquarters at Digne which prohibited the collecting of butterflies on the mountain. As there were no notices nor did the ranger indicate what area was restricted we felt somewhat aggrieved. I was unaware of what had happened as by then I was up on the scree near the summit. There were

large numbers of *E. meolans* flying and I netted each specimen I could catch up with in the wind until I eventually found a male *E. scipio*. By this process I eventually took four males and it was obvious that we were again too early as the insect was only just emerging. The area is so vast that it seemed quite pointless to prohibit collecting here and our experiences later on our journey indicated that the whole area is thick with butterflies, while collecting is limited for practical reasons to the road verges and slopes above the roadway. Other species seen here were *E. semele* and *Aglais urticae* L. with one *Cynthia cardui* L. which settled on a lone thistle. We returned to the van after about an hour to hear the news and decided to move down the road and collect in the forest. Here at every stop we saw butterflies everywhere. Both *E. ligea* and *E. euryale*, most of the fritillaries seen elsewhere, the large satyrs *Hipparchia alcyone* Schiff. and *H. fagi* Scop. with *Brintesia circe* Fab., which has a propensity to sit on tree trunks, rushing out to inspect the passer-by. *H. lycaon* was common on the road itself and several large tortoiseshells, *N. polychloros* L. fed on the heads of the Hemp Agrimony which grew in clumps interspersed with dwarf elder thickets. The flowers of the last named had a lot of *Strangalia* sp. and *Cetonia* sp. beetles on them and a few of the Bee beetle, *Trichius zonaria*, which burrow right into the flower heads. Darryl took a specimen of the Queen of Spain, *Issoria lathonia* L., during the morning and I took *Brenthis daphne* L., a fritillary which is like a large *B. ino*, a species we had taken at La Grave. Surfeited with this entomological feast we returned to our camp site of the night before and once again put up the tent and spent the rest of the evening sunshine lower down the road in the lavender fields.

The next day was to see the start of our return northwards and as we packed our equipment a storm broke over the peaks and we drove away via Sisteron in a rain storm. We had decided to return via the Col de la Croix Haute and reached there about mid-day. We spent an hour collecting on the slopes above the pass in the meadows which had not yet been cut for hay. *Erebia aethiops* was quite common, flying with worn females of *E. ceto* and I took some freshly emerged males of *H. virgaureae*. Darryl had his usual luck and took two specimens of *M. alcon*. The only gentian present which I could find was *G. lutea*. We then pressed on north back through Grenoble to camp the night by the river Ain at Pont d'Ain at the municipal camp site. We were able to have a dip in the river but found it very cold. Our next day was spent in travelling, our route being out towards the Jura via Orgelet and Clairvaux le Lac. Near Sellieries the forest stretches for miles on each side of the road—dense and mostly secondary growth. We stopped once or twice to examine the fauna and saw *L. camilla* L. in the Bois d'Aval, flying along the edge of the forest. Suddenly a much larger butterfly dropped down to circle behind a sallow—it was a female *Apatura iris* L. Darryl had gone down a ride into the wood and returned to report

seeing two female *iris* and one male. He also took our sole example of *Araschnia levana* L. which was flying over some roadside nettles. In the forest there were a number of shallow lakes and one suspected that any clearings in these woodlands would be of considerable interest. However we had to move on through Langres to camp in a small site at Humes where the camp is situated between two streams in which one could watch the trout. Fishing was unfortunately prohibited.

On Saturday, 5th August, we left camp before 8 a.m. and passed by the other Clairvaux, of monastic fame, to stop near the town of Bar sur Aube. Previously I had found the meadows near the town rich in insects but we found them now all ploughed and thick with barley. However just beyond the town there was a bank and hillside where we found *E. aethiops* and some *L. coridon* flying. Our target for that evening was the village of our first night in France, Fère en Tardenois, where we were to stop with another friend of Ron's. Our drive took us through the Champagne vineyards of the Marne valley, where the grapes stretch for miles on both sides of the river. Near Dormans we stopped to collect on some rough slopes where there were a lot of *L. coridon* and the burnet moth, *Z. carniolica*, and then on to the house of M. Canard, the local miller, where we spent an evening with his family and friends and sampled the local mead. It was raining next morning when we left to drive through the village of Pierrefonds with its fine castle and into the Forest of Retz. Here we had some fitful sunshine and were able to observe *A. iris* again at a brief stop before driving on towards Calais. Beyond St. Omer we found a camp site, off the road some distance, at Balinghem. The sun shone and we spent our last evening on French soil finishing off the wine and much of the food, ready for an early departure on the Monday morning by Hoverlloyd to Ramsgate. Our total journey to home was 1,609 miles; the cost per head including food, wine, petrol, camp fees, ferry, insurances and servicing the vehicle before the trip amounted to £80 per head, petrol at nearly £1.50 per gallon being the heaviest item.

During the expedition we recorded 129 species of butterfly, either captured or positively identified, the Erebias, *E. scipio* and *E. neoridas*, being species not taken by me on any previous trips to Europe.

P. W. Cribb (2270)

BOOK REVIEWS

Animal Life on the Galapagos by Norman Hickin, pp. 236, illustrated, 8vo, paper-covered boards. Ferendune Books, Faringdon, 1980. Price £6.65.

The author of this book must surely be already known to all but the veriest tyro amongst entomologists. His interests are wide and clearly extend far beyond the bounds of pure entomology. This leads him to

produce an entertaining and useful book in his own inimitable style amply illustrated with his own drawings, originally done on scraper-board.

Ever since Darwin put the Galapagos Islands fairly and squarely on the scientific map there has been a steady stream of publications about them but rather less scientific research than there should have been. The recent Darwin centenary (which included some high-powered scientific visiting to the Islands) has not only revived interest but has now put them fairly and squarely on the tourist circuit as well. As the author points out in his final chapter, conditions are still somewhat primitive, quite unsuitable for the typical Costa del Sol-ite, but there are a number of cruising tours and private yachts for hire, which would seem to be the best way of seeing the islands. Fortunately the Ecuadorian authorities take a responsible attitude to their scientifically important and incomparable wild-life and the only essential (or allowed) equipment required by the tourist is a camera or sketch-pad.

Basically this book is a tourists guide to the wild-life of the Islands including those of air and sea. No assumptions of knowledge are made and there is much comparison of Galapagos forms with those occurring in the better-known localities of the United States and England. Perhaps it is not generally realised that fauna occurring on the Galapagos Islands is not some unique isolated exotic community but, and herein lies its interest, consists of distinct sub-species of common, mainland and cosmopolitan forms and what so aroused Darwin's reasoning, there are separate subspecies on the separate Islands making up the Galapagos archipelago.

Most of the illustrations consist of a single species filling a page and, since there are just over a hundred of these, over two-fifths of the pages are occupied by them and not text. It is a sad omission that absolutely no indication of scale or size is given, although this is erratically done so in the text. As an instance one of the largest illustrations is of the Galapagos blue butterfly which is illustrated as of larger size than the familiar Monarch butterfly but the text states "This minute butterfly . . ."

Although insects form but a tenth part of this book, it does contain much of natural history interest. We would suggest that future editions contain a good large-scale map of the Islands; that their areas be stated; that some account of their geology be given. In particular the lack of a map was found to be a grave disadvantage in the use of the book.

BOCG

Handbooks for the Identification of British Insects, Vol. X, Part 5(c).

SEPSIDAE by A. C. Pont. Royal Entomological Society of London, 1979. 35 pp. Paperback, 8vo. Price £2.80.

The Sepsidae are a small group of Acalypterate flies which generally have spherical heads, dark bodies with few hairs, and a "waisted"

abdomen giving them a somewhat ant-like appearance. However, the family also includes the genus *Orygma*, which are rather flattened, hairy, seashore flies, often included in the Coelopidae. Adults of the genus *Sepsis* are a common sight on sunny days, running about on vegetation, waving their wings in a characteristic way.

Adrian Pont's excellent handbook includes a useful summary of what is known of the life histories of Sepsid flies, and a fascinating section on their unusual adult behaviour. The morphology of the adults and immature stages is well described, and the handbook includes a checklist of the British species. A useful list of 39 references is included.

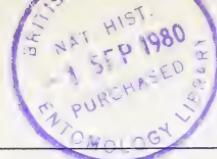
The key is perhaps unusual in that many of the couplets, even at early stages of the key, are very long, extending in some cases to six or more lines of text. The author has tried wherever possible to give a variety of characters for each couplet, which he has found to be the most satisfactory method of constructing keys for this family "where the species can be variable and some of the features are difficult to see or may even be liable to damage". At species level, the very detailed descriptions are most welcome while at earlier stages, the range of characters used in each decision results in one proceeding through the key with an unusual degree of confidence. The quality of illustration is high and the quantity can be judged by the fact that over 150 drawings have been used in the determination of a total of only 25 species.

Adrian Pont's new Sepsid handbook is a most welcome addition to the Royal Entomological Society's series.

Dennis Unwin

Advances in Insect Physiology. Vol. 14. Edited by J. E. Treherne, M. J. Berridge and V. B. Wigglesworth. Published 1979 by the Academic Press, London. 440 pp. with line drawings and black and white plates. Price £27.

I do not believe that a review of this series has previously appeared in the Bulletin although this is the fourteenth volume to appear. The reason is probably that the level of research and discussion is beyond the needs and capabilities of most of our members. However we do obviously have members whose studies are much more than superficial and reference to this series opens up a new world of interest in the insect kingdom. Much is heavy going but I found several sections worth reading and not too deep to obtain some knowledge of what was being considered. There are six papers in this volume and I can do little else but state what they are and leave the reader who wishes to know more to buy or borrow a copy. The first title is "Atmospheric water absorption in arthropods" by John Machin of Canada; then a paper by Franz Engelmann on "Insect Vitellogenin", a study of the nature and function of egg yolk protein in insects with details of those insects in which this substance has been identified. "The Physiology of Moulting in insects" is discussed by A. M. Jungreis, dealing with the function of hormones and enzymes in



this process and the physiology of the digestion and resorption of the cuticle. There is a complex paper on the morphology and electro-chemistry of insect muscle fibre membranes by T. Pick and K. Djie Njio of Holland which I found beyond me but the last two papers are fascinating reading. "Theories of pattern formation in insect neural development" by John Palka considers the development of clones of cells using transplants and "Scent glands of Heteroptera" explains the structure and function of scent secreting glands in the true bugs and is the work of Brian Staddon of University College, Cardiff. For the really keen type, why not look up the thirty-two other papers published in the first thirteen volumes!

PWC

JOHNSON REPRINTS

On page 178 of our last volume we drew attention to some interesting books reprinted by Paul Minet. We should now like to draw the attention of members to the extensive reprinting activities of an American firm, Johnson Reprint Corporation of New York who have not only reprinted some thousands of volumes, but also publish fine and facsimile editions, often in collaboration with other publishers, including our British Curwen Press. The quality of some of these facsimile editions is quite clearly reflected in their second-hand price when out of print and provides one of those curious quirks of fashion where the facsimile is now worth more than the original! We refer in fact to their "Birds of America" by J. J. Audubon, published eight years ago at \$5500 and now being offered second-hand at \$35,000. The original edition of 1830, of which several copies (or is it the same copy circulating?) have appeared at auction recently, has maintained a more or less static price of around \$24,000. Of the more luxurious works published there is a preponderance of those dealing with birds but of some interest to the Entomologist is Mark Catesby's "Natural History of Carolina, Florida and the Bahama Islands", of which the text and 220 monochrome illustrations of the original hand-coloured plates may be had for \$50. A folio of the plates in full colour is sold separately for \$575.

The Johnson Company cast their net wide. All types of books, from the earliest ever, the Gutenberg Bible, to those published only a few years ago have been reprinted and are often available either as paperbacks, or clothbound. There is a very high concentration of various reprinted runs of journals including the Zoological Record with the Insecta section available separately. The prices are very reasonable and in many cases are certainly cheaper, in terms of real money than the originals were when first published. The total number of reprinted entomological works forms in our opinion a very low percentage of the total. One of the reasons for this may well be that the total percentage of entomologists in the general population has in fact decreased over the past hundred and fifty years. The mid-nineteenth century for instance

was noted for the number of its entomologists. The hobby was open to all, rich men or poor men, whereas many other disciplines were open only to the rich or the academic. Consequently entomological publications were often produced in large quantity and at a modest price. There are therefore far more of them about today than there are those of many other subjects and it is not until the price of the second-hand article rises appreciably above the price at which it can be reproduced that reprinting becomes economic. Nevertheless I consider there are a number of entomological works long overdue for reprinting.

The following journals and books of entomological interest are at present available. Owing to the wildly fluctuating exchange rate it seems sensible to quote the prices in American dollars. Intending purchasers should, if the books are not available through their local booksellers (from whom it would be wise however to obtain a firm price quotation before ordering), write direct to Johnson Reprint Co. Ltd., 24-28 Oval Road, London NW1 7DX.

Bee World. The first 20 volumes at \$20 each.

Journal of Economic Entomology. Several of the early volumes published between 1908 - 1918 at \$35 each.

Entomological Society of Washington. Volumes 33 - 36 and 40 - 42 only at \$15 each.

Zoological Record. The Insecta section volumes 1 - 30 at \$22 each

Monograph of the British Phytophagous Hymenoptera by Cameron. Ray Society 1882 - 1893. 4 volumes \$77.

Comity of Spiders by Bristowe. Ray Society 1939. 2 volumes \$28.

British Spiders by Locket and Millidge. Ray Society 1951 - 1952. 2 volumes \$31.

The British Mosquitoes by Marshall. BM (NH) 1939. \$31.

Monograph of the beetles associated with stored products by Hinton. BM (NH) 1945. \$27.

Handbook of the Tsetse-flies by Austen. BM (NH) 1911 \$13.

Illustrations of African Blood-sucking flies by Austen. BM (NH) 1909. \$23.

Monograph of the Tsetse-flies by Austen. BM (NH) 1903. \$27.

Syrphidae of the Ethiopian region by Bezzi. BM (NH) 1915. \$13.

Catalogue of the specimens of Blattariae in the collection of the British Museum by Walker. BM (NH) 1868. \$19.50.

Synonomic catalogue of Homoptera by Distant. BM (NH) 1906. \$15.50.

List of the Coleoptera of Southern California by Fall. San Francisco 1901. [Bound with a handbook to the trees of California by Eastwood]. \$38.50.

The classification of Lepidopterous larvae by Fracker. Urbana 1915. \$12.50.

The larvae of the Coccinellidae by Gage. Urbana 1921. \$6.

New Mallophaga III by Kellogg. San Francisco 1899. \$31.

Termites and Termite Control by Kofoid. Berkeley 1934. \$38.50

British Tyroglyphidae by Michael. Ray Society 1901 - 1903 2 volumes \$69.50.

The head-capsule and mouth-parts of Diptera by Peterson. Urbana 1916. \$9.50.

The external morphology and postembryology of Noctuid larvae by Ripley. Urbana 1924. \$6.

Color and color-pattern mechanism of Tiger-beetles by Shelford. Urbana 1917. \$9.50.

The head-capsule of Coleoptera by Stickney. Urbana 1923. \$9.50.

Social life among the insects by Wheeler. New York 1923. \$23.

A classification of the larvae of the Tenthredinoidea by Yuasa. Urbana 1923. \$12.50.

A COMPARATIVE INVESTIGATION INTO THE SIZES OF GALLS PRODUCED BY NEUROTERUS LENTICULARIS AND NEUROTERUS NUMISMALIS

INTRODUCTION

The aim of the investigation was to examine the hypothesis that when more than one species of gall forming wasp (genus *Neuroterus* (*Cynipidae*)) oviposits on the same leaf, competition is observed and reflected in gall size.

The material for examination, oak leaves (*Quercus* spp.), was collected at various sites around Rhyd-y-Creuau in North Wales.

In order that a comparative investigation could be carried out three sets of leaves were sampled,

- a) leaves with only *N. lenticularis* (spangle galls).
- b) leaves with only *N. numismalis* (button galls).
- c) leaves with both types of galls.

Sampling of trees was at random from both vertical and horizontal points on all accessible branches, up to a height of 4.5 m.

The collected leaves were returned to the laboratory for measurement of gall size using a microscope with calibrated eyepiece (and a total of 1200 measurements was made). The aim of the measurement analysis was to obtain the mean (x) diameters of each type of gall when under either intraspecific or interspecific competition.

The means obtained were then used to calculate the variances (S^2) of each distribution. The variances were subsequently compared using a "t" test. In the results following all measurements are in mm.

RESULTS

Competition Type		<i>N. lenticularis</i>		<i>N. numismalis</i>	
		X	S^2	X	S^2
Intraspecific	...	4.35	0.49	2.65	0.125
Interspecific	...	4.03	0.55	2.58	0.154

Pooled variances were calculated using the following formula,

$$S^2 = \frac{Ex^2 - (Ex)^2}{n} + \frac{Ey^2 - (Ey)^2}{m}$$

		<i>N. lenticularis</i>	<i>N. numismalis</i>
Pooled variances	...	...	2.068 0.55
Variance of the difference of the two means	$S^2 (1 + 1)$ $\bar{m} \quad \bar{n}$	0.016	0.003
Standard error of the difference between the two means	$\sqrt{(S^2 (1 + 1))}$ $\bar{m} \quad \bar{n}$	0.127	0.056
Calculated "t" value	difference in means $\frac{\bar{x} - \bar{y}}{\text{std error diff.}}$ of means	5.18	2.50

It is evident that the calculated "t" value is greater than the tabulated value at infinite degree of freedom with respect to both types of galls. Therefore the results are significant at the 95% ($P=0.05$) level. There is a difference between the two sets of means and the null hypothesis applied in the "t" test has to be rejected. However the calculated "t" may not only be a result of a difference between the means, it may also be due to an unequal sample variance or both.

With a variance ratio test which is significant we can modify the "t" test thus:—

$$\frac{S^2 x}{n} + \frac{S^2 y}{m}$$

The standard error of the difference between the means is the square root of this value. The "t" value being calculated as before using "t" tables to test for significant.

	<i>N. lenticularis</i>	<i>N. numismalis</i>
Modified "t" test	5.11	2.48

Both these modified "t" tests are significant at the 95% level.

DISCUSSION

It is evident from statistical data that when the two species of galls are in interspecific competition, there is a reduction in their mean diameters. With *N. lenticularis* a 7.6% reduction in diameter is evident as opposed to only 2.9% with *N. numismalis*.

The comparison of these two types of gall may have a degree of bias due to the method not taking into account total volume, only diameter. The assumption is made that due to gall shape being round, any change in diameter will reflect quantitatively any general alteration in gall size.

One might expect species of the same genus to have developed to an evolutionary level by which interspecific competition was reduced or avoided. Previous work (Askew, 1958) demonstrated that an avoidance is evident with respect to the distribution pattern of galls vertically and horizontally on oak trees.

It may be suggested that by not avoiding competition with its reduction in gall size the species and the individual are subject to a deleterious factor. A follow up of interest may be to see if galls under interspecific competition produce wasps that are in some way at a disadvantage with respect to those that are only subject to intraspecific competition.

ACKNOWLEDGEMENTS

I would like to thank Mr. J. Bebbington for suggesting this topic for investigation and the Drapers field centre for the use of their facilities.

C. J. Atkinson (6029) A. V. Julian-Ottie (5536)

SOME ETHNOLOGICAL NOTES ON BUTTERFLIES OF THE GENERA HAMADRYAS AND MORPHO IN GUYANA

INTRODUCTION

The object of this paper is to bring together a number of field observations made by C. J. Farrell whilst on an expedition to Guyana, South America from May to June 1975, and to compare these with some previously published findings. The species observed were *Hamadryas feronia* (Linn.), *H. amphinome* (Linn.), *Morpho menelaus guyanensis* (Le Moult), *M. achilles* (Linn.) and *M. rhetenor* (Cram.). Most of the field study was carried out in the region of Dakara Creek in North-East Guayana, an area lying just east of the river Demerrara estuary where there is a fairly distinct division of jungle and savannah-land. The first of these observations describes some of the habits of *Hamadryas* (Nymphalidae), commonly known as "Click-butterflies" because of their ability to produce a loud clicking sound whilst in flight.

FIELD OBSERVATIONS

H. feronia and *H. emphinome* were commonly seen, and it was noted that the very audible clicks (which sounded like a rapid snapping of the fingers and could be heard up to 9 metres away), seemed to be caused by the wings of the butterflies when they were chasing other Rhopalocera. They were seen to adopt a characteristic attitude when at rest. Usually they would cling to the tree facing downwards, with their wings fully spread and slightly forward, pressed hard against the bark and with their abdomens raised at a slight angle, at a height varying between 3 to 10 metres.

By standing at the base of a tree occupied by a butterfly, and snapping the fingers or clicking one's tongue, it was observed that it would become agitated and restless, and shuffle on the spot, or would sometimes take to the air. If a resting butterfly saw another approaching, however, it would immediately fly to it and begin clicking as it investigated. The two butterflies would then spiral to the ground, remaining just above ground level for a few seconds, after which they would part and fly off to their own respective resting places. (Fig. 1). Usually they would return to the exact place where they had previously been resting, and always to the same tree. The instant before alighting, they would turn in the air to land facing head downwards.

Sometimes as many as three or four butterflies were seen together fighting (Barcant (1970) uses the term playing), and spiralling downwards in this manner. All would part before reaching the ground but if more than two individuals were involved in this behaviour, then sometimes there was an additional period of chasing away by one or two of the group.

Observing this "aggressive" behaviour of *H. feronia*, a lure was made by taping a dead specimen of *H. feronia* to a stick. This, when moved

through the air in the vicinity of resting butterflies, caused them to chase and investigate the lure. Once, several specimens of *H. feronia* were seen to be flying around two such stationary lures which had been left for a few hours, set upright, about 2 metres apart, on a gate. Both *H. feronia* and *H. amphinome* were found to be attracted to a white net-bag (126 × 54 cm), and could thus be easily caught. When a black net was presented in the same way, however, it had no effect.

Fig. 1

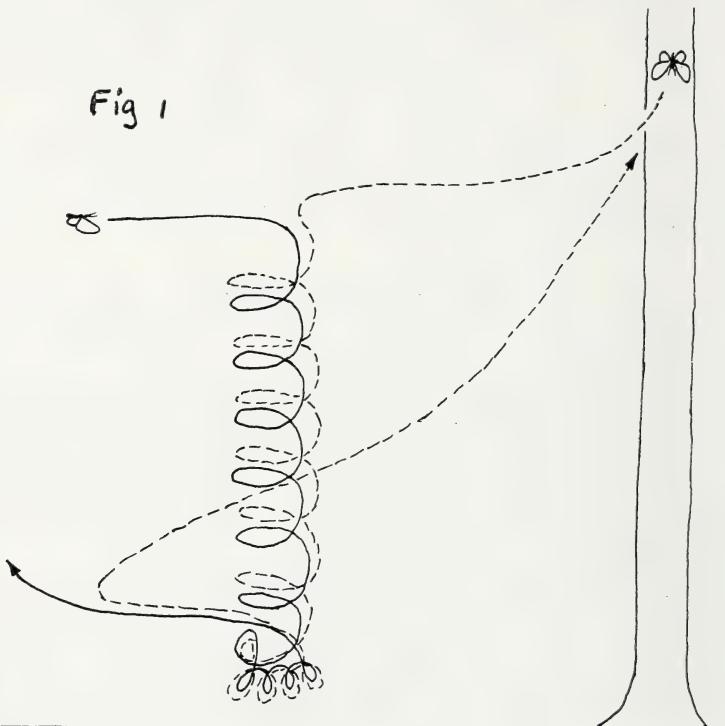


Fig. 1. Investigative behaviour of *H. feronia* is a restricted habitat.

Adjacent to the taller trees of the forest there was a much more open habitat formed by the Dakara pineapple plantation. *Hamadryas*, in this area of lower vegetation, exhibited notable differences in a number of points of their behaviour. Here they flew only about a metre above the ground and when resting on the bamboo poles of an open-sided palm thatched shelter, for example, did so at the same height. Spiralling to the ground between investigating pairs was observed far less frequently and chasing away was much more predominant and prolonged.

As for *Hamadryas*, experiments to observe the reactions of Morpho butterflies to lures were carried out. The most effective method of attracting *Morpho* was to use a stick-lure with a male specimen of *M. m. guyanensis*.

ensis taped to one end with its wings spread. This proved to be highly attractive to the males of other *Morpho* species as well as those of *M.m. guyanensis*. When, for example, a specimen of *M.m. guyanensis* was seen in the distance to be gradually approaching, the lure was waved in the air and this would cause the butterfly to come directly towards it. A period of investigation would then ensue, the butterfly following every rapid movement of the lure. On one occasion, this same lure, which had been left pushed into the ground whilst it was raining (and was, therefore, completely stationary), was soon after investigated by a fresh male *M.m. guyanensis* flying around it in the rain.

Unlike the all-blue upperside of *M.m. guyanensis*, that of *M. achilles* is predominantly brown with a 2 to 3 cm. wide band of blue scaling which runs centrally down both pairs of wings. When using this species as a lure it was found that the frequency of attraction of males of *M.m. guyanensis* was greatly lowered. Many individuals completely ignored this lure although it was presented in the usual way. As an attractant to *M. achilles*, however, the lure was found to be almost 100% efficient as had been the case when using the all-blue *M.m. guyanensis* lure.

Notes on the flight behaviour of males were made. Those of the very bright, iridescent-blue *M. rhetenor* and *M.m. guyanensis* could initially be seen at a distance of about 90 metres. *M. rhetenor* was observed to have a definite preference for areas of bright sunlight and to actively avoid shadows. *M.m. guyanensis* always flew from 1 to 2 metres above the ground with strong, full wing-beats of 5 to 6 per second. Invariably they flew in fairly straight lines for long distances with a speed that varied little, being timed over set distances to average 1 m/sec. If actively pursued *M.m. guyanensis* did not alter the height at which it flew, but would instead increase its speed to approximately 1.5 m/sec. and would also adopt a side to side, darting flight which made it an extremely difficult target to follow, both physically and visually, because the rapid, flashing, iridescent-blue upperside contrasted so markedly with the dull-brown underside of the wings that the butterfly would appear momentarily invisible between each wing-beat. The escape strategy of *M. rhetenor* was similar but there was no side to side component adopted in flight. In general *M. rhetenor* was also higher flying but both species were seen to patrol set paths, presumably in search of females. They would regularly follow a small path that met with a main jungle track, at right angles 400 metres into the jungle. At this point, the butterflies would circle for a very short time and then turn to follow the main track out to the savannah. Just before reaching the open ground however, they would fly back into the undergrowth at the forest margin.

Barcant (*loc. cit.*), writing of the habits of *Morpho peleides insularis* (Fruh.), a species closely related to *M. achilles*, mentioned that the

females are rarely seen due to their secretive behaviour. This was confirmed also for the females of *M. achilles*, of which only two were seen throughout the expedition. At both times, on two consecutive hot and sunny days, they were disturbed from their resting places at the edge of the main, sandy track which ran into the forest. The first female was seen at 11.40 and the second, the next day at 14.15. Both had remained stationary until forced to move by the observers who had approached, unknowingly, to within a metre on each occasion. Females of *M. rhetenor* and *M.m. guyanensis* were not met with at all.

DISCUSSION

Hamadryas: A review of the available literature revealed that Charles Darwin (1879) had also encountered *H. feronia* on his travels in Rio de Janeiro, Brazil, and had published notes on its behaviour. He too noted that the species was not uncommon and generally frequented orange groves, being a high flier. Exactly the same resting pose was noted and Darwin also described *H. feronia* as being the only butterfly that he had ever seen which uses its legs for running, as more than once these butterflies evaded his forceps by shuffling to one side. He confirms also how loud the clicking of these butterflies sounded, likening it to a toothed wheel passing under a spring catch and being audible at about 7 metres.

Many observers have commented on the somewhat extraordinary ability of *Hamadryas* species to produce such a *loud* clicking. For example, Barcant (*loc. cit.*) states that, during an exceptionally large brood of *H. amphinome* in Trinidad in 1960, their crackling sounds filled the air as they fought. Scudder (1889), in a review of the early literature on butterfly sounds, offered no definite conclusion as to how the sound was produced and the only decisive study appears to be that of Hampson (1892), although in a much later paper Krueger (1921) detailed the differences in the venation of various *Hamadryas* species, suggesting that there was a possible relation between the production of sound and the morphology of the veins. This was also the view held by Swinton (1877 a and b).

Hampson (*loc. cit.*) suggests that the clicking is produced by a pair of strong, curved, chitinous hooks attached to the thorax which, when the forewing is moved up and down, play on the ends of another pair of spatulate hooks attached to the wing and under which there is a small, pyriform, membranous sac. The hooks release with a click at a certain angle and the membranous sac acts as a sounding board. (Fig. 2). He also states that he found the same mechanism in both sexes of *Hamadryas arethusa* (Cram) and *H. feronia*.

Although I have studied a number of specimens of each sex of three species of *Hamadryas* under the stereoscopic microscope at definitions of up to x20, on none of these could any structure comparable to that figured by Hampson be seen. Certainly there is no structure equal in size to that implied by his diagram (which has no scale), and it can be seen

Fig 2

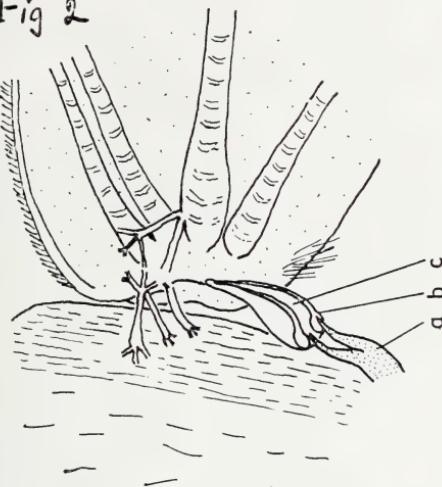


Fig. 2. *H. arethusa*: Base of male forewing and part of thorax (redrawn after Hampson 1892). (a) chitinous hooks of thorax, (b) chitinous hooks of sac, (c) pyriform membranous sac attached to forewing.

that the wing-base articulation of *Hamadryas* appears to be very similar to that of some other Nymphalids (e.g. *Charaxes*). It seems likely, therefore, that Hampson misinterpreted the visible structure at the base of the forewing, although clearly this does not rule out the possibility that the sound is, in fact, the product of some modification of the chitinous folds at the wing-bases. The mechanism may, however, be internal and thus not visible as the clicking sound must be under the control of some part of the flight musculature and it can be controlled at will. Rothschild (1966) comes to a similar conclusion concerning the audible stridulation of *Arctia caja* (Linn.).

If Hampson is correct in that both sexes can generate sound, then it seems unusual that both should also exhibit the same territorial behaviour; but it must also be pointed out, in favour of his conclusion, that no differences were in fact noted in the field that suggested a sexual difference in habits as observed for the *Morpho* species studied. Krueger (*loc. cit.*) does state that whereas males rested very high up on tree trunks, females preferred to remain on leaves at 2 to 3 metres above the ground. As the sexes are so similar, however, this statement must be regarded with caution. The sound may be used as a "predator scaring device" as a number of authors have postulated, and this then, may well have lead to the production of such a mechanism by both sexes. Rothschild (*loc. cit.*), states that it is obvious that selection will favour a duel purpose mechanism of a warning signal combined with a sexual advertisement, but further detailed research is required before any valid con-

clusions can be made concerning the stridulation of *Hamadryas*. From the numerous observations that have been recorded in the literature (see especially Scudders 1889 review), it seems that the audible stridulation by Lepidoptera is not an uncommon phenomenon.

The fact that individuals of *H. feronia* visibly reacted to a mimic of their clicking illustrated that the sound was audible in the true sense, i.e. transmitted through the air and not by the substrate on which the butterflies rested. This also indicates that they have an efficient mechanism for receiving sound waves and should, therefore, prove to be very useful subjects for the study of hearing by the Rhopalocera. Collenette (1928) also noted that an individual of *Hamadryas* reacted to the clicking beaks of two birds fighting well below it, in a way that can only be interpreted as true hearing. As noted for the two species studied in Guyana, this individual commenced clicking in reply, which strongly suggests that the sound is used as a method of intraspecific communication when the butterflies are engaged in aerial investigation. Possibly the frequency of sound differs subtly between species and therefore acts as an isolating mechanism which prevents hybridisation.

The characteristic attitude adopted by *Hamadryas* at rest certainly afforded them an effective camouflage on lichen covered bark which was analogous to that of the well studied Peppered Moth, *Biston betularia* (Linn.). Krueger (*loc. cit.*) reported that the butterflies he studied rested during the hottest part of the day and suggested that, having a cryptic upperside they can adopt a sunning posture without being seen. The fact that the butterflies also rest upside down may be associated with their very rapid reaction to visual stimuli as this would appear to allow them to survey a large area below them and to take to the air very quickly, without the necessity to turn around in the air, and with their wings already outspread.

The reaction of *H. feronia* to lures indicates that this visual stimulus of rapid movement is the primary factor required to initiate an investigative response. As previously pointed out, however, an audible stimulus is often enough to obtain a flight reaction, even if the butterfly cannot locate its source by sight or recognise another butterfly. There does appear to be another factor involved, because stationary lures also proved attractive, but this may involve an olfactory stimulus as Muller (1878) has pointed out that the male of *H. arethusa* has scent organs on its wings, although he maintained that these were absent in *H. feronia* and *H. amphinome*. The response to a white net-bag but not a black one illustrates that, like other Rhopalocera (Ilse, 1931), *Hamadryas* have the ability to discriminate between certain colours.

There has been some dispute in the literature as to whether the behaviour exhibited by *Hamadryas* (investigative spiralling etc.), can truly be interpreted as territorial behaviour; i.e. that each individual is protecting a fixed volume of space around itself. Very similar behaviour

has been noted by Baker (1972) for two Nymphalids in Britain. Both Ross (1963) and Young (1974) suggest that a shifting-home-range theory best describes the situation because, as Young pointed out, the resting tree is not permanent for each individual. The overall impression gained from the field in Guyana was, however, that the aggressive behaviour of these butterflies had indeed a territorial function, although no study was made by marking individual butterflies to ascertain their vagility. Of relevance here is an account by Hanson (1975) of a single, worn specimen of *H. feronia* in Brazil which was observed to leave and return to a Sapote tree, three or four times a day, for just over six weeks. This, together with the modified behaviour noted for *Hamadryas* in a more open habitat in Guyana, suggests that, at sites where the density of butterflies is lower (because of the fewer number of perching places), the territories become larger, and therefore more stable, and are consequently maintained for far longer periods.

Basically, the hypothesis advanced by Young (*loc cit.*) that accounts for the "extreme wariness and agonistic behaviour" of *Hamadryas*, is that they are highly palatable and therefore much sought after by predators such as insectivorous birds, and although Klots (1974) suggests that they derive a protective toxicity from their foodplants of the Spurge family, Euphorbiaceae, the cryptic nature of both their pupae and adults is strongly in support of this assumption by Young.

Morpho: The experiments using lures have shown that there is a very strong visual stimulus governing the investigative response of *Morpho* males. This can be divided into two categories: movement and colour. It appears that the latter, the amount and intensity of blue displayed, is the more important. This was illustrated by the fact that, as for *Hamadryas*, a stationary lure proved to be attractive which substantiates that movement is not a necessary prerequisite although it may certainly improve the chance of the butterfly seeing the lure.

As only males were used on the lures, it was thought that there was definitely no attraction involving the olfactory stimulus of a sex pheromone. Muller (*loc. cit.*) determined, however, that all *Morpho* males have scent producing glands at the tip of the abdomen. There seems to be no other record of this in the literature or any illustration, thus a photograph of the "scent-tufts" of *Morpho hercules* (Dalman) from Brazil is included here. (Fig. 3). These glands can be extruded by exerting some pressure on the abdomen of live, or freshly dead, specimens and are obviously used during courtship in a way similar to that of Danaids, which have much longer "hair-pencils", to stimulate the female to become receptive to the male. It is unlikely, however, that the male pheromone has any attractive influence over members of the same sex and this possibility can, therefore, be ruled out in favour of the assumption that the primary and initial stimulus is that of colour, scent playing a secondary and close-contact role when contact with a female is made.

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Fig. 3. Scent glands either side of the male genitalia of *M. hercules*.

Observations similar to the predator-avoiding flight described here for *M.m. guyanensis* have been noted by Young (1971) for *Morpho amathonte* (Deyrolle) in Costa Rica. It appears, as he suggested, that the disruptive flashing of the wings of these brilliant, iridescent-blue males proves to be a very effective means of escape from predators such as birds because of the extreme contrast between the mirror-like upper-side and the cryptic-brown underside. They thus appear very transient targets in flight, constantly seeming to disappear and reappear against either a background of sky or foliage. Young pointed out that *M. amathonte* flies in the morning when the sunlight is at its brightest, which enhances the reflectance of its wings and provides, therefore, advertisement but also protection. This explanation would also account for the preference noted for *M. rhetenor* to keep to a directly sunlit flight path and to actively avoid shadowed areas.

The obvious scarcity of *Morpho* females, compared to the large numbers of males seen during the expedition, could be explained as a large imbalance in the sex ratios of all the three species under study, but what is more likely is that this is the result of the different behavioural strategies of the two sexes. The field observations of the males have shown that all three species regularly patrol specific flight paths, obviously in search of females, and the resting positions noted for the two females of *M. achilles*, namely at the edge of one of these patrolled jungle tracks, are in full accord with this assumption. Young (*loc. cit.*) advanced a courtship hypothesis for *M. amathonte* which maintains that the bright males flying along set flight paths "wait" to be encountered (i.e. intercepted) by females which engage in an active "search effort" but which have much less consistent flight movements. Points that have arisen from this study, however, indicate that: i) It appears to be very disadvantageous for gravid and consequently more slowly flying females, to expend energy searching for males which will, therefore, also expose them to a high risk of predation. ii) It is only the males which are seen to investigate lures so readily. Never have there been any observations of females engaged in this behaviour which might then suggest that they do actively try to intercept males. It appears, therefore, that it is the male, on seeing the female, which initiates the final encounter.

CONCLUSION

These observations are not detailed studies of all aspects of behaviour of these interesting Rhopalocera, indeed limited time and the fact that it was still the dry season during the expedition, did not allow for this. It is hoped, however, that these notes and review will stimulate further research, possibly by employing the detailed approach of Tinbergen *et al.* (1942) to prepare a detailed analysis of the courtship strategies of *Hamadryas* and *Morpho*. The physiological mechanism by which *Hamadryas* stridulate is still unclear and the study of freshly caught specimens, in this respect, appears necessary. Continuing correspondence

with observers in Guyana has confirmed that, since the 1975 expedition, extensive clearing of large areas of forest, once prime areas for many Lepidoptera, has been undertaken at an increasing rate. For species like *Hamadryas* the open plantations that replace the forest, may well represent an increase in the area of habitat favourable to them, but for *Morpho* and many others the diversity of the vegetation of the forest is vital for their continuing survival.

ACKNOWLEDGEMENTS

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Michael J. Parsons

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NOTES ON ORTHOPTERA SEEN IN SOUTHERN ONTARIO, AUGUST - SEPTEMBER 1979

INTRODUCTION

This paper sets out to record observations made by the author during a visit to Canada in the late summer of 1979. He is primarily a Lepidopterist but was so impressed by the number and variety of Orthoptera to be found, that he made the following observations.

He was based in Richmond Hill, a satellite town of Toronto. During the two months he spent in Canada he travelled extensively in the southern areas of the province, and towards the end of September he visited the North Bay area of Ontario and crossed the border into Quebec, visiting Timiskaming.

He admits that he found considerable difficulty in identifying various species, especially amongst the Gryllidae. In many cases he had to be content merely to identify specimens by family or by genus.

FAMILY ACRIDIDAE

Subfamily Cyrtacanthacrydiniae

One of the most common species to be seen was *Schistocerca americana*. Considerable numbers could be caught merely by "sweeping" a butterfly net through long grass.

These insects did not appear to confine themselves to natural habitats and several were seen within the City of Toronto itself, one, very much alive swimming in a glass of beer in the underground bar of a rather seedy night-club!

It was impossible to identify any other species of this Subfamily, but many other similar grasshoppers were seen, and these appeared to be related to *S. americana*.

Subfamily Oediponidae

The most spectacular of the Orthopterids encountered belonged to this group. The most common species, when seen on the ground was not unlike the European *Oedopoda germanica*, but when disturbed the specimens flew, revealing striking black underwings, with a pale yellow band around the edge.

A member of the Toronto Natural History Society identified this insect as a regional variation of *Dissotera pictipennis*.

Set type specimens of *pictipennis* have been examined both in Canada and in England, but no specimen with these yellow and black wings has been seen. The author would be interested to receive information from other members, to confirm his suspicion that if his specimens are indeed *pictipennis*, they are of a regional variation, found only in these parts of North America.

FAMILY TETTIGONIDAE

Numerous species of Katydids were seen. Amongst those identified were: *Scudderia curvicauda*: *Conocephalus brevipennis* (in small numbers around Bruce Peninsula—an area of some 250 square miles, about 150 miles north of Toronto): *Pterophylla* (several species): *Amblycarpha* (spp): *Neoconocephalus* (spp).

FAMILY GRYLLIDAE

Most of the crickets seen were Neomibinae or Gryllinae but the author was unable to identify the species.

Mole Crickets (Gryllotalpinae) were found twice, once by a disused mill-pond, just outside Richmond Hill, and the other on the banks of the Sauble River some 250 miles North of Toronto.

One insect which appeared to be a member of the Gryllidae was in fact a Shield-backed grasshopper, of the family Tettigonidae. Perhaps *Anabrus simplex*, an enconomically important pest of field crops in Northern North America.

FAMILY MANTIDAE

There did not seem to be any native N. American species of Mantid in the area. Two introduced species, however, the ubiquitous *M. religiosa*, and the larger *Teodera aridifolia* seemed quite common. Nobody seemed to know how the two foreign insects came to be introduced into Canada. All I could find out was that early in this century they were introduced by person, or persons unknown, and that they quickly became established in the area.

Both species were voracious feeders and were seen to eat all kinds of insects, spiders and on one occasion a Spring peeper tree frog (*Hyla crucifer*). The Mantid eating the frog was found in an arid stretch of wasteland some miles from the nearest water so how it managed to catch the frog must remain a mystery.

CONCLUSIONS

The author would be interested to hear from other entomologists and to learn whether his findings correspond with those of other people who have collected in this area of North America.

By comparison with the U.K. for example, there seems to be a much wider variety and divergence of Orthoptera in South Canada, and further research into these insects, their places in the ecosystem, and their relationships with each other seems to be justified.

Jonathan Downes (6539)

BOOKS CONSULTED

BORROR AND WHITE: A Field Guide to the Insects of America North of Mexico.

KLOTS: A Field Guide to the Butterflies of North America.

CHINERY: A Field Guide to the Insects of Britain and Northern Europe.

NOTES ON THE LIFE-HISTORY OF THE HORNET CLEARWING MOTH

Although the invention of the Robinson and other mercury vapour moth traps has been extremely beneficial in facilitating the study of moths, it seems to have had a slightly detrimental side-effect by turning attention away from the day flying moths. That this is so is apparent in the growing scarcity of notes and articles on many of the less obvious day flying species of moth in the literature. In 1975 I was fortunate enough to obtain livestock of one of these species.

On 26th June one of the gardeners at the college where I was studying at that time brought me what he thought was a hornet. The insect was in fact an egg bound female of the Hornet Clearwing Moth, *Sesia apiformis* (Clerck). Hoping to induce the female to lay eggs so that I could try to rear this species, and because I had no previous experience of this species (or of any of the other clearwing moths for that matter), I turned to the literature for guidance. Ford (1955) yielded little information of the type I required, and Stokoe and South (1961) were scarcely more helpful, although they did reveal some general points about the species. Stokoe mentions that the eggs are of a flattish oval shape and are shiny. Quoting Hellins he notes that the caterpillar is soft and glossy, yellowish white in colour with a rich chestnut brown head. Apparently the larva feeds on the roots and lower portions of the trunks of Poplar and Aspen boring its way into the bark and wood a few inches above the soil. The life-cycle is reputed to last two years, most of this time being spent in the larval stage. Other authorities added little further information and I was ready to set the female free when I recalled that some years previously I had acquired an AES leaflet on collecting clearwings. This leaflet proved most useful, and with its guidance I was able to successfully rear a brood of the Hornet Clearwing.

The female was placed in a large box with a number of cross-sections cut from a small poplar tree. Over the next six days the female laid 487 eggs, a few on the bark and cut sides of the poplar sections, but more on the plastic sides and bottom of the box. As so many eggs were laid I decided to try to rear larvae using three different methods. 140 ova were removed carefully from the box and placed—twenty per tree—in crevices low down in the bark of seven large mature poplar trees. According to the leaflet, the imagines emerge in the early morning from June to August, and may be found newly emerged low down on trunks so it seems that their exit holes are generally close to the base of the trees. Consequently the intention with these was simply to search the trees for imagines each day through June, July and August two years later. 110 ova were placed at a frequency of five per tree on the bark of smaller trees, 50 on poplar and 60 on aspen. Once the eggs were placed on these trees they were left alone until the middle of May 1977,

when specially constructed cylindrical cages were placed around the trunks of the trees. The cages were made of a thick wire frame covered with fine black muslin. They were about 125 cm high with a 40 cm diameter and were constructed in such a way that they could be clipped around the trees, the netting at the top and bottom ends of the cages being kept flush to the bark of the trees by elasticated ribbon interwoven through the netting. Soil was removed from around the tree trunks so that the base of each cage could be positioned six inches below the normal level of the ground. It was hoped that any of the ova which developed and survived through to the imago would emerge within the cages, and could thus be collected. 50 ova were kept for rearing entirely in captivity (the remaining ova being distributed to colleagues and friends for rearing). The 50 ova retained were placed in cracks on the bark of cut sections of poplar, 16 or 17 eggs per section. The sections were about 20 cm in diameter and about the same length. The ends were sanded smooth and level and were placed upright in boxes of damp sand, a flat piece of metal being placed across the top of the wood sections to prevent the ensuing larvae exiting from the top end of the sections. The wood sections were replaced in October 1976 and in April, July and October 1977, this being done by placing a new section in the sand and placing the old section directly above it where they were left for one month. As there was generally no way to check that all the larvae had migrated down into the new piece of wood, the old sections were retained; however, subsequent examination of the old logs suggested that almost all the larvae did migrate downwards when new wood was available. Because cut wood has a tendency to shrink if allowed to dry out, and as it was thought that such shrinkage could cause the larvae or cocoons to be crushed within their chambers, care was taken to ensure that the sand in which the logs were standing was kept damp all the time. In addition the logs were sprinkled with water every other day throughout the two years to prevent such shrinkage.

Intermittent examination of the insects during their development allowed a series of observations and notes to be made on the life history and habits of this species.

The eggs, which were laid mainly in the afternoon, were, as Stokoe described them, and were glued in place, on their sides. They hatched after 18 or 19 days. Immediately after hatching the first instar larvae which were of a pale grey colour consumed their egg cases completely, and after a short period of inactivity they began to wander across the surface of the bark before finding a suitable crevice and burrowing into the bark and thence into the underlying wood in some cases.

By the end of September the larvae were about 1 cm long and were probably in their second instar. The boxes were placed in an outhouse over the winter months, and after the end of November no signs of activity were seen until the following April indicating that the larvae went into hibernation over the winter. The larvae became active again

in mid-April, and fed throughout the summer months. By September the larvae were between 3-4 cm long and in their final instar. Over the winter months the larvae spun up cocoons in the larval galleries, the first being noted in November. Examination of the interior of some of the cocoons, by cutting a longitudinal slit in the cocoon, showed that the larvae did not undergo the final ecdysis to a pupa until the middle of the following May. Incidentally, the slits cut into the cocoons were repaired from within by the larvae with such perfection that within three or four days it was impossible to distinguish those which had been opened from those which had not.

The fully grown larva is slightly flattened in appearance. It is rather wider than deep, particularly at the front, being widest at segment three, tapering but still flattened in front, and becoming more cylindrical behind. The head is hard and horny, of a rich red brown colour, flattened and about two-thirds the width of the second segment, into which it is retractile. There is a slightly paler V-shaped mark on the back of the head. The mouth parts are black or dark brown at the extremities, paling gradually to a shade of chestnut slightly lighter than that of the head. The mandibles are heavy and powerful being obviously adapted for the purpose of feeding on the wood of trees. The second segment is longer than any other and had a moderately heavy chitinised shield on its dorsal surface. This is widest at the front and tapers to about two-thirds this width at the posterior of the segment. The general colour of the larva is an off-white or pale yellowish-white, the second segment being rather more yellow. There is a thin complete or broken dorsal line which is slightly darker than the basic ground colour. The spiracles are ringed with chestnut, and that on the eighth abdominal segment is noticeably larger than those of the other segments. The skin is glossy and quite soft and bears a number of minute simple setae which are brown in colour. The true or thoracic legs are small but well developed. On the other hand the prolegs are not well developed at all, being little more than small folds of skin. There are four pairs of prolegs, one on each of the abdominal segments three to six, and a pair of anal claspers on the final abdominal segment. The prolegs each bear two transverse bands of minute crochets or hooks, with a single row being present on the anal claspers.

The cocoon is cylindrical with rounded ends and is about 3 cm in length, and 1.5 cm across. It is constructed of stiff silk and is coated on the outside by small pieces of wood which have been scraped from the gallery walls, consequently the cocoon is very rough to the touch. The cocoon is dark brown on the outside and a shiny purplish brown inside. The silk is about 1 mm thick. It is rather thinner at the end where the head of the larva lies, and here the silk is dirty white in colour.

The pupae vary in size, the females at around 22 mm in length being slightly larger than those of males which are about 19 mm long. They are elongate, roughly cylindrical, rounded at the head and tapering

towards the tail. Overall they are a rich brown colour. The antennal cases, eye covers and leg cases are very distinct, and are fused to the main body. The proboscis case is straight, fused for most of its length, but free at its tip. The wing cases are small but distinct, fused at their base but free for the last 3 mm of their length. A heavily sclerotized projection is situated between the eyes. The projection has a central keel and side ribs, and Imms (1957) notes that such projections are in effect cutting plates which the pupa use for working their way towards the exit hole. There are two transverse rows of spines on the ventral surface of each of the first five abdominal segments, and one row of rather stouter spines on abdominal segments six to eight. The tail is rounded with a knobby protuberance. The pupa works its way out of the cocoon before the moth emerges.

As mentioned previously, 41 of the 50 ova kept in captivity survived to the adult stage. These all emerged between 4.30 am and 9.00 am in June and July 1977, the first on 21st June and the last on 18th July. Generally the males emerged before the females; in fact 16 males emerged before the first female and all the males which resulted from these eggs (22 in all) emerged by the time the fifth female emerged.

Expansion of the wings was relatively fast, generally less than half an hour to full extension, and the imagines were ready to fly within one and a half hours of emergence. The adult is described in general terms in many books so I will not describe it here; however one or two points on its habits may be worth mentioning. The imagines, unless disturbed did not fly until a number of hours after emergence, and generally they only flew when the sun was shining. The males usually mated with the females in the afternoon of the day on which the females emerged, and in most cases before the females had undertaken their maiden flight. Once mated, the pairs remained "*in-cop*" for between 15 minutes and two hours. Some males were noted to mate more than once.

One or two additional points resulted from the examination of the trees on which ova had been put out in 1975. In natural conditions the larvae make irregular tunnels between bark and wood, keeping near ground level, and it seems to be only in heavily infested trees that the larvae bore more deeply into the wood. The frass is extruded from the tunnels and may form quite substantial heaps around the tree. The exit holes are not readily apparent on the trees until the imago has emerged as they are generally low down, often below the level of the herbage surrounding the trunks of the host trees, and they are camouflaged by a thin bark lid, which is removed by the emerging adult. Most of the exit holes were on the southern side of the trees, presumably as this is the side exposed to the sun. Occasionally a cocoon was found outside the tree in the ground, 5 or 10 cms down. These cocoons are covered with earth particles rather than the normal wood scrapings.

From the ova put out on the young poplars and aspens which had nets constructed around them, 52 imagines were obtained in 1977. Of these

31 were taken from aspen and 21 from poplar. All were obtained in July, the first being a male on poplar taken on 6th July, 1977. Examination of one of the young poplars showed that the larval chambers often extended down below ground level into the major roots, occasionally running some considerable distance from the main stock, as well as up the trunk to a height of about one metre. The exit holes of all the imagines were between 10 cm below ground level, and 25 cm above ground level.

Only three imagines were found on the mature trees in 1977, although a total of 11 exit holes were noted. All three were males and were taken during the second half of July. Most of the exit holes were again close to the ground, although one was about 50 cm above it. The small number of exit holes in the mature trees compared with the number of adults found on the younger trees, indicated initially that those ova placed on small trees have a much higher chance of survival (47.3% compared with 7.9%). However, observations in 1978 rather altered the picture. Although most authorities (Newman 1869; Fibiger and Kristensen 1974) state that the insect only passes two winters as a larva, South (1961) notes that this insect probably takes three years to complete its life cycle. Although my own observations indicated that the life-cycle is in fact only two years, I felt it worth while examining both the small and the mature trees, in the summer of 1978, three years after the ova had been put out, in case the species has a variable life-cycle length.

This examination resulted in the discovery of 27 adults and 48 new exit holes in June and July 1978 on the mature poplars. No further imagines were discovered on the young poplars or aspens.

It seems then that the length of the life cycle of the moth is variable, being either two or three years, and the variability may be dependent at least in part on the age of the host trees. Possibly the wood of the younger trees is more nutritious, so it induces more rapid larval development. Other factors such as the microclimate provided by trees of different ages or sizes may also have a bearing on the situation.

Michael E. N. Majerus (4027)

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NOTES AND OBSERVATIONS

Syrphid flies in my garden—On extended trips I have collected British Syrphidae over many parts of the country. When I have perhaps only an hour to spare I have collected in the garden. The garden which is very small is surrounded with high fences. It has a number of trees and shrubs and a few conifers. The flowers grown are those which I find are most attractive to insects. There is a small rock and water garden with a few small pools. The lawn area has been replaced with ground-cover plants, such as Thymes and Chamomile etc., which in the peak period of May and June is swarming with bees, butterflies and flies. Hoverflies recorded were as follows:—

- Baccha obscuripennis* Meigen, common.
Platychirus albimanus Fab., frequently.
Platychirus ambiguum Fallon, frequently.
Platychirus fulviventris Macquart, rare.
Platychirus timeo Harris, frequently.
Platychirus scutatus Meigen, frequently.
Platychirus sticticus Meigen, frequently.
Melanostoma scalare Fab., rare.
Melanostoma mellinum L., common.
Sphaerophoria scripta L., common.
Sphaerophoria s. dispar Loew, common.
Sphaerophoria menthastri L., common.
Sphaerophoria taeniata Meigen, rare.
Xanthogramma pedissequum Harris, frequently.
Scaeva pyrastri L., common.
Scaeva selenitica Meigen, frequently.
Syrphidis ribesii L., common.
Syrphidis torvus O-S., frequently.
Syrphidis vitripennis Meigen, frequently.
Episyphus auricollis Meigen, frequently.
Episyphus a. maculicornis Zett., frequently.
Episyphus balteatus Degeer, common.
Metasyrphus nitens Zett., rare.
Metasyrphus consisto Harris, common.
Metasyrphus luniger Meigen, common.
Metasyrphus latilunulatus Collin, common.
Enistrophe eligans Harris, frequently.
Chrysotoxum bicinctum L., rare.
Chilomyia illustrata Harris, frequently.
Cartosyrphus scutellatus Fallen, rare.
Volucella inanis L., rare.
Lampetia equestris Fab., common.
Lampetia e. Narcissi Fab., rare.
Rhingia macrocephala Harris, frequently.

- Eristalinus sepulchralis* L., rare.
Eristalis tenax L., common.
Eristalis pertenax Scop., common.
Eristalis arbustorum L., common.
Eristalis nemorum L., rare.
Eristalis intricaria L., rare.
Helophilus pendulus L., common.
Helophilus hybridus Loew, frequently.
Helophilus parallelus Harris, rare.
Zelima segnis L., frequently.
Syritta pipiens L., common.
Paragopsis strigatus Fallen, common.
Paragopsis tuberculatus Rondani, common.

My garden is situated at National Grid reference 51/163907 and to date has produced forty-four species of Syrphidae. F. L. Hatcher (1441)

Notes on Remains of a Nest of *Vespula Norvegica* (Fabr.)—Most people will be familiar with the nests of *Vespula vulgaris* which consist of a number of flat combs arranged within a spherical envelope. The subject species builds a nest based on the same theme but with a number of interesting variations, that is assuming that the one in my possession is typical.

As far as the envelope is concerned all *vulgaris* nests that I have examined have been brown and yellow in colour whereas *norvegica*'s is grey and brown. This feature is presumably influenced by the source used by each colony. The most striking difference is the pattern of striation which is always whorled on *vulgaris* nests but consists of straight lines only on the *norvegica* nest.

The combs of the *norvegica* nest are constructed and arranged in a way which distorts the basic pattern of hexagonal cells of equal size. Four combs were present, three of which appeared to be complete. There were two flat basal combs, the larger of which was 115 mm in diameter and whose cells were all the same size except the outer two or three rows which were very small and distorted and not used for keeping larvae. From the centre of each comb was built a supporting pillar for the one above which was of a reduced diameter. The third comb was tilted to one side and further support was gained by joining the edges of this and the second comb together where they touched. In addition the two upper combs were domed rather in the shape of toadstools and this feature results in the sizes of the cells varying in shape, size and depth. The largest, deepest and most perfect hexagons are found in the centre and the smallest, most shallow and most distorted are around the edge. The smallest comb had only twenty-three cells, in the centre they had 3 mm sides and were about 6 mm deep, around the edge they had 2 mm sides, were only about 2 mm deep and were more rectangular

than hexagonal. The other domed comb had centre cells with 4 mm sides and were probably proportionately deeper, but it was not possible to measure the depth as they were all capped. Around the edge the distortion was such that the cells measured about 2.75 mm \times 4 mm.

It is difficult to think of any reason for such a wide variation in size and shape and, therefore in volume, of the cells in the two domed combs. None of the small cells had been capped and their construction appears to be a complete waste of energy. It may be of course that some variation is needed to accommodate different sizes of larvae related to the three adult castes, but if this were so then it would follow that there would be more smaller cells than large ones and in this particular nest this is not the case. It would be interesting to learn if any other nests of *norvegica*, or any other comb-building species exhibit similar features.

P. R. Shirley (5621)

The Demise of Three Chalcids—On the 23rd June 1979 a gall of the sexual generation of *Biorhiza pallida* (*Oivier*) (Hymenoptera Cynipidae) was collected in the Sandwell Valley, West Bromwich. At the time it was noted that three Torymidae (Chalcidoidea) were present on the gall. These were probably *Syntomaspis apicalis* (*Walker*) and would no doubt have been in the process of ovipositing in the gall. Within thirty minutes of being placed in a small jar all three had died for no apparent reason. Is it possible that once female Chalcids have successfully laid their eggs that death follows almost immediately?

P. R. Shirley (5621)

Aberrant froghopper spreads to Kent—On 7th July, 1979, at Hildenborough in Kent, I made a most interesting observation. By the side of a footpath, near a stream, and on nettle, I saw a most unusual form of *Cercopis vulnerata* Ill. Instead of the normal bright red and black colours, I distinctly observed a fawn and black specimen. Realising that I clearly had a most interesting insect, I contacted Dr. W. LeQuesne for his comments. As far as I can gather, this form, and a pink and black form, were first discovered by Dr. D. Gibson in Surrey in 1975. Since that time, there does not appear to have been any other records forthcoming. My find of this Froghopper in Kent in 1979 suggests that the mutant Surrey form has spread across to this area since 1975. I am most grateful to Dr. LeQuesne and to Dr. Gibson for their valuable comments. I shall keep a close watch on the area this year, hoping to observe other forms. Can anyone else add to this data?

A. V. Measday (3917)

NEWS ITEMS FROM HABITAT

Ladybirds: A New Role

The usefulness of ladybirds in the garden has long been recognised for consuming aphids and other crop-attacking insects. Now Russian biologists have discovered that they are extremely sensitive to atmospheric purity. The secret lies in the colour of their wings, which indicates precisely the degree of pollution in the air.

Dragonflies in Durham

The Durham Trust for Nature Conservation requires information on dragonfly distribution in the county. A national mapping scheme is underway and Durham has very few records. Please contact the Trust at 52 Old Elvet, Durham.

Future Uncertain for National Nature Reserves

Britain's nature reserves face an uncertain future according to the Fifth Report (HMSO £4) of the Nature Conservancy Council, just published. The Report explains that only 26% of the 320,000 acres occupied by National Nature Reserves is actually owned by the NCC, the remainder being managed in the interests of wildlife under nature reserve agreements or leases with the owners and occupiers. Forty-four of these agreements and leases out of a total of 164 NNRs will expire in the 1980's. It has taken 30 years of painstaking negotiation and persuasion to establish the network of NNRs. However, the Report warns that "unless the nation is willing by one means or another to safeguard these critically important parts of its heritage, we foresee the loss of irreplaceable sites and a harsh judgement by posterity on this generation". The Report also notes that three new NNRs were declared during the year in addition to the purchase of the Ribble Estuary. The NCC is increasingly involved in international work such as advising on the Convention on International Trade in Endangered Species (CITES) and the Convention on the Conservation of European Wildlife and Natural Habitats.

Reserve News

The Benjamin Meaker Charities Trust has bought 1016 acres of heathland at Arne on the Purbeck Peninsula, Dorset for the RSPB. This includes 740 acres leased by the Society since 1965 and an extra area of heath, woodland and saltmarshes. Apart from the rare Dartford Warbler, Arne is home for a wide variety of birds, more than 300 species of plants, all six species of British reptile, including the rare smooth snake and sand lizard. It is also one of the top sites in Britain for dragonflies. Further round the coast 1631 acres of the Beaulieu river estuary and its environs have been declared as the North Solent National Nature Reserve as a result of an agreement between the Nature Conservancy Council and the Beaulieu Estate. The Reserve includes an exceptionally

wide range of estuarine and associated habitats and plant communities and also supports substantial numbers of ducks and waders in the autumn and winter. The Reserve is sensitive to disturbance and access is by permit only except along the public footpath between Bucklers Hard and Beaulieu.

A Study Takes to the Hills

Environmental problems caused by hundreds of thousands of visitors to the Malvern Hills each year are the subject of a study which is being undertaken by Land Use Consultants on behalf of the Countryside Commission, the Malvern Hills Conservators, Hereford and Worcester County Council and Malvern Hills District Council. Erosion, caused by recreational activities including walking, picnicking and car parking, has produced ugly scars on the landscape and is a threat to the wildlife of the area. The report which will be completed by the end of this year will include a survey of visitors and their uses of the area as well as a review of the work and policies of the Forestry Commission, Nature Conservancy Council and the DoE affecting the Malverns. The area was designated an Area of Outstanding Natural Beauty in 1959.

[The problem of "wear and tear" due to the sheer number of visitors is one that is causing considerable concern at more and more sites. Wicken Fen is another example where measures are having to be taken by the managers to conserve the footpaths along the droves.—Editor.]

ERRORS FOR CORRECTION

Your editor has received a number of letters pointing out some errors that have crept into previous issues, thus:—

Wrongly-named Nigerian butterflies—"May I respectfully point out two errors of identification in the November, 1979, issue of the Bulletin, Page 168. Photograph A is not *Papilio phorcas*. It is a member of the Blue-banded Swallowtail group, most likely *P. nireus* or *P. bromius* (or just possibly *P. sosia*?). I know of no reliable features to separate these three species from their undersides alone. Photograph C is indeed in the family Danaidae, but is *Amauris hecate*, not a *Danaus* species."

Wrong scale—In the illustration on page 47 of the February Bulletin, for mm read cm.

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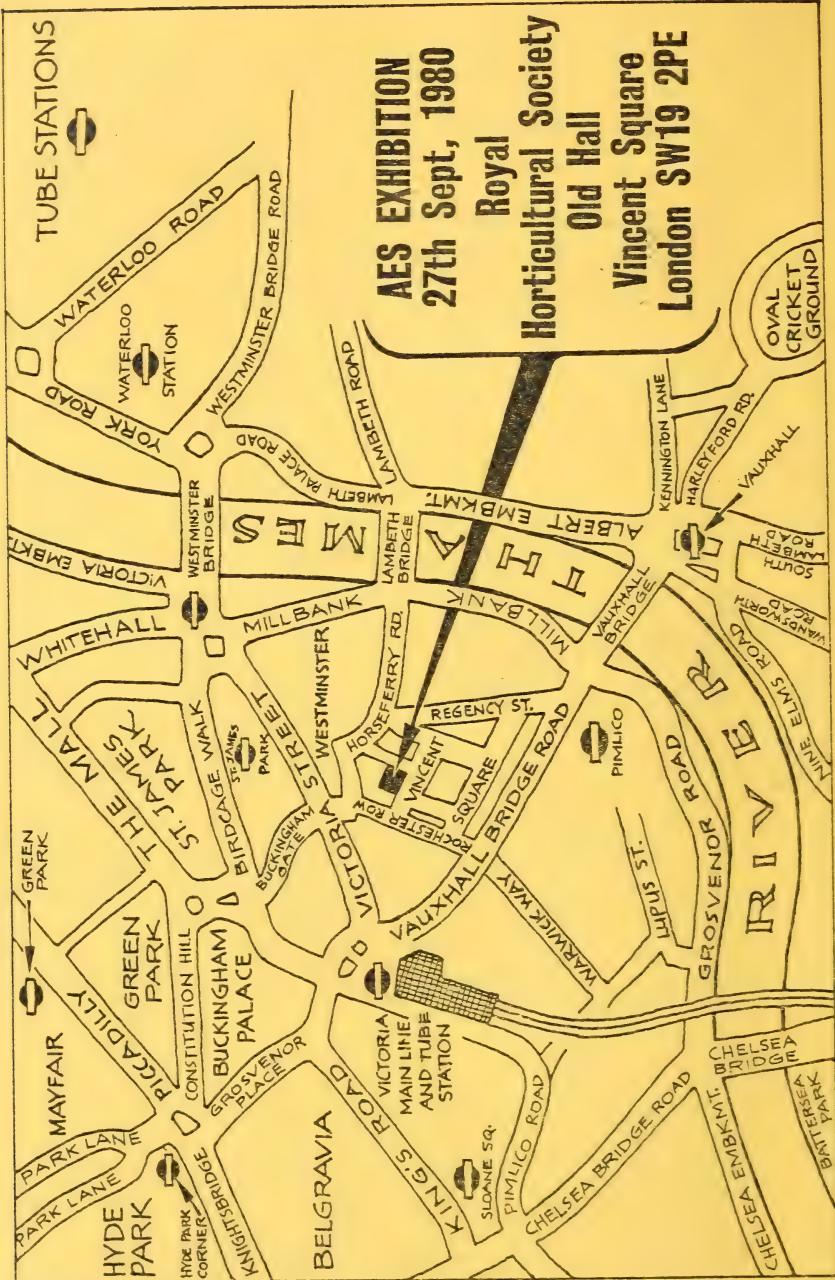
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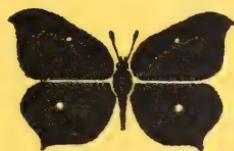
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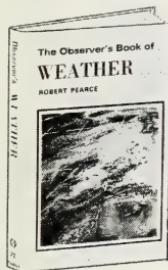
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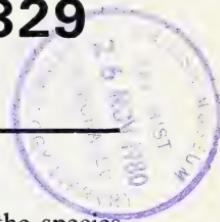
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AES BULLETIN

No. 329



A CALL TO ARMS

It is most encouraging to see the increase in numbers of the species *A. esmembercus* and the abundant numbers recorded annually at their favourite habitat *A. essexhibitionus*. This is beginning to sound like a Percy Thrower advertisement for the T.V. Times. The point is however, that we are fortunate to belong to a thriving Society that produces a most interesting and informative bulletin. Additionally, our publications are of a high standard covering most aspects of entomology for the amateur.

All this is good news but I feel the time is right for us to use our current strengths and resources in order to undertake a few projects that would have a long term beneficial effect on the existence of our threatened species of insect. Each of us has our own particular entomological interest and I am sure could think of several species that would greatly benefit from the efforts of a group of dedicated enthusiasts working together in a carefully planned and systematic manner, to provide the right breeding conditions and habitat. Naturally any such activities and their effects would need to be carefully monitored and recorded. What better an organization than our own Society to do just that?

Perhaps a Conservation Panel could be set up to co-ordinate any activities, or better still Regional Panels reporting to a central panel. Each Panel would consider projects on their respective merits, obtain advice and approval from the central panel, and then direct, control and record progress, working in close liaison with any other Authorities involved. In this way not only would the AES contribute in a more positive manner to the well-being of our fauna, but also give our members the opportunity to participate in an extremely interesting and practical way.

If there still remain a few unconverted to the idea, I suggest here for your consideration two worthwhile cases where we as a recognised and respected Society could make a start.

The Swallow-Tail butterfly has managed a precarious existence at Wicken Fen after recent re-introduction. Its existence relies largely on regular working parties keeping the larval foodplant, Hog's Fennel, clear of overgrowing vegetation, so that the female may easily lay her eggs. Whilst several eggs may be found on one plant, one egg only is laid on each plant by the same female. It will be readily seen that any lack of available foodplant will have an adverse effect on the survival

of this beautiful butterfly. 1979 was a very difficult year for *machaon* and it is on the verge of disappearing yet again from Wicken Fen. I would be more than surprised if the National Trust would not welcome practical and free assistance that we could provide to ensure the continuance of *machaon* at Wicken Fen.

Woodwalton Fen has been the home of the Dutch Large Copper since its introduction there by Capt. E. B. Purefoy in 1927. Arguments have been made that the introduction and maintenance of *L. dispar batavus* at Woodwalton Fen is undesirable. I think the vast majority are in favour rather than against and anyone having visited the Fen and admired *dispar* on the wing, would be very disappointed to see this magnificent butterfly completely disappear after a period of more than 50 years. The Fen is managed by the Nature Conservancy Council, which has for many years faithfully spent a considerable sum of money to ensure the survival of *dispar* and until the recent retirement of the warden, Gordon Mason, who was dedicated in his efforts to sustain it, the butterfly has flourished. The severe cutback in public expenditure by the Government has adversely affected the Nature Conservancy Council's ability to devote as much time and finance as in the past to the Large Copper and I am sure that yet again we as a Society could offer substantial and effective assistance. The alternative is a strong possibility that *dispar* could disappear from Woodwalton Fen, its only habitat.

No doubt many members can put forward equally urgent and deserving cases. Please do so, and bring them to the attention of our members, most of whom are concerned for the plight of certain species of our fauna. My call to arms to our members is let's not just be content to take out of our Society that which we want, but instead let's give our Society a new dimension, that of practical involvement. My call to arms to our governing Council is, please, can you urgently consider these suggestions and establish a Working Panel or Regional Panels, or both, with the sole objective of conserving our threatened fauna and localities through the direct efforts of our members under the auspices of our Society.

Malcolm Simpson (4859)

The AES Conservation Committee is anxious for more members to play an active role in insect conservation and it is corresponding with and supporting the efforts of members in local projects. Most of these projects involve the protection of habitats from changes in land use etc., and they tend to rely heavily on the enthusiasm of one or two local members who are willing to do survey work and to keep up contact with local authorities and conservation bodies.—
Editor.

For reserve management of the type referred to in Mr. Simpson's article, we need more willing members than usually live within reach

of the sites. However, Naturalists' trusts and the Conservation Corps are able to do this work, and it is most important that the work should be done in a way which takes adequate account of insect habitat requirements. This can be achieved most effectively if entomologists become active members of their local trusts and if they take advantage of the ideas and information available through correspondence with our own Conservation Committee and its newsletter, "Insect Conservation News".

David Lonsdale (4137)
(AES Habitat Conservation Officer)

As from 1st January 1980, the AES set up a new Conservation Committee to direct the Society's policy and activities in the conservation of insects and their habitats. We hope to have more regional involvement, both from members and other organisations concerned in insect conservation. We hope to publish more news shortly. The specific situations of *machaon* and *dispar* are more complex. Availability of foodplant is certainly not the only factor in the survival of these insects, indeed the failure of *machaon* at Wicken Fen is still improperly understood, but recent research by Dr. Dempster has shown that the recent dry state of the fen inhibits growth of the foodplants so that, fully grown, they are below the general surrounding vegetational level whereas *machaon* only seems to be able to find and oviposit on its foodplants when they stand at least six inches proud of their surrounding competitors.—Editor.

ORTHOPTERA IN THE HIGHLANDS OF EASTERN FRANCE

There was no planned itinerary: my wife and I simply decided to travel and camp as we felt inclined and not burden ourselves with that wrecker of so much enjoyment on holidays, The Schedule. From our landing in Dieppe on 2nd September we might eventually have gazed upon the Mediterranean or the distant Pyrenees; in fact we did neither, but were not disappointed.

The first (sunny) day was spent on chalky, forest-topped Normandy uplands a few kilometres south of our starting point. These fine hills suggested less-spoiled parts of the North Downs, but were on a larger and more complex scale altogether. The second was spent racing eastwards along the brand new Autoway of the East, under chilly grey skies; beset on either hand with incongruously placed, brightly coloured objects which resembled a child's set of wooden building blocks enormously enlarged. To our way of thinking they were created by minds with no conception of landscape values; but as the route cut through endless distances of intensive farming they doubtless served to keep regular travellers from dozing: anyhow this fine motorway took us quickly and conveniently to the most northerly of the real mountains in this part of Europe, the Vosges.

The Vosges comprise a substantial range of spruce-clad granite hills with most of the open pasture land above a thousand metres. We stayed in a camp site by the lake at Géradmere, adjacent to which was some undeveloped swampland rich in orthoptera; but the best finds here were made at higher level, along the justly celebrated Route des Crêtes, south to the highest point in the range, the tourist desecrated Grand Ballon, of just under fifteen hundred metres.

Immediately south of the Grand Ballon we camped on a long-derelict field-terrace by a back road to the village of Geishouses. This site proved an excellent place for orthoptera including both *Tettigoni*as, which occurred unexpectedly together. From Geishouses we aimed towards the limestone Jura, staying in the municipal camp site at Champagnole on the way. Rough limestone grassland in as yet undeveloped building plots adjacent to the camp provided some good records for both orthoptera and lepidoptera.

The vicinity of the Jura mountains was disappointing simply because so much of the approach to the higher pastures has been sold off as private plots for holiday chalets, where every discouragement (including ferocious dogs and wire entanglements) is offered to casual intruders. However a long-disused limestone quarry on the eastern flanks of the mountains, above the village of Thoiry was rewarding—also seemingly good for butterflies as well as orthopterons.

After this rather unsatisfactory introduction to the Juras we decided to head at once for the High Alps, via Bellegarde and tourist-haunted Annecy.

Beyond Annecy real alps begin and as altitude increased the orthoptera changed. A rich and noisy assemblage of upland species was found in cut hay meadows around the winter chalets on the slopes of the Aravis. At the Plateaux de la Croix beyond St. Nicholes de Verence a similar assemblage of orthoptera species was found—this time backed by the close-up spectacle of the western face of Mont Blanc, on a perfect summer day. *Decticus verrucivorus*, *Tettigonia cantans* and the dark-winged grasshopper *Stauroderus scalaris* were the noisiest of the orthoptera found in both places.

For the next few days we based ourselves at the delightful town of Beaufort. The camp site itself provided the (orthopteran) highlight of the trip in rare little *Meconema meridionale*, a female specimen of which was found in one of the compartments of the gent's loo. An excellent orthopteran fauna was also found in various places in scrub and pasture around and beyond the the spectacular Barrage de Roseland, which is set in impressive limestone mountains—outliers of Mt. Blanc—itself visible in the distance to the north-east. Here scarlet-winged *Psophis stridulus* was common, and very conspicuous as it flew off making its distinctive clicking flight "call".

SITE 9. COL DE LA CROIX-FRY
WINTER CHALETS ON THE SLOPES OF THE ARAVIS
AN AREA RICH IN ORTHOPTERA



South again, this time into the really high alps, over the Col de l'Isèran, where the motor road is above two thousand five hundred metres at the Point du Grand Plan. This area is noteworthy for its alpine plants—most of which were of course long over, but the few orthoptera found were very interesting high alpine species. We then went from one high alpine zone to another, via an overnight stop at the camp

site at Lanslevillard below the enormous complex of the Mont Cenis, to the south. The camp site itself was backed by a highly scenic ravine, the rocky sides of which were in themselves a natural rock garden. Here the Great green bush-cricket, *Tettigonia viridissima* must be at one of its highest stations in Europe. We travelled not over the Mont Cenis to Italy but down the warm valley of the Arc, through the town of Modane (interesting to railway enthusiasts, as the French end of the car-ferrying Frejus railway tunnel to Italy) and on to the St. Michel-de-Maurienne, where we turned off *via* Valloire for the stupendous views of the Meije and Barre de Ecrins from the Col du Galibier—another noteworthy place for both its flora and its high alpine orthoptera. The last part of the holiday was spent in warmer terrain (beyond Briançon) in the environs of the Lac de Serre-Ponçon; our base being the very convenient S.I. Provence camp site at Gap. The flora here included much wild lavender and sea buckthorn amongst the ubiquitous juniper. It had the look and smell of the now not-so-distant maquis. The orthoptera matched the terrain: grasshoppers with blue, red or yellow wings were frequent and the preying mantis was much in evidence.

The return journey up the Rhône valley included one final search for orthoptera, in a sort of country-park near Beaumont-les Valence, where in fact the list of species found was one of the longest of all from any of the sites visited—although not strictly within the title of these notes, as it was outside the upland zone.

Species recorded (English names given only for species occurring in Britain). Species with readily identifiable stridulations are marked*. Species with distinctly alpine distributions (above 1000 metres) are marked+.

Dictyoptera

Mantodea; Manteidae, Manteinae

Mantis religiosa L.

Orthoptera, (=Saltatoria)

Ensifera: Tettigonioidea, Tettigoniidae (Bush-crickets)

Meconematiniae

Meconema meridionale, Costa

Tettingoniinae

Tettigonia cantans (Fuessly) † *

Tettigonia viridissima L., Great green bush-cricket *

Dectinae

Decticus verrucivorus (L.) Wart-biter † *

Platycleis albopunctata (Goeze), Grey bush-cricket

Platycleis tessellata (Charpentier)

Metrioptera brachyptera (L.), Bog bush-cricket

Metrioptera saussuriana (Frey-Gessner) +

Metrioptera bicolor (Philippi)

Metrioptera roeselii (Hagenbach) Roessel's bush-cricket +*

Pholidoptera griseoaptera (Degeer) Dark bush-cricket +*

Anonconotus alpinus (Yersin) +

Antaxius pedestris (F.)

Conocephalinae

Conocephalus discolor (Thunberg) Long-winged Cone-head

Ruspolia nitidula (Scopoli), (syn. *Homorocoryphus nitidulus*) *

Phaneropterinae

Phaneroptera falcata (Poda)

Leptophyes punctatissima (Bosc) Speckled bush-cricket

Polysarcus denticauda (Charpentier), (syn. *Ophania denticauda*) +*

Ephippigerinae

Ephippiger ephippiger (Fiebig) *

Grylloidea: Gryllidae (Crickets),

Nemobiinae

Nemobius sylvestris (Bosc) Wood Cricket *

Gryllinae

Gryllus campestris L. Field Cricket *

Oecanthinae

Decanthus pellucens (Scopoli) *

Caeliferae: Acridoidea, Acrididae (Grasshoppers)

Catanopinae

(A fascinating, world-wide group, probably of ancient lineage with many wingless alpine species in cooler regions such as New Zealand and Europe).

Pezotettix gionai (Rossi)

Melanoplus frigidus (Bohemian) +

Podisma alpina (Kollar) +

Podisma pedestris (L.) +

Calliptamus italicus (L.)

Calliptamus barbarus (Costa)

Oedipodinae

(Generally strong-flying grasshoppers, often with highly coloured hind wings. Locusts belong to this sub-family).

Psophus stridulus (L.) +*

Oedalus decorus (Germer)

Locusta migratoria L., solitary form.

Oedipoda coerulescens (L.)

Oedipoda germanica (Latreille)

Sphingonotus coerulans (L.)

Acridinae

(Most British species belong to this sub-family, comprising generally small, but noisy, sedentary grasshoppers).

Parapleurus alliaceus (Germer)

Chrysochraon dispar (Germer)

Euthystira brachyptera (Ocskay) +

Stenobothrus lineatus (Panzer) Stripe-winged grasshopper *

Omocestus viridulus (L.) Common green grasshopper +*

Omocestus rufipes (Zetterstedt) Woodland grasshopper *

Stauroderus scalaris (Fischer Waldheim) +* — a very noisy species indeed; its raucous stridulation being one of the most distinctive sounds of the mountain pastures in late summer. Has distinctive dark grey hind wings.

Chorthippus vagans (Eversman), Heath grasshopper *

Chorthippus brunneus (Thunberg), Field grasshopper *

Chorthippus biguttulus (L.) *

Chorthippus mollis (Charpentier)*

Chorthippus albomarginatus (Degeer), Lesser marsh grasshopper*

Chorthippus parallelus (Zetterstedt), Meadow grasshopper*

Euchorthippus declivus (Bristout) *

Myrmelbotettix maculatus (Thunberg), Mottled grasshopper +*

Gomphocerippus rufus (L.), Rufous grasshopper *

Gomphocerus sibericus (L.) (syn. *Aeropus sibericus*) +*

Aeropedellus variegatus (Fischer Waldheim) +

Dociostaurus genei (Osckay)

Notes on Sites Investigated

1. Col de le Gros Pierre (5,06/53,35) Vosges, 750m. 4/9/79.

Species located: *Chorthippus biguttulus*; *C. parallelus*; *Decticus verrucivorus*; *Euthystira brachyptera*; *Metrioptera roeselli*; *Omocestus viridulus*; *Tettigonia cantans*.

An attractive scrub and bracken covered hillside with partially disused granite quarry seemingly especially attractive to the orthopteran population here. Much bilberry and winged-broom present in the ground layer.

2. Ramberchamp, Gérardmer (5,01/53,41) Vosages, 665m. 5-6/9/79.

Species located: *Chorthippus albomarginatus*; *C. biguttulus*; *C. parallelus*; *Chrysocharon dispar*; *Euthystira brachyptera*; *Metrioptera roeselli*; *Omocestus rufipes*; *Parapleurus alliaceus*; *Tettigonia cantans*.

An "undeveloped" lakeside, marshy meadow with bistort, rushes, purging buckthorn and sallows: a pocket obviously still rich in wild life despite housing, campsite and playing field development all around.

3. Summit ridge of Haut de Phen (4,97/53/38) Vosges, 1004m. 5/9/79.

Species located: *Chorthippus brunneus*; *C. parallelus*; *Euthystira*

brachyptera; Metrioptera brachyptera; M. roeselli; Omocestus viridulus; Tettigonia cantans.

Open, ling and bilberry covered ground surrounded by a mixture of natural spruce and beech forest. *M. brachyptera* was virtually confined to places where ling and purple moor grass occurred. *C. brunneus* appeared to be restricted to vicinity of footpaths and collapsed dry stone walls.

4. Strass Whur Common, Montabey (5,20/53,39) Vosges, 1200m. 6/9/79.

Species located: *Chorthippus parallelus; Metrioptera brachyptera; M. saussuriana; Omocestus rufipes; O. viridulus; Podisma alpina; Polysarcus denticauda.*

Open sheep-grazed pasture with dense clumps of bilberry (the main cover for the green *P.denticauda*) surrounded by rather stunted high-level beech forest. The stridulation of the strange-looking and bulky *P. denticauda* was a fascinating sound: "z z z z z — PHUT — z z z z z z", etc. continuing for long periods, with "explosive" breaks in the constant buzzing.

5. Tête du Chien (5,25/53/20) Vosges, 1237m 6/9/79.

Species located: *Metrioptera saussuriana; Podisma alpina; Polysarcus denticauda.*

The hill is a conspicuous feature of the southern end of the Route des Crêtes; sheep and cattle grazed pasture above the tree line with much bilberry, yellow gentian *Gentiana lutea L.* and alpine pasque flower (*Pulsatilla alpina L.*) in evidence. There were quite a number of butterflies on the wing including swallowtail (*Papilio machaon L.*), small, dark *Erebia* species, and many small coppers (*Lycaena phlaeas L.*).

6. Derelict Pasture near Geishouses (5,30/53,21) Vosges, app. 700m. 7/9/79.

Species located: *Chorthippus biguttulus; C. parallelus; Decticus verrucivorus; Ephippiger ephiggiger; Euthystira brachyptera; Gomphocerippus rufus; Gryllus campestris; Metriptera bicolor; M. roeselii; Nemobius sylvestris; Omocestus rufipes; O. viridulus; Pholidoptera griseoaptera; Tettigonia cantans; T. viridissima.*

Rough grassland by a minor road on a south facing slope with scattered scrub and neglected orchard trees — an excellent locality for orthoptera, especially interesting in that the two *Tettigonia* species occur together.

7. Building plots adjacent to the Municipal Camp site at Champagnole (3,98/51,97). 8/9/79.

Species located: *Chorthippus biguttulus; C. parallelus; Chrysochroa dispar; Decticus verrucivorus; Euthystira brachyptera; Gomphocerippus rufus; Gryllus campestris; Metrioptera bicolor, M. roeselii; Nemobius sylvestris; Omocestus rufipes; Stenobothrus lineatus; Tetti-*

gonia viridissima. Also *Acheta domesticus* (L.) in the camp buildings. Rough, pony-grazed limestone grassland with rough, gappy hedges, on a southfacing incline. Butterflies noted included both Chalkhill and Adonis blues (*Lysandra coridon* Poda and *L. bellargus* Rottemburg) in good numbers.

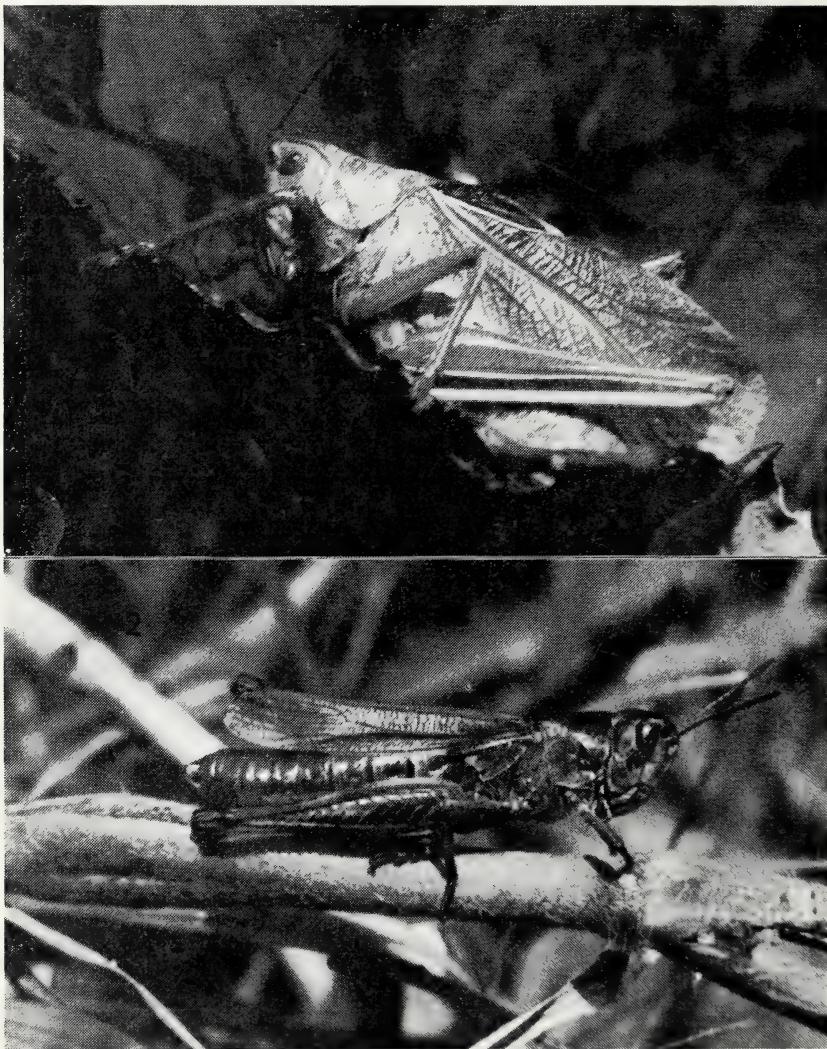


Fig. 1 Tireless songster of sub-alpine scrubland, a male *Tettigonia cantans*. Site 9.

Fig. 2 A male of the noisy *Strauroderus scalaris*, a characteristic mountain pasture species from site 9.

8. Disused limestone quarry near Thoiry (4,04/51/38) Jura 650m. 9/9/79.

Species located: *Chorthippus biguttulus*; *C. mollis*; *Chrysoschroa dispar*; *Euchorthippus declivus*; *Euthystira brachyptera*; *Gomphocerippus rufus*; *Gryllus campestris*; *Metrioptera bicolor*; *Nemobius sylvestris*; *Omocestus rufipes*; *Oedipoda germanica*; *Phaneroptera falcata*; *Pholidoptera griseoaptera*; *Platycleis albopunctata*; *Stauroderus scalaris*; *Stenobothrus lineatus*; *Tettigonia cantans*.

Scrub and grass in long-disused and extensive limestone quarry — obviously an excellent locality for orthoptera. Butterflies also conspicuous including large satyrids which I took to be *Hipparchia fagi* Scopoli.

9. Col de la Croix-Fry (4,50/50,97) Chaine de Aravais, 1450m. 11/9/79.

Species located: *Chorthippus biguttulus*; *C. mollis*; *C. parallelus*; *Decticus verrucivorus*; *Metrioptera saussuriana*; *Omocestus viridulus*; *Stauroderous scalaris*; *Stenobothrus lineatus*; *Tettigonia cantans*.

Typical alpine hay meadow, now being extensively developed for the ski "industry", with rentable chalets, lifts etc. in what must until recently have been rather remote and quite unspoilt mountainside. Luckily France is very big and the extent of its mountains enormous, relative to what we have in this country, but the visible development of chalet "towns" and lifts in the Alps, from the Vosges southwards, is very noticeable now as it seems so often to be in otherwise most attractive places.

10. Manant; Gorge de l'Arondine (4,65/50,93) 1000m. 11/9/79.

Species located: *Chorthippus parallelus*; *Chrysocroa dispar*; *Euthystira brachyptera*; *Metrioptera roeselii*; *Pholidoptera griseoaptera*; *Tettigonia cantans*.

Riverside banks and meadowland with large quantities of coltsfoot and meadow saffron, surrounded by beech and spruce forest.

11. Plateaux de la Croix, St. Nicholes de Verence (4,84/50,95) 1500m. 12/9/79.

Species located: *Chorthippus parallelus*.

Decticus verrucivorus; *Euthystira brachyptera*; *Metrioptera roeselii*; *M. saussuriana*; *Omocestus rufipes*; *Pholidoptera griseoaptera*; *Stauroderus scalaris*; *Tettigonia cantans*.

Steeply sloped alpine meadowland interspersed with spruce woods and a stunning view of Mont Blanc to the east.

12. Camp site at Beaufort (4,72/50,80) 743. 12-14/9/79. Species located:

Chorthippus biguttulus; *C. parallelus*; *Gomphocerippus rufus*; *Meconema meridonale*; *Metrioptera roeselii*; *Omocestus rufipes*; *Parapleurus alliaceus*; *Pholidoptera griseoaptera*; *Tettigonia cantans*.

Grassy fields and hay meadows by a river, set in mixed spruce-deciduous woodland. Alders by river.

13. Col de Meraille (4,80/50,78) 1700m. 13/9/79.

Species located: *Chorthippus biguttulus*; *C. parallelus*; *Decticus verrucivorus*; *Euthystira brachyptera*; *Psophus stridulus*; *Stauroderus scalaris*; *Stenobothrus lineatus*; *Tettigonia cantans*.

Steep cattle-grazed mountain-side pasture above the Barrage de Roseland with marshy pockets and much exposed limestone rock. A rich alpine flora noted, including much *Sedum* spp.—ideal “Apollo country by the look of it.

14. Col du Pré (4,77/50,77) 1700—1900m. 13/9/79.

Species located: *Chorthippus biguttulus*; *C. parallelus*; *Decticus verrucivorus*; *Euthystira brachyptera*; *Metrioptera roeselii*; *Omocestus rufipes*; *Podisma alpina*; *Psophus stridulus*; *Stauroderus scalaris*; *Tettigonia cantans*.

Mountain pasture and small outcrops of lime-free rocks with ericaeuous shrubs and areas of spruce woodland.

P. alpina seemed to be confined to these places.

M. saussuriana was anticipated but not located.

15. Bondin (4,76/50,76) 1200m. 13/7/79.

Species located: *Chorthippus biguttulus*; *C. parallelus*; *Chrysochraon dispar*; *Decticus verrucivorus* including an all-brown specimen; *Gomphocerippus rufus*; *Omocestus rufipes*; *Pholidoptera griseoaptera*; *Stenobothrus lineatus*; *Tettigonia cantans*.

Limestone pasture, spruce and beech woodland and streamside scrub with much raspberry. *P. griseoaptera* seemed restricted to this latter area.

16. Pont du St. Charles, Isère (5,15/50,42) 2011m. 14/9/79.

Species located: *Chorthippus parallelus*; *Gomphocerus sibericus*; *Metrioptera saussuriana*; *Podisma alpina*; *Stenobothrus lineatus*.

Cattle-grazed mountain pasture with scattered aspen and scrub along the streamsides. This site was virtually at the tree-line. *G. sibericus*, the males of which have swollen front legs, is a most engaging and interesting grasshopper — its stridulation sounding not unlike a stone trapped in a tyre.

17. Point du Grand Plan, Col de l'Isèran (5,27/50,48) 2528m. 14/9/79.

Species located: *Gomphocerus sibiricus* dwarf form; *Podisma pedestris*.

Scanty vegetation composed of a rich alpine flora.

18. Camp Site at Lanslevillard (5,09/50,35) 1179m. 14-15/9/79.

Species located: *Chorthippus biguttulus*; *C. parallelus*; *Tettigonia viridissima*.

Fig. 3 A male *Gomphocerus sibiricus* in courtship attitude; note the “boxing gloves” adjoining its front legs. Site 16.

Fig. 4 A colourful Burnet moth on wild lavender. Probably *Zygaena fausta*: Site 25.



Rich alpine pasture and juniper scrub. A very high altitude for *T. viridissima* and *T. cantans* was anticipated but not located.

19. Orelle (Valley of the Arc) (4,68/50,23) app. 750m. 15/9/79.

Species located: *Chorthippus biguttulus*; *Metrioptera bicolor*; *Pholidoptera griseopatera*; *Platycleis albopunctata*.

Steep, scrubby south-facing hillside above deep river valley.

20. Col du Telegraphe (4,58/50,22) 1570m. 15/9/79.

Species located: *Chorthippus biguttulus*; *C. parallelus*; *Omocestus viridulus*; *Podisma alpina*; *Psophus stridulus*; *Stauroderus scalaris*.

High level pasture and rocky scrubland; also a splendid view point to the north.

21. Col du Galibier (4,53/50,07) 2,400-2,600m. 15/9/79.

Species located: *Aeropedellus variegatus*; *Anonconotus alpinus*; *Gomphocerus sibericus*; *Melanoplus frigidus*; *Podisma alpina*; *G. sibericus*.

Scanty herbage rich in both alpine plant species and alpine orthoptera. A stupendous view of the Meije and Ecrins to the West.

22. Col du Lautaret (4,54/50,04) 2038m. 15/9/79.

Species located: *Chorthippus brunneus*; *C. biguttulus*; *Decticus verrucivorus*; *Myrmeleotettix maculatus*; *Podisma alpina*.

Low scrub and rough sheep grazed pasture with a famously rich alpine flora. This must be about the altitude limit for *D. verrucivorus*. No sign of *C. parallelus* or *M. saussuriana*, both of which were anticipated, whereas *C. brunneus* was unexpectedly found.

23. Wasteland by N 94 near Crots (4,59/49,47) app. 500m. 16/9/79.

Species located: *Antaxius pedestris*; *Chorthippus biguttulus*; *Ephippiger ephippiger*; *Oedipoda coerulescens*; *O. germanica*; *Sphingonotus coerulans*.

Semi-maquis scrubland of juniper, sea buckthorn, lavender, thyme etc., with scattered clumps of grass over very rocky terrain. A complete contrast to the near-by mountain floras.

24. S. I. Provence camp site at Gap (4,16/49,26) 450m. 16-19/9/79.

Species located: *Chorthippus biguttulus*; *C. brunneus*; *Epippiger ephippiger*; *Euchorthippus declivus*; *Leptophyes punctatissima*; *Nemobius sylvestris*; *Decanthus pellucens*; *Oedipoda coerulescens*; *Omocestus rufipes*; *Tettigonia viridissima*.

The camp, just off the N 85, 3 km out of Gap towards Sisteron is set in a landscape of light industry with the usual association of rough, neglected grassland and old hedgerows. Such terrain is usually good for orthoptera, as many species naturally inhabit warm steppe-lands or wood margins and light industrial development is often surrounded by this type of vegetation, which becomes virtually permanent around the yards and tips.

25. Rocky scrubland by a stream beyond the west end of the tunnel on the D 954 road; Pont du Villaret to le Sauze (4,44/49,41); river level, 17/9/79.

Species located: *Chorthippus biguttulus*; *C. vagans*; *Calliptamus barbarus*; *Euchorthippus declivus*; *Gryllus campestris*; *Nemobius sylvestris*; *Metrioptera bicolor*; *Oecanthus pelluscens*; *Oedaleus decorus*; *Oedipoda coeruleascens*; *O. germanica*; *Omocestus rufipes*; *Platycleis albopunctata*; *Sphingonotus caerulans*; *Stenobothrus lineatus*; *Tettigonia viridissima*; *Mantis religiosa*.

Rough grassland, scrub and rocky streamsides on limestone just by the point where the Ubaye flows into the South-eastern arm of Lac de Serre-Poncon. The area here is obviously very rich in insect life generally. A number of lepidoptera were noted including many freshly emerged Burnet moths — probably *Zygaena fausta* (L.), clustering around the flowers of the wild lavender — a Clouded yellow, *Colias sp*: butterfly and a large satyrid, either *Hipparchia fagi*, Scopoli or *H. alcyone* Schiffermueller were also seen.

26. Vicinity of the public beach at St. Michael's Bay. Lac de Serre — Poncon (4,42/49,44) 17/9/79.

Species located: *Chorthippus biguttulus*; *Euchorthippus declivus*; *Gryllus campestris*; *Metrioptera bicolor*; *Nemobius sylvestris*; *Omocestus rufipes*; *Platycleis albopunctata*; *Tettigonia viridissima*.

Grassy meadows and rough hedge banks by one of the few public access points to the lakeside, on this north shore. The interesting homopteron of the family Dictyopharidae, *Epiptera europaea* was also found here.

27. Swamp and reed-filled ditches by the D 900B (4,41/49,45) 17/9/79.

Species located (in wet area): *Chorthippus parallelus*; *Concephalus discolor*.

These species appeared to be completely restricted to this wet area; obviously the need for relatively moist atmosphere is one of the few factors which restricts the distribution of *C. parallelus*, otherwise so widespread in many kinds of habitat.

28. 'Recreation' Common land by D 538A near Beaumont-les-Valence (2,90/49,86) 139m. 19/9/79.

Species located: *Chorthippus brunneus*; *Calliptamus italicus*; *Dociostaurus genei*; *Euchorthippus declivus*; *Gryllus campestris*; *Locusta migratoria* (solitary form); *Nemobius sylvestris*; *Oedaleus decorus*; *Oedipoda coeruleascens*; *Omocestus rufipes*; *Pezotettix giornai*; *Platycleis albopunctata*; *P. tessellata*; *Ruspolia nitidula*; *Tettigonia viridissima*; *Dictyoptera* — *Mantis religiosa*.

Sandy "common" land with mainly leguminous scrub and short grass and stands of mature oak and planted conifers. Obviously a first-rate locality for orthoptera. Descriptions of some of the more interesting species mentioned will be included in a further report.

ACKNOWLEDGEMENTS

I am especially grateful to Dr. David Ragge and to Mrs. Linda Pitkin of the British Museum (Natural History) for identifying specimens of those species for which my own reading of Chopard proved inadequate and for up-dating the nomenclature where necessary; and to my wife Jane for much needed assistance in both locating and securing or photographing specimens in the field.

E. C. M. Haes (5849)

REFERENCE

Chopard, Lucien (1951), *Faune de France*, 56; Orthopteroïdes.

SYCHNANT PASS, NORTH WALES, JULY 1979

During a week's hectic bug hunting in North Wales last year, we made a trip to one of North Wales' better known localities, Sychnants Pass near Penmaenmawr, known for two Welsh specialities: *Amathes ashworthii* Doubl. and *Sterrhia eburnata* ssp. *britanniae* Mull.

By the time myself, Peter Walley, Mr. H. N. Michaelis, and Mrs. J. Rees had arrived the wind was howling down the pass, it was cold and threatening rain. During the preliminary walk round I decided to try and knock something up from the heather; all I managed to do was put my foot in a wasps nest and subsequently be chased by some rather angry inhabitants! After I managed to escape unscathed it was suggested that we set up both the actinic lights back near the cars. Under Mr. Michaelis's instruction we put one on a flat grassy path and the other against a rocky slope, both having sheets under them.

Twilight came, the wind didn't drop, and an ominous looking moon made intermittent appearances. This was a night that I would never have dreamt of leaving a nice warm house had I been back down south.

By 11.15 p.m. only a few moths had turned up, these included a pair each of *Hepialus fusconebulosa* de Geer and *Eupithecia nanata* Prout, and one battered *Apatele menyanthidis* View. It looked as if I was right to be pessimistic.

After a short lull in activity a couple of moths appeared from nowhere, both danced tantalisingly round the light and then disappeared into the surrounding rocks; a few seconds later one of them reappeared, again danced round the light and this time settled on the sheet, for me to see that it was only an *Apatele rumicis* L. Just as the disappointment sunk in, the other moth returned and settled on the sheet, it looked different and with renewed vigour I fumbled for a box, just as I found a box it again took off. I think most bug hunters know what this is like! Luckily all it did was fly around the light and settle again to be successfully boxed. I scrambled down the slope to the car where Mr. Michaelis confirmed my suspicion, a fresh *Amathes ashworthii*.

I was pleased to get one, and didn't expect to see any more, but by the time we packed up, 12.15 a.m., we had seen seven of them and, further, a moth which in the fading torchlight appeared to be a dark *ashworthii*, on returning home turned out to be an unexpected bonus since it was an *Ammogrotis lucernae* L.

Between the two traps only 23 moths had been seen, 22 of these at the light in the rocky situation and a single *Colostygia pectinaria* Knoch at the other trap. It was also interesting to note that *ashworthii* was the commonest moth taken, Mr. Michaelis supported this observation as on a previous occasion he had noted 45 of them within half an hour. From this it would seem that this Welsh speciality appears to be in no danger from over collecting in this locality.

Acknowledgements

My thanks to Peter Walley for inviting me along with him to stay with his relatives; the Rees family for putting up with me and especially Mrs. J. Rees for driving myself and Pete to localities and staying up to some unsociable hours. My thanks to Mr. P. Crow, Mr. T. Poole and Mrs. J. Morgan for suggesting localities to visit and a special thank you to Mr. H. N. Michaelis who took us to some exact localities including the one just written about, and also to all Mrs. Morgan's friends who rustled up a socket for my MV light!

M. Parsons (5983)

FURTHER NOTES ON THE STATUS OF VESPA CRABRO AND VOLUCELLA ZONARIA

Since my article on the hornet and *V. zonaria* was published (*Bull. amat. Ent. Soc.* 38: (1979) 3-6) I am indebted to several members of the Society who have sent me records of sightings of these two insects made in recent years. Although I have not seen either species myself since leaving the London area in 1968, it is interesting to know that they are still to be found, although probably in smaller numbers than in the period of comparative abundance in the 1940's and 50's. Records for the last decade are as follows:—

VESPA CRABRO L.

Devonshire. 1978 Bovey Tracey (S. R. Miles (4415), P. Williams (4965), exact locality not stated).

Hampshire. 1978 New Forest (S. R. Miles, P. Williams, G. S. Vick (4942)).

Suffolk. 1979 Brandeston (S. R. Miles).

Cambridgeshire. 1979 Cambridge area (S. R. Miles informed by P. Yeo).

Shropshire. 1977-8 Pontesbury; Earls Hill; Roden; Tenbury Wells. (D. J. Smith (4535)).

Herefordshire. 1971 Lugardine. (M. R. Young (3759)).

Kent. 1979 Ashford (P. Hogben (6494J)).

V. ZONARIA Poda

Middlesex. 1976 Strawberry Hill; Feltham. (S. R. Miles).

Kent. 1970's Petts Wood (P. Williams).

Essex. 1970 Bromley-by-Bow (J. H. Davidson (4548)).

There are also a number of records for Essex extending from 1953 to 1968 listed by Payne (1973-74).

Members interested in the subject are also referred to a paper by K. G. V. Smith (1974) which includes a distribution map of *V. zonaria* and histograms illustrating the relative abundance and scarcity with that of wasps, over the years from 1920 to 1972.

B. R. Stallwood (1547)

REFERENCES

- PAYNE, R. M. (1974) The Hoverflies of Essex *The Essex Naturalist* 33. (Pt. 2)
SMITH, K. G. V. (1974) *Volucella zonaria* and its relation with Wasps. In *The Changing Flora and Fauna of Britain*. Hawkesworth, D. L., (Ed.), Academic Press, London & New York.

NOTES ON BREEDING THE SPANISH FRITILLARY

As recorded elsewhere I collected larval webs of this species (*Euphydryas desfontainii*, Godart) in north Spain in the vicinity of Burgos, found feeding on *Knautia* species on an area which appeared to have been very wet earlier in the year. I placed the web, on my return to England, on a growing teasel plant, *Dipsacus fullonum*, a plant I use for breeding *E. aurinia*. By the end of August the larvae had disappeared into the debris around the base of the plant. Examination did not find the typical *E. aurinia* type of purse web and it seems that the larvae hibernate in the loose soil. Early spring examination did not discover any larvae but as soon as March arrived and we had the first warm sunshine I observed a large number of black larvae up sunning. Soon they started to feed and in appearance and habit they now closely followed the *aurinia* larvae which were housed in nearby breeding tubs. Little difference was observed until the final instar when it was observed that *desfontainii* is much more distinctly marked with the white speckling that occurs as a dorsal band and as a band on each side of the body. The effect of this was to make the appearance much more spectacular and the final size was distinctly more robust and longer than *aurinia*. Pupation took place after the larva had spun a web platform or small web tent within which it hung itself to make the final transformation. The pupa appeared to be indistinguishable from that of *aurinia* though larger. Pupation was completed by all the larvae by the 8th May and the first imagines appeared by the 21st May, the pupal period being about 21 days. The insects are extremely handsome and there is considerable variation in ground colour and marking in the females though the males seemed much less variable.

I placed six pairs into a small breeding tub with a potted devil's-bit scabious plant, *Succisa pratensis*, together with flowers of chive for the butterflies to feed on. I observed three pairings and egg masses were laid on the underside of the leaves in the same way as are those of *aurinia* and like them they are yellow turning to dark brown after a few days and then to a purplish tint. I hope to be able to continue to breed the stock.

About the same time I had emerge some *E. aurinia provincialis* from Var, France and I placed three females in with three males of *E. aurinia aurinia* (ex West Sussex stock) and all three mated and have laid fertile eggs. I hope that I shall be able to let our members know of the result of this experiment in due course.

P. W. Cribb (2270)

NOTES AND OBSERVATIONS

Worms in larvae—While recording the insect population of a woodland in North Dorset in May 1980 I took a "looper" larva feeding on oak in the hope of later identifying the species.

The larva had grown in captivity to 30 mm when a 145 mm tapeworm emerged, leaving it looking rather sad. Two days later a dark red parasite pupa appeared and the larva died as a result of the overwhelming odds.

Although I have studied lepidoptera for many years I had not previously encountered the phenomenon of the worm and wondered whether it was unusual. I further wondered whether the worm might have derived indirectly from bird excreta, there being a good chance of such larvae being taken by birds and perhaps fed to their young.

P. R. Grey (2820)

[This tapeworm is probably a nematode of the genus *Mermis*. These are well known as parasites of grasshoppers and locusts so a record from a lepidopteran is indeed unusual.—Editor.]

Import Control on Bees—In the November issue last year the attention of members was drawn to the serious threat posed to the honey bee by the mite *Varroa jacobsoni* and the measures proposed to combat it. These measures have now become law and as from 1st July last it is now prohibited to import any bees belonging to the genus *Apis* unless an import licence has been issued for them. Anyone who infringes these regulations will be liable to a maximum fine of £1000. Application for licences must be made to the Ministry of Agriculture, Fisheries and Food, Room 170, Great Westminster House, Horseferry Road, London SW1P 2AE. This information was communicated to us by the new General Secretary of the British-Keeper Association, Dr. John Feltwell, 35 Fishers Road, Staplehurst, Kent TN12 0DD.

Record of Lime Hawk from Yorkshire—I read with interest an article in "Notes and Observations" in the February '80 bulletin from A. J. Gillery. He notes that South's "Moths of the British Isles" records only one capture of the Lime Hawk moth (*Mimas tilae* L.) from the county of Yorkshire, and states that in June this year he captured one in York in a light trap. I would like to add that on 21st June, 1976 I captured a male Lime Hawk (also by light trap) in Willerby, Hull, Yorkshire—the specimen had obviously been on the wing some time as it was fairly worn.

Other interesting captures consisted of The Scorched Wing (*Eurymene dolabraria*), at light on 16th June, 1976 (a single specimen), a Golden Plusia (*Plusia moneta*) on 14th July, 1976, also at light, and a single Vapourer (*Orgyia antiqua*) on 20th September, 1976 at light. All the above were from Willerby in Kingston-upon-Hull, Yorkshire.

Karen Gallon (6387)

Notes on occurrence of the Painted Lady butterfly in Southern England

—Two observations of this fitful insect I have made over the last few years may be of interest to readers. On the 12th of May, 1980 while walking with Paul Thornton in Bramshill plantation near Eversley, Hampshire, we noticed a fresh Painted lady (*Vanessa cardui* L.) on a patch of Knapweed flowers which were growing in a wide ride which cuts through the wood. We refrained from taking it and took some photographs, then a few minutes later two more, much more worn, turned up on the same patch of Knapweed.

These specimens may have been early migrants to this country but three in one place at the same time in the middle of a Forestry Commission plantation in May is unusual.

The last time I observed this insect in Britain was on the 10th August, 1976 at Coombe Bottom near Worth Matravers, Dorset. On that day quite a few were seen on the hillside and a number were observed flying northwards up the valley which leads from the sea less than 2 Km away.

David Rees (1510)

Clouded yellow in Cambridgeshire—My fourteen year old son Stuart sighted a male specimen of *Colias crocea* Geoffroy, in our back garden at Wistow, near Huntingdon, on the 15th June, 1980 at 15.00 hours.

He took Clouded yellows on holiday in France last summer and has a specimen in his collection on his bedroom wall. His knowledge of all the British butterflies is good and he is definite on his identification.

M. S. L. Simpson (4859)

An amazing reaction to ants attacking larvae—I obtained ova of *Parnassius apollo* L. from females in Spain during our trip in 1979 and placed these in the refrigerator. Despite the low temperature of storage the eggs hatched just after Christmas, indicating that in the natural state this must be the correct time for emergence, for the temperature

in the Montes Universales in Spain would also be low at this time of the year. The larvae took happily to *Sedum* sp. and as the weather improved I moved one plant in an earthenware flower pot into the garden in a sunny spot. The pot was protected with a fine gauze cover but ants managed to build a nest in the base of the pot via the drainage hole. The ants were *Lasius niger*. The larvae were just into their last instar when the ants turned their attention to the larvae and I found them swarming over those that were in the pot. I quickly removed them and put them into a new pot with foodplant but instead of feeding they immediately buried themselves and pupated. Other larvae which I had kept separately continued to feed for two weeks and grew to full size before pupating. The pupae from those that pupated prematurely were about half-size and although the insects developed inside the pupae and I could observe the wing pattern as they came to maturity, none was able to emerge successfully. I assume that the panic caused by the ant attack triggered off the pupation response as a form of defence. I have observed in the past when beating the larvae of some of the Hair-streaks, particularly *Strymonidia pruni* L., that the shock of beating causes several of the larvae to pupate immediately if they are far enough advanced.

P. W. Cribb (2270)

Anatis ocellata (L.) var. *hebraea* L. (Col. Coccinellidae): an old record—
My article on a specimen of *A. ocellata* var. *hebraea* found in Scotland (1979, *Entomologist's Gaz.*, 30: 21-22) omitted an old record of this variety which Mr. J. Muggleton (pers. comm.) kindly drew to my attention. Fowler and Donisthorpe (1913, *The Coleoptera of the British Islands*, 6 (supplement), London) state that one specimen of var. *hebraea* was taken by B. G. Rye at Oxshott, Surrey, and that it was "unique as British". The date of this capture is not recorded, but presumably it would have been made between 1889 (when Fowler's *The Coleoptera of the British Islands*, volume 3, which included the section on Coccinellidae, was published) and 1913.

A. D. Liston (6983)

Sawflies (Hym., Symphyta) from Loch of the Lowes Nature Reserve, Perthshire —

On 14.6.1980 the Loch of the Lowes Nature Reserve (run by SWT), near Dunkeld, was visited by the Edinburgh Natural History Society. Though weather was not favourable, and it was late in the season for sawflies, many specimens representing 17 species were found in the reserve itself, these are marked with an asterisk in the list. A few species found less than a mile from the reserve boundary are included. Area of reserve surveyed was a damp meadow and its surrounding woodland of natural birch, alder, oak, willow and ash. Determinations are based on Benson (1951-58 *Handbk Ident. Br. Insects*, 6 (2a-c)):

PAMPHILIIDAE.—*Pamphilius vafer* (L.), leaf-rolls with larvae.

ARGIDAE.—**Arge clavicornis* ssp. *expansa* (Klug).

TENTHREDINIDAE.—**Strombocerus delicatulus* (Fall.), **Aneugmenus padi* (L.), **A. fuerstenbergensis* (Konow). **Dolerus aeneus* Hartig, **D. haematodes* Schrank, *D. nigratus* Müller, *Athalia cordata* Lep., **Blennocampa pusilla* (Klug), **Profenus a pygmaea* (Klug), **Eutomostethus luteiventris* (Klug), **Empria liturata* (Gmelin), **Tenthredopsis nassata* (L.), **Rhogogaster punctulata* (Klug), **R. viridis* (L.), **Tenthredo mesomelas* L., **T. balteata* Klug, *T. schaefferi* var. *perkinsi* Morice, **Pachyprotasis rapae* (L.), *Pristiphora lacris* (Hartig), *Euura mucronata* (Hartig), **Phyllocolpa leucosticta* (Hartig), *Pontania briddmannii* (Cameron).

Nearly all of these are common and widely distributed, except for *P. pygmaea*, which may be local north of the Forth-Clyde line (only previous published Highland record from Aberdeenshire: Cooter, *Ent. mon. Mag.*, 1979, 114:96).

A. D. Liston (6983)

Entomological knowledge—1749 style—The whole earth would be overwhelmed with carcasses, and stinking bodies, if some animals did not delight to feed upon them. Therefore when an animal dies, *bears*, *wolves*, *foxes*, *ravens*, and etc. do not lose a moment till they have taken it all away. But if a horse, e.g. dies near the public road, you will find him, after a few days, swollen, burst, and at last filled with innumerable *grubs*, of carnivorous *flies*, by which he is entirely consumed, and removed out of the way, that he become not a nuisance to passengers by his poisonous stench.

When the carcasses of fishes are driven upon the shore, the voracious kinds, such as the *thornback*, the *hound fish*, the *conger eel*, and etc. gather about and eat them. But because the flux, and reflux soon change the state of the sea, they themselves are often detained in pits, and become a prey to wild beasts, that frequent the shores. Thus the earth is not only kept clean from the putrefaction of carcasses, but at the same time by the economy of nature the necessities of life are provided for many animals. In the like manner many *insects* at once promote their own good, and that of other animals. Thus *gnats* lay their eggs in stagnant, putrid and stinking waters, and the grubs that arise from these eggs clear away all the putrefaction; and this will easily appear, if any one will make the experiment by filling two vessels with putrid water, leaving the *grubs* in one, and taking them all out of the other. For then he will soon find the water, that is full of *grubs*, pure and without any stench, while the water that has no *grubs* will continue stinking.

Lice increase in a wonderful manner in the heads of children, that are scabby, nor are they without their use, for they consume the redundant humours.

The beetle kind in summer extract all moist and glutinous matter out of the dung of cattle, so that it becomes like dust, and is spread by the wind over the ground. Were it not for this, the vegetables that lie under the dung, would be so far from thriving, that all that spot would be rendered barren.—From "The Economy of Nature" by Isaac J. Biberg. Upsala 1749. Translated by Benjamin Stillingfleet 1775.

FURTHER NOTES ON HYBRID HAWKMOTHS

After rearing 71 adults of the hybrid between male Poplar hawk (*Laothoe populi* L.) and female Eyed hawk (*Smerinthus occelata* L.) in 1976, I had decided that I was unlikely to find out much more by breeding further examples of this particular hybrid, known as *Smerinthus hybr. hybridus* Steph. However, after writing up some notes for the Bulletin (Fry & Fry 1977) I was intrigued to see several female specimens in the collection donated to the British Museum by R. W. Watson (at present located in his house near Lymington, Hants), since all the specimens I had bred were apparently males. I therefore decided to experiment further with this hybrid in 1978, and was successful in breeding a further 82 pupae from four pairings.

This time when I checked the sex of the pupae I was delighted to find that three of them were female. These duly emerged after a few weeks, but for some unknown reason the remainder decided to over-winter and failed to emerge during the next spring (by the summer of that year they had all died). The three females that emerged do not appear to be wholly female, since although they have the fine antenna that are characteristic of those of the parent species, the genitalia have distinct differences from those of a normal adult. In particular they have some curious additional appendages in the segment in front of the normal sex organs. To date I have not examined these in fine detail as I am reluctant to damage them by dissection. However, I may attempt this if I manage to breed a further series of females in the future. After a cursory examination they appear to be similar to the last specimen described by Tutt on page 453, volume 3, of his British Lepidoptera series (Tutt 1902).

One of these female hybrids is a particularly fine specimen, certainly the finest I have seen—the background colouring of the wings is bright pink, the abdomen is also pink although this is tending to fade with age. The eye spots which are fairly well defined are also tending to pink, and the stripe on the thorax is closer to that of a normal Eyed hawk than is usual with this hybrid.

The same year (1978) I also had a number of other cross pairings as follows:—

1. Male Poplar hawk × female Eyed hawk. This hybrid is known as *Smerinthus hybr. inversa* Tutt, and although two pairings produced fertile ova, I was again unsuccessful in rearing these for similar reasons to those recorded in the previous article.

2. Male Poplar hawk \times female Lime hawk (*Mimas tiliae* L.)—only a few ova laid, all infertile.
3. Male Lime hawk \times female Poplar hawk—again only a few ova laid, all infertile.
4. Male Lime hawk \times female Eyed hawk. This hybrid is known as *Mimas* hybr. *leoniae* Stdfss. In this case the female Lime hawk laid over 120 ova, starting on 24th May, most of which were fertile.

Although the latter hybrid pairing started as the event of the season, it unfortunately turned out to be both frustrating and disappointing as will become evident from the following account of the progress of the larvae. However, as with most studies there are compensating factors in terms of the experience gained and the lessons learnt.

The hybrid *leoniae* larve started emerging on the 3rd June, and the first problem was what foodplant to feed the young larvae on, since the parents apparently have none in common. Initially they were given the choice of a variety of Poplars, Lime and Birch etc., but it soon became apparent that whilst a few would nibble Aspen Poplar (*Populus tremula*), they appeared to have a distinct preference for Lime (*Tilia* sp.) and would hardly touch Poplar in later stages.

Initially the young larvae resembled those of a normal Lime hawk although they were a slightly paler shade of green, and the caudal horn or 'tail' was slightly longer and was tinged with red at the tip. All seemed to be going quite well through the first ecdysis although there was a hint of the trouble to come as quite a few fell off the surface they were 'spun' onto, and died.

By the 13th June over 80 larvae had moulted successfully thus reaching their second instar. At this stage the skins of the larvae had become rougher with the points tipped with yellow, fine yellow stripes had appeared on their sides, and their tails were completely red. The larvae continued to feed up well and some started to spin up for the second moult on the 20th June. It was at this point that disaster struck, many of them falling off the supporting leaves or from the sides of the cage to which they had attached themselves. The initial reason for this appeared to be that the larvae were spinning an insufficient number of threads to attach their 'false' legs and anal claspers to the surface chosen to support them during the moulting process.

It is well known amongst breeders that with many species it is usually impossible to save a larva that has become detached from its support before it has started to shed its skin; this seems to be particularly the case with our hawk-moth larvae. Sometimes, but not always, you can save one that has almost completely shed its old skin, but generally this must be achieved before the old skin has hardened and stuck to the new skin (the old skin is softened before ecdysis by a 'moult fluid')

as will be described later in this article). In this case then, some new ideas appeared to be essential if more than one or two larvae were to survive.

In the past I had failed to save larvae in a similar state of distress by sticking them down with various types of glue, including the quick drying type. This time I decided to try using pieces of sellotape with a small section secured with the 'sticky' side facing upwards. The larvae were then attached to the sticky tape by the last four or five pairs of legs and a percentage of those that had fallen off managed to moult successfully using this artificial 'staging'. This method could well be suitable for larvae that have become detached for other reasons. When breeding in captivity it is amazing how often one of your most valuable larvae spins up on a leaf—only to have one of its companions come up behind it and chew-away the remainder of the leaf, causing it to fall off!

I have already tried out this method with several other larvae, and it seems to work as long as they are re-attached before any damage is done—if they are found in a partially moulted state, and the old skin has hardened and stuck to the new one, it is almost certainly too late. When using this method it is necessary to protect the larva from walking onto the sticky-tape after moulting, by covering up the exposed areas on either side of the larva once its legs have been attached. This is particularly important with species that eat part of their old skins.

Only 22 larvae survived the second moult, some naturally, and some with the assistance of the artificial staging, and although the survivors continued to feed well I was naturally concerned that I would get a similar high percentage of losses during the next moult. The largest larvae started to spin up for this on July 2nd, and at this stage they were large enough to observe the moulting process much more closely. Now, whilst most enthusiastic Lepidopterists have been thrilled by watching a butterfly emerge from its chrysalis or a larva change into a chrysalis, and these are often described in reference books, how many have watched the larval moulting process in any detail? It is quite absorbing when you do, and I would particularly recommend our younger members to watch this process, and to record the stages that different families of larvae go through. All you need is a good magnifying glass and lots of patience. The Oak eggar (*Lasiocampa quercus* L.) for example, moults in quite a different way to hawk-moth larvae; it seems to be able to split its skin right down the middle of its back—almost as if it were fitted with a zip-fastener—and then walk out of it without too much difficulty!

A good deal of time was spent in observing the moulting process of several larvae, including a number of Eyed hawks that had reached the same stage of development, to see if any clues could be gained as to what was going wrong. Paragraphs (a) to (h) below list the most significant stages although the order in which these occurred varied in small

details from larva to larva. In addition to the observations mentioned below, an important fact to note is that in the early stages of the moulting process a new skin, or cuticle, is formed under the old skin, and the space between them is filled with a moulting fluid. This fluid contains enzymes (for further details see Imms 1959) which dissolve the bulk of the old cuticle, leaving a soft outer layer. This fluid, or perhaps an additional solution, also appears to act as a lubricant to assist in the release of the old skin.

The moulting process is roughly on the following lines:—

- (a) The new head starts to 'bulge' in the area immediately behind the old head, the larva stops feeding and spins its false legs and anal claspers to a supporting leaf, twig or other surface.
- (b) The size of the new head increases significantly, the old one looking as if it has been stuck on as an after-thought. The larva twitches frequently, and moves up and down as if stretching up from its anal claspers.
- (c) Body of larva goes rigid and tissue can be seen to gradually leave the old head-shell until this finally goes white. It is particularly noticeable with these larvae because the tissue is green and the head-shell semi-transparent.
- (d) Ripples start moving along the body as the larva prepares to get rid of its old skin. At first these ripples appear to have little effect—but all of a sudden the old skin becomes detached from the new, it seems as if some sort of lubricant is injected between the two skins enabling the old skin to move. This particular point is quite dramatic as suddenly the whole of the old skin becomes mobile.
- (e) When the old skin has moved back a little way so that two or three folds appear towards the tail, there is obviously a high stress around the head, and, in conjunction with the new head bulging even more, the old skin splits on the top of the new head and around the circumference of the old head. It is about this point that a white stripe appears along each side of the larva, and although this looks like a continuous line, it is in fact made up from a number of individual linings which are withdrawn from the 'spiracles' or breathing holes (these are the little red dots that you can see along the sides of Lime, Poplar, Eyed, etc., larvae).
- (f) The larva now starts to 'ripple' the old skin back quite quickly, stretching and contracting during this process. Around about the time that the first three pairs of legs (the true or thoracic legs) are free, and the old skin has moved back to the first or second abdominal segment, the movement stops for a short time whilst the larva gets rid of its old head-shell. At first I thought that it got rid of it by levering it against a leaf or stem, but in the cases observed this is not so, and it appears that the old head is pushed off with the mandibles or mouth parts.

- (g) The old head having been shed, the rippling motions now continue until the old skin is forced down past the four pairs of false legs, and then the anal claspers and horn are slowly removed.
- (h) The larva pauses at this stage with the 'new' anal claspers holding on to the old skin. After a time, a very gentle wriggling of the anal area occurs and the larva raises its claspers from the old skin. Close observation at this point shows that it is very carefully shedding the lining of the anal canal (Imms 1959).

The above description gives a number of clues as to why it is so difficult to save a larva which has failed to moult completely. However, as stated previously, if a larva is found which has partially moulted it is sometimes possible to save it if it is treated before the old skin has dried out. It is obviously necessary to ensure that the linings of the spiracles are drawn out very carefully, but it is also essential to resist the temptation to remove the old skin as soon as the anal claspers are clear of the old skin—it would appear to be essential to let the larva shed the lining of the gut by itself, since this is obviously one of the most critical areas. Damage to the gut will almost certainly result in death, although it may not occur until sometime later.

Only five *leoniae* larvae survived the third moult, and it seemed highly unlikely that any of them would even reach the pupa stage. It was now time to take stock and see if anything else could be done. There appeared to be two critical factors: firstly, there was the inability of the larvae to 'spin' themselves properly to a support, but it seemed that this could be taken care of. Secondly, the moulting process appeared to be going wrong in stage (d) given above, in that although the old cuticle appeared to separate from the new, there did not appear to be sufficient 'slip' between them for the larva to push back the old skin. My own thoughts were that this may have been due to a lack of lubricating fluid, or perhaps because the old cuticle was not being dissolved sufficiently. On reflection it might have been helpful to have compared the relative thickness of 'old' skins from the hybrid larvae with those of the parent species; e.g. by measurement with a micrometer. However, this was not thought of at the time.

There was obviously little that could be done if the chemical elements of the moulting fluid were incorrect, but on the other hand if it was due to a lack of fluid, perhaps the larvae were not getting sufficient moisture. To correct this possibility the larvae were given drops of water at frequent intervals throughout the fourth and fifth instars and they appeared to thrive on this, drinking very readily, almost eagerly!

In the fourth instar the larvae exhibited characteristics of both of the parent species. Their skins were not quite as 'rough' as Lime hawk larvae having more points, rather like Eyed hawk larvae. On the other hand these points were tipped with yellow like Lime larve, and the green background colour was closer to that of the Lime hawk. The horn was a

fairly dark red throughout its length, but the red shield under it which is characteristic of Lime hawk larvae was absent in this and all other instars.

Four of the larvae were apparently very healthy at this stage and fed up well. The fifth, although feeding well, was a very curious shape—each segment being very 'baggy', just as if it had a loose fitting sleeve over it tied around the space between each segment! All five larvae continued drinking drops of water frequently, and the first spun up for the next moult on the 18th July.

This time the moulting process seemed to go much better and four larvae succeeded in changing their skins, including the baggy one—which looked just the same afterwards. The fifth unfortunately died for some unknown reason. In this, the fifth and final instar, the background colour of the larvae was lime green and the fairly fine points were tipped with whitish-yellow. The head was a darker shade of green edged around its triangular circumference with yellow dots. The first six stripes along the body were yellowish-white edged above with a darkish green, and the last stripe, which runs up to the tail horn was thicker and almost pure white, also edged above with a dark green. The horn was quite thick, green at the base, and grey-blue going towards dark grey above.

The remaining four larvae continued to feed for quite a long time, still drinking frequent drops of water, and the first went down to pupate on 8th August. The second, the baggy one, died on 13th August, and the other two went down on the 15th August. The larvae did not undergo the dramatic colour change that Lime hawks do just prior to pupation, but did go 'shiny' like the Eyed hawk.

Of the three that went down, the first produced a pupa which was perfect apart from a slight displacement of one of the antenna cases, the second partially moulted to what was apparently a sixth larval instar, and the third produced a deformed pupa. Naturally I was disappointed to have only bred on pupa from over 100 larvae, but still that was better than none at all, and to date I have only found one reference to this hybrid having been bred before (Tutt 1902).

This single *Mimas* hybr. *leoniae* pupa is sitting in front of me now, much to my dismay it over-wintered and died sometime in January 1979. This pupa is male, and in general appearance is much closer to a Lime hawk than an Eyed hawk pupa. Apart from the wing cases, the general texture of the surface is somewhat rough like the Lime hawk but the colour is more reddish and not so dull (i.e. the colouring has more of a polished appearance). The wing cases are tending to the shape of the Lime hawk but are distinctly narrower, and unlike the Lime hawk they are smooth and 'polished' like the Eyed hawk. The 'spiney' point at the opposite end of the pupa is shorter than that of a typical Lime hawk, closer to the Eyed hawk.

One feature which will be evident from the above, was the long period between the ovum and pupa stages, some 12 weeks compared with something like 6 to 7 weeks with the *hybridus* specimens that I have bred.

In 1979 I again attempted to obtain hybrids between a number of species of hawk moths, but only succeeded in breeding a further 49 *Smerinthus* hybr. *hybridus* pupae from two pairings. Following the high losses of hybrid pupae that had over-wintered the previous year, and a similar experience by at least two other Lepidopterists, I decided to try 'forcing' them in a warm airing cupboard which was found to have an average temperature of around 72°F. The year, 1976, when I had a high success rate was noted for its long hot summer.

By the middle of August 1979, one female (probably an intersex) and 35 males had emerged in this artificially warm environment. The remainder (all males) had dried up and died by the end of September, perhaps because I had to take them away on holiday with me and they were subjected to a wider range of temperature. Most records I have found relating to hybrid hawk-moths suggest that the adults normally emerge within a few weeks of pupation, although a few have apparently been successfully over-wintered. However if our summers follow their current pattern, it seems wiser to attempt to force them in a warm environment—with frequent spraying of course to prevent them drying out.

In four years I have successfully bred 110 *hybridus* adults, and obtained specimens with a wide range of colouring and 'eye spot' size. The photograph accompanying this article shows a range of four of these specimens including the 'pink female' mentioned at the beginning of this article.

At this point it is worth considering why female specimens should apparently be so scarce with this hybrid. A useful reference source which provides some possible clues may be found in the chapter on Theoretical Genetics in 'Butterflies' (Ford 1977). Briefly the author explains that in the Lepidoptera the sex of each individual is controlled by a pair of genes, which in the male comprise two X chromosomes, and in the female a pair which are different called X and Y. Thus a specimen which has XX pairs of chromosomes is male, and a specimen which has XY pairs is female.

In the reproductive process the sperms and eggs each carry only one of the chromosomes from the pair, and on fertilisation these unite to form a pair once again. The division of the XX chromosome of the male obviously can only produce sperms carrying a single X chromosome, whilst the segregation of the XY pair in the female should produce eggs carrying either the X or the Y chromosome in equal numbers. On fertilisation therefore we would expect there to be equal XX and XY recombinations, producing equal numbers of males and females.



FOUR EXAMPLES OF *SMERINTHUS HYBRIDUS*

Why then should the *hybridus* specimens be mainly males? One possibility could be that the eggs carrying the Y chromosome differ in some way which results in fertilisation being unsuccessful. However, I believe that this can be ruled out since in my experience the vast majority of ova produced from such a pairing are fertile. Certainly the ratio of fertile to infertile ova obtained from 9 such pairings have differed little from those of normal pairings from either of the parent species.

Another possibility can be postulated from the article on Theoretical Genetics, in which the author suggests that the X chromosomes in some races of a particular species may have a stronger influence on the sex of the offspring than in other races. In a similar manner, if the X chromosome of the Eyed hawk has a stronger impact on the Y chromosome than that of the Poplar hawk, it is possible that in hybrids between these species the X chromosome of the Eyed hawk will, as the specimen develops, over-ride the Y chromosome of the Poplar hawk, resulting a switch from female to male at some time during its development.

This could explain why my particular 'female' specimens have additional appendages—the specimens having started off as females, changing over to males at a relatively late stage in the development of the embryos. It is also possible that this is the reason why so few females occur, the general pattern being that in specimens starting as female, the Y chromosome is overwhelmed at a much earlier stage.

According to Ford, specimens such as these are known as intersexes, and are different from gynandromorphs not only in their origin but also in two other ways as follows: first, the male and female parts do not develop simultaneously but one after the other, so that all the earlier formed structures are of a different sex to those formed later. Secondly, the two sexes do not necessarily occupy distinct areas of the body or wings; some regions may have characteristics of an intermediate type.

True gynandromorphs also occur with this hybrid although these are probably extremely rare. In the section of the National collection donated by R. W. Watson, there is one specimen which has a male antenna on one side and a female on the other. This specimen also has a 'dividing line' down the middle of the abdomen showing a slight difference in the colouration of the hairs on either side. Both of these features point to a true 'halved' gynandromorph, although it may have intersexual characteristics which are not obvious.

Finally I should like to record a few observations concerning the fertility of hybrid hawk-moth pairings. There are many records of infertile pairings between species which have been known to produce fertile ova on previous occasions, but as far as I am aware there has been little speculation or firm evidence as to why this should be so. In

my own experience the hybrid between male Poplar hawk and female Eyed hawk more often produces fertile ova than infertile, although this may not be noticed because the young larvae usually die in the egg. Similarly with the reverse cross, I have obtained fertile ova from 9 pairings and infertile ova from only 4. Often when the pairings is unsuccessful, and this also applies to other hybrid crosses, the female will only deposit a few ova, perhaps one or two per night, particularly if she is relatively fresh, and may even resume 'calling' for a mate.

One major reason why this occurs is that pairing is not always completed successfully, even though the male may remain in the copulatory position until the next evening. However, before I explain why I believe this to be the case, it is worth giving some details concerning the fertilisation process.

First of all there are two apertures in most female Lepidoptera, one of these, the egg pore, is to be found on the 9th or last segment, and its function is obviously that of depositing the ova. In hawk-moths and many other species a second aperture is located on the 8th segment and is known as the ostium, or copulatory duct, which leads to the 'bursa copulatrix'. In pairing the male grasps the end of the female abdomen and the male organ is inserted into the ostium (for full details see AES leaflet No. 34).

Secondly, during copulation, the male coats the inside of the bursa copulatrix (via the ostium) with a substance which hardens to form a vessel called the Spermatophore, and this is then filled with a fluid containing the fertilising sperms. Finally after the insects have parted, the female cracks open the spermatophore by muscular contraction, and the sperm pass along another duct to fertilise the ova as they pass along the oviduct during the process of being laid.

Now, on several occasions when I have obtained hybrid pairings between Lime, Eyed and Poplar hawks, the spermatophore has been observed outside the body of the female an hour or so after pairing has commenced. In these cases this would of course explain why any ova laid are infertile. It may also explain why in some cases the females are reluctant to deposit more than a few ova; can they perhaps detect the absence of the spermatophore when they try to crack it open prior to ovipositing?

Next season I hope to try once again to breed *Mimas hybr. leoniae* Stdfss., it is however extremely difficult to get the male Lime hawk to pair successfully with the female Eyed hawk, possibly because these females usually have a wider body than the female Lime hawk. If anyone else has had any success with hybrid hawk-moths, or is aware of any other useful references on the subject, I should like to hear from

them. Two additional articles on the subject may be found in earlier AES Bulletins—(Spoczynska 1958) and (Goldsmith 1964).

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BOOK REVIEW

The **Conservation of Dragonflies**, published by the Nature Conservancy Council. Joint authors: D. Chelwick, C. Hammond, N. Moore and A. Stubbs. 20 pp. 15 black and white photographic reproductions and two maps. Price 35p.

This very attractive little publication is one of a series produced by the Nature Conservancy Council, a previous one having dealt with Bees and Wasps. The introduction considers the conservation value of Dragonflies and then outlines the British members of the Order, as to the number of species, behaviour, breeding sites, life cycles, etc. The vulnerability of the members of the Order is then considered and, most importantly, the habitat requirements and the factors which militate against survival. Conservation areas are next considered and finally the recording of dragonflies under the National Recording Scheme. An appendix gives information on the habitat, distribution and status of the British species in outline. The back cover gives a summary of further reading and it is unfortunate that our own leaflet on the Order is not listed. The cost of the booklet is 35p but for £1.15 one can obtain this and those on Bees and Wasps, the Natterjack toad and Snails, Slugs and Freshwater Molluscs. The concentration on habitat preservation is the most useful function that this series fulfils and the authors are to be congratulated on the contents and presentation.

The Council issues a series of other publications and wall-charts suitable for instruction in the classroom and elsewhere and those interested should obtain the latest list (April 1980) from the Nature Conservancy Council, Attingham Park, Shrewsbury SY4 4TW.

PWC

NOCTURNAL ACTIVITY OF HYMENOPTERA

In connection with the interesting observations made recently by Dr. J. C. A. Craik (1979, *Bull. Amat. Ent. Soc.* 38: 129-31) and Mr. S. C. Littlewood (1980, *Ibid.* 39: 18) on hornets captured in light traps, it

might be of interest to members to know that Stritt (1971) has compiled a substantial list of Hymenoptera which he collected in brightly lit tram halts in the city of Karlsruhe, South-West Germany, BRD. It has long been known that certain normally diurnal ichneumonids and other Hymenoptera occurred in light traps (e.g. Gauld and Huddleston, 1976). Such occurrences have usually been explained as fortuitous ones resulting from the operator disturbing the vegetation surrounding the trap. Although this explanation probably accounts for many of the specimens of normally diurnal Ichneumonoidea that appear in traps, from my own experience and some recent papers that have appeared in the continental literature, I think that to extend this explanation to some of the other groups of Hymenoptera might be unwise.

Dr. Stritt's paper is of particular interest in that it includes representatives of most of the major groups of Hymenoptera. These are as follows (rearranged to conform with Fitton et al., 1978): Symphyta (91 spp. from all the large families, each recorded from at least 4 or 5 specimens); Ichneumonidae (155 spp.); Braconidae (19 spp.); Evanioidea (Aulacidae 1 sp., Gasteruptiidae 5 spp.); Cynipoidea (Genera of Figitidae and Eucoilidae only); Chalcidoidea (6 spp.); Proctotrupoidea (6 spp.); Chryridoidea (Chrysidae & Cleptinae of Chrysidae 17 spp., Dryinidae 1 sp.); Scolioidea (3 spp. Tiphidae & 1 sp. Myrmosinae of Tiphidae, 3 spp. Sapygidae); Pompiloidea (244 spp.); Vespoidea (14 spp. of Eumenidae and Vespidae-Polistinae and Vespinae); Sphecoidea (96 spp.) and Apoidea (98 spp.). This makes an impressive total of about 517 species. I expect that the majority of British entomologists have no experience of many of these groups coming to light.

Groups which would seem to be most unlikely to exhibit regular nocturnal flight activity are sphecids, bees and all the insects which rely heavily on their acute visual senses for the capture of prey and for orientation to their burrows or nests. The very large number of specimens collected by Stritt leaves little doubt that the bees and wasps were attracted to the light and not simply trapped in the buildings for some other reason. So it would seem that, like the hornets observed by Mr. Littlewood, these insects had failed to return to their nests by dusk and so became disorientated and were eventually attracted to the nearby lights. Stritt mentions that the tram stops where he found his material were mostly near small parks, or areas of wasteland, etc.

On the other hand, there would seem to be no reason why some of the phytophagous Hymenoptera, particularly sawflies, would not be able to carry on their usual activities during the night. Sawflies probably have more to gain through nocturnal activity than any of the more advanced Hymenoptera. Their slow flight, generally small size, usually thinly chitinized bodies and the fact that they lack stings make them easy prey for a wide range of predators. Nocturnal activity and daylight retreat to safe refuges, as practised by many moths, would probably

considerably reduce the risks run by the adult insects. Also, sawflies are not specialised predators as are the Sphecidae, though many do consume other insects when available. This means that there is no need for precise orientation, for neither do they have nests to return to.

It might well be asked, in view of the above considerations, why there are no definite records of regular voluntary nocturnal activity for the Symphyta. I can think of a couple of factors which may have helped to prevent the development of such behaviour. Firstly, unlike most moths, they do not have highly developed olfactory organs. This would be likely to reduce the chances of a nocturnal insect being able to find a mate and might also cause problems in the location of host plants and in subsequent oviposition at the correct site. Secondly, sawflies lack the ability to develop the superb camouflage patterns possessed by many nocturnal moths. This would increase the risk of their being attacked by predators while at rest during the day. But these are fairly minor handicaps which could quite easily be overcome by behavioural adaptation. Many known nocturnal insects have similar problems which they appear to have surmounted successfully.

My own records of sawflies at light are few. I have found several specimens of *Arge ustulata* (L.) and *Claudius difformis* (Panzer) at a light on a whitewashed wall in Switzerland. I have not seen anything of this sort in Britain, but I suspect that this is chiefly due to our different ideas about how we should illuminate our streets and buildings. What I have observed is marked crepuscular activity in *Strombocerus delicatulus* (Fallén). Both Dr. L. Rezbanyai in Switzerland and Mr. J. Bowden at Rothamsted Experimental Station, Great Britain, have encountered sawflies in light traps. Rezbanyai (1974) has published some of his records. Bowden (*pers. comm.*) has recorded that large numbers of *Athalia* and *Priophorus* make up the sawfly catches in traps that he has operated at Rothamsted. It seems certain that many sawflies exhibit crepuscular activity, if not truly nocturnal. Indeed, if species of Lepidoptera were found at light in the same numbers as some Symphyta have been found, nobody would think twice about stating that the moths were nocturnally active. This leaves the most obvious explanation as to why entomologists have not attributed nocturnal activity to some Symphyta: the problem is probably not lack of evidence, for many light trap operators have found these insects in their catches, but simply a biased approach in interpreting these phenomena.

Perhaps the most important thing that hymenopterists can draw from this is that light trapping, or even just searching round suitable lights on buildings, can produce interesting specimens. Some European entomologists have already realised this (e.g. Peter, 1979). I hope in writing this contribution that light trap operators will be stimulated to look critically at some of the Hymenoptera that are appearing in their traps. It seems at present that an important aspect of behaviour of a

least one group of Hymenoptera is being overlooked. Regular nocturnal activity is, of course, already known in the Formicoidea (Brian, 1977) and in many ichneumonids and braconids.

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OBSERVATIONS OF CAPTIVE TRICHOPTERA AND EPEMEROPTERA TAKEN FROM STREAMS IN THE BIDEFORD AREA OF DEVON

INTRODUCTION

In conjunction with Miss Jane Murray, Mr. David Braund and Mr. Richard Downes, the author carried out an investigation into the fauna of a small stretch of an insignificant stream, on the farm belonging to Messrs Burrow and Raffe, Town Farm, Woolsey, Bideford, Devon. During this investigation, the results of which will be published separately, some specimens were taken for examination, and after the close of the investigation certain aquatic insect larvae from the stream were kept.

Specimens have also been taken from other streams in the area and a list of the owners is below. Certain difficulties were encountered in the keeping of these insects and it is hoped that the following observations contained in this paper will be of help to other people working in the same field.

ORDER TRICHOPTERA

Family Rhyacophilidae

The larvae of these primitive Caddis flies do not build either a case or a net during their larval stage. They are commonly found beneath stones in several fast flowing streams in the area. Most specimens taken by the author have died within 48 hours of capture but specimens have been kept for as long as a week. In captivity they have eaten well, on a mainly carnivorous diet consisting of crushed limpet (*Ancylus*), and small copepods. It would seem from the author's marked lack of success in keeping these insects that running water would be essential for their well-being.

The larvae appear to pupate at any time between the months of February and June and immediately before pupation they construct cases of gravel and small stones, which they anchor to larger stones on the river bed. Specimens of these species have been observed to stay for up to ten days inside their immobile cases before they actually pupate. The cases are often in groups of four or five individuals and on two occasions groups of twelve and fifteen pupal cases were noted!

Only one species of Rhyacophilid larva has been noted from North Devon streams and the author has preliminarily identified it as *Rhyacophila obliterata*, McLachlan, although it must be admitted that the aforementioned trait of 'communal' pupation has more often been noted amongst insects of the Genus **Agapetus**. Specimens of this insect have been taken from streams at Venn, Cranford, Lane Mill, Stroxworthy, Irene Bridge and Leworthy.

Family Hydropsychidae

Only one member of this family has been noted: *Hydropsyche ornatula* McLachlin. Specimens of this species have only been taken from two localities in the area. Both places were shallow, sluggish backwaters of small streams, one at Venn, and one at Lane Mill.

The larvae of insects belonging to this family are particularly interesting in that they weave silken nets with which they capture the river zooplankton on which they feed. They are not common and are found singly. If two specimens are captured and kept in the same container, even a fairly spacious one the larger will attack and eat the smaller within a very short space of time. Surprisingly, specimens of this species adapt well to an artificial environment, and will thrive under even the most unlikely conditions.

Specimens of *H. ornatula* that have been kept by the author still weave nets although in the absence of running water they cannot use them for trapping their prey. These Caddis larvae will eat most small insect larvae (an interesting exception being *Chironimus*, which they will not eat in any circumstances), and they have even taken bacon rind.

Families Limnephilidae and Odontoceridae

Several species from this family have been found in still water in this area but only a limited number of specimens of running water species have been taken. They include *Stenophylax*, with its easily recognisable case made entirely from minute sand grains. However it is easy to confuse specimens of *Stenophylax* with specimens of *Odontocercus albicorne* Scop. (from another family—the Odontoceridae) which is also found in large numbers in the area.

The commonest species of Caddis larva taken from any stream in the area is the ubiquitous *Anabolia nervosa* Curtis. This is probably the most familiar and well-known Caddis larva in the British Isles with its characteristic 'walking stick' appendages along the side of the case.

These sticks prevent the insect from being swallowed by trout and other predators who thus ignore what would otherwise have been a major food source. When specimens of *A. nervosa* have been ejected from their cases and put into a new container with building materials freely available they will always (when possible) include a 'walking stick' in the composition of their new case.

The author has carried out experiments in providing unusual-alternative case-building materials for several species of Caddis larvae and has produced insects with cases of: fragments of brick; bits of silver foil; bits of crushed glazed pottery, amongst others. However he has not been able to observe any preference for the colour blue amongst Caddis larvae, as has been noted by many previous observers. Indeed on several occasions the insects have shown preference for any other colour except blue, which they repeatedly ignored.

Other species of Limnephilidae have been taken from still waters in other areas of North Devon, however at present the species so far described in this paper are the only Trichoptera to have been taken from streams in the area.

ORDER EPHemeroptera

Family Ephemeridae

Specimens of the larvae of *Ephemerina danica* Mueller, perhaps the largest of the British Mayflies have been taken from two locations in the Bideford area of North Devon, Venn Marshes and Irene Bridge although undoubtedly they exist elsewhere. They have in fact, also been found at Ford Mill Forge, which is slightly outside the area under review in this paper.

The larvae of this species appear to be completely vegetarian and in captivity they feed readily on *Elodea* and other aquatic plants. I have found them to be a very useful source of food for captive Bullheads (*C. gobio*) during the first few days in the tank. I have found that *C. gobio* will not take 'flaked' fish food, as is fed to ordinary Goldfish until they have adjusted to living in still water. They will only take live food and larvae of *E. danica* are the best that I have found.

The nymphs of *E. danica* kept by the author have shed their skins on several occasions. They sometimes have been observed to eat the cast skin but on other occasions it is ignored.

In the wild state these insects appear to live most commonly in fine silt at the bottom of slow-moving streams some six inches deep. They are often found in the areas beneath bridges.

In captivity however they adapt well to a still water environment and an absence of silt or mud. However they seem quite sensitive to temperature change and a sudden change in the temperature can kill large numbers of them. It has been noted by Chinery (1974) and Clegg (1956) that these nymphs can take over two years to mature.

Family Ecdyonuridae

Specimens of the nymphs of *Ecdyonurus dispar* Curtis from this family are perhaps the most common species of Mayfly nymphs to be found in North Devon streams. The author has found that specimens of *E. dispar* will thrive if kept in cool shallow water with a large surface area/volume of water ratio thus ensuring a relatively high level of oxygen in the water.

This species is commonly found beneath stones in fast running streams, often in conjunction with the Caddis larva *R. obliterata*. However in captivity it does not hide beneath stones even when they are provided, and one can only assume that it hides beneath stones in order to resist the current of the stream: Indeed these insects will swim up to the top of their container to be fed. The author has had considerable success feeding them on ordinary, proprietary brands of Goldfish food. Specimens have been observed 'moulted' their skin but on no occasions has the skin been eaten.

CONCLUSIONS

It is almost impossible for the amateur, with only a limited amount of time to adequately study these fascinating insects in the field. The author himself is only able to make trips to the natural habitats of these insects at weekends, and then, often, the weather is inclement. It would be impossible to conduct a really serious study of these insects without visiting pre-prepared sites at least twice a day, every day for some time. For the author, and one suspects for many other would-be enthusiasts, this is clearly impossible. Therefore one must take the specimens one needs and keep them in captivity for observation.

For the author, at least, keeping these insects in captivity has one great advantage. He keeps his 'bugs' in a large, empty outhouse at the top of his garden, and he is therefore able to visit the collection and make observations at intervals throughout the day. However in these conditions and with the limited equipment and financial resources available to the author it is clearly impossible to exactly simulate the conditions in which they naturally occur, an obvious difference being the difficulty in providing running water supplies. It is interesting however to note how the insects themselves have reacted to the change in their environment. The *H. ornatula* (Web spinning caddis), started to hunt for their food, instead of waiting for the organisms to drift into their nets. The nets were, however used as a refuge. The nymphs of the Mayfly *E. dispar*, have totally rejected the stones provided for them by the author. In their natural habitat they hide beneath the stones, but in the absence of running water (and predators?) they live, most unnaturally, clambering about in the waterweed.

It would seem that more experience in the keeping of insects of this type should be gained because of the practical problems that must be encountered by the amateur when attempting field studies. The keeping

of such insects as the ones mentioned briefly in this paper should never replace field study, but should be used, intelligently, in conjunction with it in order to produce more information about these interesting, but seemingly insignificant insects.

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5. Mrs. G. Gorrell, 'Irene', Woolsery, Bideford, North Devon.

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OBSERVATIONS ON RHOPALOCERA IN ANDORRA—

JUNE/JULY 1979

As a result of my wife's helpful encouragement I duly arranged to spend a two-week 'package holiday' in Andorra, a Pyrenean region hitherto not visited by me, between 23rd June and 7th July 1979 through Rambler's Holidays. Such a 'package holiday', which is specifically arranged for the benefit of mountain walkers and ramblers, seemed to be an excellent medium for the pursuit of both my entomological and botanical field studies with the hopeful additional bonus of some photographic work on the subject of Pyrenean mountain flora. I chose this particular fortnight in the hope of being fortunate enough to record a reasonably extensive number of species of rhopalocera on the wing in fresh condition as well as affording me the opportunity to record and photograph the last of the Pyrenean Spring endemic plants before their flowering period was totally finished. As events transpired, my chosen period proved to have been well-timed for successful results.

Throughout the fortnight there was no day during which heavy rain seriously impeded walking, although the first four days the weather was unsettled and we often experienced heavy thundery rain for short periods in the mid-afternoon. However, from 29th June onwards the weather conditions dramatically changed by the appearance of long periods of sunshine and light breezes with temperatures soaring up to 28°C. on at least three days during the second week. General conditions were, therefore, ideal for both field studies and plant photography.

With the able guidance of our resident party leader we were able to spend much time in various remote valleys and mountainous higher ground levels away from habitation, which would otherwise have been difficult to find on one's own. I did, however, find a number of opportunities to spend away from our party in order to carry out a more detailed field study within particular productive areas without appearing to be unsociable as a party member! I soon became a focal point of interest during our rambles whenever any butterfly or local flower was encountered! I, for my part, thoroughly enjoyed the companionship amongst a very friendly group of people of differing ages and interests.

The Principality of Andorra lies in the eastern range of the Pyrenees and has an area of approximately 468 square kilometres. The terrain is naturally mountainous with an average altitude level of 1600 m and contains a number of peaks along the northern and eastern frontiers which exceed 2800 m. The interior contains two long valleys in the shape of a 'Y', the main stem of which has the Gran Valira River flowing down to the Spanish frontier with a number of small tributaries on either side which lie in peaceful valleys, providing the walker with access to the higher mountain regions. It is within these valleys that much of the flora and fauna is to be found amongst the summer pastures and meadows. The climate is generally mild with a higher amount of annual sunshine than found in many other areas of the Pyrenees. Snow covers the high peaks for five to seven months of the year and the lower valleys are under snow for at least three months.

Since I was able to record no less than 72 species of Rhopalocera during my visit, I propose setting out my observations in diary form under family group headings in relation to each particular area visited in the hope that readers will appreciate that the extent of species recorded depended on prevailing weather conditions, altitude and habitat factors, which were surprisingly variable from one district to another. My observations were largely confined to the north-eastern region as well as around Encamp, a small village in the centre, where our party were staying in a small hotel, although a visit to the Madriu Valley lying to the South of Les Escaldes and a visit to the western frontier region were achieved.

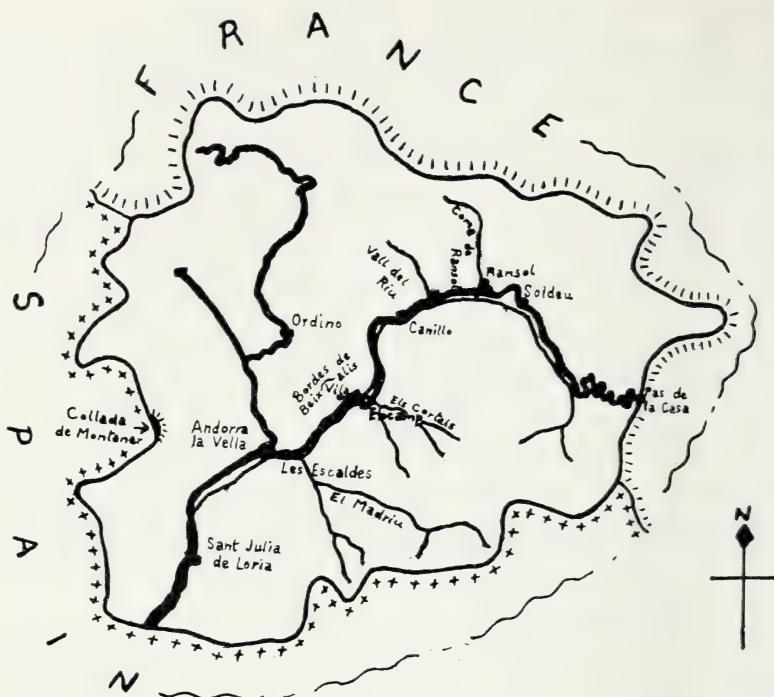
LOCALITY: Encamp

Habitat: Local terraced summer pastures and meadowland areas with small pockets of dry, rocky wasteland containing sparse conifers, small deciduous trees and bushes.

Average altitude: 1,400 m.

Date of observations: 24th June 1979.

Despite an unpleasant delay at Gatwick Airport over our departure arising out of the Air Traffic Controllers' strike at that time and a 5-hour night coach journey from Perpignan Airport, ending with the arrival at



ANDORRA

our appointed hotel at 6 a.m., my enthusiasm to carry out an inspection of the local pastures could not be dampened by the loss of so much sleep! Whilst the rest of our party of sixteen were catching up on their loss of sleep, I was already sampling the delights of the local countryside in warm sunshine by 10 a.m. As little hay-cutting had commenced at that time, I was delighted to find many of the local terraced fields were full of butterfly life, whereas a few weeks later such a scene would have disappeared.

PAPILIONIDAE

As the terrain in this area was particularly favourable, I was not surprised to see both *P. machaon gorganus* Fruhst. and *I. podalirius feisthamelii* Duponchel. present in flight in small numbers. I was unable to determine the sex because of their powerful flight pattern. The general condition was noted, however, as being undamaged thereby indicating that they had freshly emerged. Although my observations remain to be confirmed, *gorganus* appeared to be a little larger in wing span than those which I had encountered elsewhere in Central Europe in

earlier years. Both species are in fact widely distributed throughout Andorra and are likely to be found throughout the summer and early autumn months in two broods.

PIERIDAE

As suspected both *P. brassicae* L. and *P. rapae* L. were present in small numbers and most appeared to be in good condition although some *rapae* were found to be rather worn, which showed that it had been on the wing for some weeks.

Amongst the higher terraced fields I found two male *P. napi* L. feeding on cruciferous plants; both were in good condition.

In the midst of waste ground pockets containing broom and gorse bushes *L. sinapis* L., both male and female, were weakly fluttering around.

NYMPHALIDAE

Most of my records for this area proved to be generally confined to species of this family. *A. urticae* L. and *V. atalanta* L. were sighted frequently in flight, and on one exposed col with a medieval chapel perched on top I stumbled upon four very worn *V. cardui* L. males flying around the outer walls in an erratic manner.

Amongst fritillaries I was delighted to find three male *A. lathonia* L. flying around a lower terraced field. All were in good condition and were probably freshly emerged specimens. Unfortunately my efforts to photograph this species were repeatedly frustrated by its habit of darting off on being closely approached and in the end I decided to give up the unequal struggle!

M. cinxia L. was also present amongst the lower terraced fields in small numbers and both sexes were recorded. No further fritillaries were found within this generally cultivated area during a morning visit.

SATYRIDAE

Amongst the higher terraced fields and within waste ground areas I found *C. pamphilus* L. and *C. arcania* L. in small numbers. Although most appeared to be male, there were a few females present on the wing. Despite the fact that *arcania* is widely distributed throughout Central and Southern Europe, I had never seen this species before due to earlier timed visits and I was therefore pleased to make its acquaintance. This species enjoys resting on top of low foliage within dappled sunlit areas, displaying the bright orange marginal and metallic ante-marginal lines as well as a number of prominent yellow-ringed ocelli on the underside of the hindwings.

Amongst the *Erebia* genus I had my first encounter with a male *E. triaria* de Prunner. which fluttered across my path without warning whilst I was traversing a lower terraced field. Later I found further males in limited numbers amongst waste ground areas at higher

altitudes. This species is easily confused with *E. meolans* de Prunner, as the coloration and markings are somewhat similar. However, on closer inspection *triaria* will be found to display a tapering yellowish fulvous post discal band towards the apical area of the upper-side of the forewings with as many as five irregular white-pupilled ocelli enclosed within, whereas the post-discal band of *meolans* is normally deep brick-red with a reduced number of white-pupilled ocelli which are often grouped together as a pair towards the apex of the forewings and are further often smaller than those of *triaria*. I also noticed that *triaria* tended to display a small ocellus in space 6 on both upper and under sides of the forewings, which was often vestigial amongst female imagines. This small costal ocellus was not present on the forewings of *meolans*. Furthermore, *triaria* usually displayed an irregular irrorated greyish coloration with a darker discal band on the underside of the hindwings, whereas *meolans* simply displayed deep universal brown coloration. As both species do, however, tend to fly together for part of their respective flight periods, it is very difficult to identify them apart without collecting a small series for closer detailed study.

LYCAENIDAE

Only *P. icarus* Rott. and *C. minimus* Fuessly were found in small numbers in lower pasture areas; both males and females were recorded as being present. No other species of lycaenid were found in this area during the morning in question.

HESPERIIDAE

I found *E. tages* L. and *T. sylvestris* Poda, male and female, darting around wherever the ground area was open and unrestricted. All appeared to be in fresh condition.

I also found a small colony of *P. alveus* Huebner, some of which spent most of their time darting up and down a short stretch of rough wasteland.

LOCALITY: Encamp

Habitat: Small area of uncut pasture and meadowland.

Altitude: 1330 m.

Date of observation: 24th June 1979 (late afternoon).

Following a pleasant afternoon's ramble up the Gran Valira Valley to Canillo in order to acclimatize ourselves for the rigours in store for us, I stopped off on our return to explore an area of meadowland close by the terraced fields which were the subject of my morning visit. Although it was after 5 p.m. and the temperature was dropping rapidly, I had noticed undiminished insect activity in the area which clearly needed investigating.

NYMPHALIDAE AND LYCAENIDAE

Apart from the many of the species referred to above as recorded in the morning I recorded my first sighting of *C. selene* D. & S., both male and female, and amongst the Lycaenids I found a few freshly emerged male *C. semiargus* Rott. in flight around a patch of vetches and other leguminous plants. I was surprised to note that in general the imagines were very small with one specimen having a forewing span of little more than 9 mm from apex to base. Others appeared to be little larger than this particular specimen. Whether this is a normal feature of this species in Andorra, I have yet to have confirmed.

PIERIDAE

Amongst the Pierids I was delighted to find one fine male *E. ausonia ausonia* Huebner fluttering around in an indeterminate manner in the midst of a clump of cruciferous plants. No other new species of this family were recorded during that afternoon.

HESPERIIDAE

Only a few male *T. sylvestris* and one male *P. alveus* were recorded as being present in this small area of meadowland.

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: 1,600 m.

Date of observations: 25th June 1979.

My general observations during this day were largely confined to the early morning hours up to 11 a.m. when we were on our way for a full day's walk through open summer pastures lying to the north-east of Encamp and into an extensive coniferous belt above the highest local point (Bonay de les Neres—2,211 m) from whence we descended on the north-western side to the village of Ordino. Thereafter our return journey was accomplished by local bus.

The first couple of hours was spent in gently walking along well defined tracks leading into a broad area of summer pasture and meadowland (Bordes de Beixalis) lying above a cluster of farm dwellings (Vila). This area afforded me my first full opportunity to experience the natural beauty and tranquility to be found in Andorra. During the morning there was plenty of sunshine with gentle breezes; however, in the afternoon the weather became unsettled with thundery conditions prevailing on our way to Ordino, thereby terminating insect life on the wing.

PAPILIONIDAE

Both *P. machaon gorganus* and *I. podalirius feisthamelii* were recorded in flight in the higher pasture areas and in waste ground areas

close to the path before we reached the coniferous belt; only isolated imagines appeared to be present at any one time. All were in good condition. *Feisthamelii* did seem to favour rough and steep waste ground areas whereas *gorganus* preferred the flower-studded meadows on higher ground.

PIERIDAE

Few representatives of this family were on the wing in spite of the favourable conditions, and apart from a few *P. brassicae* and *L. sinapis* on the wing at lower levels around small cultivated fields only *C. crocea* Geoffroy was recorded as being present above 1,500 m. Such *crocea* as were found, were in very good condition and were obviously freshly emerged insects.

NYMPHALIDAE

Apart from a few male *C. selene* found fluttering amongst the bushes and outlying conifers at the edge of the coniferous belt, no other Nymphalids were encountered. I suspect that this was due to our appearance being a little on the early side of the morning before full activity was generated by the heat of the sun.

SATYRIDAE

A few *arcania* were already on the wing in the morning amongst bushes within waste ground areas at lower levels around Vila. It was not present, however, above 1600 m and was scarce within open summer pastures.

I found *E. meolans zagasia* Fruhst. on the wing in the higher extended areas of pasture and meadow land. This sub-species is readily identified by its large forewing span which can extend to 26 mm from apex to base. Furthermore, it displays an enlarged brick-red post-discal band on the forewings with three to four white-pupilled black ocelli. The upper sides of the hindwings also display three to four brick-red patches with smaller ocelli. The general coloration of both upper fore- and hind-wings is deep velvet brown. They were particularly active in sunshine, and although their flight never appeared to be strong, they were capable of flying many metres before suddenly disappearing into long grass to rest. This subspecies is confined to the eastern Pyrenees and probably does not extend far beyond Andorra as it is replaced by a smaller and more variable subspecies (*E. meolans pyrenaica* Rühl) in the central and western Pyrenees.

At higher levels amongst open pasture I found a few male *E. triaria* which were freshly emerged and in good condition.

LYCAENIDAE

Throughout the whole of the morning only a limited number of *C. minimus* males and females were found close to open paths wherever

there were puddles and damp patches. No other Lycaenids were recorded in this region which was no doubt due to our early appearance in the area.

HESPERIIDAE

Around stony ground and dry banks at lower levels *E. tages* as well as *T. sylvestris* were often to be found darting about close to the ground. In the open pastures at higher levels I encountered a small colony of *T. lineola* Ochs. and as only males appeared to be present, I deduced that this species had only just appeared on the wing at that time.

LOCALITY: St. Julia de Loria

Habitat: Rough hillside ground area with low scrub and scattered deciduous trees and conifers on higher levels.

Average Altitude: 1000 m.

Date of observations: 26th June 1979.

This was a day when I was absent from our party's walking activities, as I had arranged to spend some time with Dr. Patrick Roche, who had kindly earlier furnished me with most helpful advice and information on what rhopalocera I was likely to encounter during my visit. Dr. Roche has for many years been engaged as a Resident in the Principality in detailed survey work in regard to certain orders of the class of insecta with particular reference to Hemiptera, Lepidoptera and Coleoptera, and much of his work is proving to be of inestimable value to the local Andorran authorities, since no extensive studies have ever been carried out within the Principality.

Shortly after my arrival at Dr. Roche's flat in the village of St. Julia de Loria which lies close to the Spanish frontier in the south, I was taken on an informal guided tour of a local hillside area where much of his own personal field survey work is being conducted. Weather conditions were good with plenty of warm sunshine and only a light southerly breeze present.

I was immediately aware of the obvious habitat differences from those around Encamp, a dozen or so kilometres away to the north-east, as the general terrain was clearly drier with "maquis" vegetation which is so predominant throughout the Mediterranean coastal regions of France, Spain and Italy. There was, therefore, much flora present which is entirely absent in the northern districts of the Principality. There is also a change in soil structure in this region by reason of a greater amount of alkilinity present which manifests itself by a noticeable amount of impure limestone conglomerate rock and shale throughout the area.

Due to the timing of my visit Dr. Roche had sensibly warned me that I could not expect to see as generous a variety of rhopalocera as one would find a little later in July. I was not however, disappointed by the

limited number of species sighted during this short visit as my main objective was to spend a few relaxing hours with Dr. Roche without too much energetic exercise!

PAPILIONIDAE

P. machaon gorganus was not in fact sighted during this visit, although this subspecies is certainly to be found in this district. However, two fine male *I. podalirius feisthameli* were seen sailing and gliding around a group of Lombardy poplars, and I particularly noted the greyish-white general coloration on both fore-and hind-wings which is such a predominant feature of the spring-brood imagines.

PIERIDAE

The notable records within this family was my first encounter with a large female *A. crataegi* L. flying around a small elder bush and the sighting on two separate occasions of a male *A. belia euphenoides* Staudinger in fast flight zig-zagging up a steep bank covered with meadow flowers. As regards the former species I was puzzled by its apparent greyish suffused coloration on the forewings, which I subsequently discovered is caused by the thin dispersal of colour scales within the discal area on the upper sides of the female's forewings, providing the insect with a curious greyish transparency in flight. The latter species is notable for the male's bright sulphur yellow coloration on the upper-sides of both fore- and hind-wings as well as the striking orange-reddish apical patch on the forewing. The undersides of the hind-wings display a complex series of reticulated green markings over the general yellow ground-colour. *Euphenoides* is widely distributed throughout the Iberian Peninsula and extends its range into southern France along the eastern Mediterranean seaboard. It is doubtful that *euphenoides* extends far into Andorra and records of its appearance in central valleys are likely to be variable and intermittent.

Amongst other Pierids only a limited number of *P. brassicae* and *P. rapae* were recorded as seen in flight around the lower slopes. Two male *C. crocea* were also sighted in the earlier part of the morning.

NYMPHALIDAE

A restricted number of *V. atlanta* and *A. urticae* were seen from time to time flying around exposed ground areas. I also disturbed from the top of a clump of bushes a single *P. c-album* L. spring-brood imago which had probably been roosting among the inner branches before being disturbed from its sanctuary.

Whilst walking around a path on higher ground, I disturbed a fine unblemished male *A. lathonia* at rest in full sunshine. I particularly enjoyed the spectacle of this insect flying up and down the path with its large silver spots on the under side of its hindwings glinting in the sunlight. I also noticed how beautifully the rich fulvous general ground colour was accentuated by the sunshine.

Within minutes of my discovery of the *lathonia* I found two male *M. athalia celadussa* Fruhs. fluttering around close to the ground. The notable feature of *celadussa* is the bright fulvous coloration on the upper sides of both fore- and hind-wing with less macular black markings present than those displayed by the nominate species. *Celadussa* tends to show less fuscous suffusion of blackish scales towards the basal region of the hindwings. In other respects the size and markings on the undersides of both fore- and hind-wings are very similar to those of the nominate species. This subspecies appears to be widely distributed in southern Andorra whereas in the central and northern districts an intermediate form exists at higher altitudes which display more fuscous coloration.

SATYRIDAE

Shortly after my discovery of *celadussa* I disturbed a much larger butterfly, which had been resting amongst long grass, and upon inspecting this insect, I realised to my pleasure that I had found my first male *M. galathea lachesis* Huebner. which is in fact widely distributed throughout Andorra and provides a common sight later in July. In some entomological quarters this insect is given a nominate specific status, which is perhaps understandable in view of the insect's clearly defined markings and coloration. Generally *lachesis* is a little larger than *galathea* with a forewing span measuring as much as 28 mm from apex to base. *Lachesis* displays a much larger area of white ground colour with less heavily black mottled markings with the basal and discal markings often entirely absent. It is this latter feature which particularly distinguishes *lachesis* from the nominate species. I found three males close together and as they were not very active on the wing, I was provided a good opportunity to photograph this species successfully.

C. arcania was found in small numbers on higher ground basking in the sun along the edges of the path and amongst low vegetation. The males appeared to be a little larger than those earlier encountered around Encamp, although I have no definite assurance that this is the general rule.

While Dr. Roche and I were returning by following the course of a small stream, I spotted a male *P. aegeria aegeria* L. flying within the shade of a large walnut tree. The general orange-yellowish ground colour with the mottled deep brown markings provided the insect with good camouflage in such a situation making it difficult to see in shade.

No other Satyrids were recorded during this visit.

LYCAENIDAE

Because of the early timing of my visit, there were few Lycaenids to be seen. I did however, record as having seen a limited number of *C. minimus* fluttering around a path and grassy bank close to where *euphenoides* had been sighted, and at a lower level I caught what I

thought to be *P. thersites* Cantener only to find later that I had ensnared a freshly emerged male *P. icarus*. The two species are however very similar and require a detailed inspection of the undersides of the fore-wing in order to determine the species found.

HESPERIIDAE

There were in fact very few members of this family on the wing during my visit and only *E. tages* and *T. sylvestris* were recorded as being present in small numbers within the lower hillside area.

LOCALITY: Pic de Casamanya

Habitat: Exposed mountain hillside pastures containing sparse stunted conifers.

Altitude: 2600 m.

Date of observation: 27th June 1979.

Most of the morning and afternoon of this day was spent climbing to the top of this spectacular mountain which provided us with a breathtaking aerial view of much of the mountainous districts within the Principality, and as the weather was very unsettled with periods of thundery squalls accompanied by moderate windy gusts, there was scarcely any insect life on the wing throughout the whole day. However, when we were 100 m or so from the summit of this peak, one of our party who was climbing a few metres above me, drew my attention to a white butterfly which he had inadvertently partially squashed with his foot. In view of the high altitude at which such a butterfly had been found, I knew that it must be a somewhat local insect. In fact it turned out to be a male *P. callidice* Huebner, which apart from the damage sustained, was in good condition. I duly collected it as I doubted that I would be given another opportunity of collecting any further specimens of this fine species in view of its powerful flight pattern and the remoteness of its preferred habitat. In fact I was never again lucky enough to see this species at close quarters and so I was particularly pleased to record its existence in this one high mountainous region.

LOCALITY: Vall del Riu

Habitat: Rough summer pastures and damp meadowland areas surrounded by coniferous belts on higher ground.

Average altitude: 1800 m.

Date of observations: 28th June 1979.

After a 20-minute bus journey from outside our hotel, we alighted at an intermediate bus stop lying between the two villages of Ransol and Soldeu close to a smaller cluster of chalets referred to as El Tarter (1679 m) and thereafter we spent most of the morning hours 'contouring' the hillside areas above El Tarter at an altitude of approximately 1800 m in a westward moving direction. This walk involved crossing the broad Ransol Valley (Coma de Ransol) close by the attractive village of

Ransol perched high above the Gran Valira Valley, before our walk carried us further westward towards Vall del Riu where we stopped for a welcome lunch-break and an hour's rest. There had been heavy rain during the night before and the sun was slow in appearing during our morning's travels. It was not surprising therefore, that the weather conditions were not entirely suitable for recording insect life whilst it was very wet under foot and local cloudy conditions prevailed. However, the weather improved once we reached the sheltered valley known as Vall del Riu, and whilst we were having our lunch break, I was able to carry out a quick local survey around the river banks and pasture areas. The number of species recorded was, however, unduly reduced by reason of the earlier unsettled weather conditions, which accounted for why no members of the Papilionidae, Nymphalidae and Lycacnidae families were seen on the wing throughout the afternoon.

PIERIDAE

Around the river banks and amongst damp meadowland areas with pockets of sparse conifers I found both male and female *A. cardamines* L. to be very abundant. Many males were discovered to be particularly small with forewing span of little more than 16 mm from apex to base, whereas female imagines rarely appeared to be less than normal size.

Away from the river banks *C. crocea* was also found to be reasonably abundant, although most appeared to be males, thereby leading me to conclude that this species had yet to reach its full flight period. No other Pierids were at any time recorded during this day.

HESPERIIDAE

My only record amongst members of this family was a small colony of *E. tages*, which was present in the midst of where we had stopped to have our lunch break. Two males showed uninhibited curiosity by frequently alighting on my legs for warmth, much to my amusement!

LOCALITY: El Madriu

Habitat: Summer pastures and open meadowland areas with pockets of marsh wasteland surrounded by steep mountain scree and an extensive coniferous belt.

Average Altitude: 1600 m.

Date of observations: 29th June 1979.

After a spectacular cable car ride from outside the village of Encamp to the Lake of Engolasters, our party spent much of the morning walking along mountain tracks inside a large coniferous belt lying to the south of the Lake before dropping down into the Madriu Valley, which lies to the south-east of Les Escaldes. As soon as we reached this broad valley I could see that this was an ideal locality for many species of rhopalocera in view of the extensive flowering meadows and pasture areas which were at that time undisturbed. As the weather was particu-

larly fine with much sunshine and only light breezes to disturb insect life, I indicated to our leader, who intended taking the rest of the party further up the valley, into an exposed region of small cirques containing a variety of lakes and pools, before returning to Encamp by another route, that I was happy to stay put in the valley so as to carry out a full afternoon's survey of this potentially attractive area. Our leader indicated to me that I should in fact have no difficulty in finding my way back without having to use the cable car as there was a suitable path leading down from the lake into Encamp. As soon as the rest of the party had departed, I immediately turned my attention to the local pastures close at hand. As my records will show, this afternoon in fact proved to be one of the most profitable occasions spent during my holiday in one of the most attractive regions of Andorra, and I am only sorry that I was not afforded a further opportunity of extending my field studies elsewhere within this tranquil and beautiful valley.

PAPILIONIDAE

The major prize was the unforeseen capture of a fine male *P. appollo pyrenaicus* Hartcourt-Bath, which appeared across my path and quite literally flew into my net before I knew what had happened! This lovely sub-species was latterly found to be widespread in distribution during the second week of my holiday, and is likely to be encountered anywhere within the Principality after the beginning of July until the middle of August. The noteworthy features of this subspecies are perhaps its large wing span (a forewing span of up to 46 mm) and the particularly clear white general ground colour. The red spots ringed with black and containing white pupils on the upper sides of the hindwings are perhaps somewhat smaller than those displayed by other central European sub-species and forms, although I suspect that this is in fact a variable feature of this particular subspecies. Further males were sighted in flight later in the afternoon at a lower level in the valley, and as all were clearly in very good condition, I was in no doubt that this insect was only just appearing on the wing at the time of my visit. No females were recorded, and in fact I was unable to record any of this sex as being sighted elsewhere during the period of my visit, although I did encounter a small number in mountain meadows on the French side round Ax-les-Thermes at a much lower altitude where insect life in general had emerged somewhat earlier than their counterparts in Andorra. *Pyrenaicus* displays an ungainly flight pattern by flapping about in a hesitant manner and often allows itself to be blown about by gusts of wind without any attempts to pursue any particular direction. Despite this weakness in flight, I found that this butterfly was capable of evading capture with extraordinary ease!

The only other member of this family encountered was one damaged male *P. machaon gorganus*, which was fluttering around a patch of

thistles with much difficulty as one of its forewings had clearly been damaged earlier, possibly as a result of bird attack. No *I. podalirius feisthamelii* were seen at any time in this valley.

PIERIDAE

No new species were recorded and the most common species around were *C. crocea* and *A. cardamines*, which were to be found everywhere in reasonable numbers. *L. sinapis* was also present in limited numbers within damp hollows and within the dappled areas amongst deciduous trees and bushes growing close to the river bank. A few worn *P. brassicae* were also found in flight at a lower level of the valley.

NYMPHALIDAE

A few *A. urticae* and *V. atlanta* always seemed to be present in single numbers throughout the afternoon, and *urticae* was also particularly abundant in flight amongst scree areas along the path winding up from the valley, when I was returning back to Encamp in the late afternoon.

It was however, amongst the fritillaries that I found the most abundant activity. Within the damp hollows and lower meadow pastures where mountain flora was abundant both *C. selene* and *C. euphrosyne* L. were reasonably plentiful and both male and female were recorded as being present. In the middle of a large area of meadow pasture I spotted a large *Argynnid* flying around a clump of thistles and on closer inspection I identified the insect as a fine male *M. aglaia* L. On higher ground I also spotted what was almost certainly a male *F. adippe* D & S flying around scree area. This latter species was not seen again that day.

During the mid-afternoon whilst I was traversing a boggy area of waste ground I disturbed from basking in the sunshine a male *E. aurinia aurinia* Rott. I failed to capture this insect because of its ability to dart away without warning as soon as I approached it at rest, although I was afforded at least three opportunities to inspect its wing coloration and pattern at close quarters. Such coloration and markings appeared to be more in conformity with *E. aurinia debilis* Oberthur. as the wing span was small and the general coloration was pale-yellow with a considerable amount of greyish-fuscous suffusion on the upper sides of both fore- and hind-wings. The only distinctive orange area was the sub-marginal band present on the upper side of the hind-wings. I therefore concluded that this may have been a representative of a local transitional form with undeveloped subspecific characteristics. Unfortunately I did not find any more elsewhere in this valley and I was therefore unable to confirm my conclusions.

Within minutes of my discovery of *aurinia* I noticed close at hand three attractive fulvous fritillaries fluttering around in long grass, and as their appearance was clearly different from any other species found to date, I immediately moved across to investigate. I was delighted to find

that I had in fact stumbled across a colony of *B. ino* Rott. Although this species is widely distributed throughout southern and central Europe and is a lover of marshy meadows and damp hollows on waste ground during most of the month of June, I had never found this species elsewhere during past holiday visits in Central Europe until this particular encounter. All those sighted were male and I was delighted to find that they were in excellent condition and had clearly only emerged during the course of the last few days prior to my visit. The males display the most beautiful clear orange-fulvous general coloration with distinctive black linear discal and post-discal markings on the upper sides of both fore- and hind-wings and can easily be confused with its larger cousin, *B. daphne* D. & S.; however, apart from the size factor between these two species, it is generally safe to say that *ino* can be differentiated very easily from *daphne* by reason of the fact that this species tends to display a continuous black sub-marginal border on the upper sides of both fore- and hind-wing, whereas *daphne* will generally display a series of disconnected diamond-shape black markings along the sub-marginal upper sides of its wings. It is also probably true to say that although both species can be found in flight together as I found to be the case during our visit a few days later to Ax-les-Thermes in France, *ino* generally appears slightly in advance of *daphne* and is unlikely to be found much later than the second week of July, whereas *daphne* is more likely to be encountered from mid-July onwards. Furthermore, I also found the flight pattern of these two species to be somewhat different in character; *ino* displays a weak fluttering flight pattern and both male and female imagines are reluctant to stray far from their colonised areas, whereas *daphne* tends to display a more determined flight pattern and did not appear to confine its flight to such local marshy areas.

SATYRIDAE

This visit to the Madriu Valley proved to be my first real opportunity to study Erebias at close quarters in any numbers. Apart from *triaria* and *epiphron* which appeared to be quite plentiful in the broader meadow pastures and around the base of scree areas, I also encountered a small number of *E. oeme* Huebner. Although this latter species was found to be variable in size, the presence of the white-pupilled twin subapical ocelli were generally constant. I also particularly noted that the series of white-pupilled sub-marginal ocelli displayed on the undersides of the hindwing were often conspicuously bright and uniform in character.

E. meolans was also found in some numbers around the scree areas, and I found the larger form *zagasia* Fruhst. as the predominant sub-species present on higher ground amongst conifers around the steep path leading away from the valley on my return journey to Encamp.

At a later period in the afternoon I spotted a somewhat large Erebia species in solitary flight in the midst of open meadow pasture, and on catching it, I discovered that I had found a fine male *E. euryale* Esper., which was clearly freshly emerged. As no more of this species were found throughout the afternoon, I concluded that this was an early isolated specimen as the species is normally on the wing from mid-July onwards. The noteworthy feature of this species is perhaps the chequered cilia on both fore- and hind-wings which gives the species a superficial similarity to that of *E. ligea* L.; this latter species is not however found in the Pyrenees and there is, therefore, no risk of confusing the identification when finding *euryale*.

Both *C. pamphilus* and *C. arcania* were found everywhere, although *arcania* tended to confine its appearance to the scree slopes and waste ground areas wherever there were small bushes present. Neither species were very common on the higher scree slopes above 1800 m, and both tended to confine themselves to the warmer pockets at lower levels.

Whilst in the midst of inspecting a female *epiphron* at rest amongst scree, I disturbed a large Satyrid which took to the wing in a sudden manner and then came to rest on the ground a few yards in front of me. Upon approaching this insect with care, I discovered that I had disturbed a particularly large female *L. maera* L. form *adrasta* Illiger.; this form is notable by its extended fulvous coloration and markings on the upper sides of the forewing and is in fact the prevailing form found in Southern France, Spain and Portugal. During the remainder of the afternoon further females as well as a limited number of males were sighted around the base of scree and amongst drier wasteground pockets.

LYCAENIDAE

As the general habitat was of course ideal for Lycaenids, it was no surprise to me therefore to find many of the earlier recorded species in abundance amongst the open meadow pasture areas. In the marshy pockets in the higher pastures I found an extensive colony of *P. hippothoe* L., which were surprisingly tame as I was allowed on more than one occasion to move very close to them basking on the top of bistort flower-heads. Most were, however, male and only two females were found in flight in the colony. The general condition of most was good and I, therefore, concluded that this particular colony had not been on the wing for very many days. Amongst them I also spotted the unmistakable fiery red coloration of one single male *H. virgaureae* L. in fast flight—an early herald of a widely distributed species in this region of the Pyrenees.

Amongst the Hairstreaks I only encountered one very worn male *C. rubi* L. which was fluttering around a small gorse bush in a somewhat dazed condition. This was a late record as this species is more likely to be found in early June. No other members of this family were recorded during this visit.

HESPERIIDAE

A few *T. sylvestris* and *E. tages* were found throughout the afternoon darting about the pathway and lower scree areas and all appeared to be in general good condition. *P. alveus* and *T. lineola* were not recorded as sighted in this valley, although it is quite likely that both in fact exist there.

(To be continued)

NEWS ITEMS FROM HABITAT

A Book of Honey by Eva Crane. Published by Oxford University Press, price £6.95 hardback and £3.50 paperback.

This is a very interesting and readable account of honey from how it is made to its uses and applications. Its history is fascinating: most early civilisations for example, prized honey very highly regarding it, and bees, as sacred. Rock paintings of ancient honey collecting occur in Spain, India and Egypt proving that honey both as a source of food and for medicinal purposes has played an important role in the history of man for a considerable length of time. Dr. Eva Crane is very well qualified to write such a detailed guide to honey as she has been Secretary of the International Bee Research Association for some years.

Butterfly Stamps for 1981

In 1981 the British Post Office are to issue a set of butterfly stamps as part of their programme in the GB Fauna series. It is expected that the set will consist of four stamps each featuring one of the most important species of this group. A 30-minute film about the current state of butterflies in Britain has been planned by the BBC for transmission in February next year.

Biting Question

Dr. Eric Duffey and R. A. Plant of the Institute of Terrestrial Ecology, Monks Wood, Abbots Ripton, Huntingdon, are conducting an investigation into the occurrence of spider bites in Britain which they say has been gradually increasing in recent years. If any reader has suffered from spider bites in the house, garden, at work or elsewhere in Britain and can provide details of the circumstances and the effects of the bite they would be pleased to hear from you. Ideally they would like to have the name of the offending species or else the well preserved specimen which can then be identified.

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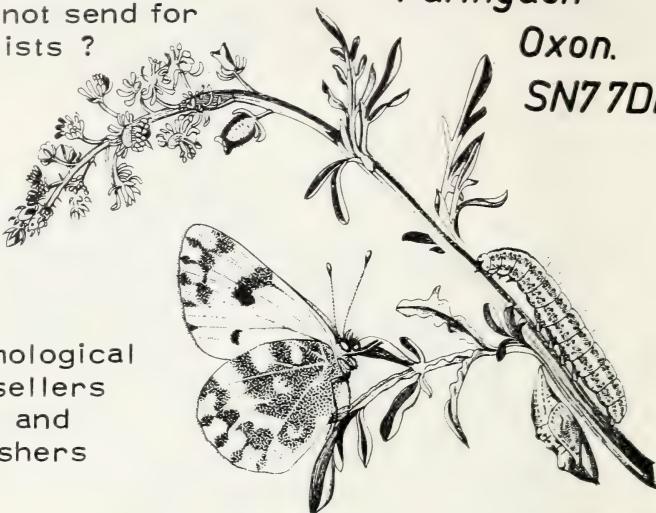
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