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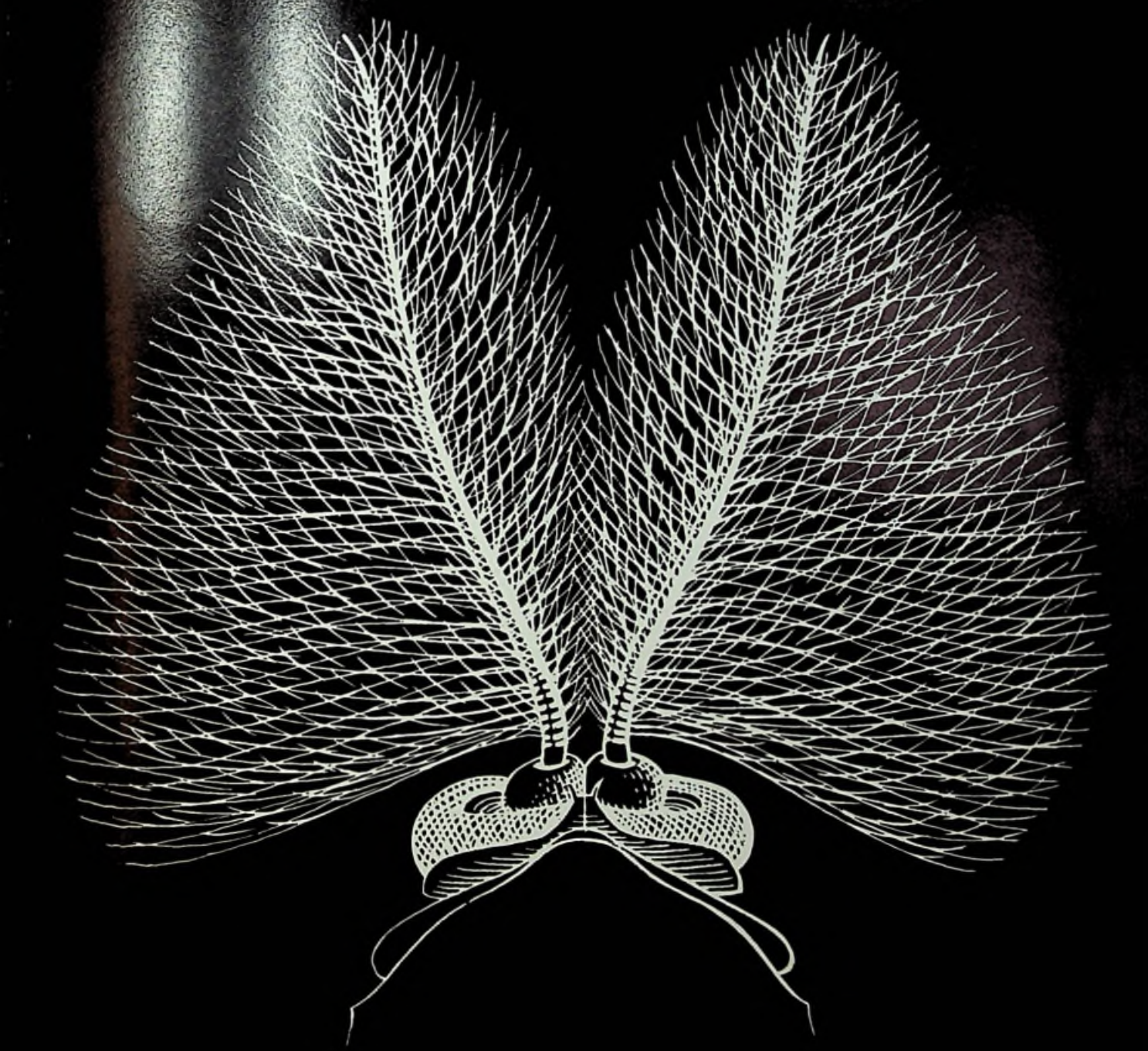
Bulletin of the Royal Entomological Society of London



October 1977 Volume 1 Number 2

Royal Entomological Society of London

Patron: Her Majesty The Queen

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Assistant Editors:
A.E. Stubbs and R.I. Vane-Wright

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ROYAL ENTOMOLOGICAL SOCIETY OF LONDON

Contents

July's Cover

Was William Morris a pioneer user of the 'Stereoscan'? If he had been, no doubt he would have been delighted by the patterns to be found on antennae. The July cover picture showed part of the latero-ventral surface of a male antennal segment of *Calinaga buddha* Moore s.s. (Lepidoptera: Nymphalidae, Calinaginae). The Calinaginae, comprising about ten species in the single genus *Calinaga*, are of very uncertain status within the Nymphalidae *sensu lato*. Among many peculiar features of these sino-oriental butterflies, the inter-carinal 'dishes' of the antennae (one shown in the picture) are both distinctive of the group, and of individual species.

From a montage of nine scanning electron micrographs taken by R.I. Vane-Wright (British Museum (Natural History)). Magnification: × 600.

Do you know what sort of insect the antennae on the cover of this issue belong to? Probably. But who drew the original, where was it first published, and where has it been republished since? All will be revealed in the January issue.

H.E. Hinton

Professor Howard Everest Hinton, F.R.S., died in Bristol on 2 August aged 64. Born in Mexico, he attended high school and university in Berkeley, California, coming to England in 1934 to study for a Ph.D. at Cambridge. Between 1939 and 1949 he worked as a taxonomist in the Department of Entomology of the BMNH producing many scientific papers, including a 350 page monograph of the beetles infesting stored products. In 1949 he was appointed Reader in Entomology at Bristol University, later becoming the holder of a personal chair and finally, in 1970, head of the Zoology Department, a post which he held until his death. He was elected a Fellow of the Royal Society in 1961, and served as President of the RESL in 1969–70.

Possessed of a life-long passion for natural history, and maintaining a rare breadth of knowledge in these days of extreme specialization, Professor Hinton's numerous publications made substantial contributions over the whole field of insect biology. Just before his death he completed a three volume work on the biology of insect eggs, and some years ago founded and continued to edit the highly successful journals of *Insect Physiology* and *Insect Biochemistry*.

Correspondence

Trade in insects

15 August 1977

Sir,

The latest stage in the metamorphosis of RESL publications is a most noble one. Out of the long quiescent (and largely immobile) *Proceedings*, has emerged a most satisfying creature—the gorgeous *Antenna*. It appears, however, that the bright young image is flawed by evidence of some minor degree of parasitization—or the ravages of some kind of virus. I am referring to the philosophical blemishes made apparent by the incongruous placement in the same issue of John Burton's (pp. 15–16) appeal concerning International Insect Trade, together with R.N. Baxter's (p. 27) equally poignant plea for readers to seek his Lists of Insects for Sale.

I realize that *Antenna* needs cash to operate (who doesn't these days?)—but surely this sort of thing may only make the new creature unfit for serious flight? Perhaps a note from the editors explaining the *bona fides* of the Entomological Suppliers Association (of which Mr Baxter is a member), and its charter, could serve to clear suspicions of crude commercialism both from themselves and Mr Baxter. I also suggest that a list of just which dealers belong to this well-meaning Association would be of considerable value.

Yours faithfully,
Bernard D'Abrera,
c/o Department of Entomology, BMNH.

'Gorgeous' indeed, Mr D'Abrera! However, we have received other, less high-flown but generally complimentary, certainly encouraging, reactions from readers of the first issue of Antenna. *Although not published here, we thank those who have sent us their comments. We hope that any continuing favourable reaction will be marked by the sending of contributions on which we depend—most particularly news items and information for our Diary, but also information to keep the British Fauna section up-to-date, offers of reports, articles, cartoons, cover illustrations. . . . With regard to Mr D'Abrera's main point, we can but agree that juxtaposition of the two items he refers to, in the same issue of* Antenna, *if stemming from a single editor's decision, would indicate at least a degree of schizophrenia. While the stand of the RESL as a Society must surely be to oppose trade in endangered species of insect (and that is certainly the position taken by* Antenna*'s editors) the RESL does include in its Lists of Fellows, those who sell and purchase insect specimens. The Entomological Suppliers Association, while its members may trade extensively in insect specimens, opposes illicit handling of protected species. We would invite a response from the Entomological Suppliers Association (and others) to the points which Mr D'Abrera makes. Where does (and should) the RESL stand on the question of trade in insects?*
Editor

Entomology and editors

21 July 1977

Sir,

God bless Miriam!

I hasten to join the throng that will certainly gather behind Miriam Rothschild's banner. Thank goodness for a distinguished entomologist who is prepared to make vocal the new underground rumblings that those of us with ears to the ground have now heard for many months. The fact is that many of today's editors are neither literary nor scientific, but mere dismal, amateur cost-benefit analysts with perhaps even less appreciation of long-term and latent values than even the professional variety of that major social pest.

I will save you (I hope) the necessity to abbreviate this testimony of support, by quoting only one example: a paper (not by me), viciously slashed by the editor of one distinguished journal and submitted to another, whose editor, more enlightened, demanded the reinstatement of much of the excised material. His is the kind of journal that is surely going to collect the contributions—and, hopefully, the subscriptions—in the future. I look forward with fiendish delight to the transfer of goodwill from the miserable neotabloids to those periodicals that have retained some sense of grace.

Yours faithfully,
W.B. Broughton,
28a Thorley Lane, Bishop's Stortford,
Herts, England.

Compartmentalization and the RESL journals

22 July 1977

Sir,

It is no use lamenting the compartmentalization in entomology when our Society—by publishing three restrictive scientific journals—does its best to perpetuate false dis-

tinctions between the different 'disciplines'. Twice in the past decade the Society has shaken up its journals, and twice it has forgone the chance to promote the unity of entomology by publishing a *single* journal.
For years the Society has been schizophrenic, avowing that one of its aims is to foster the synthesis of entomology but denying this by fragmenting the subject in its publications. A curious paradox! At least with a single journal there would be *some* chance of the individual specialist looking at the other fellow's stuff once in a while. Then, Sir, your lamentations might be less needed.

Yours faithfully,
R.W. Crosskey,
2 Willow End, Totteridge,
London N20 8EP.

Terminal terminology

12 February 1977

Sir,
As an amateur entomologist I have become resigned to the plethora of professional abbreviations which now bespatter the literature. I mean CC, CA, ER, IGR, JH, ATP, etc. (see IUPAC and SIU systems), and, if, on the first occasion, one mistakes DDR or CSIRO for new sex pheromones, this eventually sorts itself out. However, I am deeply depressed at recent attempts at 'clarifying' the terminology of mimicry. Mr Vane-Wright, for instance, has decreed that henceforth Müllerian mimicry, or, as Poulton called it, 'common warning colouration' must be known as Class I synergic warning mimicry, and Batesian mimicry is to be renamed Class VI antergic defensive mimicry. These definitions can be further clarified according to some authors by designating them as convergent, divergent or advergent antergic defensive mimics.
Now we are also confronted with 'automimicry'. This term was invented in the United States by Professor Lincoln Brower and his school to describe those members of an aposematic population of a single species of butterfly which lacked an important toxic chemical, or group of chemicals (in the case in point it applied to Monarch butterflies lacking sequestered heart poisons). The concept was further expanded to include the males which are less toxic and less dangerous than their females. Thus a male Monarch with a low concentration of cardiac glycosides in its body would become a sex limited Class I synergic warning automimic, and if it had sequestered none at all (and also presumably lacked pyrrolizidine alkaloids) it would be designated a sex limited Class VI antergic defensive automimic.
The word 'auto' however, means 'self' (Oxford Dictionary) and if this dubious term is used at all it should be restricted to cases of true 'self' mimicry, of which there are plenty of straightfroward examples—for instance those Hairstreaks which, with their quivering antennae-like 'tails' and eye spots, deceive the predator into snapping at their backsides instead of their heads, or species in which marks on the cuticle simulate oozing haemolymph (faked bleeding spots).
If it is necessary to coin a term to apply to individuals of the same species (whether they are clines, variations or polymorphisms) varying in aposematic attributes, we can surely select a better one than automimic—a term which embraces the notion that the mimicry concerns another individual of the *same species*, not itself. Homo-mimic and auto-comimic would be preferable. But why must we sacrifice the hallowed names of Müller and of Bates? Sir, the suggestion is intolerable. The memory of these intuitive and gifted naturalists (names, moreover, which are so easy to recall!) should at all costs be preserved. And in my view a grateful generation should rename automimicry 'Browerian mimicry' in honour of its author.
Let me hasten to assure you that many examples of Browerian mimicry are to be found in the British fauna. Take for instance the case of the Garden Tiger moth. There are several varieties in which much of the red pigment is suppressed or lacking; many males are apparently unable to stridulate; according to their polyphagous habits some lack cardenolides, some lack pyrrolizidine alkaloids and most of them lack tetrahydro-cannabinol. Finally French Garden Tigers have a more pungent odour than the British strains. All these are examples of Browerian mimicry.
Finally there is one dabbler in the field of mimicry who is for ever reiterating that 'every mimicry situation is a special situation'—for, as we well know, a butterfly can be an antergeic defensive mimic for one predator and a synergic warning mimic for another, etc. Inherent in this comment is the threat of at least fifty new terms. This all-embracing type of special confusion could be designated Rothschildian mimicry.

Yours faithfully,
Jackson Bees (Col. Rtd.),
The Garden Cottage, Elsfield,
Oxford, England
[Forwarded by Miriam Rothschild]

INTEGRATED CONTROL OF PESTS

S.P. Simmonds, Entomologist, ADAS, Starcross, Devon

Can be defined as pest control which combines chemical, biological and other suitable methods. These include the use of attractants, sterilized insects, resistant varieties of plants and pathogenic viruses and fungi which are very effective against specific pests but are not harmful to man or his animals. Many scientists working in this field are members of the International Organization for Biological Control of Noxious Animals and Plants (10BC). This organization with headquarters in Switzerland has sections covering all parts of the world. The parent body encourages working groups of scientists to concentrate on special subjects. There are working groups on Integrated Control in Orchards, Biological Control of Citrus scales, Integrated Control in Mediterranean Pine Forests, Integrated Control of soil pests, Integrated Control in Brassica Crops, Integrated Pest Control under glass, etc.

In each group scientists compare the results of their work with similar work in various parts of the world. When a suitable biological control agent is discovered, attempts are made to rear it in large numbers. In addition, the insect or mite is studied to make sure that its introduction to a new area will not cause any harmful results. The main aim will be to limit the use of harmful chemicals in future years and by so doing to avoid contamination of the environment. However, with the increasing world population and the rapidly developing demand for food it would appear that suitable pesticides will be required in the foreseeable future. Ideally, however, these pesticides will be applied only when required and at the lowest effective concentration to maintain economic control of the pest. Whenever possible, biological control agents will be used with pesticides which are effective against the specific pest and with minimal effect on the beneficial organisms.

In the United Kingdom and Europe many growers are using Integrated Control on glasshouse crops such as cucumbers, tomatoes, year round chrysanthemums, etc. A mite predator *Phytoseiulus persimilis* (Acarina, Phytoseiidae) from Chile has given excellent control of the glasshouse red spider mite *Tetranychus urticae* on cucumber, tomatoes, roses, chrysanthemums and various ornamentals. This mite is now being widely used by commercial growers in many countries. The glasshouse whitefly *Trialeurodes vaporariorum* is parasitized by *Encarsia formosa* (Hym., Eulophidae) and considerable research is taking place to determine how this parasite may be used more effectively by commercial growers. Entomologists, including members of the Glasshouse Crops Research Institute (ADAS), and in some Universities are studying this problem and there is every hope that the parasite will become as widely used as the mite predator.

On cucumbers a severe pest is the onion thrips *Thrips tabaci* and this frequently becomes more troublesome, through less competition on the leaves, when red spider mite is fully controlled by the predator. Since this pest leaves the plant to pupate in the soil a chemical such as gamma BHC or diazinon may be selectively applied to the root area to give effective control without affecting the predator or parasite on the leaves. It is likely that a suitable parasite or predator may be found for this pest but in the meantime it is controlled by chemicals. Aphids can be controlled by a selective aphicide pirimicarb which controls the pest without harming predators or parasites. It is expected that aphid parasites or predators may be used instead in a few years' time. Similar methods are also successful on tomatoes.

On chrysanthemums the red spider mite is effectively controlled by the mite predator and leaf miner *Phytomyza syngenesiae* (Dipt., Agromizidae) by a larval parasite *Diglyphus isaea* (Hym., Eulophidae) and a pupal parasite *Rhizarcha* sp. (Hym., Aphidiidae). The common aphid *Myzus persicae* can be controlled by a parasite *Aphidius matricariae* (Hym., Aphidiidae) and the occasional use of selective aphicide (pirimicarb) which controls other aphids which might infest the crop.

On roses under glass, when the grower is willing to avoid sulphur fumigation, the mite predator will control red spider mite and pirimicarb can be used for aphids. On all these crops it is possible to control diseases by using fungicides that are not harmful to the biological control agents. Caterpillars which can be troublesome on some of these crops can often be controlled by applying a commercial formulation of *Bacillus thuringiensis*.

To be effective the biological control agents must be available in sufficient numbers and at the correct time for growers to introduce them. In 1974 the parasite *Encarsia formosa* was in very short supply at the critical period and many growers were unable to obtain supplies at the correct time or in insufficient numbers. Consequently, the whitefly population often built up to a level at which the parasite could not control it. In 1975 and 1976 supplies have been adequate and very effective control of the pest obtained, where the parasite was managed properly. It is essential that adequate supplies of parasite and predators are available for growers to introduce sufficient numbers before the pests are able to build up to very large numbers. Workers at GCRI and ADAS advisers can advise growers

on the numbers of parasites and predators required to prevent economic loss in crop.

Out of doors, the mite predator (*Phytoseiulus*) has given very promising control of red spider mite on strawberries, violets, dahlias etc. At the moment workers are investigating the use of the predator in the hope that economic use may be made of it on strawberries.

In orchards the most severe pests are the codling moth *Laspeyresia pomonella*, totrix moths, capsid bugs, winter moth caterpillars and fruit tree red spider mite *Panonychus ulmi*. The capsid bugs, aphids and winter moth caterpillars are controlled by pre-blossom sprays. To help the growers to apply chemical treatments against codling and tortrix moths at the optimum time light traps are set up in the main fruit growing areas. In 1974 and 1975 pheromone traps were compared with light traps to determine whether they gave a more accurate estimate of moth populations; these use synthetic sex secretions to attract male moths into the traps, where they are imprisoned by a sticky solution. Suitable traps are now available at commercial fruit growers and have been found more reliable than light traps. ADAS entomologists are attempting to interpret the data from experimental traps in an effort to improve timing of application of pesticides. Timing will be related to the peak catch of moths in each case.

In the United Kingdom the natural enemies of codling and tortrix moths do not occur in sufficient numbers to give adequate control. In some countries large numbers of sterilized male codling moths have been liberated into the orchard to mate with the females. Where very large numbers of sterile males can be liberated, damage can be very greatly reduced.

In some countries the woolly apple aphid *Eriosoma lanigerum* can be controlled by its parasite *Aphelinus mali* (Hym., Eulophidae). This parasite has proved very effective in Australia, but less so in Britain. In Essex at one time the ACE group of fruit growers used the parasite each season. The parasitized aphids were collected on apple twigs and maintained in a fruit store over winter. Growers purchased the material in the spring and suspended the twigs in trees where the pest was troublesome. The method was discontinued following the introduction of more effective aphicides.

In many countries the fruit tree red spider mite *Panonychus ulmi* can be controlled biologically. Although effective predators occur in the United Kingdom, these are killed by the pesticides required for codling and tortrix moth control. Since these pesticides are essential to prevent severe damage to the apples, natural predators cannot be used for reliable control of the mite.

Basic research is being carried out at East Malling Research Station in an attempt to develop a satisfactory integrated pest control programme for orchard crops. There have been very useful developments in Nova Scotia and other countries where growers have successfully used integrated control in apples for some years. Weather conditions in Britain are not favourable for this, but research is continuing. In the meantime apple growers are minimizing the use of chemical sprays against pests.

Methods of forecasting the appearance of pests and limiting chemical application to the correct time are being used on many other field crops. For example, with pea moth *Laspeyresia nigricana* entomologists report when moths are found in the field and when eggs are found on leaf samples. Pheromone traps are being tried also and if results are good may be used more in the future. Warnings are sent to pea growers when the moths are active. Forecasting schemes are also in operation for leatherjackets (the larvae of the crane fly), pea midge *Contarinia pisi*, wheat bulb fly *Leptohylemyia coarctata*, bean aphid *Aphis fabae*, carrot aphid *Cavariella aegopodii* etc.

It is hoped in the future to be able to forecast outbreaks of other pests, the aim being for growers to apply the most successful pesticide at the most suitable time to give maximum yields of good quality produce. In the present economic system growers are expected to produce large quantities of high quality unblemished produce. At the present time this is very difficult to obtain with integrated control programmes in Britain. By applying the pesticide at the optimum time to control the pest, it is possible to limit pesticidal use and so allow beneficial parasites and predators to exert their control, particularly later in the season. Together with skilled application of pesticides it should be possible to prevent pests from doing excessive damage without causing too much harm to the environment as a whole. In addition, plant breeders are attempting to produce high yielding plants which are resistant to pests. Oat and barley varieties are being grown which are resistant to the cereal cyst eelworm *Heterodera avenae*. Potato varieties resistant to the potato cyst eelworm *Heterodera rostochiensis* are available and it is hoped to have suitable varieties resistant to a closely related eelworm *Heterodera pallida*.

Some chrysanthemum cultivars are very resistant to aphids

[*Continued at foot of p. 39*]

There will never be another chance in the history of Planet Earth

Alan Stubbs Nature Conservancy Council, London, England

Palaeontologists are used to dealing with a fragmentary record of the history and evolution of life. They can never know the ultimate truth of conditions in the past but only make assumptions and postulations based upon a few pieces of a jig-saw. A collection here, a collection there, with luck some information about the environment which may provide a clue concerning ecology or functional morphology. In some cases it is still possible to gain another sample of environment—a piece of rock or preferably a look at a whole rock face. One can never test the genetics, physiology or behaviour of fossils and only rarely say much about their biochemistry. There is often no knowing what taxa lived at any given period or in any given place, the gaps in information and inadequate quantity and quality of material is often tantalising. Probably most entomologists will be saying to themselves 'thank goodness I am not a palaeontologist'.

Geologists, and indeed biologists, are accustomed to the concept that there are cataclysmic events in the history of the evolution of life when wholesale extinctions occurred, not necessarily sudden, rather something slower and more insidious but nonetheless dramatic. We are potentially living within such an event. Let us take the optimistic view that mankind will somehow adjust to the constraints of environmental resources of the planet (or beyond), and as entomologists concentrate on the event as it affects our field of interest. Within much less than a generation entomologists will come rather closer to the restricted scope of operation of the palaeontologist than many of us would care to accept.

Insects are essentially terrestrial animals, also being successful colonists of freshwater. We all know what is happening to our terrestrial environment. We all know that over one million species (interpolate your own figure) in that environment are insects. Of course, many of those species are still with us, despite the lack of primary vegetation in many parts of the world occupied by man. It is disconcerting enough to realize the virtual absence of virgin primary forest in lowland Europe but at least we have plenty of semi-natural forest. It is possible to think of areas of drastic loss or change within the last century or so, such as tropical islands grazed out by goats, or the cultivation of vast tracts of North American prairie. No doubt species, whole communities have been lost, but in Europe, and North America, the number of cases of certain extinction within relatively well-known groups of insects, such as butterflies, seems to have been surprisingly few. It is also in such areas where conservation measures are to varying extents a reality and it is easy to be complacent: we are bound to lose some species, but this will not be on a dramatic scale.

A major problem lies in the tropics, though many other areas outside could bear comparison. Tropical rain forest, one of the richest entomological habitats, is being lost at an alarming rate. On a visit to Malaya, where most of the peninsular is forested, I was told that virtually the whole of the rain forest outside a few national parks was due to be cleared within 10–20 years (only 3% of the timber was being used). In Ceylon it is difficult to find forest, entire large scale mountainscapes being covered in ever increasing monocultures of tea. The world is aware of what is happening now that the Amazon is being opened up but can we really expect that more than a small fraction of this fragile forest will survive. The ideal salvation is the national park or large reserve, but one does not have to probe far below the glossy exterior to find that the reality in many countries is totally inadequate control of such activities as illicit cut and burn agriculture or poaching (upsetting the natural balance of grazing) and encroachment of domestic cattle—all aspects of a rapidly growing world population and weak political will to come to terms with the resulting problems.

It is disconcerting to realize that only 100 years ago Africa was still largely uncharted, the famous Dr Livingstone story originating in 1871. Today the Amazon is well past that position. By the end of the century or just beyond, many areas of the world such as the Malay Peninsular could see a more dramatic change in 20 years than parts of Africa in 100.

There are many museums which rely on the pioneer collectors. Often that material is beyond price because the localities have long since gone in an entomological sense. More recent expeditions and collectors have continued to add to our fund of scientific raw material. However, we are already too late. In many parts of the world there are vast gaps in our taxonomic knowledge and there is no chance of doing more than pick up remnants—or literally a relict fauna.

We still have the time to go out and obtain material which will almost instantly become a fossil collection. This is the last chance to find out what really did live on parts of the planet when it was in a natural, or even semi-natural state. It is the last chance to salvage something approaching a total view of natural distribution, speciation and subspeciation within the world as a whole. We need to know as bio-geographers, as taxonomists, as evolutionary biologists etc. Whatever we get in our fossil collection will be as complete or fragmentary a jig-saw as the effort we put in.

Future generations will either thank or denounce our level of scientific forethought.

The implications of these remarks could be immense in terms of the resources required to obtain and curate collections. This need not necessarily be the case, though with large numbers of unemployed zoologists many would leap at the chance to do something useful on a shoe string budget, rather than stand in the dole queue or sell vacuum cleaners. One answer is to make the most of every opportunity to gain bulk samples—never mind the sorting, never, mind the pinning and individual labelling. All we need do is get those bulk samples into the safe custody of national museums for storage. It may take hundreds of years before anyone eventually gets to work on those samples but this does not matter. The chances are that similar material could not be obtained by someone in the field in hundreds of years' time. We are talking of a scientific gold mine that can never be quarried again.

Cannot more be done by the various expeditions, universities and institutes around the world? They all collect their own thing, but by greater use of traps and other simple methods of sampling it should be possible to gain general bulk samples. True some efforts are being made, and others have no doubt spoken of the need, but are even the lepidopterists satisfied that their requirements for material will be met in time?

There is no point in trying to accurately quantify the problem, even if one accepts an FAO estimate of 11 million hectares per year as the rate of destruction of forest alone (and accelerating). It is of course not only forest that is being destroyed. The loss is not an erosion of a uniform percentage of each vegetation type or of geographical area, it is uneven, often involving the complete loss of entire complex communities. You can develop your own island population theories for what we are to lose. It may well be half the insect species of tropical forest by the end of the century. That is an awful lot of irreplaceable scientific information gone, often with no record. Insects do not readily become fossilized in tropical forest!

One of the popular concepts of the geologist is that the present is the key to the past. Whatever does survive in the long term will be the key of future generations of entomologists, enabling studies of the remaining living insect species to lead to an understanding of extinct species. The number of notches on the museum collection key is up to the present generation.

As a conservationist, my earnest hope is that a reasonable range of natural and semi-natural habitat with its insects will be adequately safeguarded for the future. However, much will inevitably be lost, and what one cannot save for studies of the living insect one may as well conserve on the end of a pin—an 'instant' fossil.

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and these can be very useful in an integrated pest control programme on all the year round chrysanthemums under glass. Plant breeders of a wide range of crops find varying degrees of susceptibility and are attempting to use resistant plants in breeding programmes and so producing commercial varieties resistant to specific pests or diseases. The use of such resistant varieties can be of great importance in integrated programmes of pest control, for the plant itself can limit the build-up of the pest and maintain it at a level where biological control agents can effectively control it without the use of pesticides.

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MORE THAN JUST BIRDS

Gerald Legg, Booth Museum of Natural History, 194 Dyke Road, Brighton BN1 5AA, UK

In 1874 Mr E.T. Booth had a museum built in the grounds of Bleak House, Brighton. He erected his private museum to house his considerable collection of birds that he had personally collected (shot and trapped) in the British Isles. The collection was added to over the years after he bequeathed his museum and the collections to the Corporation of Brighton. It is one of the most important collections of its type in the world with the majority of birds that inhabit or have visited the British Isles mounted in cases representing their natural haunts.

The old 'Booth Museum of British Birds' has now been renamed the 'Booth Museum of Natural History' for good reason, since in addition to the extensive collections of mounted birds the museum also has a wide range of collections on other aspects of natural history.

In February 1976 a new gallery opened, showing some of Brighton's magnificent collection of animal skeletons, the finest in Britain outside the national museums. Most of the specimens were given to Brighton by Frederick W. Lucas, an eminent zoologist of the 1920s.

The near future will hopefully see the development of two new galleries, one on geology (the reference collection contains some 20 000 geological specimens) and one on insects.

Of all the reference collections (molluscs, echinoderms, crustacea, insects, arachnids, birds' eggs, bird skins, mammal skins and pressed plants) that of the insects is the largest. There are approximately 1 000 000 insects, the greater proportion of which are Lepidoptera. Other insect groups represented include: Diptera, Hymenoptera, Orthoptera, Dictyoptera, Neuroptera, Odonata, Mecoptera, Ephemeroptera, Plecoptera, Phasmida, Dermaptera, Psocoptera, Heteroptera, Homoptera, Trichoptera, Siphonaptera, Mallophaga and Coleoptera.

The British insects are represented by several important reference collections, with particular emphasis on the Sussex fauna: Morris (Lepidoptera, Coleoptera), Hillman (Lepidoptera), Tonge (Lepidoptera, Hymenoptera), Jenner (Lepidoptera, Coleoptera, Diptera, Odonata), Cribb (Coleoptera), Brazenor (Hymenoptera, Diptera, Odonata), Elliot (Hymenoptera, Heteroptera) and others.

The exotic Lepidoptera are dominated by the Hall collection. Arthur Hall collected extensively in South and Central America around the turn of this century up until 1934. His main interest lay with the nymphalids on which he prepared over 40 volumes of his 'Monograph on the Nymphalidae' (unpublished). During 13 visits to South and Central America he avidly collected (usually within reach of an hotel) all families of butterfly and some moths. He also collected in Central Europe during the 1890s. His specimens from Africa, North America, Australasia and Asia were obtained from other eminent collectors (including J.J. Joicey) and through purchases. Hall described many new species and subspecies, and the collection contains in the region of 600 types.

Other large collections of non-British insects include: de Rhé Philip (Indian Lepidoptera), XVIIth Baroness Zouche of Harygworth (European Lepidoptera), Jeffry (African Lepidoptera), Brown (African and South American Lepidoptera), Craig (Indian Lepidoptera and Coleoptera), Goring Bridger (African Lepidoptera and Coleoptera), Taylor (South American insects) and others. The 'general' collection of butterflies contains some 150–200 000 specimens from Joicey, C. Oberthür and several other famous collections. It will not be before time that at least part of the Museum's insect collection will be on display.

An exhibition 'The Unnatural History of an English County' was prepared by the museum and is at present on display at the Exceat Barn, Seven Sisters Country Park, Alfriston, Sussex. This will eventually return to the museum and be incorporated into a permanent display. The theme of this exhibition is the overwhelming influence man has had on Britain since his arrival and up to the present day, with particular reference to Sussex.

Periodically temporary exhibitions are held and it is hoped that an exhibition of scanning electron micrographs will be forthcoming at the beginning of next year, entitled 'Larger than Life'. This will have a strong arthropod bias!

The Booth Museum is now the Regional Data Bank for Biological Records for the south-east of England. The museum has only recently taken up this role and it is hoped that as records are accumulated and filed, the data available will be of use to various interested persons and authorities.

An important contribution to Museum Documentation has been made by the Brighton Museums which involves the development of a computer orientated accessioning and cataloguing system (dispensing with cumbersome, time-consuming card files). The versatile system makes information retrieval extremely easy as well as cutting down the amount of manual labour involved in initially recording the data. Indexes and special searches are easily performed and prepared, making the life of the researcher easier.

All the collections are open for study to any one who is interested in any particular aspect of natural history. For further information telephone Brighton 552586/63005, ext. 64.

DIARY

Abbreviations: *RESL*, Royal Entomological Society of London; *RESL(QG)*, RESL Rooms, 41 Queen's Gate, London SW7, UK; *BENHS*, British Entomological and Natural History Society; *BENHS(AC)*, BENHS meeting at Rooms of the Alpine Club, 74 South Audley St, London W1, UK; *IB*, Institute of Biology; *RS(CHT)*, The Royal Society, 6 Carlton House Terrace, London SW1 5AG, UK; *I*, information from.
Meetings of the *RESL* are in **bold** type.

Please help to make this DIARY a success—by sending information of relevant meetings to the Editor of *Antenna*. It is our desire to include all national and international level entomological meetings, together with notice of many other events related to entomology and general biology. Notice of local meetings will largely be restricted to the UK, and on a selective basis.

Oct. **5** **The influence of plant odours on host-plant selection by the cabbage root fly.** S. Finch (National Vegetable Research Station, Wellesbourne, UK).
In recent years much effort at Wellesbourne has been concerned with finding methods of insect control to supplement insecticides, since many pests are now resistant to certain insecticides, and are likely to become resistant to others in the near future. This contribution will be concerned mainly with how certain plant odours attract an insect to its host-plant, and how such attractants might be used for trapping insects. Most of this work has been carried out on the cabbage root fly, a serious pest of cruciferous vegetables in the temperate zone, though many of the results are applicable to other pest species. The difficulties encountered and the possible ways in which they can be overcome will be discussed.
RESL(QG), tea 17.00, meeting 17.30.

11 *Biographical dictionaries, their preparation and uses.* R.G.C. Desmond. Society for the Bibliography of Natural History, Margaret Murray Room, University College, London WC1, UK. 17.30 for 18.00.

13 *Stretch activation of muscle: function and mechanism.* Croonian Lecture by J.W.S. Pringle. *RS(CHT)*, 16.30. *I:* The Executive Secretary, *RS(CHT)*.

13 *British harvest spiders.* J.H.P. Sankey. *BENHS(AC)*, 18.00 for 18.30.

22 *Irish natural history before 1800.* Society for the Bibliography of Natural History. 14.00. Dublin, Eire. *I:* E.C. Nelson, National Botanic Gardens, Glasnevin, Dublin 9, Eire.

28 *Scientific aspects of the 1975–76 drought in England and Wales.* One-day discussion meeting. *RS(CHT)*. *I:* The Executive Secretary, *RS(CHT)*.

28 *Annual dinner, BENHS.* London, UK. *I:* G. Prior, 23 Manor Way, N. Harrow, Middx, UK.

29 *Annual exhibition, BENHS.* Chelsea Town Hall, London SW3, UK. *I:* G. Prior, 23 Manor Way, N. Harrow, Middx, UK.

Nov. **2** **The morning after the night before.** H.F. van Emden (University of Reading, UK). Aphids can to some extent compensate in youth for periods spent on inferior diets, but this compensation is limited. Longer periods on inferior diets may result in better diets later not being fully utilized. The plant provides a continuous diurnal alternation of rich and dilute diet, and the aphids response to this alternation has implications for the use of synthetic diets. *RESL(QG)*, tea 17.00, meeting 17.30.

7–10 *Endocrinologie.* Symposium, France. *I:* Conférences INSERM, 101 rue de Tolbiac, 75645 Paris Cedex 13, France.

9–10 **Ant biology.**
Two-day meeting, *RESL(QG)*.
Provisional programme: C.A. Collingwood (MAFF), *Variation and speciation in the* Formica rufa *species group*

in relation to their ecology; A.J. Pontin (Royal Holloway College), *Underground aphid populations with* Lasius flavus; M.V. Brian (ITE, Furzebrook), *Sexual production by* Myrmica *colonies;* B. Taylor (Kenton, Harrow), *The ant mosaic and black-pod disease of Cocoa in western Nigeria;* J.H. Sudd (University of Hull), *Wood ants and aphids—a behavioural analysis;* G.J. Skinner (King George V School, Merseyside), *Methods of assessing the foraging activity of ants;* I.H. Haines (Rothamsted), *Toxicants and baits for the control of* Anaplolepis longipes *in the Seychelles—laboratory and field assessment;* I.H. Haines (Rothamsted), *The pest status of the crazy ant* A.longipes *in the Seychelles;* R.J. Quinlan (UCNW, Bangor), *The role of the fungus in the energy relations of* Atta *colonies;* M. Fisher (UCNW, Bangor), *The passage of food materials in leaf-cutting ant colonies;* J.M. Cherrett (UCNW, Bangor), *Ecological polyphagy in leaf-cutting ants: reasons and advantages;* P.B. Cornwell (Rentokil Ltd), *Ant infestations in buildings in the United Kingdom;* J.P. Edwards (MAFF, PICL, Slough), *New methods for the control of ant pests;* P.E. Howse (Southampton University), *Multicomponent pheromones in ants;* S. Winterbottom (Southampton University), *Chemical basis of species and colony recognition in the genus* Myrmica. (It is likely that there will be additional speakers.)

Meeting fees: Fellows of *RESL*, £2.00; Non-Fellows, £3.00 (to be confirmed; will include coffees and teas). *I:* J.P. Edwards, Pest Infestation Control Laboratory, London Rd, Slough, Berks, UK.

10 *Exhibits and communications meeting.* *BENHS(AC)*, 18.45.

11–12 *Genetical Society meeting.* London, UK. *I:* M.A. Ferguson-Smith, Secretary Genetical Society, Institute of Genetics, University of Glasgow, Glasgow G11 5JS, UK.

12 *Diptera Recording Schemes annual meeting.* London, UK. *I:* A.E. Stubbs, 19 Belgrave Sq, London SW1X 8PY, UK.

12 *Dipterists' Dinner.* London, UK (evening). *I:* A.C. Pont, British Museum (Natural History), London SW7 5BD, UK.

12–13 *Entomologische Arbeitsgemeinschaft am Oberösterreichischen Landesmuseum,* annual meeting. Linz, Austria. *I:* R. Reichl, Hagenstrasse 7, A-4020 Linz, Austria.

17 *From butterflies to preventing rhesus babies.* C.A. Clarke. *IB* Darwin Lecture, London, UK. *I:* General Secretary, *IB*, 41 Queen's Gate, London SW7 5HU, UK.

19–21 *British Ecological Society meeting.* Lancaster, UK. *I:* British Ecological Society, c/o Harvest House, 62 London Rd, Reading RG1 5AS, UK.

21–24 *Pests and diseases.* 9th British insecticide and fungicide conference. Brighton, UK. *I:* W.F.P. Bishop, F. Bishop (Conference Planners) Ltd, 4 London Rd, Croydon CR0 2TB, UK.

23–25 *Medical entomology centenary.* Symposium, Royal Society of Tropical Medicine and Hygiene, London, UK. Organized to commemorate the centenary of the 'Birth of Medical Entomology', Manson's discovery that a mosquito was a vector of filariasis. Seventeen papers will be read by British and overseas specialists, and there will also be entomological demonstrations. The Registration Fee (£8.64 incl. VAT) covers attendance, summaries, teas, coffees, and lunch at Manson House on 23rd. Lunch available on 24th at LSHTM, £1.50. Meetings will be at the RSTMH,

London W1, and the London School of Hygiene and Tropical Medicine, London WC1. The sessions will be chaired by S.G. Browne (President, RSTMH), T.R. Odhiambo, D.S. Bertram, J.D. Gillett (President, *RESL*), P.C. Garnham and W.W. Macdonald. For list of speakers and titles, see *Antenna* for July '77, p. 11. *I:* M.W. Service, Liverpool School of Tropical Medicine, Liverpool L3 5QA, UK.

24 *Effects and aftermath of the 1976 drought*. Discussion meeting. *BENHS* (*AC*), 18.00 for 18.30.

25 *Regulation of arthropod growth and development*. One day meeting, Society of Chemical Industry Pesticides Group. Lecture theatre, the Zoological Society, Regent's Park, London NW1 UK. 10.00–17.00.

25 *The contribution of scientists to medical research. IB* meeting, London, UK. *I:* General Secretary, *IB*, 41 Queen's Gate, London SW7 5HU, UK.

— *Entomological Society of Peru annual meeting*. Arequipa, Peru. *I:* P.G. Aguilar, Sociedad Entomológica del Perú, Aptdo 4796, Lima 1, Peru.

27–Dec. 1 *Entomological Society of America 1977 general meeting*. Washington, D.C., USA. Meeting includes 20th National Insect Photosalon. *I*: Entomological Society of America, Box AJ, 4603 Calvert Rd, College Park, Md. 20740, USA.

Dec. 5–6 *Agricultural Education Association winter conference*. London, UK. *I:* P. Biglin, Secretary Agricultural Education Association, Askham Bryan College, York YO2 3PR, UK.

7 **Insect jumping: a question of power, engineering and economics.**
H.C. Bennet-Clark (Dept Zoology, University of Oxford, UK).
Because of their small size, jumping insects must accelerate extremely rapidly over a short distance. This requires a production of power which cannot normally be explained by direct muscular activity. Instead, it is necessary to invoke energy storage as a means of power amplification to produce the large power outputs and large accelerations required for the jump. Most jumping insects have energy stores which are modified regions of the cuticular skeleton, and muscles which are adapted to produce a high energy output as well as a high power output during the phase of energy storage.
The use of energy stores is economically attractive; they are far lighter than the muscles, whose energy they store, and they are capable of working with very low energy losses. As a scale effect, however, small insects tend to use different types of energy store from large insects. Another important scale effect is air resistance, and it is shown that this acts as an effective limit to the jumping performance of smaller insects, and may be an important factor determining the economic range of the jump of larger insects.
The talk will be illustrated by models and film, in addition to slides. *RESL*(*QG*), tea 17.00, meeting 17.30.

8 *A naturalist in Oman*. K.M. Guichard. *BENHS*(*AC*), 18.00 for 18.30.

8–9 *Natural selection and behaviour*. Symposium, Association for the Study of Animal Behaviour. London, UK. *I:* J. Krebs, Dept Zoology, University of Oxford, S. Parks Rd, Oxford, UK.

14 **The ecology and evolution of butterflies.** One-day workshop, *RESL*(*QG*). Eight speakers, to include J. Thomas, E. Pollard and M. Rothschild. The provisional programme will be available from *RESL*(*QG*) at the meeting of 5 October and thereafter. Meeting fees: Fellows of *RESL*, £1.25; Non-Fellows, £2.50 (to be confirmed; will

include coffees and teas).
I: J. Thomas, Furzebrook Research Station, Wareham, Dorset BH20 5AS, UK.

27–30 *Phenetic and phylogenetic approaches to classification* (Willi Hennig memorial); *Numerical taxonomy; Primate phylogeny: a confrontation of methods.* Annual meeting and three symposia, Society of Systematic Zoology. Toronto, Canada. *I:* M.C. McKenna, American Museum of Natural History, Central Park West at 79th St, New York, N.Y. 10024, USA.

1978

Jan. 3–6 *Society for Experimental Biology meeting.* Brighton, UK. *I:* Society for Experimental Biology, c/o Harvest House, 62 London Rd, Reading RG1 5AS, UK.

12 *An island called Australia.* C.G. Roche. *BENHS*(*AC*), 18.00 for 18.30.

18 **RESL meeting. Ecology of fig-insects (Hym., Chalcidoidea) associated with two species of *Ficus* in Africa.** Rev. A. Watsham (Salisbury, Rhodesia). *RESL*(*QG*), tea 17.00, meeting 17.30.

26 *BENHS annual meeting.* *BENHS*(*AC*), 18.00 for 18.30.

26–27 *The biochemical functions of terpenoids in plants.* Discussion meeting organized by T.W. Goodwin. *RS*(*CHT*). *I:* The Executive Secretary, *RS*(*CHT*).

Feb. **15** **RESL meeting.** Speaker and title to be announced in next issue of *Antenna.* *RESL*(*QG*), tea 17.00, meeting 17.30.

22–23 *Light scattering in physics, chemistry and biology.* Discussion meeting organized by A.D. Buckingham. *RS*(*CHT*). *I:* The Executive Secretary, *RS*(*CHT*).

Mar. **1** **RESL annual general meeting.** *RESL*(*QG*), tea 16.30, meeting 17.00.

1 *The Verrall Supper.* London, UK. (By invitation only, through members of the Verrall Association.)

29 **Insectary design, construction and management.** One-day workshop, *RESL*(*QG*). *I:* J. Boorman, Animal Virus Research Institute, Pirbright, Woking, Surrey GU24 0NF.

— *1st European congress for lepidopterology.* Societas Europaea Lepidopterologica. Paris, France. *I:* G. Bernardi, Laboratoire d'Entomologie, Museum d'Histoire Naturelle, 45 bis rue de Buffon, F-75005, Paris, France.

Apr. 10–14 *Variation within plant pathogens.* Joint meeting AAB and FBPP. Norwich, UK. *I:* D. Gareth Jones, Secretary Association of Applied Biologists, Dept Agricultural Botany, University College of Wales, Aberystwyth, Dyfed SY23 3DD, UK.

20 *Immunity to malaria.* Review lecture, S. Cohen. *RS*(*CHT*). *I:* The Executive Secretary, *RS*(*CHT*).

27 *Recent progress in the numerical prediction of weather and climate.* Review lecture, B.J. Mason. *RS*(*CHT*). *I:* The Executive Secretary, *RS*(*CHT*).

June 1 *Applications of catastrophe theory to biology.* Review lecture, E.C. Zeeman. *RS*(*CHT*). *I:* The Executive Secretary, *RS*(*CHT*).

June 4–9 *4th international symposium on insects and host plants.* Slough, Berks, UK. *I:* E.A. Bernays & R.F. Chapman, COPR, College House, Wright's Lane, London W8 5SJ, UK.

July 24–28 *4th international congress of pesticides chemistry* (IUPAC). Zurich, Switzerland. *I:* M. Spindler, Congress Secretariat, 4th international congress of pesticides chemistry, PO Box 182, CH-4013 Basle, Switzerland.

July 31–Aug. 9 — *9th international congress on electron microscopy*. Toronto, Canada: *I:* Banting Institute, 100 College St, Toronto, Ontario M5G IL5, Canada.

Aug. 6–12 — *5th international congress of acarology*. East Lansing, Michigan, USA. *I:* J.G. Rodriguez, University of Kentucky, Lexington, Ky 40506, USA.

Aug. 16–23 — *3rd international congress of plant pathology*. Munich, W. Germany. *I:* E. Fuchs, Congress Plant Pathology, Biologische Bundesanstalt, Messeweg 11/12, D3300 Braunscheig, W. Germany.

Aug. 19–26 — *4th international congress of parasitology*. Warsaw, Poland. *I:* B. Bezubik, Dept of Parasitology, University of Warsaw 00-927, Warsaw, Poland.

Sep. 10–16 — *2nd international working conference on stored-product entomology*. Ibadan, Nigeria. *I:* T. Ajibola Taylor, PMB 5029, Moor Plantation, Ibadan, Nigeria.

Sep. 10–16 — *2nd international congress of ecology*. Jerusalem, Israel. *I:* 2nd international congress of ecology, c/o Conventions-Kopel, 122 Hayarkon St, PO Box 3054, Tel Aviv, Israel.
[Erroneously included for 1977 in *Antenna* for July.]

Sep. **19–22** — **1st European congress of entomology.** *RESL*, Reading, UK. *I:* 1st European congress of entomology, Dept of Zoology, The University, Earley Gate, Reading RG6 2AT, UK.

Oct. 11–13 — *4th international symposium on pollination*. Maryland, USA. *I:* D.M. Caron, Dept of Entomology, University of Maryland, College Park, Md 20742, USA.

1979

Aug. 5–12 — *9th international congress of plant protection*. Washington, D.C., USA. *I:* B.G. Tweedy, Secretary General, 9th international congress of plant protection, c/o Pesticide Coordinator, Office of Secretary, USDA, Washington D.C. 20250, USA.

Aug. 6–11 — *27th international apicultural congress*. Helsinki, Finland. *I:* K. Vesterinen, Suomen Mehilaöshoitajien Keskuyärjestö, Sume r y, PO Box 112, 33101 Tampere 10, Finland.

J.D. Hooker to H.W. Bates, circa 1862. . . .
'Above all things, remember that entomologists are a poor set, and it behoves you to remember this in dealing with them. It is their misfortune not their fault; deal kindly with them.'

NEWS

News of Gunong Mulu Expedition

(See *Antenna* 1(1): 13)

Ecologist Mike Singer (Austin, Texas) visited London on 14 August, returning to America after five weeks at Gunong Mulu. There he helped to start a project in which insect damage to several plant species, including two or three forest trees and *Selaginella*, will be quantified. He was impressed with the diversity, abundance and alacrity of Homoptera, Hemiptera and Coleoptera, which hopped or flew away at the slightest disturbance. Most appeared to be host-specific, and many were specialized for locating and feeding on young leaves of saplings in the understory. Butterflies were diverse but few species were abundant, and only two individuals were seen feeding on flowers. More usual food sources were bird droppings, fallen fruit and honeydew. Moths were abundant and diverse as larvae, but pending the arrival of Dr J.D. Holloway with a mercury-vapour trap, were less in evidence as adults. In terms of personal survival, Dr Singer reported no great difficulties, except for the predictable leach attacks, some to the most tender parts of the anatomy.

Arid Zone research

Academic Press Inc. (London) Ltd has decided to inaugurate a high quality, interdisciplinary journal for the publication of research and reviews on arid lands and their problems of development. Offers of contributions and requests for 'Instructions to Authors' should be addressed to Professor J.L. Cloudsley-Thompson, Editor; *Journal of Arid Environments*, Department of Zoology, Birkbeck College (University of London), Malet Street, London WC1E 7HX, UK.

Expedition to Venezuela

In the last few years, two Fellows of the Society, Michael Adams and George Bernard, have made three very successful expeditions to Colombia, to study the butterflies of the isolated Sierra Nevada de Santa Marta, and the neighbouring mountain areas. They have become increasingly interested in the pronophiline satyrids, a very diverse and characteristic element of the montane butterfly fauna of South America. A joint paper on some of the new species they have discovered is shortly to appear in *Systematic Entomology*.

Adams and Bernard are now extending their work to field studies on the life histories and ecology of the species. At present they are making a fourth expedition, this time to the Mérida area of Venezuela. We recently received a letter dated 9 August, giving news of their progress: 'We've now spent a week encamped at 2450 m above the town of Mérida, counting pronophilines up an altitude transect, collecting outside the transect, and searching for early stages by torchlight at night. The pronophiline larvae are magnificently camouflaged by day, on the brown leaf-shafts deep down at the bamboo nodes. By night they come out onto the leaves to feed, and we've found 12 larvae of five species, numerous eggs, and one beautiful pure green pupa. We've excised eggs from captured females, but everything we have found *in situ* we are going to try to keep alive and follow through to the adult. We'll keep head capsules, and we have photographed the larvae and pupa. Our total of butterfly specimens is now 1300, and we hope to augment that to 1800 or more before the end of the month. In addition we hope to collect perhaps 500 ithomiids from a 'pocket' we know in the foothills of the Sierra Nevada de Santa Marta, just before we leave from Valledupar for home.'

Newspaper reporter discovers new fly

Commenting on a recent invasion of hover flies (mostly *Episyrphus balteatus*) into Britain, the London *Evening Standard* (10 August) included the following observations: 'The massed brigades of hover flies sending shudders up spines all over Essex and the South East mean the bumper cereal crops will be saved from a threatened scourge of aphids. The flies are scaring people because they look like wasps. The young ones have yellow and black striped bodies. The older ones are black. But while the cereal harvest has been saved from aphids—the staple diet of the hover fly—bulbous plants such as chrysanthemums are threatened. The flies live in stagnant ponds or puddles but they breed on the plants.'

Clearly, these new flies, which live on underwater plants, eat aphids, bulbs and chrysanthemums, and change colour during adult life, represent a startling new biological phenomenon—*garbling hybridization*. Did you know that James Hunt plays cricket for Bulgaria?

Vladimir Nabakov

Entomologists will be saddened to learn of the recent death of author Vladimir Nabakov. Perhaps best known as the author of *Lolita*, he was also a specialist in the Lycaenidae, and was appointed Research Fellow in Lepidoptera at the MCZ, Harvard, 1942–48.

Lepidopterists in London

Three lepidopterists specializing on the mimetic butterflies of South America are pictured during a visit to the British Museum (Natural History) in August. From left to right: Dr John R.G. Turner (Rothamsted), Prof. K.S. Brown, Jr (Campinas, Brazil), and Dr Gerardo Lamas (Lima, Peru). *Photograph by Bernard D. Abrera.*

Dr Lamas, funded for his six week visit through the Latin-American Exchange Programme and a Smithsonian Post-Doctorial Fellowship, is working on Ithomiinae, Danainae, and Dismorphiinae. The South American Dismorphiinae, some 40 highly polytypic species, include the classic 'Leptalides' involved in H.W. Bates' original formulation of mimicry theory. Strangely, these species have received scant attention since. Dr Lamas' work at the BMNH will help him to prepare a systematic revision of the group, and compare their biogeographic differentiation patterns with those of their models.

Taking advantage of a family reunion trip to Europe, Prof. Brown spent a week in London pursuing his research on the Ithomiinae. Professor Brown has contributed much to our understanding of the biogeography of South American insects, through his research on pleistocene forest refugia. *Systematic Entomology* recently published his paper on *Melinaea* and *Mechanitis*, which included a detailed reconstruction of the postulated refuge areas. Professor Brown's current work involves the application of isoline mapping techniques to locate centres of endemism, partly

Lepidopterists in London

to help pin-point high priority conservation zones within the remaining neotropical forests.

Dr Turner, who has spent much of the last 15 years specializing on the Heliconiinae, has recently returned from the USA to take up a new post at Rothamsted Experimental Station, where he will be working on aphid population genetics. This change of direction has precipitated the completion of a number of Dr Turner's projects on the evolution of Lepidoptera, including a major paper to be co-authored with Prof. Brown, Dr W.W. Benson, Dr M.C. Singer and the late Prof. P.M. Sheppard, on the evolution and genetics of *Heliconius*. It is hoped this will appear in print during 1978.

Warden of Wicken Fen retires

The Chairman of the Wicken Fen Local Committee of the National Trust, Dr John Smart, has informed us that Lt Col Charles E. Mitchell, Warden-Naturalist of the Fen, is retiring in December this year. Col Mitchell was appointed to the post in 1961. Those readers who recollect the general condition of the 'Reserve' at that time, will appreciate the great changes that have taken place under Col Mitchell's management and the scope of the problems that he has successfully dealt with. In 1961 the number of visitors was about 5000 whereas it now exceeds 40 000 per annum. Sales of produce amounted to about £100 in 1965; they had reached around £4000 in 1975. Entomologists will be grateful for the greatly improved condition in which we find the Fen today, as Wicken remains one of the most important reservoirs of relict insect species in the British Isles. A large share of the credit goes to the Warden-Naturalist, and the Wicken Fen Local Committee are marking Col Mitchell's retirement with a presentation. Contributions should be sent directly to the Hon. Treasurer, Mr J.R. Flint, Midland Bank Ltd, 32 Market Hill, Cambridge CB2 3NU. Cheques etc. should be payable to: National Trust Wicken Fen, Presentation Account.

D.W.H. Ffennell

On 16 August 1977 Mr Denzil Ffennell collapsed and died in his garden at Martyr Worthy, Hampshire, at the age of 56. Although not a Fellow of the RESL he was esteemed by members as an authority on the collecting and rearing of British Lepidoptera, especially the 'Micros'. He was currently working on the family Oecophoridae for the *Moths add Butterflies of Great Britain and Ireland* series. As a collector, his more notable finds include the addition of the gracillarid *Phyllonorycter dubitella* and the incurvariid *Lampronia flavimitrella* to the list of British Lepidoptera. The latter species was discovered in his garden and an account is *in press* with the *Entomologist's Gazette*.

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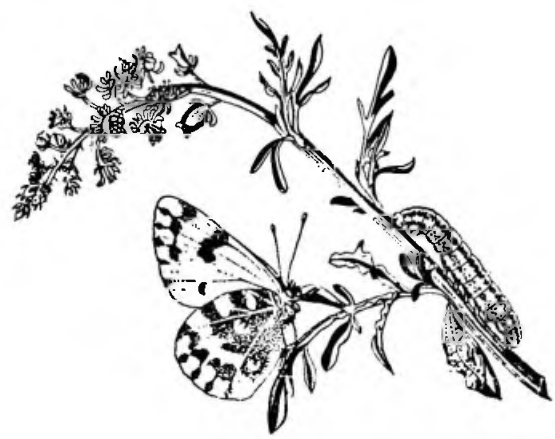

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Reports

Grassland Fauna Symposium

Ireland was the appropriately green venue for an enjoyable and instructive symposium on the invertebrate fauna of grasslands which was held at University College, Dublin, from 14–16 March 1977. Perhaps the chief importance of the meeting was that it brought together specialists from a wide range of disciplines and backgrounds, all of whom had an interest in one or more aspects of grassland fauna.

Three sessions were held. The first, ably chaired by M.B. Usher (York), considered community structure and processes and included nine papers under the headings of succession, community structure and decomposition processes. A feature of this session was the way in which practical problems were set in the context of ecological theory. This was well exemplified in a paper by J.P. Curry (Dublin) in which current ideas on species diversity were tested against real field situations. Amongst several well presented papers, that by M. Hassall and S.L. Sutton (Leeds), on decomposition of dune grassland litter by isopods, was particularly elegant.

The second session, under the chairmanship of M.G. Morris (ITE, Furzebrook), examined the effects of management on grassland invertebrates and included seven papers. The problem of adequately replicating field experiments with grazing animals was highlighted here. The contribution of G.P. Vickerman (Game Conservancy, Fordingbridge) was particularly valuable in that it dealt with the effects of changing agricultural *systems* rather than with single methods of management. A special word must be put in for Germaine Ricou (INRA, Rouen) for coping not only with a wide range of grassland Diptera but also with the difficulties of presenting a paper in English.

The third session was chaired at short notice by G.O. Evans (Dublin). Four papers were presented on the effects of invertebrate pests on grassland production. R.O. Clements (Hurley) trailed his coat with admirably provocative effect in considering the chemical control of grassland pests and R.T. Plumb (Rothamsted) effectively reminded the meeting that many invertebrates are important vectors of virus diseases of grasses.

The read papers were well supported by several contributions to a poster session.

Those attending the symposium appreciated the hospitality extended by University College and the excellent comfort and quiet of Broc House, where Bord Fáilte laid on an enjoyable reception and entertainment. The success of the meeting was in large part due to the initiative of Jim Curry in arranging it and his unobtrusive efficiency in organizing it. The participants were unanimous in supporting the idea of future meetings on the same subject. The Proceedings of the Symposium are to be published by the Royal Dublin Society.

M.G. Morris.

International Conference on Fleas

(Sponsored by the World Health Organization, London School of Hygiene and Tropical Medicine and the Royal Entomological Society of London)

This was held at Ashton Wold, Peterborough, Charles Lane's house, arranged by his mother Miriam Rothschild, with the assistance of a very efficient and able organizing committee (Miss J. Beer, Mrs G. Brinck-Lindroth, Dr T. Clay, Mr F.G.A.M. Smit and Col R. Traub) from 21–25 June. About 80 delegates attended, although some were unable to stay for the full five days. Sixteen countries were represented. The Royal Society, Imperial Chemical Industries, The Boots Co. Ltd, Fisons Ltd, Shell Research Ltd, The Wellcome Foundation and the British Council contributed to travelling expenses.

The delegates began arriving the previous Sunday and Monday, and transport was provided from London, Heathrow and Peterborough for those coming from abroad. After registration delegates were taken to the various farm cottages and local hotels where they were housed for the conference, and from where they were daily collected for the meetings which took place at Ashton Wold from 8.30 am onwards. (All the drivers were volunteers, and among them I spotted Paul Sheppard, son of the late Professor Philip Sheppard of Liverpool.) Transport was slightly erratic, and on the second morning the GPO failed to give the publican his morning call, and breakfast was grievously late. Colonel Robert Traub, who organized the programme, juggled with the time at his disposal, and with the aid of an alarm clock, despite this delay, fitted everyone into the schedule.

The congress was opened on Tuesday evening by Sir Vincent Wigglesworth with a witty and apposite speech, followed by a buffet supper. The fare was not only home cooked, but the baby beef and lamb were fattened on the farm, earmarked for the conference six months previously. Everything, in fact, from milk to potatoes, was produced by Ashton Farms.

Among the distinguished guests invited to meet the delegates, Sir Arthur Drew proved the most intrepid. He claimed that he was never bitten by fleas, and challenged any of the specialists present to show they were equally unattractive. Dr Gratz, who was chair-

A party from Israel at the Flea Conference at Ashton Wold; L. to R.: Dr Norman Gratz (WHO), Mrs Ruchama Schlein, Professor Rachael Galun, Dr Yosef Schlein.

ing the medical section of the congress, accepted the challenge. Dr Rothschild thereupon produced a plastic box with a hole at opposite ends: at a given signal the competitors simultaneously inserted a hand into the box, which contained 50 ravenous cat fleas. The insects displayed no aversion to either hand: Dr Schlein, the referee, declared Sir Arthur the winner with five feeding fleas to Dr Gratz's six. But were the fleas really feeding? It was rather late at night to establish this with scientific accuracy . . . . We think it only fair to Sir Arthur Drew that he has another opportunity to prove his claim.

The scientific papers were read before lunch each day and were grouped in the following sections: Evolution and Zoogeography (R. Traub, P. Price, A. Marshall, G.P. Holland, R.L.C. Pilgrim, C.E. Hopla, J.R. Busvine); Medical and Veterinary (N.G. Gratz, H. Googstraal, D.C. Cavanaugh and J.E. Williams, B.C. Nelson, R. Traub, S. Ito and J.W. Vinson, C.E. Hopla, R. Shepherd, A.R. Mead-Briggs and J.R. Vaughan); Physiology and Morphology (R. Galun, P. Wenk, J. Schlein, R.C. King, F.G.A.M. Smit, G.E. Haas, H.E. Krampitz); Ecology and Faunistics (I. Szabo, J.C. Beaucornu, M. Abreu, Per Brinck, A. H. Benton and C.E. Day, G. Brinck-Lindroth, R. Mehl and G. Hosie). Informal discussions took place during the afternoons on matters raised in the morning sessions, but these in fact ranged widely over the whole field of interest.

The proceedings are to be published by A.A. Balkema of Rotterdam during 1977.

One of the outstanding features of the

congress were the photographic exhibits, of which the electron micrographs of cat fleas, taken by Professor S. Ito, were a memorable example. The light microscope photos of Ceratophyllid fleas by R. Traub were also unique in their way. Karl Zeiss provided a magnificent exhibit of their latest microscopes. There were many interesting distribution maps on show and Dr S. Sternberg's flea jump-meter was also working efficiently.

After morning sessions an excellent buffet lunch, at very low cost, was available, served in the garden amidst the Alpine meadow-type lawn developed at Ashton. For those who preferred excursions in the afternoon, Quest 4, a travel organization based at Ashton, arranged several local tours: Peterborough Cathedral, Peakirk Duck Decoy (Dr Worms, who carried out a survey of the bird fleas of the Duck Decoy, motored down from Mill Hill to accompany the delegates round the decoy), Burghley House, Fotheringhay, the Department of Zoology, Cambridge, the Institute of Terrestrial Ecology (Monks Wood Experimental Station) and the Cambridge University Botanical Gardens, where Dr Max Walters entertained the delegates to tea.

On Thursday a picnic lunch was taken to the Woodwalton Fen National Nature Reserve, where the delegates were welcomed by Dr Max Nicholson (one time Director of the Nature Conservancy) and M.V. Laberne. The Reserve was purchased and maintained by the late N.C. Rothschild, and in 1923 bequeathed to the SPNR. After a tour of the Fen the delegates returned to Ashton for a cocktail party on the village green. Local conservationists and chairpersons of all the County Trusts for Nature Conservation were invited to meet the delegates. It should be recalled that 1977 is the centenary of N.C. Rothschild's birth. Entomology, particularly the Order Siphonaptera (of which he described 500 species) and conservation were two of the major interests of his life. He was the first man to realize the paramount importance of preserving the habitat, as well as specific rare species. With this in mind he founded the Society for the Promotion of Nature Reserves in 1903. The party on the green thus brought together representatives of his two major natural history interests, set appropriately in the village which he rebuilt in 1901. To commemorate the anniversary, the 17th-century Ashton Mill had been restored, and a fish conservation and angling museum had been added to the outbuildings. A small room had been set aside for a permanent photographic and painting exhibition, which included two views of the Mill by Sir Alistair Hardy, painted when he was a schoolboy at Oundle. Magnificent pictures of the kingfisher by Eric Hosking and his son David, and delightful paintings by Brian Hargreaves, Arthur Smith and the late F.W. Frohawk were on view. The mill also contained exhibits of Roman pottery and various implements recovered from the adjacent excavations of Roman Ashton. Morris dancers gave an excellent display in front of the Chequered Skipper Inn, and Oxford Scientific Films showed a superlative natural history film of the common wasp.

The conference was brought to a close on Saturday by a party which must have baffled many of the delegates from overseas. An ox was roasted on a spit; a tame fox and Lord Hesketh wandered freely among the guests; Ginger Baker organized a polo match; the deputy director of British Steel was seen gazing, amazed, at a lighted greenhouse containing 100 captive Monarch butterflies; the Deller Consort gave two excellent performances, and Dr Kim Parker (Imperial College) produced two rock and roll bands who played gamely for seven hours in an arctic wind on top of a farm wagon. Professor Ito proved himself a crack shot at the rifle range and shamed all the local poachers.

Despite these many diversions the delegates put in five days of solid hard work. Miss Bernice Williams seized the opportunity for carrying out an interesting experiment: taking advantage of a newly born Jersey bull calf which she spotted in Charles Lane's cow sheds, she introduced a sample of ravenous cat fleas on to this unusual host. By the end of the congress she was able to demonstrate that the female cat flea can mature its ovaries and produce yolk-laden oocytes on this rather unusual male host. Professor Robert King was also observed on several consecutive afternoons working doggedly at the microscope, examining serial sections of flea ovaries.

At the end of the Entomological Congress in Canberra in 1972, Professor Doug Waterhouse was heard to remark: 'This Congress has been a terrific success—no-one has died.' Fortunately we can say the same.

A participant.

Termites—their role in West African savanna

(RESL meeting 6 July 1977)

Since the inception in 1973 of a collaborative project between COPR and Nigerian colleagues, work on the role of termites in natural west African ecosystems has been energetically pursued. Some results from studies to date formed the basis for the contributions of three speakers.

Dr T.C. Wood (COPR) introduced the subject (see *Antenna* 1 (1): 9—*Diary*) and, using colour-slides, illustrated a variety of nests and feeding behaviour. He showed how each of the series of major climatic and vegetational zones of west Africa differs in the number of termite species supported and in the feeding-habits which predominate in its termite fauna. In general, the wetter the zone, the greater the number of soil-feeding species. In savanna, where termites occur at densities of about 4000 individuals per metre, the soil-feeders account for less than 10% of individuals, while the fungus-growers (Macrotermitinae), which feed on plant material, account for more than half. In the Macrotermitinae, while the nests are built largely from soil, the faeces are used for making fungus-combs. Because of this arrangement the conversion of plant to macrotermitine termite tissue, is accompanied by the production of water and CO_2 (from fungal respiration), but virtually no return to the soil. Termite tissue is recycled almost entirely by predation.

Dr N.M. Collins (COPR) outlined work on the energetics of the dominant fungus-growing species *Macrotermes bellicosus*. Describing the termites' comb-building and feeding behaviour, he employed striking illustrations of nest interiors, the details of nest construction here receiving their first public showing. Results of studies on termite predators were presented by Mr C. Longhurst (Southampton University), concentrating on the behaviour of the large ant *Megaponera foetens* in relation to *Macrotermes bellicosus*, its principal prey, although dealing also with the small myrmicine ant *Decamorium uelense* (an important predator of *Microtermes*) and the role of four opportunistic predators (all ponerine ants). The results of recent work suggest that the numbers of termites predated in one year by ants in savanna areas is equivalent to about half of the termite population to be found there at any one time.

Questions and discussion in which H. Dick Brown, V.F. Eastop, P.M. Hammond, A.W.R. McCrae, O.W. Richards, J. Turner, N. Waloff and the President, as well as all three speakers, participated, centred on the details of nest construction, the precise balancing of *Macrotermes* budgets, and predators. It was revealed that, although ants are undoubtedly the major predators of foraging savanna termites, birds and insectivores are likely to consume large numbers of alates. Predation from nests by aardvarks (common in southern Africa) is likely to be of little importance in west Africa, where these predators are considered to be uncommon.

P.M. Hammond.

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Contributions or enquiries relating to this section of *Antenna* may be addressed to Alan Stubbs, Nature Conservancy Council, 19 Belgrave Square, London SW1X 8PY (Tel: 01-235 3241), or relayed via the Editor.

CHECK LIST

Names of species to be added to check lists and names replacing others which are invalid or result from misidentification are in bold type. The name regarded as valid is given first in each entry. References, where not given in full, are to be found under 'Key Works' below.

Collembola

Proctostephanus madeirensis da Gama, 1959 [Isotomidae] (Lawrence & Khaloyan, 1977) [place genus before *Uzelia*, *Handbook* **11** (1): 7].

Hemiptera

Aphis comari Prior & Stroyan, 1977 [Aphididae] (Prior & Stroyan, 1977).

Notostira erratica (Linnaeus, 1758) [Miridae] (Woodroffe, 1977).

Graphocephala fennahi Young, 1977=*coccinea* auctt. Brit. nec (Forster, 1771)) [Cicadellidae].

[Dr W.J. Knight informs us that 'taxonomists and horticulturists alike have been puzzled for many years over the correct scientific name of the Rhododendron Leafhopper which, imported from North America, was first recorded in this country by W.E. China (1935, *Entomologist's mon. Mag.* 71: 277–279) and subsequently referred to as *Graphocephala coccinea* (Forster). A recent publication by D.A. Young (1977, *The North Carolina Agricultural Experiment Station Technical Bulletin* No. 239: 1135 pp.) reveals that true *coccinea* is restricted to eastern North America, southwards into Mexico and Central America whilst the form introduced into England is a new species, *fennahi* Young, restricted otherwise to Virginia, North Carolina, Georgia and Oregon. The two species differ slightly in colour and male genitalia as well as in host preferences, *fennahi* being known only on rhododendron whilst *coccinea* is more polyphagous'].

Trichoptera

Hydroptila martini Marshall, 1977 [Hydroptilidae] (Marshall, 1977).

Hydroptila valesiaca Schmid, 1947 [Hydroptilidae] (Marshall, 1977).

Lepidoptera

Stigmella repentiella (Wolff, 1955) [Nepticulidae] (Emmet, 1977).

Coleoptera

Bembidion mannerheimi Sahlberg, R.F., 1827=*unicolor* Chaudoir, 1850 [Carabidae] (Lectotype of *B.mannerheimi* designated by Silfverberg, 1977, *Notul. ent.* **57** (2): 44).

Stenus providus Erichson, 1839=*rogeri* Kraatz, 1857 [Staphylinidae] (V. Puthz, 1974, *Beitr. Ent.* **24**: 311–314).

Stenostola dubia (Laicharting, 1784)=*ferrea* sensu auct. not (Schrank, 1776) [Cerambycidae] (P. Skidmore & C. Johnson, 1969, *Entomologist's Gaz.* **20**: 210).

Mr R.D. Pope has advised us of the following minor corrections to the new edition of Kloet & Hincks *A Check List of British Insects* Part 3: Coleoptera & Strepsiptera:

1. Primary homonyms: the following junior primary homonyms are in regular use and should be added to those listed on pages xi–xiii of the 'Check List', and marked with a bold 'H' as suffix in the list:

p. 7. *Harpalus* [*Carabus*] *rufitarsis* (Duftschmid, 1812) nec Illiger, 1801.

p. 7. *Harpalus* [*Carabus*] *vernalis* (Duftschmid, 1812) nec Müller, O.F., 1776.

p. 44. *Trox* [*Silpha*] *scaber* (Linnaeus, 1767) nec Scopoli, 1763.

p. 56. *Kateretes* [*Dermestes*] *bipustulatus* (Paykull, 1798) nec Thunberg, 1781.

p. 57. *Epuraea* [*Nitidula*] *pusilla* (Illiger, 1798) nec Thunberg, 1794.

p. 69. *Tomoxia* [*Mordella*] *biguttata* (Gyllenhal, 1827) nec Rossi, 1794.

p. 70. *Anthicus* [*Notoxus*] *bifasciatus* (Rossi, 1792) nec Fabricius, 1792.

2. Misidentifications: *Proteinus* [*Omalium*] *macropterus* (Gyllenhal, 1810) would, following J. Muona (1977, *Notul. ent.* **57** (1): 15) replace *P.macropterus* (Gravenhorst, 1806) and be marked as a misidentification, or replaced by the new name proposed by Muona (l.c.) for this taxon. However, Gyllenhal would appear *not* to have misidentified Gravenhorst's species (Muona, in litt.) so the original 'Check List' entry (p. 22) stands.

Quedius tristis (Gravenhorst, 1802) indicated as a homonym is, in fact, a misidentification and should be added to the list on page 10 of the 'Check List'.

. Status: *Nicrophorus germanicus* (p. 20) should be prefixed ?†'. *Pyrrhidium sanguineum* (p. 71) should have the oubtful status prefix removed. Evidence that this species s endemic in the British Isles is presented by A.A. Allen and R.W. Lloyd (1951, *Entomologist's mon. Mag.*, **87**: 157–158).

4. Dates: the dates for *Oreodytes sanmarki* (Sahlberg, C.R.) and *O. septentrionalis* (Sahlberg, C.R.) (p. 11) should be **1826**, not 1824. Genera in the Coccinellidae and Chrysomelidae attributed to Dejean, 1835 should be attributed to Dejean, **1837**.

5. Various: *Placusa depressa* (p. 34): the second synonym should read *humilis* ? Erichson, 1839. *Clambus evae* (p. 46): the author's name is **Endrödy-Younga**, not Endrödi-Younga. *Thaneroclerus* (p. 55) is attributable to **Lefebvre, 1838**, not Westwood, 1838. *Tilloidea* (see *Antenna* **1** (1): 24) was described by **Laporte de Castlenau, 1833**. In the entries for *Monotoma angusticollis* and *M.longicollis* (p. 58) the authors and dates should be enclosed in brackets. *Ceutorhynchus punctiger* (p. 86): the author and date should read (**Sahlberg, C.R., 1835**), not Gyllenhal, 1837. *Xyloterus* (p. 89): all specific epithets should end in **-us**, not *-um*.

Diptera

Megaselia (Amphiochaeta) dipsacosa Smith, 1977 [Phoridae] (Smith, 1977).

Megaselia (Megaselia) setulifera Smith, 1977 [Phoridae] (Smith, 1977).

Metasyrphus neilseni Dusek & Laska, 1976 [Syrphidae]= *arcuatus* Collin, 1931; nec *arcuata* Fallén, 1817= *punctifer* Hippa, 1968; nec *punctifer* Frey in Kanervo, 1934 (M.C.D. Speight, 1977, *Entomologist's Rec. J. Var.* **89** (5): 154–155). [As *sp. indet* in Check List, 1976, *Handbook* **11** (5): 63].

Diptera Check List Supplement

On the advice of Mr A.M. Hutson, these notes update the 1976 Check List for three families of Nematocera-Tipulidae, Mycetophilidae and Scatopsidae [*Handbook* **11** (5)]. Additional species of Mycetophilidae have already been noted in *Antenna* **1** (1): 24.

p. 4. **Dicranoptycha Osten-Sacken, 1859** [Insert after *Helius*]. [Inadvertently omitted].

p. 4. **Dicranoptycha fuscescens (Schummel, 1829)**. [Insert after *Helius*]. [Inadvertently omitted].

p. 6. *Erioptera lutea* Meigen, 1804, *f. taenionota* Meigen, 1818 [not *taeniota*].

p. 24. *Mycomyia exigua* (Winnertz, 1863)= ? *nigra* (Walker, 1837), nec (Macquart, **1826**) [not 1926].

p. 25. *Sciophila cliftoni* Edwards, 1925=*fenestella* var. Edwards, 1913 (not *fenestalla*].
Coelosia flava (Staeger, 1840)= ? *flava* (Walker, 1837) [add ?].
Boletina nasuta (Haliday, 1839)=*lundbecki*: Edwards 1925 nec Lundstroem, 1912. [add misidentification].

p. 26. *Rondaniella dimidiata* (Meigen, 1804)=*variegata* (Winnertz, 1863) [remove misidentification].

p. 32. **Holoplagia transversalis** (Loew, 1846) [not a junior synonym].

STATUS DOUBTFUL

Lepidoptera

Arethusana arethusa arethusa (Denis & Schiffermuller, 1775) [Satyridae] (Hedger, A.J., 1977, *Entomologist's Gaz.* **28** (2): 73–74). [One from a Surrey Heath among a series of *Hipparchia semele* (L.); remote possibility of establishment].

KEY WORKS

Collembola

Lawrence, P.N. & Khalogan, O.K., 1977. The Taxonomy and ecology of *Proctostephanus madeirensis* da Gama, 1959 (Collembola) colonizing waste tips in Britain. *Entomologist's Gaz.* **28**: 127–132.

Plecoptera

Hynes, H.B.N., 1977. A Key to the adults and nymphs of Stoneflies (Plecoptera). *Scient. Publs. Freshwat. biol. Ass.* no. 17, 90 pp., 47 figs., 30 maps.

Hemiptera

Prior, R.N.B. & Stroyan, H.L.G., 1977. A new species of *Aphis* from *Potentilla palustris*, with a discussion of related species. *Systematic Entomology* **2** (3): 245–253. [Key separating *comari*, *tormentillae* and *poterii*].

Woodroffe, G.E., 1977. *Notostira erratica* (L.) and *N. elongata* (Geoffroy) (Hem., Miridae) in the British Isles. *Entomologist's Gaz.* **28**: 123–126.

Megaloptera & Neuroptera

Elliott, J.M., 1977. A Key to the larvae and adults of British freshwater Megaloptera and Neuroptera with notes on their life cycles and ecology. *Scient. Publs Freshwat. biol. Ass.* no. 35, 52 pp, 1 plate: ill.

Odonata

Hammond, C.O., 1977. *Dragonflies of Great Britain and Ireland.* Curwen, London.

Trichoptera

Marshall, J.E., 1977. *Hydroptila martini* sp. n. and *Hydroptila valesiaca* Schmid (Trichoptera: Hydroptilidae) new to the British Isles. *Entomologist's Gaz.* **28**, 115–122. [Key separating *martini*, *valesiaca* and *occulta*.]

Lepidoptera

Emmet, A.M., 1977. *Stigmella repentiella* (Wolff, 1955) (Lep. Nepticulidae): A Species New to Britain, *Entomologist's Rec. J. Var.* **89** (6): 178–182. [Adult and mine illustrated].

Coleoptera

White, I.M., 1977. The larvae of some British *Gyrophaena* Mannerheim (Coleoptera: Staphylinidae) with notes on the taxonomy and biology of the genus. *Zool. J. Linn. Soc.* **60**: 297–317. [Key to adults of British spp.]

Hymenoptera

Bohart, R.M. & Menke, A.S., 1976. *Sphecid Wasps of the World, a Generic Revision*, University of California Press, ix + 695 pp, 189 figs.

Lomholdt, O., 1975–6 & 1977. The Sphecidae (Hymenoptera) of Fennoscandia and Denmark *Fauna ent. Scand.* **4** (1 & 2), 452 pp, 464 figs.

Diptera

Anderson, H., 1977. Taxonomic and phylogenetic studies on Chloropidae (Diptera) with special reference to Old World Genera. *Entomologia Scandinavica* Suppl. 8: 1–200, 119 figs.

Smith, K.G.V., 1977. Notes on some British Phoridae (Diptera) including two species new to science. *Entomologist's Rec. J. Var.* **89** (6): 161–168. [Explains additions in 1976 Check List].

ECOLOGY & DISTRIBUTION

Under this heading we have listed a paper from the 'Biological Flora of the British Isles' series. For any entomologist unfamiliar with these works, it may be noted that each paper includes an account of the autecology of a single species of plant, including interpretation of a distribution map; known insect associates of the plant species are also listed. The Biological Records Centre will be glad to receive information concerning additional associated species.

Bretherton, R.F., 1977. Immigrant species of Lepidoptera at the light trap in West Surrey in 1976. *Entomologist's Rec. J. Var.* **89** (6), 186–187. [Exceptional number of scarce immigrants for inland situation, weather analysis.]

Bretherton, R.F., 1977. The status of *Autographa gamma gammina* Staudinger (Lep.: Noctuidae). *Proc. Trans. Br. ent. nat. Hist. Soc.* **10**, 27–28.

Britton, M.R., 1977. The scarcity of the Orange-tailed Clearwing (*Aegeria andrenaeformis* Laspeyres). *Entonologist's Rec. J. Var.* **89** (7), 192–194. [Recognition of burrows.]

Cole, J.H., 1977. Diptera of Huntingdonshire (9). *Huntingdon Fauna and Flora Soc.* 29th Ann. Rpt. 25–32. [Brachycera, part.]

Craik, J.C.A., 1977. A second generation of the Broad-bordered Bee Hawk-moth (*Hemaris fuciformis* L.). *Entomologist's Rec. J. Var.* **89** (6), 188. [Apparent first record in Britain, though regular on Continent.]

Cribb, P.W., 1977. Some observations made during a phenomenal summer. *Bull. amat. Ent. Soc.* **36** (315), 62–65. [1976 drought.]

Dennis, R.L.H., 1977. *The British Butterflies: Their Origins and Establishment.* Classey, Faringdon, England.

Gray, A.J. & Scott, R., 1977. Biological Flora of the British Isles *Puccinelia maritima* (Huds.) Parl. *J. Ecol.* **65**, 699–716.

Lekander, B. *et al.*, 1977. The distribution of bark beetles in Nordic countries. *Acta ent. fenn.* **32**, 1–36, 78 maps.

Marshall, J.E., 1977. Studies on the Hydroptilidae (Trichoptera): Morphology, Taxonomy and Distribution. Ph.D. thesis. London, 2 vols.

Michaelis, H.N., 1977. The history and present status of *Luperina nickerlii gueneei* Doubleday in Britain. *Entomologist's Rec. J. Var.* **89** (6), 183–185.

Shaw, M.R., 1977. The distribution of some Satyrid (Lep.) larvae at a coastal site in relation to their ichneumonid (Hym.) parasite. *Entomologist's Gaz.* **28**, 133–134.

Siggs, L.W., 1977. New Forest Mercury Vapour Light Records for 1976. *Entomologist's Rec. J. Var.* **89** (6), 174–176. [Includes drought effects.]

Welch, R.C., 1977. Coleoptera from Rothamsted light traps at Monks Wood National Nature Reserve, Cambridgeshire during 1976. *Entomologist's Rec. J. Var.* **89** (7), 195–198.

Welch, R.C., 1977. Recent Coleoptera records from Huntingdonshire with particular reference to Monks Wood and Woodwalton Fen National Nature Reserves. *Huntingdon Fauna and Flora Soc.* 29th Ann. Rept., 15–18.

RECORDING SCHEMES

Current News

Neuroptera and Mecoptera Mapping Scheme

A mapping scheme has been started for the British Neuroptera, including Megaloptera, and Mecoptera. It is run in co-operation with the Biological Records Centre. The object is not simply one of 'dot-spotting' but additionally to collect data towards improving the existing keys to the species. Due to problems in identification, the organizer

would be grateful to receive any material with data (pinned or in envelopes). He is willing to identify specimens and return them, in exchange for the collecting records. The organizer is Dr M.A. Kirby, Department of Zoology, University of Manchester, Manchester M13 9PL.

Diptera Recording Schemes

The annual meeting is to be held on 12 November, beginning at 11 a.m., at the British Museum (Natural History). The morning programme includes an annual review of recording schemes (A.E. Stubbs) and talks on 'Behavioural studies with dung-flies' (G.A. Parker), 'Biology of pipunculids' (M.A. Jervis), 'Ecological studies of Scandinavian calliphorids', and 'Results of National Fish Skin Week' (J.P. Dear), and 'Biology of some larger Brachycera' (A.G. Irwin). The afternoon programme will include exhibits, discussion of recording schemes and a talk on 'Identification and collecting of hover-flies'. Further information from A.E. Stubbs.

The annual field meeting is to be held in and around Brecon Beacons, South Wales, between 7 and 12 October. This is timed to coincide with the autumn peak in Tipulidae and Mycetophilidae—other parts of Wales have proved rich in species during previous meetings. Certain other groups of flies should also be present in good numbers, especially Nematocera. The meeting will be concerned with ecological distribution recording and it is hoped that both specialist and non-specialist entomologists can benefit. It may be possible to allocate space to a few non-dipterists should they wish to record other groups of insects or be introduced to Diptera. Details from A.E. Stubbs, Nature Conservancy Council, 19 Belgrave Square, London SW1X 8PY.

Biological Recording in Scotland Committee (BRISC)

This relatively new body is actively promoting recording in Scotland. A guide entitled Biological Recording in Scotland gives information on all schemes, including entomological ones, and is available free (providing a stamped, addressed envelope is included) on application to BRISC, 8 Dublin Street, Edinburgh EH1 3PP.

CONSERVATION AND ECOLOGY

Ratcliffe, D.A. (Ed.) 1977. A Nature Conservation Review: *The Selection of Biological Sites of National Importance to Nature Conservation in Britain*, Cambridge University Press, 2 Vols. An ecological monograph building upon the foundation of Tansley, a Domesday Book of the prime ecological or conservation sites in Britain, it will be seen in different lights according to your viewpoint. The compilation of this substantial book has involved a considerable number of people over the last ten or so years. It sets out to cover the basis for site evaluation, the description of the main ecological types in Britain and includes an account of 735 sites in England, Scotland and Wales which are of major importance for their representation of the natural and semi-natural ecological types in Britain. There are already 155 National Nature Reserves (including a few geological ones); others are in various types of safe custody, but a considerable number have no guaranteed future and many reserves are only on short-term leases. One hopes that the scientific community, the conservation and amenity bodies, local and national government bodies and the public at large will rally round the cause of ensuring that these, the best and most representative ecological sites in Britain will be safeguarded for present and future generations.

The list of sites is not final and it is expected that some sites of high scientific status yet await recognition. Inevitably, consideration of vegetation and vertebrates formed the main basis of assessment, but the review contains reference to invertebrates where data was readily at hand. The framework for this review goes back to a period before the Biological Records Centre's active promotion of invertebrate recording on the scale of recent years. Perhaps we are now moving into a period where entomological data can be more fully integrated; quite possibly there are sites which ought to be added purely because of their importance in terms of insects. One must assume that a high number of the chosen sites are also important for insects, but good entomological data will be required if suitable management strategies are to be adopted.

It should be pointed out that the majority of sites require the landowners' permission for access and collecting. If you intend serious study, the local Nature Conservancy Council offices will advise; more general enquiries may be directed to NCC offices in London.

The book is published jointly by the Nature Conservancy Council and the Institute of Terrestrial Ecology. The price of £60 will unfortunately result in this being a rather scarce work!

INFORMATION SOURCES IN ENTOMOLOGY

The 'information explosion' of recent years has had its impact on the entomologist as much as anyone. However narrow our field of interest or research it is only too easy to remain, in the midst of plenty, in ignorance of the most relevant published work. Each entomologist may have his own particular way of attempting to deal with this problem, or of trying to make it go away. The professional entomologist who, like myself, works in a large research establishment will generally have a series of stratagems ready to deal with 'retrospective' searches. If, for example he develops a sudden (and perhaps temporary) interest in a highly specialized topic (say, the wing area of dragonflies in relation to body size), he may begin his search by 'asking around'. There is usually someone (especially if the establishment has a library with experienced staff) who knows best where to start looking. The search will be considerably shortened by asking the right person first. The problem of keeping up with the latest work over a broader field of interest, or several, possibly not closely linked topics, is more of a general problem, even for the fortunate individual with helpful colleagues and libraries at hand. One may establish contacts, exchange papers and news of work in progress, attend meetings and conferences, and, directly or indirectly, scan the readily available literature. Even so, much will be missed; this may be particularly true of the plethora of 'semi-published' reports and theses for which even abstracts are not to be found in the most widely used abstracting journals.

In this context, we should like in *Antenna* to produce, on at least an occasional basis, short articles aiming to give some sort of guidance in the more 'difficult' areas of entomological source hunting. This may amount to no more than making an entomological package of information which is already available in another guise. But, *Antenna* is for entomologists, so no apologies should be needed.

As an example of the sort of information which may prove helpful to readers I append to these few words a list of sources containing 'current literature' for a variety of special subjects within or related to entomology. It is assumed that readers will already be familiar with the valuable weekly *Current Contents* (serving Science as a whole), and the more specific *Entomology Abstracts* and *Abstracts of Entomology*.* All of the periodicals listed (with one exception) appear more than once a year. Less frequently appearing sources, annual reviews, retrospective bibliographies, sources concerning unpublished theses, conference reports, obituaries, etc.—all may be touched on in later articles.

Frequently appearing specialist current literature sources in entomology:

Acrida. Quarterly.
[Contains 'Acridological abstracts—new series'.]
From: Association d'Acridologie, 105 boulevard Raspail, 75 Paris 6e, France.

Apicultural Abstracts,* Quarterly.
[Classified entries; author and subject index.]
From: International Bee Research Association, Hill House, Gerrards Cross, Bucks, SL9 0NR, UK.

Bibliography of Agriculture. Monthly.
[Index to the literature of agriculture and allied sciences; classified entries in which ten classes are specifically entomological; entomological references extensive; author and subject index etc.]
From: The Oryx Press, 3930 E. Camelback Road, Phoenix, AZ 85018, USA. [$170.00 for 12 issues, plus postage.]

British Museum (Natural History)—Accessions to the Museum Libraries. Entomology and also other libraries. Monthly.
NOT for distribution. Available in BMNH libraries.

Bulletin Analytique d'Entomologie Medicale et vétérinaire. Monthly.
[Extensive classified current literature list.]
From: Service des Publications de l'ORSTOM, 70–74 route d'Aulnay, 93140 Bondy, France.

Ceratopogonidae Information Exchange. Six-monthly.
[Current literature list; also retrospective bibliographies and current research news.]
From: J. Boorman, Animal Virus Research Institute, Pirbright, Woking, Surrey GU24 0NF, UK.

COPR (Centre for Overseas Pest Research) *Library Accessions (except pests)*. Fortnightly.
[Subject headings; includes many unpublished reports.]
[COPR also issue a series of specialist accessions lists: Locust Accessions (fortnightly), Termite Accessions, Stem Borer Accessions, Invertebrate Pest Accessions, Insect Vector Accessions, Heliothis Accessions, Cotton Pest Accessions, Armyworm Accessions (all monthly).]
NOT available for general distribution.

Curculio [Curculionid newsletter]. Six-monthly.
[Current literature list; also current research news.]
From: Horace R. Burke, Department of Entomology, Texas A & M University, College Station, Texas 77843, USA.

Drosophila Information Service. About six-monthly.
[Extensive current literature list.]
From: E. Novitski, Sylvius Laboratory, University of Leiden, Leiden, The Netherlands.

*Flea News.** Three times yearly.
[Current literature list; occasional other bibliographies.]
From: F.G.A. Smit, Department of Entomology, British Museum (Natural History), Cromwell Road, London SW7, UK.

Freshwater Biology Association—Library List. Monthly.
[Classified list of limnological papers in journals and other publications received by the library.]
From: The Librarian, The Ferry House, Ambleside, Cumbria, LA22 0LP, UK [for an annual subscription].

Ichnews [Ichneumonid newsletter]. Twice yearly.
[Current literature list; current research news etc.]
From: M.G. Fitton, Department of Entomology, British Museum (Natural History), Cromwell Road, London SW7, UK.

Mosquito News. Quarterly.
[Classified current literature list.]
From: AMCA, 5545 East Shields Ave., Fresno, California 93727, USA.

Mosquito Systematics News Letter. Quarterly.
[Occasional current literature list.]
From: AMCA, 5545 East Shields Ave., Fresno, California 93727, USA.

*Odonatologica**—*Journal of the SIO* (Societas Internationalis Odonatologica). Quarterly.
[Extensive 'Odonatological Abstracts'.]
From: Dr J.M. van Brinck, Institute of Genetics, University of Utrecht, Transitorium III, Padualaan 8, Utrecht, The Netherlands.

Proctos—Proctotrupoid Newsletter. Twice yearly.
['Recent publications' list.]
From: Lubomire Masner, Biosystematics Research Institute, Agriculture Canada, Research Branch, Ottawa, Ontario, Canada, K1A OC6.

*Review of Applied Entomology, Series A (Agricultural)** and *Series B (Medical & Veterinary)**. Monthly.
[Both contain classified entries; author and subject index, etc.]
From: Central Sales, Commonwealth Agriculture Bureau, Farnham Royal, Slough SL2 3BN, UK.

SEL (Societas Europaea Lepidopterologica) *Newsletter* ('Nota lepidopterologica') [forthcoming].
[Will contain current literature list; emphasis on systematics of W. Palaearctic Lepidoptera.]
From: Dr G. Ebert, Landessammlungen für Naturkunde Karlsruhe, Erbprinzenstrasse 13, Postfach 4045, D7500 Karlsruhe 1, W. Germany.

Tribolium Information Bulletin. Yearly.
[Extensive current literature list; covers stored products entomology, systematics of Tenebrionidae and other Coleoptera.]
From: A. Sokoloff, School of Natural Sciences, California State College, San Bernardino, California, USA.

Tropical Diseases Bulletin. Monthly.
[Classified current literature list (including 'Medical Entomology'); author and subject index.]
From: Bureau of Hygiene and Tropical Diseases, Keppel Street, London WC1E 7HT, UK.

How many have I missed?

Peter Hammond.

* In RESL Library.

SOCIETY
News and Notices

1st European Congress of Entomology

Following the initiative of representatives of a number of European Entomological Societies that met in Giessen, Germany, in March 1976, the Royal Entomological Society will sponsor the first EUROPEAN CONGRESS OF ENTOMOLOGY, which will be held at Reading University in Britain from 19–22 September 1978.

Entomologists, whether amateur or professional, are cordially invited to the Congress. Contributions concerning recent research into problems related to European entomology will be welcome. However, papers on entomological research in other areas will also be considered. It is hoped that young research workers will contribute a large part of the programme. All interested entomologists are asked to send their name and address to the address below before 31 December 1977, and they will then be sent further details of the Congress in due course.

Entomologists wishing to offer a contribution should send the title and 150 word abstract to the address below by 1 December 1977 at the latest. Contributions in English, French and German will be accepted.

It is thought unlikely that the programme will be able to accommodate all of the contributions offered, but the Planning Committee will select papers from those received by the date stated and will produce a stimulating and structured programme. Contributions will not be published other than as preprints of extended abstracts issued to participants at registration.

It is anticipated that attendance at the Congress will cost about £50 for those booking full accommodation, and participating in all events and visits. A sightseeing programme will be arranged for accompanying family members if there is sufficient interest.

1st European Congress of Entomology,
Department of Zoology,
The University,
Earley Gate, Reading RG6 2AT,
England.

Forthcoming Workshop on Insectary Design, etc.

A one day workshop and discussion meeting on 'Insectary Design, Construction and Management' will be held under the auspices of the Royal Entomological Society of London on Wednesday, 29 March 1978, at 41 Queen's Gate, London, starting at 9.30 a.m.

It is hoped that the programme will include all aspects of the insectary—for example, types of building, finishes, control systems, security and problems in managing 'difficult' species.

The accent will be on mechanical rather than biological aspects. Contributions to the programme, of 10–15 minutes duration, will be welcome. It would be helpful if those wishing to contribute to the programme, or simply to attend, would contact J. Boorman, Animal Virus Research Institute, Pirbright, Woking, Surrey GU24 0NF, in order to assess numbers.

Election of Officers and Council

In accordance with the provisions of Chapter V, Section 2 of the Bye-Laws, Fellows are reminded that the Honorary Offices and four seats on the Council will fall vacant at the next Annual Meeting. With the exception of Dr Brady, the Editorial Officer, who wishes to resign his Office, the Honorary Officers are qualified and willing to serve again. Fellows are invited to submit to the Secretary, on an informal basis, the names of Fellows for consideration as Council nominees. The Members of Council who have served for three years and who retire are: Dr M.T. Gillies, Dr T. Lewis, Dr P.L. Miller and Mr R.W.J. Uffen.

From the Secretary—à propos a 'sit-in'

While we hope that your presence at meetings is an indication of your interest in the topic, as well as the chance to meet your colleagues, we hope that you will join us in an experiment on your behalf.

We are proposing to replace the benches in the Lecture Theatre with individual chairs. This will not only increase the seating capacity, but also enable more flexible use of the room for meetings.

The chairs will be stackable but the first criterion should be comfort (perhaps not *too* comfortable?). Samples of the different chairs will be available for you to test. We hope that you will then let us have your comments on the 'sit-in'.

Cancellation of Journal Subscriptions

Fellows who do not wish to continue their Journal subscriptions after December 1977 are requested to so inform the Registrar, on or before 31 October 1977, so that the publishers can take appropriate action before the 1978 issues are despatched.

New Fellows

Names of candidates for election to the Fellowship are posted on the Society's noticeboard and are read at two Ordinary Meetings prior to consideration at a Council Meeting.

Elected July1977:

Cook, Dr Anthea Gene, International Institute of Tropical Agriculture, P.M.B. 5320, Ibadan, Nigeria.

Platt, Dr Austin P., Department of Biological Sciences, University of Maryland Baltimore County, 5401 Wilkens Avenue, Catonsville, Maryland 21228, USA.

Pyle, Dr Robert Michael, 1 Toll Bar Cottages, Burley-on-the-Hill, Oakham, Rutland, Leicestershire, UK.

Changes of Address

The Post Office has returned to the Society's offices correspondence and publications addressed to the following Fellows: Mr David E. Evans, London WC1; Mr R.T. Ford, Peterborough; Dr D. Ilse, Munich, Germany; Mr R.C. Joyner, Cambridge; Dr Hywel Roberts, Dursley, Glos.; Mr A.J. Young, Caerleon, Monmouthshire.

It would be appreciated if anyone who is in touch with a Fellow whose name is listed above, would ask the Fellow concerned to notify the Registrar of his current address.

A new 'List of Fellows' has recently been produced and a copy should reach each Fellow by the time this issue of *Antenna* is published. The Registrar would be glad to hear of any corrections to be made to this list.

Change of address: Dr R.W. Crosskey now at Department of Entomology, British Museum (Natural History), London SW7.

Removal of Fellows

Chapter XVIII Section 3 of the Bye-Laws requires that a list of Fellows who owe more than two annual subscriptions shall be exhibited in the Library, and Council have directed that this list will be reproduced in *Antenna*. Fellows are reminded that under the provisions of the Bye-Law, Council may cause the removal of any Fellow from the Society who has not paid the arrears within three months of publication of the List.

The following is a list of Fellows who have failed to respond to several reminders about their subscription arrears, and whose names have now been removed from the Fellowship under Chapter XVIII Section 3 of the Bye-Laws:

Mr L.C. Adkins (Essex), Mr V.A.L. Allen (New Zealand), Mr K.M.D. Alva (India), Mr J.W.T. Armstrong (Australia), Mr M. Armstrong (Kent), Mr R.J. Brunning (Wiltshire), Prof. C.S. Carbonell (Uruguay), Mr M.M. Chaudry (Pakistan), Major A. Crawforth (Bucks), Mr R.A.H. Davies (London), Mr I.H.M. Fosbrooke (Surrey), Mr S. Garcia (West Indies), Mr K. Gopinath (India), Miss A. Haring (Nigeria), Mr E.C. Harris (Bucks), Dr M.M. Ikeme (Nigeria), Mr P. Hunter-Jones (London), Mr R.A. Khan (London), Mr M.V. Lloyd (West Indies), Mr E.K. Mann (Northumberland), Mr I.R. May (South Africa), Mr R. Mills (Kent), Mr B.A. Penney (Bristol), Mr L.C. Scarmuzza (Cuba), Dr Tribeni Singh (India), Mr L.A. Tillin (London), Mr P.T.P. Tsui (Florida), Mr D.C. Wareham (Manchester), Miss M.H. Waters (Australia), Mr G.B. Whitehead (Aldershot).

The following is the list of Fellows who owe more than two annual subscriptions, published in accordance with Chapter XVIII Section 3 of the Bye-Laws:

Mr A.P. Buckle (Birmingham), Dr W.F. Buren (Florida), Dr J. Carayon (Paris), Dr S. Chakravorty (India), Mrs H.L. Durkee (California), Mr D.E. Evans (London), Dr S.C. Goel (India), Dr Gazi Hariri (Syria), Mr Z. Hashim (Surrey), Mr P.J.C. Hawkins (Sussex), Mr T.W. Hogan (Australia), Mr D.J.E. Johnson (Slough), Dr T. Karabag (Turkey), Mr J.R. Linley (Florida), Dr D.D. Linsdale (California), Mrs J.I. McLeod (Letchworth), Dr A.T. Marshall (Australia), Dr M.G.R. Menon (India), Mr S.M. Misari (Nigeria), Mr D.P. Norris (Australia), Mr F.N.C. Osuji (Nigeria), Mr W.J.B. Pond (Australia), Mr K.A. Sattar (Arabian Gulf), Dr I.R. Sherlock (Brazil), Dr J.B. Wallace (Georgia), Mr J. S. Bale (Newcastle).

Deaths

The Society has learned with regret of the following deaths:

Godfrey Sturge Cotterell, on 28 June 1977 (elected 1920).

Ronald Dennis Eady, on 12 January 1977 (elected 1952).

Professor Howard Everest Hinton, on 2 August 1977 (elected 1934; Council 1944–6, 1956–8; Vice-President 1956, 1958; President 1969–70; Honorary Fellow 1977).

Percy George Shute, on 26 January 1977 (elected 1929).

The Rev. C.E. Tottenham, on 30 June 1977 (elected 1928; Council 1943–5).

Current contents of the Journals

Physiological Entomology

Volume 2, Number 3, September 1977

C.H. Bell. The sensitivity of larval *Plodia interpunctella* and *Ephestia elutella* (Lepidoptera) to light during the photoperiodic induction of diapause.

T.R. Flanagan and H.H. Hagedorn Vitellogenin synthesis in the mosquito: the role of juvenile hormone in the development of responsiveness to ecdysone.

Emmanuel Uche Iheagwam. Photoperiodism in the cabbage whitefly, *Aleyrodes brassicae*.

Jennifer Jones, Judith V. Stone and W. Mordue. The hyperglycaemic activity of locust adipokinetic hormone.

O.T. Jones and T.H. Coaker. Oriented responses of carrot fly larvae, *Psila rosae*, to plant odours, carbon dioxide and carrot root volatiles.

Wei-Chun Ma. Alterations of chemoreceptor function in armyworm larvae (*Spodoptera exempta*) by a plant-derived sesquiterpenoid and by sulfhydryl reagents.

J.R. McLaughlin and T.R. Ashley. Photoperoid and temperature modulation of male eclosion timing in the white peach scale, *Pseudaulacaspis pentagona*.

P.L. Miller. Neurogenic pacemakers in the legs of Opiliones.

Bradford Rence and Werner Loher. Contact chemoreceptive sex recognition in the male cricket, *Teleogryllus commodus*.

Ian Seath. The effects of increasing mandibular load on electrical activity in the mandibular closer muscles during feeding in the desert locust, *Schistocerca gregaria*.

Paul Taylor. A continuously recording respirometer, used to measure oxygen consumption and estimate locomotor activity in tsetse flies, *Glossina morsitans*.

Systematic Entomology

Volume 2, Number 4, October 1977

M.J. Adams and G.I. Bernard. Pronophiline butterflies (Satyridae) of the Sierra Nevada de Santa Marta, Colombia.

J.R. Barron. The Nearctic species of *Orthopelma* (Hymenoptera: Ichneumonidae).

Mark A. Jervis. A new key for the identification of the British species of *Aphelopus* (Hym: Dryinidae).

Richard P. Lane. Ectoparasitic adaptation in *Forcipomyia* from butterflies, with two new African species (Ceratopogonidae).

P.N. Lawrence. Studies on the tibiotarsal chaetotaxy of Collembola.

D.J. Lewis, D.G. Young, G.B. Fairchild and D.M. Minter. Proposals for a stable classification of the Phlebotomine sandflies (Diptera: Psychodidae).

Y.A. Popov and Robin J. Wootton. The upper liassic Heteroptera of Mecklenburg and Saxony.

Ecological Entomology

Volume 2, Number 4, November 1977

B. Overgaard Nielsen and A. Ejlersen. The distribution pattern of herbivory in beech canopy.

E.D.M. Macaulay and T. Lewis. Attractant traps for monitoring pea moth, *Cydia nigricana* (F.).

N.A.C. Kidd. Factors influencing Aggregation between Nymphs of the Lime Aphid, *Eucallipterus tiliae* (L.).

A.G. Marshall. Inter-relationships between *Arixenia esau* (Dermaptera) and molassid bats and their ectoparasites in Malaysia.

E.U. Iheagwam. Comparative flight performance of the seasonal morphs of the cabbage whitefly, *Aleyrodes brassicae* (Walk.), in the Laboratory.

D. Horsfield. Relationships between feeding of *Philaenus spumarius* (L.) and the amino acid concentration in the xylem sap.

J.H. Sudd, J.M. Douglas, T. Gaynard, D.M. Murray and J.M. Stockdale. The distribution of wood-ants (*Formica lugubris* Zetterstedt) in a Northern English Forest.

B. Freeman. The biology in Jamaica of the sphecid wasp *Sceliphron assimile*.

ROYAL ENTOMOLOGICAL SOCIETY OF LONDON

1. THE ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

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2. THE BRITISH ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY

(formerly the South London Entomological and Natural History Society)
Founded 1872

Ordinary meetings are held twice a month on Thursdays at 18.00 hours at the Society's rooms at the Alpine Club, 74 Audley Street, London W1 5FF, except in August. Field meetings are held between March and October most weekends. The Proceedings are published in two double parts annually at about 6-monthly intervals. (The price of single copies may vary if bought by non-members.) Annual subscriptions for full or corporate members: £4.00; country members £2.25; junior members (under 21) £1.25. (Other publications include: *A Guide to the Smaller British Lepidoptera*, by L.T. Lord, B.A., £2.50; supplement, £0.50; *The Natural History of the Garden of Buckingham Palace* (compiled by a team of specialists), £1.00.) The Society's collections and library may be consulted by members. For details apply to: Hon. Secretary, G. Prior, F.L.S., F.R.E.S., 23 Manor Way, North Harrow, Middx.

3. THE AMATEUR ENTOMOLOGISTS' SOCIETY

Volume No. 7. *The Hymenopterist's Handbook*. Originally published 1943, facsimile reprint 1969. A comprehensive guide to collecting, rearing and study of ants, bees, wasps, gall-wasps and parasitic Hymenoptera. Keys to all the British families. 160 pp., 183 figs, 2 pls.

11. *A Coleopterist's Handbook*. Originally published 1954, revised edition 1975. Describes the tools and methods of collecting, habitats, commensals and pre-adult stages, recording, personal collections and conducting a local survey. 142 pp., 62 figs, 18 pls.

12. *A Silkmoth Rearer's Handbook*, by W.J.B. Crotch. Originally published 1956, facsimile reprint 1970 without colour plates. How to breed 120 exotic species in Britain, including substitute foodplants and early stages. Systematic section refers to 1400 species. (Does not cover Mulberry Silkworm for which there is A.E.S. Leaflet No. 3). 165 pp., 26 figs, 24 pls.

For price list and details of all A.E.S. publications: A.E.S. Publications Agent, 137 Gleneldon Road, Streatham, London, SW18 2BQ, England.

4. ENTOMOLOGIST'S GAZETTE

A quarterly illustrated journal of Palaearctic Entomology founded in 1950. Annual subscription (from January 1978) £6.00 sterling, US $16.00.

Editor: W.G. Tremewan.

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For further details or free sample copy write to the publisher:
E.W. Classey Ltd, Park Road, Faringdon, Oxon. SN7 7DR, England.

APPLICATION FOR FELLOWSHIP

To: The Royal Entomological Society
41 Queen's Gate, London, SW7 5HU, England.

I, ...
(*Full name in capitals, surname last with degrees etc., if any*)

a ..... (*Occupation*),

date of birth (*if under* 25).....

of: .....

.....

.....
(*Address of place of work, or home, and telephone no.*)
being much interested in the study of Entomology, and especially in:

.....
(*State special interests*)
wish to become a Fellow of the Royal Entomological Society of London.

..... (*Signature*).....(*Date*)
We, the undersigned Fellows of the Society, recommend the election of:

..... to the Society.

Proposer* ....
(*name in capitals*) (*signature*) (*date*)

Seconder..... ....
(*name in capitals* (*signature*) (*date*)

Supporter ....
(*name in capitals*) (*signature*) (*date*)

* The Proposer must be personally acquainted with the candidate and know of his suitability for Fellowship.

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R. MATSUDA, *Biosystematics Research Institute, Canadian Department of Agriculture, Ottawa*

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Editor: **MARTIN LÜSCHER**, *University of Bern, Switzerland*

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Insect Clocks

D.S. SAUNDERS, *Department of Zoology, University of Edinburgh*

A review of insect 'clocks' or rhythms of all periodicities; examples are drawn from throughout the Insect group. Most of the early investigations of photoperiodism in insects were concerned with the nature and location of photoreceptors and the effector system controlling metabolic changes such as entry into diapause. Only recently has progress been made in determining the nature and properties of the clock mechanism, a topic which has been the subject of much controversy.

Contents: Introduction. Sleep/Wake or Daily Activity Cycles. Population Rhythms. The Circadian System. Hibernation. Aestivation and the Photoperiodic Control of Diagaux. The Photoperiodic Clock. The Photoperiodic Counter. Other Types of Clocks in Insects.

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