THE BULLETIN OF THE AMATEUR ENTOMOLOGISTS' SOCIETY

VOLUME 22

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Edited by

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and by

H. V. DANKS

The Amateur Entomologists' Society

42 Normandy Avenue, Barnet, Herts

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Compiled by H. V. Danks (2907).

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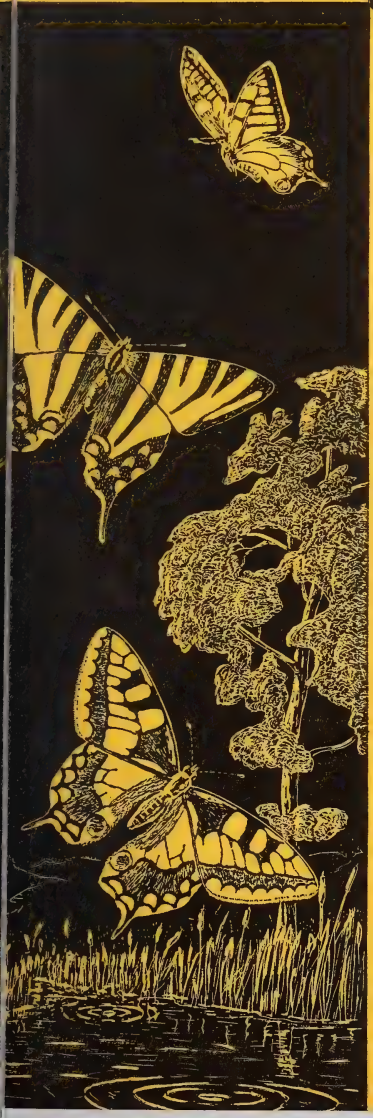

THE BULLETIN OF THE AMATEUR ENTOMOLOGISTS' SOCIETY

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EDITED by PETER G. TAYLOR, B.Sc., F.R.E.S.

AES NOTICE

WHERE TO WRITE

Membership applications, offers of help, changes of address, and non-arrival of Bulletins *to:* D. E. Dodwell, *28 Summerleaze Park, Yeovil, Somerset.* *Yeovil 928.*

Advertisers to: R. D. Hilliard, *54 Gyles Park, Stanmore, Middlesex.* *EDGware 1604.*

Offers to lead Field Meetings, exhibit, etc., to: B. F. Skinner, *85 Elder Road, West Norwood, London, S.E.27.* *GIPsy Hill 0057.*

Manuscripts, drawings, and books for review to: Peter G. Taylor, *International Language Club, 12 Park Hill Road, East Croydon, Surrey.*

Subscriptions (15/- per annum, 10/- for Juniors) to: B. R. Stallwood, *17 Claremont Avenue, Sunbury-on-Thames, Middlesex.* *Sunbury 2687.*

Youth matters to: M. C. Birch, *Hooton Vicarage, Little Sutton, Wirral, Cheshire* *Hooton 2020.*

HOW TO WRITE FOR THE *BULLETIN*

See full-length article in text of this issue for detailed guidance.

CONTRIBUTIONS ARE ALWAYS WELCOME

AES
BULLETIN
No. 258
FEBRUARY, 1963

EDITORIAL

With the first of the new series of ıarterly *Bulletins* we all fervently hope at our problems will begin to sort emselves out. We also hope that embers are making fullest use of the ew Membership List, which offers ch opportunities for contacting our llow-Members, especially those in ır own home area or, probably more luable still, those living in the areas e intend to visit while on holiday. ven though some collectors do tend, hen engaging in joint field-trips, to end rather more time and energy keeping an eye on their companion(s) an looking out for their quarry—just case they should miss seeing his ccesses ! — such co-operative venres can be most useful and stimulating the participants : the more so if they e able to rise above the petty jealousies at so often seem to arise in the sort case I have just mentioned.

In this issue, as promised, there pear once again, but in a somewhat odified form, the notes compiled for e guidance of intending contributors our pages. It appears that some of ır Members found parts of these notes fensive in their original form, appearg to overlook the fact that they were awn up for *all* contributors, both perienced authors and tyros, with e intention of improving the style the *Bulletin* and assisting contributors their efforts to make such improvent easier to effect. Perhaps they ould read *these* with more charity.

Following on from the recent corresndence in these pages on the subject Conservation of Wild Fauna and ora, there appears the first in a ojected series of articles presenting introduction to and outline of the considerations involved. Since this is a matter which concerns us all so deeply, if the things we love are to have any chance of survival, it is to be hoped that all Members will read the articles very carefully and learn as much as possible from them.

The front cover of this issue is once again adorned by a brand-new decorative panel, again the work of our Member Mr A. M. Freebrey, and there are more on the way, and accompanying Mr Ollevant's notes on *The Smaller Moths* there are the first two of a series of very fine drawings by another Member, Mr E. S. Bradford.

Last but not least, the Index to Volume 20 of the *Bulletin* (published during 1961) is now out, and it has occurred to us that some of those who were Members in 1961, but have since left the Society, are entitled to receive a copy, to go with their *Bulletins*. If they will write to the Hon. Secretary, Mr D. E. Dodwell, he will be pleased to send them one. Conversely, if any Member receives a copy and can find no use for it, he would help the Society greatly if he would be so kind as to send it, not folded or crumpled, and of course, not marked, to the Society's Publications Agent, whose address will be found on any of the advertisements for AES publications in current issues of the *Bulletin*. A common cover for the Volume is in the press, and will be despatched as soon as possible.

Lots more copy, please !

Peter G. Taylor (719).

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AN INVITATION

An invitation has been received from Mrs Margaret Fraser Hay, of Rock Mount, Frodsham, near Warrington,

Cheshire, for any Member visiting the North Wales area.

In respect of a small tract of land in Abersoch, Caermarthen, North Wales, containing a converted water-mill and a four-acre lake in the hills behind the house, where insect life is very prolific, Mrs Fraser Hay would be delighted to see Members of the AES and to allow them access to the land around the lake.

D. E. Dodwell (3482),
Hon. General Secretary.

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WANTS AND EXCHANGES

Our Society has as its aim the assistance of the amateur entomologist, in particular the beginner and those who have little opportunity to meet others with similar interests. To achieve these ends we have a *Bulletin* which acts as a link and a means of disseminating ideas, a *Membership List* which enables Members to get in contact with each other, and a long list of publications on the practical aspects of entomology. Yet one of the first means used by the Society was the circulation of lists of items which were offered for exchange or which were wanted. My own experiences with such lists have convinced me that they have a very important part to play, a part which has been sadly neglected in recent years. Almost all my friends in the field of entomology have been made through the medium of the *Wants and Exchanges List.* Over a period of years I have offered surplus livestock for exchange and this has brought me into contact with many whom I should not otherwise have come to know. Correspondents, only names on paper, have become people and friends by means of the Annual Exhibitions and meetings in the field, but without the original contacts I feel I should not have reaped the full benefit of membership of the AES.

It has been a disappointment to me that in the last year or so the *Lists* have not been regular enough in their appearance for Members to make the proper use of them, but this is a matter which the Society has now taken steps to correct. A more serious matter to me is that the recent lists have been more and more devoted to items for sale. The sale of surplus equipment and books cannot be objected to but it does seem to be contrary to the spirit of an amateur membership to offer for sale surplus livestock. Surplus insects come as a gift to us from the over-generous fecundity of Nature, and they offer us an opportunity to introduce to others the pleasure of breeding some unusual species and to introduce ourselves to a wider circle of ' bug-hunters '. There are a few of our Members who are not truly amateurs and these use our Lists as a means of advertising their wares. As long as they are Members they are entitled to do this, but it should not be the green light for others to attempt to ' cash in ' on our hobby. I would suggest that Members offer their surplus stock for exchange against items that they themselves require, but where another Member is anxious to accept the offer but unable to offer immediate exchange material, the surplus should be a gift. In only a few cases in my experience has such an action gone without its eventual reward. In regard to set specimens, the same remarks apply. Without such an attitude within our Society there is a possible danger of the more localised species having a market value which would attract over-collecting (as in fact happened in the last century—*Ed.*) and the wrong type of Member. There are hobbies which can show a legitimate profit but trading in our native fauna by professed amateurs should not be encouraged.

Good Manners

The etiquette of exchanging require

at postage should always be offered less material is being received by st in return. More important is that boxes, tins, etc., should be returned the sender. On a few occasions I ve sent material to enquirers and t only has the box not been returned t the receipt of the material was not knowledged.

Fortunately such experiences have en infrequent but once could be fficient to discourage a Member fering material for the first time from oing so again.

The lists often advertise Field Meetgs of our own and other Societies. think that there could be an extension this idea. Members who wish to visit rtain areas, at home or abroad, and ho would like to join forces with nother Member or Members of like terests could use the *Wants and xchanges List* as a means of communition. Members with cars, or other eans of transport, could help less rtunate Members and those proud ossessors of mobile mercury-vapour ght-traps could give much pleasure other Members by contacting those similar interests in areas which ey are visiting. It is here that the *embership List* with its geographical ey becomes so useful.

I hope that local groups of Members ill be formed, such as that at Croydon, nd that the dates of their meetings ill be advertised in the *Lists*. In short, e *Wants and Exchanges List* can go a ng way towards becoming the lifeood of our Society, but this can only ome about if it is published regularly n time and is used to the full by the hole of our membership.

The dates of publication are February t, May 1st, August 1st and October t, and copy must be in the hands of e *List's* editor, Mr. R. W. J. Uffen, the 17th of the previous month. ark your diary with these dates and your little action to help the Society sending in at least one item during e year.

P. W. Cribb (2270) *President.*

HOW TO SUBMIT CONTRIBUTIONS FOR THE *BULLETIN*

Please remember that these notes are for the *guidance* of all Members, both beginners and experienced authors, wishing to write for the *Bulletin*, and are intended to help them to make it easier for the Editor to use what they have written : they do NOT constitute a directive, but are an outline of how contributions must appear before the Editor will allow them to go to the printer, so what *you* don't do, he will have to. Therefore, if there are some things that you feel you can't do, just leave them to the Editor (who is quite humble enough to ask for advice when unsure about something, and, be it noted, quite prepared to admit it). On the other hand, if some of the points mentioned seem elementary and an insult to your intelligence, please try to remember that unless the Editor had found from bitter experience that they might sometimes be of assistance to would-be contributors, he wouldn't have bothered to include them !

(1) If possible, please submit typewritten copy ('copy' is the technical name for material submitted to a printer). If you *can* get it typed, please ensure that it is fully double-spaced (*i.e.*, that there is a whole line empty between successive lines of type) with very wide margins ($1\frac{1}{2}$ inches on the left ; at least one inch on the right), but do not rule the margins. It must be on ONE SIDE ONLY of quarto paper, which is three inches shorter than foolscap and the same width.

(2) If it is not possible to type your copy, please make quite sure that it is very clearly written, so that it cannot be mis-read (if someone else can read it when holding it at arm's length, it's probably as good as it could be). It is a good plan to get a friend to read your manuscript back to you *aloud*—you'd be surprised how easy it is for someone who isn't actually thinking your

thoughts to misinterpret what seemed to you to be as clear as crystal !

(3) The title must be in capital letters throughout, NOT underlined (that means 'italics' to a printer), and centrally placed across the page.

(4) The author's (or authors') name(s), followed by AES Membership Number(s) in parentheses, must be placed at the *end* of the article, on the right-hand side, on a different line from the text, and not underlined.

(5) The date of writing, in the simplest, neatest, most logical way of writing it, should be placed on the left, opposite the author's name. (*Example:* 25.12.63.).

(6) ALL species of insects, and of other living things (where *exactly* identified), to be named with their *full* scientific names, *i.e.*, *full* name of genus with a capital initial letter ; correct specific name with *small* initial letter (these *two* to be underlined unless occurring in a passage of which the text is to be in italics and therefore itself underlined) ; name of *author* of that scientific name (or standard, *unambiguous* abbreviation of it; N.B.: 'Linnaeus' and 'Fabricius' to be abbreviated to 'Linn.' and 'Fab.' respectively, NOT 'L.' and 'F.', with all respect to the memory of these great men!) with a capital initial letter and NOT underlined.

(7) If, and *only* if, there is a *regularly* used English name, this is to be added, in parentheses after the scientific name, with *each word* of the name having a capital initial letter, e.g.:—

Lycaena phlaeas Linn. (Small Copper).

(8) If you don't know any item of this information, please *don't* just leave it out, but leave a good-sized gap, so that the Editor can fill it in for you. (Make sure, of course, that you *have* supplied enough information for him to be able to identify the species to which you are referring !).

(9) Once you have given the *full* names of a species, you may, if you wish, refer to it further in the same article by its English name alone (if any) or by its scientific name alone. If the latter, and provided no confusion can possibly arise by doing so, you may, if you wish, omit the author's name altogether and /or abbreviate the generic name to its initial letter, followed by a full point (.).

(10) If you use the name of a genus on its own, it must be underlined, and if it is followed by 'sp.' (singular) or 'spp.' (plural) meaning 'species,' this is *not* to be underlined. (*Example: Pieris* sp.)

(11) ALL scientific names of groups above the rank of genus must have a capital initial letter and *not* be underlined. If you use an adjective made from one of these names (e.g., hymenopterous) or a noun, formed similarly but referring to a student of the concerned group (e.g., lepidopterist), give them small initial letters. If, however, you take such an adjective (as in "an agromyzid fly.") and use it as a noun ("an Agromyzid") it is usual to give it a capital initial letter.

(12) If you use an English vernacular word that does not attempt to identify a *species* of living thing (e.g., oak, elm, grass, butterfly, beetle, lady-bird, cow, etc.) do not give it a capital initial letter (unless, of course, it begins a sentence!).

(13) All abbreviations are to be treated as recommended in the *Concise Oxford Dictionary*, *i.e.*, they are to be followed by a full point (.) *only* if the last letter of the word is missing (thus, 'sp.' and 'Linn.' for 'species' and 'Linnaeus' respectively, but 'Mr' for 'Mister' and 'Stgr' for 'Staudinger'). By the same authority, some abbreviations consisting of initial letters only (e.g., AES, FRES, UNESCO, etc.) are to be treated as ciphers, and the points omitted altogether.

(14) All references to articles in the *Bulletin* are to be indicated by the *World List* abbreviation (*Bull. amat Ent. Soc.*), underlined, followed by a comma, then the NUMBER ONLY o

ne Volume, and then a full colon (:) ollowed by the number(s) only of the age(s) occupied by the article(s). lultiple references should be separated y semi-colons, but indication of the old type used for volume-numbers hould be left to the Editor.

Examples: Bull. amat. Ent. Soc., **22**: -5; and: *Bull. amat. Ent. Soc.*, **21**: 3-5; 5-7; **22**: 3-5.

(15) Strict rules of grammar will e applied to the final product, e.g., very sentence must have a finite verb, nd be complete and meaningful on s own ; successive sentences must ever be separated by a comma alone ; nfinitives will never be split.

(16) If any offering is submitted that ; primarily 'literary'—an essay in tyle rather than merely the careful etting down of scientific information and the Editor, forgive him, must ecessarily be the final arbiter in such ases!), the above rules will, of course, e suitably waived.

(17) Please count the actual number f words in your contribution (excluding title and signature, but counting roups of initials and abbreviations as ne word each) and write it, in PENCIL nd ringed round, in the top right-and corner of the first sheet of each rticle.

(18) If the contribution needs any llustration, and you feel like submitting our own drawings for publication, hese should be twice as big, in both eight and width, as they are to be rinted, and *must* be drawn clearly in *lack Indian ink* on *white* Bristol board, vhich you can buy from any good tationer or artists' sundriesman. Otherwise they will not reproduce roperly, and printing blocks are expensive ! (Don't forget that any writing will come out half-size, too.) If you don't eel able to make your own drawings or publication, send the best you can nd we shall forward them to one of everal Members who have kindly offered their services as artists.

(19) Your copy will be checked carefully and, if there is any ambiguity or inaccuracy of grammar or naming, any major alteration(s) will be sent to you for approval before printing. Keeping a copy of the original simplifies this.

(20) When the final form of your copy has been agreed between you and the Editor, or, in the absence of any major alteration(s), as soon as possible after it has been received, it will be sent to the printer at an appropriate time, which may not be the next issue.

(21) When the Editor receives the proofs of your article he will send you a copy for a final check. You will have this for only a *strictly limited time.*

(22) If it is satisfactory, please return it to the Editor, marked 'O.K.' and signed and dated.

(23) If there is anything you *must* have altered, and the change meets with the Editor's approval, he will instruct the printer to make the alteration.

(24) If you and the Editor cannot agree, the item will not be published.

(25) If you fail to return the proof of your article within the time-limit, it will be printed as it stands, or with any compositor's errors corrected.

(26) Please take care to use the Editor's *full name and address* as shewn at the foot of these notes, to avoid errors and delay—there are frequently several unconnected Taylors living here !

These notes will be published in the *Bulletin* at regular intervals (probably in the February issue each year), with a *résumé* in the form of a cover-panel inside the front cover of each issue. As soon as possible they will be duplicated or reprinted, so that they can be sent on request to any Member (stamped, addressed envelope, please) seriously contemplating becoming a fairly regular contributor.

Peter G. Taylor (719),
Bulletin Editor, AES,
International Language Club,
12 Park Hill Road,
EAST CROYDON, Surrey.

THE SCOTTISH FIELD STUDIES ASSOCIATION

A programme of the summer courses held by this Association has been received by the Society, and it includes an Insect Natural History Course held from 29th June to the 6th July at the Garth Field Centre.

The courses are held at the following places:—Garth Memorial Youth Hostel, Fortingall, Aberfeldy (Perthshire), Isle of Great Cumbrae, Black Isle, Pitlochry, Isle of Arran, Strathpeffer, North Ballachulish, and Alnmouth in Northumberland. There is also a tour of the Hebrides. Enquiries should be made to S.F.S.A., 179 West Regent Street, Glasgow, C.2.

D. Ollevant (1514).

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COLLECTING NOTES — Spring

The Smaller Moths

In this, the first of a new series of Collecting Notes, we have been fortunate in being able to reproduce two fine line drawings by Mr E. S. Bradford. We are very grateful to him for drawing these moths for the *Bulletin*, and hope to be able to continue to publish two of these drawings in each issue.

Tinea pellionella Linn. is a very common moth which can be collected without going out of doors as it is one of the 'Clothes Moths'. Its common name is the Case-bearing Clothes Moth because its white larva lives within a silk case which is covered with portions of the material that it is feeding on. The moth can be found on the wing from June to October.

Plutella maculipennis Curt. is also a very common moth, but is to be found out of doors. Its common name is the Diamond-backed Moth, this being descriptive of the moth at rest. The larva is a pest on cruciferous plants, especially Cabbages. It is also a migratory moth and this has led to its universal distribution.

Collecting in the Spring and early Summer can be by almost all methods, there being plenty of species on the wing and plenty of larvae to be found.

By carefully looking at the shoots of Germander Speedwell (*Veronica chamaedrys* Linn.) the green larvae of the 'Plume,' *Stenoptilia pterodactyla* Linn. may be found in May. The moths will start emerging in mid-June.

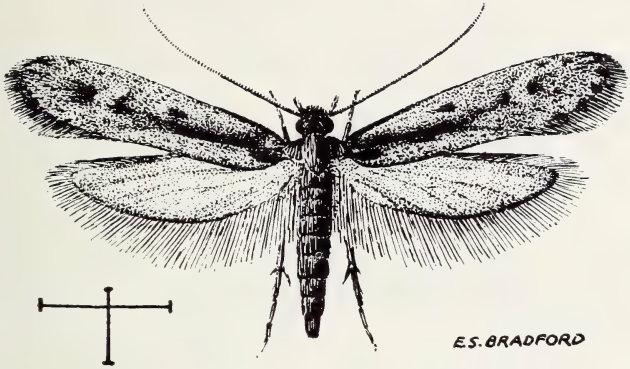
An easy way of identifying the larvae of the variable Tortrix moth, *Acroclita naevana* Huebn. is to look for those which feed on Holly (*Ilex aquifolium* Linn.) during May and June. The larva can be easily detected in the new shoots.

Alispa angustella Huebn. occurs around Spindle bushes (*Euonymus europaeus* Linn.) during May and June. The ova are deposited on the fruits and the newly hatched larvae bore into them. During their feeding they will move from one fruit to another, but when they become nearly full-grown their presence can be detected by the frass. If the berries are collected in September, a piece of rotten wood (or cork with drilled holes) should be placed with them in a suitable container; and the larvae will spin up in it.

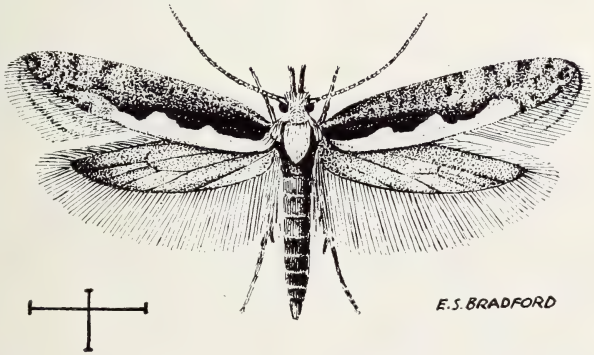
Salebria fusca Haw. can usually be disturbed by day on heaths during May, July and August—have you any records for June?—especially in burnt places. However, it can be found in other places too as it often turns up at light in the suburbs of London.

In June the red larvae of the local moth, *Paltodora cytisella* Curt. can be found in the stalks of Bracken (*Pteridium aquilinum* Linn.): look for a discoloured or partially deformed frond, and a slight swelling. The larvae must be taken nearly fully grown as Bracken stalks quickly decompose when cut. The larva leaves the stalk to pupate.

A tortricid moth new to Britain, *Pammene agnotana* Rebel, was taken at Newlands Corner on the North Downs



Tinea Pellionella Linn



Plutella Maculipennis Curtis

n Surrey, by Mr F. M. Struthers on the 5th April, 1961. A full report was ublished by Mr S. Wakely in the *ntomologist's Record*, Vol. 75, page 13 January 1963). This moth resembles *ndothenia carbonana* Doubl. but appears n the wing earlier in the year. The oodplant is unknown, so pay special egard to any dull-looking, small (10 nm. expanse) Tortricid taken early in he year.

D. Ollevant (1514).

FROM OUR NORTHERN CORRESPONDENT

Experimental Breeding

At the commencement of these articles it was suggested that a useful contribution might be to describe the breeding of one or more species of moths over a long period. We have all at some time or other been greatly impressed by a series of fine specimens.

Usually these have been reared in captivity and very often they are the result of several years' careful selection. However, there is much more to experimental breeding than producing a fine series for the cabinet. The study of genetics is one so absorbing that it amazes me that so few entomologists spare time and thought upon it, and the practical application of a few simple rules will produce an endless variety of wonderful results. There is always the chance too that something altogether unique may be produced.

It would be foolish to suggest that this type of study is always rewarding, or even that it is usually crowned with success. Very often the results are ordinary and the work of rearing thousands of insects of one species seems to have little to commend it. However, I am sure that Members who have already tried their hand at this type of study will support my view that it is not only helpful to the beginner, but is also of infinite worth to the more experienced entomologist who has never undertaken such work.

First the choice of a species must be made. I feel that far too few species are bred by most of us, especially of those insects which are easily obtained in other ways. Each year for many years I have attempted to rear at least one species never previously attempted by me, and this is a constant challenge to one's knowledge and skill. However, for the purpose of experimental breeding it becomes necessary to select one of the species which is easily reared in captivity, which has a foodplant readily available in large quantities, and which is given to a reasonable amount of natural variation. Much work has been done on members of the Sphingidae and Lasiocampidae, but I feel sure that the most rewarding family from every point of view is the Arctiidae. Almost every one of the 'Tigers' is easily reared, eats common foodplants, and produces almost endless varieties. At present I have pupae of the seventh generation of *Spilosoma lutea* Hufn. (Buff Ermine Moth), and the remainder of this article refers to the progress made on this species.

Buff Ermine

Many named varieties of this moth are known and at least a third of the wild specimens occurring in many Northern localities (and, one assumes, in Southern localities also) show signs of variation, usually in the amount of dark marking. Some years ago about 50 larvae were collected and reared to maturity. Of the resulting moths about a dozen were slightly darker in general coloration than the others. Three pairings were obtained and approximately 600 eggs were deposited. The resulting larvae were fed on a variety of food. They readily accepted leaves from several low-growing plants and bushes, and changed over from one to another without any trouble. The object was to obtain some 250 pupae, as it had been decided that this was a suitable number to aim at over a number of years, not beyond the space and time which were available, yet giving a reasonable number to produce long series and possible varieties. It was further decided to select for setting about 10 per cent of the moths produced. This, of course, meant that a fair representation of each variety or type produced would have to be taken, so that the two dozen set specimens would show a fair picture of the results obtained.

The first very surprising result was that after only one year at least a third of all moths produced were var. *radiata*, but after a further six years this proportion has not greatly increased. The second obvious trend was to produce females of unusually large size and white background—whilst the males tended to be somewhat small and often a deeper buff than one expected. Indeed the great difference between the sexes of the third generation was most interesting. In the most extreme

ıses the dark banding on all wings ecame sufficient to cover about half the total wing-surface. From this xtreme there was every type of variaon to specimens almost totally devoid marking.

It is not within the scope of this ıort article to comment at all upon ıe technicalities of the genetics, but ıfficient has been said for those who e interested in this aspect (and one otes with pleasure that a Study Group ıs been formed within our Society ith this in mind) to appreciate that ıere is endless interest to be gained. owever, one can only go so far: after ome five or six generations the weakesses of close inbreeding become all o apparent. The proportion of criped moths rises and the mortality rate the early stages becomes too great. t this stage one must introduce fresh ock or start again.

The ideal method of covering a wide eld and obtaining the best results ould be for several Members to conıct breeding with the same species om different parts of the country. om time to time they could exchange ock, and it would be very exciting to vait the results. The splendid varieties *Pieris napi* Linn. (Green-Veined /hite butterfly) were mainly estabshed in this way, and there is no oubt that many other species would ve similar results if the individuals om different geographical races were ought together.

W. E. Collinson, FRES (247).

•

PIERIS BRASSICAE LINN. — A NEW STUDY GROUP

Members may recall that in 1961 eld observations prompted me to ıblish in the *Bulletin* (*Bull. amat. ıt. Soc.*, **20**: 105) a number of queries oncerning the Large White butterfly '. *brassicae*).

Since then a certain amount of interest in the species has been shown —both in the pages of the *Bulletin* and in correspondence with me—and this has now become sufficiently defined to warrant the formation of a new Study Group, to answer both the original problems and others which have since arisen.

Of the queries published earlier, only one has been definitely answered. It seems that there were quite extensive migrations in 1961 and as far as I can tell from the limited amount of data received migration occurred in 1962 also ; and it would appear that, unlike the year before, there was a significant Spring migration as well as the Summer one.

To attempt to solve the remaining problems, many more data are required. Every Member must surely have seen *P. brassicae* in sufficient numbers to be able to make some observations—even reports from parts of the country where the insect was absent would be very useful in compiling a picture of the distribution, for this is presumably partly controlled by migration. Would any Member who has any data at all, therefore, please send them to me : the original queries, for the benefit of new Members, concerned the sex proportions in migrations and field captures ; the order in which the sexes emerged in breeding, etc.

Members who wish to join the Study Group are urged to write to me, stating whether they are able to undertake any breeding of *P. brassicae*—for meaningful amounts of data can be obtained only by rearing large numbers of larvae divided, for practical purposes, between different breeders. I should also be glad to hear from anybody who has, or is likely to have, surplus livestock of this species on which the Group can work.

If possible all breeding data should be in full, so that I can extract from them anything that may be of interest—even though it may not seem important.

Because of the limited amount of data so far in hand no definite explanations have been worked out for the sex proportions in *P. brassicae*. However, the observations seem to confirm that the sexes do not, as might be expected, occur in equal numbers. It would appear that in the London area, at least, females were much more common than males in the Summer of 1961. Mr P. J. S. Miles records (*in litt.*) that migrations on the Kent coast during the last two weeks of August consisted of *Pieris brassicae* and *P. rapae*, with females of both species invariably more common than males. However, his field observations indicated that before the migration males were slightly more common than females. It is interesting that in '*Insect Migration*' Dr C. B. Williams records a large flight during 1940, in which females (estimated by counting the wings, scattered on the ground, of those insects captured and eaten by birds) seemed far commoner than males. He suggested that this was because females are the easier sex to catch. However, this year (1962) half of the males that I have captured were taken in full flight—which suggests that birds would find little difficulty in catching them, although the flight of migrating butterflies may well be stronger than usual.

1962 saw a reversal of the sex proportions of the year before. Of the limited numbers of specimens which I took—the species being far less common than in 1961—four out of every five were males. Interestingly enough, records of Kent migrations for 1962 showed males to be predominant (80-90 per cent), so that it may be that the sex proportions observed in the field are merely the result of the influx of migrant populations. On the other hand, females in London were found to be much more common than males well before the 1961 migrations took place, so that another factor is probably involved. Perhaps the density of population has some bearing on this; thus it is possible that females may be more resistant to disease in crowded conditions, so that they become predominant in years of great abundance like 1961, whereas another factor operates to give dominance of males in conditions of less crowding, as in 1962. Again, it is possible that the emergence times of the sexes are important and perhaps affected by weather conditions, but too little information is available to tell whether this is likely.

A further point of interest concerns the sex proportions of *P. brassicae* in France. Mr Miles (to whom I am very grateful for the amount of data which he has contributed) records that males were again the commoner sex in a suspected migration which he observed on the French coast in late August.

This year, then, males have been predominant. As always, collected larvae have been found, when reared, to be heavily parasitised, and it has been suggested, as previous comment in the *Bulletin* has indicated (*Bull. amat. Ent. Soc.* **19:** 61), that the species is unable to survive in Britain without reinforcement by migration — even though the immigrants would seem to be relatively ineffective for breeding because of the sex proportions among them.

As far as the distribution of the sexes obtained in breeding is concerned there is slight evidence that females were more numerous in bred batches in 1961, but that males emerged first in both 1961 and 1962. It must be emphasised, however, that there is so little evidence available that this suggestion, like the previous ones, may well be wrong. This leads back to the fact that *far more data are required* before any firm ideas can be formulated—any observations at all would help, even if they seem irrelevant. It may be, for instance, that the overwintering of pupae of the third or a possible fourth brood affects the sex proportions in the following year, so that even apparently

eless data on these broods could be luable. Again, I have received a note at Mr R. F. W. Redman has observed number of lethargic female *P. brassicae* his garage during the Spring of 1962. though it is possible that these insects d hibernated (!), Mr P. G. Taylor s suggested that it is more likely that e specimens were showing the normal male inclination not to fly before iring, having emerged in the building hich the larvae had entered to pupate. owever, such notes may prove to be gnificant, so that any other 'irrelent' information on *P. brassicae* which receive will be welcomed.

It will be seen from the above that a eat deal of work needs to be done on en a common insect like the Large /hite butterfly ; and as the insect is common, this is a study in which we nateurs can take a very active part. is hoped that the initiation of the roup will be a start in learning more out this interesting butterfly.

11.62. H. V. Danks (2907), onvener, *Pieris brassicae* Study Group.

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NSECT PESTS OF GARDENS—II

phids

Perhaps some of the most important sts in horticulture and agriculture e the group of insects popularly own as Greenfly or Plant Lice. hese insects belong to the Order emiptera, sub-order Homoptera. The mber of species is very large, and early ever plant species is attacked by me kind of aphid. Many of the ecies attack a wide range of plant pes, whereas others are specific in eir feeding-habits, *i.e.*, feed upon ly one species of plant.

The feeding-habits of many aphids produce signs of attack which are very useful as an aid to identification. Briefly, the following representative list shows how this is possible:—

Curling of leaves of Plum (*Prunus domestica* Linn.): Plum Leaf Curling Aphid (*Anuraphis* (*Rhopalosiphum*) *padi* Linn.);

Distortion of shoots of ornamental *Pyrus* spp: Green Apple Aphid (*Aphis* (*Doralis*) *pomi* Degeer);

Discoloration of flowers of *Tulipa* spp: Tulip Aphid (*Rhopalosiphoninus tulipaellus* Theob. (*Hyperomyzus staphyleae* Koch));

False galls and tumours on branches of *Pyrus* and *Cotoneaster* spp: Woolly Aphid (*Eriosoma lanigerum* Hausm.);

Infestation of stored bulbs and corms: Tulip Bulb Aphid (*Anuraphis* (*Yezabura*) *tulipae* Fonsc.);

Premature leaf-fall of Sitka Spruce (*Picea sitchensis* Linn.): Spruce Aphid (*Neomyzaphis abietina* Walker);

Wilting of *Dianthus* plants (Pinks and Carnations) owing to root damage: *Aphis wilsoni* Laing.

Most species of aphids have complicated life-histories, and usually spend part of their lives on a woody 'primary' host plant, later migrating to a 'secondary' host plant, which is often a member of a widely different Order and may be either an annual or other herbaceous weed or a cultivated plant.

A summary of a typical aphis life-history (if there is such a thing) would be for eggs to be laid on the primary host in the Autumn, and to hatch in the following Spring to produce wingless (apterous) females, called 'stem mothers,' which in turn produce living young—all females—parthenogenetically, *i.e.*, without mating. Each of these produces more living young, once again all females, so that the rate of reproduction is very high. During this rapid increase in population density there appears among the apterous offspring a number of winged (alate) females, which fly to the secondary

host and there give rise parthenogenetically to further females which themselves produce wingless females throughout the Summer.

In late Summer and Autumn winged 'return migrants' fly back to their primary host plant, and these produce a brood of apterous, oviparous (egg-laying) females. Winged males are produced at the same time. The oviparous females are fertilised by the males, and eggs are deposited on the young shoots, mature stems or older branches, as the case may be.

The direct injury caused to the plant by these insects is the abstraction of cell-sap, giving rise to distortion of the foliage, discoloration of the leaves, checked growth, and formation of galls and tumours. Indirectly, aphids cause damage by wounding plant tissue, thus allowing the entry of disease-causing organisms, and by transmitting certain viruses. They also exude a sweet, sticky substance called honeydew—a suitable medium for the growth of various moulds, which not only make plants look unsightly but also intercept light and thereby reduce photosynthesis.

Fortunately for the gardener aphids have a wide range of predators, chief amongst them being the larvae of Hover-flies (Syrphidae) and Lacewings (Chrysopidae and Hemerobiidae), and both the larvae and adults of the Ladybird beetles (Coccinellidae). Certain minute parasitic chalcid wasps also play a large part in the natural control of aphids. In fact, one species of Chalcid, namely *Aphelinus mali* Haldeman, is introduced commercially into orchards to help control the Woolly Aphid.

Below is a partial list of host plants and the aphids associated with them. Only those aphids which attack cultivated species, and that one can reasonably expect to find, are included:—

Dogwood (*Cornus sanguinea* Linn.)—*Anoecia corni* Fab.;

Roses (*Rosa* spp.)—*Macrosiphum rosae* Linn.;

Annual plants such as Beans (*Vicia* spp.) also Potatoes (*Solanum tuberosum* Linn.)—*Myxus persicae* Sulz. and *Aphis fabae* Scop.;

Cornflowers (*Centaurus cyanus* Linn.)—*Macrosiphum* (*Dactynotus*) *jaceae* Linn.;

Auricula (*Primula auricula* Linn.) roots—*Pemphigus* (*Byrsocrypta*) *auriculae* Murray;

Water-lilies (*Nymphaea* spp.,—? and *Nuphar* spp.)—*Rhopalosiphum nymphaeae* Linn.;

Cypress (*Cupressus* spp.) — *Panimerus* (*Neochmosis*) *cupressi* Buckton;

Cherry (*Prunus* spp.)—*Myzus cerasi* Fab.;

Beech (*Fagus sylvatica* Linn.) — *Phyllaphis fagi* Linn.;

Poplar (*Populus* spp.) — *Pemphigus* (*Byrsocrypta*) *bursarius* Linn.;

Liliaceous plants — *Myzus* (*Aulacorthum*) *circumflexus* Buckton;

Chrysanthemum spp. — *Macrosiphoniella sanborni* Gillette;

Ferns (Filicini) — *Idiopterus nephrelepidis* Davis.

21.11.62. A. J. Tuton (2639).

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CONSERVATION

1. NATURAL FACTORS AFFECTING INSECT POPULATIONS

In subsequent *Bulletins* I hope to publish a series of articles on conservation. I would assure Members that I shall not 'preach' but I hope that even those to whom the subject has only a limited appeal will be reminded that conservation of our insects ultimately *does* concern them.

In these articles I shall attempt to outline the factors which operate on the insect inhabitants of any area, and how it is possible by controlling some of these to protect the members of such insect populations.

It is not possible, of course, to control atural factors to any appreciable ex- ent, but it is these which will be con- dered first since they bear on the uman influences such as collecting and dustralisation with which the subse- uent articles will deal. Members will robably be aware of these natural ctors already, but I feel that they ould be briefly included here both for e sake of completeness and because ey form a suitable introduction.

Since many of our rarer insects are onfined to certain areas, it is necessary discuss ecology, and hence conser- ation, in a particular habitat ; and erefore the natural factors to be alt with are those which relate to is habitat, rather than to the country a whole. The most evident of these ctors is the actual physical structure the habitat concerned, *i.e.*, its ology and topography, and this is portant in determining whether the ea is suitable for the formation of a lanced community which includes the ecies under consideration. The eather experienced there, too, is of ime importance—some species, for stance, cannot tolerate high wind— ut here we begin to see the inter- lationship of factors which ecology volves : for example, if there is a pographical feature which protects area from wind, wind-sensitive ecies will be able to survive there. rthermore, the inter-relationship etween other resident organisms and ese physical factors can now be seen, g., a forest, too, would act as an fective windshield. But perhaps the ost important biological (' biotic ') fluences are those which relate more rectly to the insect under consider- ion : in order to survive, the insect ust be able to obtain food, and to mpete with other organisms—as well being able to exist under the geo- aphical (' edaphic ') and weather climatic ') conditions of the habitat, mentioned above.

Ecology is not, however, as simple as this statement would imply. The majority of foodplants, for instance, are unlikely to be members of an entirely balanced flora, since any region, if left undisturbed, will eventually reach a stable state (or ' climax ') which in Britain is generally woodland, its type depending on the soil, etc. Moreover, since in Western Europe practically all plant habitats have more or less recently been disturbed by the agency of man, they rarely support true climax communities. It follows that the great majority of insect foodplants in that region are members of such a natural succession towards a climax, not at the climax itself, and therefore the changes involved may contribute to the decline of species feeding on particular foodplants. Such species must spread to new areas as the old ones become unsuitable, and here conservation may be directed either to creating new suitable areas or to preventing the climax from being reached in the original area, the latter being preferable as the species are already established there.

Again, the foodplant is likely to be fed upon by animals other than the species of direct interest, and the same thing applies to prey in the case of predators. Therefore, if a competitor for the foodplant increases, other species may decrease. Extinction becomes possible when a factor such as increase of the competitor, is linked with others causing decrease of the species in question.

In this case, the resulting damage to the species may be too great for recovery to occur. Evidently such recovery usually takes place, but if an artificial factor such as collecting is introduced when the numbers are naturally low, recovery may be prevented, and this is true whenever the numbers decrease for any reason at all: disease, severe weather, failure of reinforcement by migrations, etc.

It is particularly difficult to appreciate the precarious position of certain species

in this type of situation if they normally require a relatively high population density for continued survival, as, for example, where the means by which the sexes meet to pair are poorly developed. Such a species might appear to be fairly common whilst at the same time being close to the minimum population density that it can tolerate.

All natural populations undergo fluctuations in numbers, large decreases being of particular interest in conservation, as indicated above. Often, however, a species is decreasing steadily and naturally on the edge of its range because of long-term effects such as melting of the polar ice-caps, though this is no reason to overcollect it, as often happens. Some 'entomologists' seem to feel that "if it is declining anyway", they should have a nice series to fill their cabinets, and take as many as they can *because* it is rare! Far more valuable would be a study of its *natural* decline and a correlation of the factors causing it, thereby adding to knowledge.

If conservation were practised more widely, not only would such studies be possible, but the extinction of species temporarily reduced in numbers, before they could recover sufficiently to withstand collection, would be prevented. *How* it can be practised, not just by research teams but by the ordinary entomologist, I hope to indicate in subsequent articles.

7.2.63. H. V. Danks (2907).

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BREEDING AND FOODPLANTS OF SPECIES OF *MELITAEA*

Readers may recall from my previous notes (*Bull. amat. Ent. Soc.*, **15:** 49; **17:** 13) on the foodplants of the genus *Melitaea* (*M. athalia* Rott. and *M. cinxia* Linn.) in England, my suggestion that the true foodplant of both our native species is *Plantago lanceolata* Linn. (Ribwort Plantain), and that the eating of *Veronica* spp., *Melampyrum* spp., and other *Plantago* spp. has arisen subsequently when supplementary pabula have been available or necessary. Mr T. J. Honeybourne, of Wilmington, Kent, agrees that he has reached a conclusion similar to mine in regard to *M. athalia* as it has been his experience that a colony will not survive if there is not Plantain present amongst the Cow-wheat (*Melampyrum pratense* Linn.) This would refer to the Kentish and Essex habitats, and the Sussex locality which I studied had a liberal supply of Plantain growing amongst the *Veronica chamaedrys* Linn. (Germander Speedwell). It seems that the plantain is essential for the young larvae immediately after Spring feeding starts. In the Isle of Wight I found that *M. cinxia* laid exclusively on *P. lanceolata* even when the plant was surrounded by *P. maritima* Linn. (Sea Plantain); and the fact that its larvae are found feeding on this latter plant seems only accidental, or perhaps sometimes necessary in view of the existence of large numbers of larvae in limited areas. The occasions upon which *M. cinxia* could feed on *Veronica* spp. on the Island would be limited.

My visits to France enabled me to see *Melitaea* spp. on a wider front. In addition to the species mentioned, I took *M. didyma* Ochs., *M. deione* Huebn., *M. parthenie* Borkh., *M. parthenie* form *varia* Meyer-Duer., *M. dictynna* Esper, and one specimen of the high alpine species *M. asteria* Freyer. Of these I was able to obtain ova of *M. didyma*, *M. deione*, *M. parthenie*, and *M. athalia* by the simple process of putting fresh females into plastic boxes in the corner of the hotel window, a piece of *P. lanceolata* being placed in each container. Ova were laid next day in each case, all those from one female being deposi-

:d in a single pile on the underside f the incurved tip of a leaf.

The ova did not hatch until I had eturned to England and in each case 'ere hatched in about 18 days. Of all ıe larvae, the only ones found to be ifferent in appearance were those of 1. *didyma*, and the pupae also mainıined this difference. All species fed ɔ maturity on *P. lanceolata*. The eference books list a wide variety of ɔodplants, most of which are in the crophulariaceae. I examined the ırvae of the three species, *athalia*, *eione* and *parthenie*, and could nd no differences structurally, or in oloration, rate of growth, or habits f feeding and final pupation. Even the upae betrayed no detectable differences nd it was only in the imagines that it /as possible to find sufficient differences ɔ classify according to the type descripion, though in all species reared there ccurred odd specimens which were ke bridges between the species and /hich would have been difficult to lassify if taken on the wing.

How far the species which are so imilar to *M. athalia* in the ova, larvae nd pupae as to be indistinguishable re good species has been called into oubt by older authorities quoted by :ane in *European Butterflies*, and only ttempts at interbreeding them would ive any definite answer. I cannot race any work in this direction, lthough it may have been done. I did ot attempt pairings of *M. parthenie* + 1. *athalia*, but crossed *M. athalia* feıale + *M. deione* male and have overintering larvae. Mr R. Jarman of laidenhead was more fortunate in hat he crossed a male of my *M. arthenie* stock with a wild female 1. *athalia* taken in Kent. From the airing he bred a fine series and then btained a pairing amongst the progeny, btaining a further series of butterflies onstituting an F_2 generation. This, on he face of it, relegates either *parthenie* r *athalia* to subspecific status, being capable of reproduction to a second generation when crossed with a related species. Mr Jarman showed both generations at the AES Exhibition (1961) and the gradation of markings covered the range of extremes from *athalia* through *varia* to *parthenie*. More such experimental work might establish that several of the so-called 'species' of *Melitaea* are really subspecies.

Going back to the matter of foodplants it is usual to assume that as a species begins to differentiate it begins to specialise in its foodplant, so that many of our butterflies now rely on one genus of plant only. With the species of *Melitaea* it would seem that the original foodplants were of the genus *Plantago* and (probably on account of their chemical constitution) low-growing members of the family Scrophulariaceae. It seems that they have retained *Plantago* as a 'common-denominator' pabulum, much in the same way that the *Argynnis* group uses the Dog Violet (*Viola canina* Linn.), but specialisation of habitat has n some cases forced *Plantago* spp. to take a back seat in favour of some more easily available or abundant Scrophulariaceae. Thus it was that in a field of oat stubble south of Grenoble, I found a vast colony of larvae of *M. cinxia* feeding on the remnants of *P. lanceolata* plants and on the masses of *Veronica arvensis* Linn. (Field Speedwell) growing there. I was able to gather up handfuls of larvae in a few square yards and the eating of the *Veronica* was a necessity, unless migration or starvation were to occur: the Plantain had been the first choice.

It is an interesting possibility that change in foodplant might be a contributory factor leading, by selective survival of those strains best suited to the new foodplant, to the building up of local characteristics and eventually bringing about the formation of new races or subspecies. The pabulum contains the whole chemical intake of

the larva and this could affect chemical pigmentation, as it is known to do in plants. Feeding can alter size and emergence dates, as has been shown. In a previous note (*Bull. amat. Ent. Soc.*, **17:** 13) I have noted the loss in pigmentation in the species *Euphydryas aurinia* Linn. (Marsh Fritillary) when fed on Teasel (*Dipsacus sylvestris* Linn.), and this butterfly appears in the Alps in a very pale form called var. *merope* Dup. which feeds on the Alpine Primrose (*Primula viscosa* Vill.). This species, despite its change in foodplant, size and colouring, is not recognised as a separate species from *aurinia*.

I should still be interested if any Member or botanist friend could analyse the chemical factors which are common to alternative foodplants for without some such touchstone all field experiments are of limited value. I hope to try further experiments involving foodplants and cross-breeding amongst these species of *Melitaea* and report anything of interest in the *Bulletin*.

Foodplants given in the reference books for the species mentioned are:—

M. athalia—*Melampyrum* spp., *Plantago* spp., *Veronica chamaedrys* Linn., *Digitalis purpurea* Linn.

M. deione—*Linaria* spp. (*Toadflax*), *Plantago* spp.

M. parthenie—*Plantago* spp. and *Scabiosa* spp. (mine would not eat *S. succisa* Linn.).

M. parthenie var. *varia*—not recorded (presumed as for typical *parthenie*).

M. dictynna—*Plantago* spp., *Veronica* spp., *Valeriana* spp.

M. asteria—not indicated. Kirby says *Melampyrum* spp.

M. cinxia—*Veronica* spp., *Plantago* spp., *Hieracium* spp.

1.1.62. P. W. Cribb (2270).

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COLLECTING OVA OF THE WHITE ADMIRAL BUTTERFLY (*LIMENITIS CAMILLA* LINN.)

Several of the woods in the Northwood area of North-West Middlesex harbour the White Admiral. We were in one of these on the 9th August when the weather turned dull and cloudy, and we decided to spend a little time searching the Honeysuckle (*Lonicera periclymenum* Linn.) where we had seen males of the species on the 21st July. We have found elsewhere that the females often frequent different parts of the woods for ovipositing from those where the males patrol, so we were not very optimistic. Honeysuckle is so abundant that it is difficult to know where to start looking. We had some success, however, and this is attributable largely to previous experience of having watched the females laying and recognising the kind of situation chosen. The following advice is offered to others wishing to take up the search:—

(a) Find a situation where the butterfly flies, and try to distinguish between the areas where males congregate to patrol and disport, and the areas where breeding occurs. The former are often dry bracken-filled clearings with scattered oaks; the latter seem to be those rides and clearings where sunlight penetrates, but where there is yet a good growth of hazel, bramble, and other shrubbery (possibly because this retains a humid atmosphere). Finding freshly-emerged specimens or observing females laying are, of course, the best guides.

(b) Recognise the type of Honeysuckle bush the butterflies appear to select. Avoid the great succulent healthy masses that look most likely: *in our experience* they are unproductive. Avoid also the carpeting of short, erect stems one to two feet high that cover many of the thinner parts of the wood. (We have found ova here, but the chances of looking on the right leaf in thousands are slight.) Look for old, blackened,

vizened columns of Honeysuckle with hort, woody side-spurs bearing clumps of from four to twelve soft, hairy, small-sh leaves: these are quite unlike the mooth, rather shiny, firm, succulent eaves borne in pairs on vigorously-rowing, current year's growth. Such lumps on hazel, ash and birch have roved productive, but Honeysuckle n other trees should also be examined.

(c) Recognise the type of leaf and ituation often chosen. The type of eaf is described above: the light-green r dull greyish-green, somewhat trans-ucent, delicate leaves seem favoured. The leaves that hang outward at about 45° to the horizontal and catch the ate afternoon shafts of sun (that is, ace to the North-West) should be examined. The egg, grey in colour, is usually about half-way along on the upper side of the margin, and on the right as one looks at the leaf. Sometimes the egg is nearer the mid-rib, but usually still on the right side. Most of those we have found have been at chest- or shoulder-height, but when a really popular bush is found about a dozen ova may be present, right down almost to ground-level.

(d) Pay special attention to potential predators. Very often, on the underside of a leaf where a White Admiral egg is found, there is attached also the egg of a Lacewing fly (Neuroptera). This egg is suspended on a fine thread. From it emerges a larva which will attack and destroy any other egg or larva. We suspect that this accounts for the frequency of finding empty egg-shells, and for the rarity of young larvae even where the eggs have been plentiful. We believe that only a few of the eggs laid ever give rise to caterpillars—it may well be that the ovipositing Lacewing seeks the White Admiral ovum, thus instinctively providing a first meal for its own offspring.

A few years ago, in Whippendell Wood, Watford, Herts., there was a bush of Honeysuckle where ova could nearly always be found. However, one season this bush became very heavily infested with aphids and died. The White Admiral has subsequently (though possibly not as a result) become much less common in this locality. Such changes are continually taking place in any area.

When one has learnt to recognise the likely breeding-spots, with just the conditions described above, it is surprising how few they are, even in a wood where the butterfly is plentiful. This greatly facilitates searching, but at the same time endangers the species if accidental changes affect all or most of the breeding-areas simultaneously.

Finally, of course, we should emphasise that these are the situations where we have had success. This does not mean that there are no ova on the remaining Honeysuckle (which we now ignore completely in our search), nor does it follow that the same rules will apply in other woods than those we have visited. As for the date, it should be remembered that 1962 was a very late year: usually the butterfly appears here on about the 1st July, but we first saw it on the 17th July this year. The date of searching for ova should be adjusted for the locality and season, but towards the end of July in an average season would seem to be about right.

T. S. Robertson (2417),
15.8.62. and A. S. Robertson.

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FREQUENCY OF VARIATION IN *LYCAENA PHLAEAS* LINN. (SMALL COPPER BUTTERFLY)

For some years this butterfly has claimed my attention and, among other aspects of its biology, I find the rate at which major and minor variation occurs is of some interest. It seemed that about one specimen in a hundred might be expected to be a major variety (such as *bipunctata*, *eleus*, *alba*, or *radiata*) and that a further two in a hundred

could be lesser varieties (such as *infra-eleus*, *semi-radiata*, or the asymmetrical *transformis* forms). Although this impression had been gained from rough counts it seemed worthwhile trying to obtain exact figures.

Some collectors claim that the different generations in the year differ in their capacity to throw varieties, but disagree on which generation is most productive. Most say that the first generation produces little variation, while others say the second, and still others the third generation is the most productive. These statements are difficult to put to the test, and I suspect that the variation-rate differs little. The second and third generations tend to build up to large numbers, often becoming extremely numerous, as they last did in September 1959, when many major varieties were to be had. It may be this increase in total population that leads to the belief that certain generations are more variable than others. The numbers in the first generation are usually rather low, and yet some striking aberrations can be obtained in it.

In 1962, working with my son Andrew, I kept records of all the Small Coppers observed and examined (though not necessarily caught). With practice one can get a very good estimate of the number of specimens on a hillside and memorise the appearance of individual specimens, with any identifying characters, and the area where each is flying. A visit a few days later will usually reveal the same specimens in roughly the same places, but with some newcomers and some absentees. In this way it is possible to avoid adding into a cumulative total specimens which have already been examined, and this without the need for special marking techniques.

The first Small Copper was seen, in Hertfordshire, on 3rd June and the last, in Middlesex, on 8th October. Observations were also made in Bucks., Somerset, Suffolk, Surrey, Sussex and Wilts., and a total of 440 ± 20 specimens was examined.

The results are summarised below:—

1st Generation. 3rd June to 24th June. 28 specimens including one *antisinistransformis*.

2nd Generation. 1st August to about 12th September. 375 specimens including two *partimtransformis*, one each of *antisinistransformis*, *antidextransformis*, *infra-eleus*, *alba*, and one teratological specimen.

3rd Generation (supposed). About 8th September to 8th October. 37 specimens with no varieties.

It is felt that the numbers of first and third generation specimens are too small for any calculations of rate of variation to be significant. The distinction between 'major' and 'minor' varieties is quite artificial but is probably worth making. This gives overall figures for our 1962 observations of approximately one in 440 for major variation and one in 60 for minor variations.

17.11.62 T. S. Robertson (2417).

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SUMMER HOLIDAY, 1962

From 3rd to 18th July, my brother and I spent a collecting holiday in North-West Sardinia, an island which neither of us had visited before, and whose entomological possibilities were completely unknown to us. My prey consisted of Coleoptera and Hemiptera-Heteroptera, while my brother was after Hymenoptera, especially the Aculeata. A catalogue of the species taken would be of little general interest, and will certainly not be available for a long time—the holiday will for both of us be re-lived many times during the Winter when we get down to the job of identifying our catches.

Sardinia is, we discovered, surprisingly little known to the majority of people in this country. We assumed (as it turned out, perfectly correctly)

hat, in July, it would be reasonably not; and an out-of-date encyclopaedia referred to "extensive oak forests" and "taciturn natives." The prospect of our collecting in the shade of leafy glades, peered at suspiciously from behind tree-trunks by surly Sardinians was rudely shattered within minutes of our arrival at Fertilia airport. As we circled down, the heat shimmered from a uniformly brown landscape in which slightly darker patches turned out to be plantations of stunted olives. The courtesy and speed with which we found ourselves whisked through customs and immigration formalities into a taxi whose driver had been armed with our names by a thoughtful hotel manager have not been rivalled in our experience at any other airport. One sentence will serve to deal with the encyclopaedia's information: at no time during our visit did we see any plant vaguely resembling an oak tree, and the interested and friendly chatter which our peculiar operations drew from the local populace was diametrically opposed to the dictionary definition of 'taciturnity'.

We confined our attentions to the immediate vicinity of Alghero, a coastal resort of some 20,000 inhabitants, except for one expedition 24 kilometres into the interior. The countryside is barren, and, in July, burnt-up and brown. Shade from the sun was really difficult to find. The soil is very shallow, and the rocky outcrops, with the remains here and there of neolithic dwellings, give an air of general untidiness. The shade temperature on the coast was, generally speaking, in the low 90's (32-35 °C.) and ten degrees higher (38-41 °C.) on the occasion of our one excursion inland.

When setting forth on such a holiday the equipment to be taken presents a problem, especially when travelling by air with a 20 Kg. weight limit. I found that, for my beetle and bug collecting, a folding sweep-net, a mackintosh sheet, a pooter, and three dozen tubes were ideal for the actual field-work, while the 'base' equipment in the hotel bedroom consisted of a small bottle of ethyl acetate, four plastic laurel-jars, a camel-hair brush, forceps, and a packet of high-quality toilet-paper. (The latter is a most important item, as the variety provided in Italian hotels is invariably a species of crepe paper, quite unsuited to entomological purposes).

My bees-and-wasps brother had a fine nylon net, a few tubes and glass-bottomed boxes, and a cyanide killing-bottle in the field; his hotel wardrobe contained a large number of cork-lined cardboard boxes. He, poor chap, had to pin his stuff each evening; it took me only a fraction of the time to get my beasts into screws of paper in the laurel-jars, so I was usually one up on him at the bar before dinner.

Collecting beetles and bugs was pretty hard work. They were scarce (just over 1000 specimens in a fortnight) — presumably because I was too late in the year—but my brother found the Hymenoptera to be very plentiful. Collecting in Sardinia is also a somewhat uncomfortable business. Unlike its human population, Sardinia's vegetation is distinctly unfriendly; every plant is equipped with thorns and spines of incredible sharpness. The thistles range from noble plants nine feet high (through plantations of which one tries to ooze without using the elbows) to miserable, insignificant and well-nigh invisible species, an inch or so high, which invariably contrived to be exactly beneath me whenever I squatted to deal with the contents of my sweep-net. The desiccating properties of the sun and wind tended to limit our collecting sessions to about 2½ hours, but a thoughtful local brewery has produced an excellent liquid which, when given in sufficient quantity at lunch-time enabled an afternoon collecting stint of 2½ hours to be undertaken without any seriously deleterious effects on health.

I worked on the principle of taking

about a dozen examples of each species which I could recognise as such, and as many as I could lay hands on of small things such as *Apion*. Therein lay one of my mistakes; as soon as I got home and started to set my catch I realised that what I thought in the field was one large and easily recognisable species was in fact two, or possibly three species. I console myself with the thought that here is a valid excuse for another trip to Sardinia next year in order to complete my series.

8.8.62. P. J. L. Roche (3965).

In fairness to the encyclopaedia, might I suggest that, at the time its information was collected, the peasants native to Sardinia were almost certainly very taciturn, especially when confronted with the type of Englishman that it was usual to find travelling abroad in those days (who probably regarded them contemptuously as benighted—or b-something!—foreigners); that the occupation of the island during the last war by British and American troops may have had quite a lot to do with breaking down their reserve; and that since *Harmsworth's Universal Encyclopaedia* for about 1922 says that about four-fifths of the island are covered in forest, there may have been more to the report of 'extensive oak forests' then than now. After all, Sardinia was a bitterly fought-over battlefield during the last war, and we all know what happened to the extensive woods of northern France during 1914-18. The trees referred to might well have been the Cork Oak (*Quercus suber* Linn.), which has long been grown in the Mediterranean region. Alternatively, the word 'forest' may have been intended to carry its older meaning of 'a wild place where game runs freely', as it still is used in the names of our own great Forests—especially, for instance, the Caledonian Forest, where there are few, if any, plants that a Southern Englishman would dignify with the name of tree!—*Editor*.

THE ROAD TO DJEM DJEM

Since few lepidopterists have collected in Ethiopia, we thought Members of the AES might be interested to read an extract from some notes made by Mr and Mrs P. R. A. Mansfield who, without previous entomological experience, made some most successful trips on our behalf to collect the Swallowtail butterfly *Papilio dardanus* Brown, in the Djem Djem Forest near Addis Ababa. The notes were written by Mr and Mrs Mansfield when they left Ethiopia in 1960, to give guidance to Mr and Mrs J. W. Tiffin, who had promised to try to continue the collecting of these Swallowtails for our research, and we are able also to give an extract from a letter from Mr and Mrs Tiffin.

C. A. Clarke (1569)
and P. M. Sheppard.

Notes by Mr and Mrs Mansfield, 1960

Before we arrived in Addis Ababa in 1956, Drs C. A. Clarke and P. M. Sheppard of the University of Liverpool had written to Mr Chojnacki, the Librarian at the University College of Addis Ababa, asking whether he could help them in their genetic studies by obtaining living *Papilio dardanus* which was known to occur in the Djem Djem Forest; unfortunately at the time Mr Chojnacki had been unable to help.

During 1957 we made two or three trips to Djem Djem, and with the help of Mr Chojnacki identified *Papilio dardanus* and found specimens of both the non-mimetic and the mimetic forms of the female. In one case we collected some eggs, but these were infertile, and we did not succeed that year in getting any live specimens back to England. Early in 1958, when we were on leave in England, we went up to Liverpool where Drs Sheppard and Clarke are conducting research into

he evolution of mimicry in butterflies vith the help of a grant from the Iuffield Foundation. They gave us the ollowing background information.

Papilio dardanus is widely distributed n Africa. Some forms of the female nimic other different species of butteries, referred to as the models. These nodels are distasteful to predators, articularly birds, and therefore the nimetic forms of *P. dardanus* obtain ome protection by reason of their imilarity to the models. There exist n the Djem Djem Forest both mimetic nd non-mimetic females so it appears hat the advantage of being mimetic is ot absolute. The non-mimetic forms which resemble the male) and the nimetic ones are also found in other laces in Ethiopia, but the male-like nes do not occur anywhere else on the nainland of Africa. However, they re the sole form of the female in Iadagascar and in the Grand Comoro slands.

After returning from our 1958 leave n England we were able to collect a air number of live butterfles (about ighty) from Djem Djem, and these ubsequently arrived safely in Liverpool. They have been used for mating with outh and East African races of the pecies. As a result of these experiments everal papers have been written for ntomological and genetics journals, ut there is still a great demand for urther live specimens because the esearch is by no means complete.

Since 1959 the ownership of the Forest as reverted to the Ministry of Agriulture, and Mr Ato Adefris Bellehu, ead of the Ethiopian Locust Control nd Plant Pathology Department of the Iinistry of Agriculture, is very helpful nd knows about the collection of . *dardanus*. He gave us a permit o collect butterflies in the Djem Djem Forest. We have from time to time een asked for the permit while in the Forest, and his has always been adequate, ut without a permit you might have rouble. During recent visits we have also had a certain amount of trouble from the local people, who on one occasion threw boulders from the top of a nearby cliff. We informed the Shum (the village headman or chief) and he took action against the boys responsible. Any new person going to the Forest would, I think, be well advised to see the Shum before camping and possibly obtain a *zabania* (a watchman or guard) from him.

The butterflies are fairly plentiful in the Djem Djem. From the camping-site described above, the best area is along the river valley and up the steep slopes on each side of it. Butterfles normally fly between 10 a.m. and 4 p.m. when the sun is shining. If it is cloudy you will not see any. On the whole they fly less strongly at 10 a.m. than in the middle of the day. The males are at least twice as frequently met with as the females. The females are of two types, mimetic and non-mimetic, of which the non-mimetic ones are commoner. These are the ones that the research-workers at Liverpool most require at the moment, but they are also interested in the mimetic forms, and in the Djem Djem we have caught the mimics *P. dardanus niavioides* Kheil and *P. d. ruspinae* Kheil and a further one which has not, so far as I know, been properly identified. Mr Chojnacki also caught *P. d. ruspinae* at Wolisso, and other interesting mimics in the Belete Forest. As these names will probably mean nothing to those unfamiliar with the species, we suggest that for anyone going there to collect it, the best plan is to get in touch with Mr Chojnacki who has examples of all these in his collection, as well as specimens of the non-mimetic forms. As far as the non-mimetic form of the female, and also the male, are concerned, the local children know what we have been trying to collect and many of them can identify the butterfly.

When you go hunting, take a supply of flat cigarette-tins in your pocket. When you catch a specimen, put it

straight into the tin and put the tin back in your pocket. When you get back to camp, put the live specimens all together in a cardboard box (the larger the better) covered with organza. The males and females can be kept together. The females occasionally lay their eggs in the box, but most often on the organza, and you can send the eggs to Liverpool in a turkey quill anchored to the *bottom* of the envelope so that they are not crushed when the stamps are franked.

Feed the butterflies once or twice every twenty-four hours by the usual method of pulling out the proboscis and placing it in a solution of sugar in water. You can tell if the butterfly is feeding well because the antennae move up and down. Females tend to feed better than males, and many of them imbibe for as long as seven minutes. After feeding return the butterflies to the cardboard box and bring it back to Addis Ababa.

We have found the best results follow when we send the butterflies off on a Monday morning. The method is as follows:—

Get up early and feed the butterflies, as described above. After feeding it, put each butterfly in a separate Cellophane envelope which has previously been cut to the size of the flat cigarette-tin in which they are to travel. Along the bottom of the Cellophane envelope insert a thin wedge of cotton wool, and see that the wings are lying closed and flat inside the packet. Put the packet, with the butterfly inside it, into the cigarette-tin ; you can put three envelopes in one tin, and they should be packed head to tail. Wrap the tins into a parcel, taking care to pack them so that they are not dented in transit, address it and mark it "Insects, not subject to Pest Control Act". Take it to Mr Ato Adefris Bellehu in the Ministry of Agriculture and he will stamp it with the Ministry stamp. This is essential or you may have trouble with the Ethiopian Customs. From Mr Bellehu's office go to the Post Office, get the Customs stamp, and send the parcel by Registered Airmail. This must be done before 10.30 a.m. or you will not catch Monday's plane. The journey to England should not take more than three days from door to door, and in this case the majority of the specimens survive. (Tommy at the Embassy knows the procedure from the time the parcel is packed and addressed; if an arrangement can be made to use him for the despatch of the parcels, everything should go smoothly).

P. R. A. and E. R. Mansfield.

Collecting in 1960

(Extract from a letter from Mr J. W. Tiffin).

My wife and I enjoy hunting *Papilio dardanus* enormously. The country is very pleasant and so is the sport. We gathered your first request was urgent, so we lent out our spare nets and offered a reward of one-sixth of a dollar for each *P. dardanus* caught. This spurred the locals to catch nine of our total. My wife thought it most unsporting, but I thought it was warranted in the circumstances. The postage came to a further 60/-, which seems quite fantastic. This makes us rather regret sending one of the rather tattered male specimens; the trouble was that he was caught on an ant-hill and, with my wife, was half eaten by ants, but he showed so much life that we couldn't resist sending him.

We tried to get into the Djem Djem again but had to give it up because of the rain. We have been having a period of very unseasonable weather and it looks as though the rains are coming in early this year. The track is of a black treacherous soil which rapidly becomes impassable with rainy weather. We had difficulty getting in last time. It does, however, dry up quickly, and my car appears to be better in it than

ıe Land Rover. The chief trouble is ıat there is a stream to be crossed hich, if the rains continue, could ecome quite impassable. We shall, owever, try to get in a couple of ays' collecting, but if you are desrate for *P. dardanus* we can hire some ıules.

J. W. Tiffin.

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CHASING BUTTERFLIES IN AFRICA

The truth is that even now I am not uite sure of the difference between a utterfly and a moth. Until my business ·ip this Summer to Nyasaland, I looked pon lepidoptera-hunting, in the hands f my fifteen-year-old son, as a Quaterıass-like activity creeping and seeping ıto cupboards and holes and shelves ıd corners of the household, threatenıg to drive the rest of the family to ıke up residence elsewhere before the ver-accumulating clutter of pins, apers, setting-boards, breedingatches, books, boxes and cabinets. lready two domestic helps have given otice to quit rather than face the ruesome task of cleaning out that nest f wriggling, squirming insect life that vas once my son's bedroom. Our ouse is a living example of Frank loyd Wright's dictum that "in a roperly designed dwelling you cannot ee where the garden ends and the house egins".

Anyhow, prior to my African journey, was given detailed instructions on ow to catch these elusive specimens. : soon became evident, as more and ıore of my own things were removed ·om my bags to make room for boards, uias, nets and other paraphernalia f professional bug-swatting, that a tranger could be excused for thinking hat I was some sort of rival to David ttenborough off on my annual Zoo Quest.

Eventually, one Saturday afternoon in Zomba, I was put to the test. Clad in khaki shirt and shorts and straw hat, I felt at least that I looked the part. However, the first thing I discovered was that there are an awful lot of noseyparkers up and down the world. "Going fishing?" total strangers would enquire. I soon found it politic to say "Yes." Whereas most people seem to accept fishing as a normal hobby, they would greet the explanation that I was collecting insects with a slightly unbelieving air, as if I were engaged in some kind of beyond-the-fringe occupation reserved for cranks ana eccentrics. "Go on. Not really!" As for the Africans, observing with pop-eyed incredulity my sudden galvanisation into frenzied pursuit, climbing gum trees and swooping through the elephant-grass, they gave me the uncomfortable feeling that I was one of the mad dogs and Englishmen out in the midday sun. As they reclined in indolent ease beneath an umbrella tree whilst I sweated it out, I was inclined at times to agree with them.

Another thing I discovered was that the biggest and most colourful specimens suddenly appeared as sitting targets when I was without a net. On all other occasions, when I was fully equipped, they either fly at tree-top height or settle insolently on thorny bushes that would tear the net to shreds. There was one three-inch wing-span specimen that, for so frail a bodily structure, had a remarkable velocity. It had been eluding me for days. Right in the middle of a conference with some brass-hats, one fluttered into the room to sit down for half an hour within three feet of my nose. I was in such a tizzy of tantalising torment I didn't hear another word of what was said. It remained there until the exact moment that I returned from the car with a net.

By the end of the second week, I had well and truly caught the fever of the chase. Polite professional conversation was ignored. My net was at the

ready for all occasions. "Well, Mr McGeeney, I think the economic situation here is "Whoops!" and off I would shoot into leaps and gyrations that would have done credit to Nureyev. "Got it!" I would exclaim to my startled partner in conversation. "As you were saying, the economic si—Look! there's another." One hot, sultry evening at one of those cut-glass, silverware, port and liqueur do's that one has to attend, I caught a beauty after nearly knocking the cigar out of someone's mouth. On the last afternoon, in a gully where I had been told it was dangerous to go off the path in case of occasional leopards and frequent snakes—be damned to it, I thought, and actually caught the three-inch wing span job. It does get you after a while.

About ninety of them in all I caught. Now, when visitors call and the cabinets are fetched out, I just can't wait until we get to that third drawer down. "Now this one *is* a rare specimen. Three hours it took to net that. I had to find out what it fed on first. Ecologically, it . . ." Not that I'm really bothered now I'm back ho—What's that out of the window? A Red Admiral? Hey! where's that net?

Patrick McGeeney.

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INSECT MIGRATION

I think that Mr P. G. Taylor's remarks on migration (*Bull. amat. Ent. Soc.*, **21**: 18-20) are worthy of further comment. "As I understand it," he writes, "the critical factor is the population density in the early stages of development."

This is not, however, the whole story, for the effect of population density has been extensively investigated only in the Desert Locust (*Schistocerca gregaria* Forsk.). If several generations of the locust live under crowded conditions the gregarious form of the insect eventually results. This has been shown to be associated with the presence of a chemical substance, secreted by the body surface of mature males, which causes the female to mature more quickly as the gregarious form, or alternatively, as one producing eggs which develop into the gregarious form; and, further, that these females are affected *via* the endocrine (hormone-secreting) gland controlling egg-development.

The secretions of this gland are also caused to flow more readily by stimulation of the sense organs, as would occur in crowded conditions. Thus it appears that in the Desert Locust, at least, a mechanism other than mere mutual agitation due to the density of a population may very well contribute to the tendency of its members to migrate. Furthermore, the degree of crowding necessary to produce the gregarious form in any individual cannot be the only cause of locust migration, since the solitary form also migrates (though far less often) for great distances. [See footnote.]

For insects other than locusts, however, the picture is much less clear. To start with, migrations may be seasonal and apparently not brought about by present population conditions—as in the case of the Monarch butterfly (*Danaus plexippus* Linn.) in North America, with its seasonal migration to and from the South. The reasons for this are not altogether understood; temperature, wind-direction and/or daylight-length are all possibilities. Indeed it has been shown that seasonal regulation of the life-cycles of aphids is influenced (*via* endocrine glands) by daylight-length—*not* by population density, as might have been expected in these insects, with their habit of forming large groups by parthenogenesis.

To return, though, to non-seasonal migration by insects other than locusts: I should hesitate to suggest that popu-

tion density in earlier stages is sponsible for migratory tendencies certain Libellulid dragonflies, for stance, since (a) the nymphs tend to de in their own lairs and not come to contact with other nymphs; and) if two nymphs do meet, the result usually a fight to the death, often of oth.

Again, most of the Hawkmoths show igratory tendencies, although eggs e generally laid singly and cannibalism adily occurs: were it not for the ct that Hawkmoths migrate, I should e inclined to think that inveterate nnibalism, as in the larva of the un-bar moth (*Cosmia trapezina* Linn.), another mechanism equivalent to igration in that it reduces excessive opulation density to a level less likely jeopardise the chances of survival the species.

Mr Taylor's statement that caterllars kept in crowded conditions ove about and feed more, etc., than olitary larvae, would seem to be relevant unless the adults produced om the larvae are migratory—and this sort of correlation I have seen o proof. The quicker growth of owded larvae might be explicable in rms of greater endocrine activity used by extra stimulation of sensory paratus, as in locusts, but such ndocrine activity is not necessarily ke that of the locusts in producing igratory tendencies. The greater pacity for movement of crowded rvae as compared with solitary ones ould serve to decrease the numbers any micro-zone of high population ensity, and would therefore probably educe overcrowding without the ecessity for redistribution away from e macro-zone occupied by the population, *i.e.*, without migration. This eans that ' restless ' larvae need not be onnected with migratory adults.

Even if we accept that the crowding early instars in Lepidoptera causes igration, there must presumably be ome further control, for crowded larvae are much more subject to diseases and parasites than are solitary ones. Furthermore, since many parasites kill their hosts only in the pupal instar, unless a regulatory mechanism for migration were present in the adult, the very small remainder of a large, but parasitised, larval population would migrate—an obvious disadvantage to the species.

It appears, then, that many questions concerning migration have still to be answered. Little *is* known about its causes except in locusts, and even now further research is being carried out on these important pests. It is in trying to solve the problems for other insects that records of migration made by AES Members may come to be of the greatest importance in the future.

5.6.62. H. V. Danks (2907).

REFERENCE

HIGHNAM, K. C. (1962): Hormones and the swarming of locusts. *New Scientist*, **14**: 86-8.

I was very pleased to receive Mr Danks's response to my article, which, I confess, was written partly with an eye to what it might stir up in the way of controversial matter for the *Bulletin*. This is why some of the suggestions I threw out were (I hoped!) outrageous, and why, I fully admit, I over-stated several of the points.

Mr Danks is, of course, quite right to seize upon my bald statement that "the critical factor is the population density in the early stages of development", without any limiting adverb such as "often". Indeed, there is plenty of experimental evidence leading one to the conclusion that overcrowding *is* often the root cause of migration in many different kinds of animals, including insects. But this is not to say that it is *always* the *only* cause. For instance, in our own fauna, the Red Admiral (*Vanessa atalanta* Linn.), the Painted Lady (*V. cardui* Linn.), the Clouded Yellow (*Colias croceus* Fourcr.),

the Large White (*Pieris brassicae* Linn.), and probably also the Small White (*P. rapae* Linn.) are butterflies which frequently, if somewhat irregularly, migrate into these islands from the direction of the Continent, usually early in the Summer, and quite often in swarms.

There is no evidence that larvae developing from eggs laid by such immigrants are overcrowded, yet there is plenty of evidence that the butterflies resulting from them frequently migrate singly back in the direction of the Continent. In a case like this, one suspects day-length of being a contributory factor, but I know of no experimental evidence that it is so.

On the other hand, also among our native species of Lepidoptera the Marsh Fritillary butterfly (*Euphydryas aurinia* Rott.) and Mottled Umber moth (*Erannis defoliaria* Cl.), for example, are both known to occur in vast swarms as larvae—so thickly, in fact, as to defoliate their foodplants and run out of food, yet they have never been known to migrate in numbers. In fact, although one does occasionally come across an odd specimen of the Marsh Fritillary miles from a locality and flying fast and straight, there is no positive evidence of migration by the Mottled Umber. Indeed, the 'wingless' (brachypterous) female of this species would be hard put to it to migrate at all by her own efforts! However, even isolated woodlands and orchards can become colonised by the species—but how?

One must be very careful to avoid jumping to the conclusion that any phenomenon, however widespread, must therefore be universal; but this is not to say that it is not widespread. For instance, the larvae of some Lepidoptera, such as the Peacock butterfly (*Nymphalis io* Linn.) and the Buff-tip moth (*Phalera bucephala* Linn.), not to mention all the communal web-spinners, live perfectly happily in very dense concentrations in which cannibalism is non-existent and migration of the adults is unusual, to say the least. On the other hand, many other species such as the Orange-tip butterfly (*Anthocaris cardamines* Linn.) and the Dun-bar moth (*Cosmia trapezina* Linn.) cited by Mr Danks are notorious cannibals and cannot tolerate the presence of even one other individual. This does not mean that cannibalism is any the less a mechanism whose effect and, one supposes, since it survives, whose function is the reduction in numbers of a population too numerous for the survival of the species. Nor is this any the less so in cases, such as the Hawk-moths referred to by Mr Danks, where another mechanism with the same apparent function exists alongside it. Without any hard thought one can see four such mechanisms controlling population density in our own species—famine, diseases, migration and war, and I have no doubt that there are others.

The secreted chemical triggers referred to by Mr Danks and reported in the *New Scientist*, **14:** 86-8 appear to be a part of the biochemical machinery by means of which population density is translated into the migratory habit; *not* a separate phenomenon; and certainly not invalidating the mutual-stimulation theory. Of course, the degree of response to the presence of such chemical substances will vary, as shown by the fact that in some populations of migratory insects, even while individuals migrate there are some co-existing with them that do not. The very existence of this range of response is an example of continuous variation indicating its dependence on the presence of a polygene system. Owing to such polygene variation, what are 'the wide open spaces' to one animal (locusts included) may represent intolerable overcrowding to another: hence the odd solitary form migrating.

I should be very interested to hear of a reference to an account of experimental work showing that the migration of aphids is *not* influenced by population

ensity—I should have thought that it ould be very difficult to demonstrate e validity of such an uncompromisingly egative statement. Finally, may I give reference—to Dr C. B. Williams's ook *Insect Migration*, in the *New aturalist* series.

.10.62. Peter G. Taylor (719).

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HE DARK TUSSOCK MOTH (*DASYCHIRA FASCELINA* LINN.)

Further to the account of the visit aid by Dr Fox and myself to the Kent oast on the 5th May 1962, given by r Fox in the *Bulletin* (*Bull. amat. Ent. c.*, **21**: 64-6), I should like to report at of the larvae in my care four fed n Broom (*Cytisus* sp.) and twelve ere changed to Bramble (*Rubus* sp.). hen found, they were 12 mm. long. None of the larvae had been para- sised, and those fed on Bramble were e earliest to spin up, starting on the t June.

On the 8th July the first, a male, nerged, and the moths continued to nerge every day. On the 15th July e first pairing was obtained.

In five days the females laid an average 200 ova each. These were deposited batches of 20-40 and each batch was vered with some of the brown hair- e scales from the tuft at the end of e body.

The ova hatched after 19 days and the rvae were fed on Hawthorn (*Crataegus* .). They continued feeding under bservation until the 13th September, hen over 200 were taken to their ace of origin and distributed on veral Broom bushes. They were then cm. long.

So that I can check their habits rther, there are some of the remaining rvae wintering in a sleeve in my rden, and today this was examined. am glad to say that these larvae have rvived the snow and hard frosts, and ope that those set free in Kent are in a milar state.

.2.63. Cyril Bruce (1746).

A GENERATION OF *SPHINX LIGUSTRI* LINN.

In June 1960, with my usual unfailing optimism, I sent up to a dealer an order for one dozen ova of *Sphinx ligustri* Linn. (Privet Hawkmoth), in the hope that if anything went wrong I should benefit from my mistakes. A few days later the eggs arrived and I placed them in an airtight jar with the usual blotting-paper at the bottom. On hatching, the larvae were fed on Lilac (*Syringa* sp.), as Privet (*Ligustrum* sp.) had not been satisfactory for previous larvae. Almost immediately one larva had its 'tail' bitten off, proving they were overcrowded. The remaining eleven were spread out.

The time of the first skin-change arrived, and tension rose. However, they all survived that, and seemed to be thriving excellently on Lilac. But the second skin-change brought the mortality list up by two. I decided to sleeve them outside now, and made a sleeve out of one of my mother's old stockings. Two more died mysteriously, although I do not think the stocking was the cause. For several more days all went well. Then one morning, when I went on my usual inspection, I found large holes in the sleeve. The larvae had taken to nylon as a 'substitute foodplant', with no ill effects! The holes they had made provided a good means of escape, and four had 'turned tail' and fled. This left three larvae, which I placed in a round Perspex-walled breeding-cage. "Let them eat their way out of that!" I thought. To my great surprise all three pupated successfully, giving one female and two male pupae.

Spring of 1961 came round, and the female and one male hatched. He and she were placed together in a cotton-net cage, and they were placed out in the garden. "I can't fail to get a pairing," I thought. After an anxious night's sleep, in the morning

I rushed downstairs to the garden. The netting was in shreds, and the lovers had eloped to the nearest privet hedge. The cause was obvious. A passing cat had seen the moths fluttering about in the cage, and had pawed at the mesh to catch them. However, I still have one male, which I set when it emerged . . . in memory of the other eleven.

1.7.62. L. R. Staines (3238J).

One day several years ago, some young friends brought me a large, healthy, female pupa of the Goat Moth (*Cossus cossus* Linn.), and I could hardly wait until it emerged (I had to, of course!) as I had high hopes of trying to assemble males to the moth. I had no idea then whether it was even possible to 'assemble' such a primitive species, but felt that it was worth trying anything once. Accordingly, when the great day arrived, like Mr Staines I imprisoned my moth in a cotton-net cage (consisting, in my case, of my 'kite' net with the bag supported by stiff wire hoops) on the lawn, and retired to bed in the same frame of mind as an 'expectant' father! Like him (no, Mr Staines, of course!) I rushed downstairs 'at the bang of dawn', half expecting to find the lawn littered with males. However, I too found the lady's boudoir in fragments and, far from attracting the amorous attentions of numerous local 'billies', it seemed that my 'nanny'-Goat had provided supper for one of our neighbours' cats.

I still have no idea whether it is possible to assemble *Cossus cossus*, but it looks like being some time before I again try my hand as what I can only refer to as 'entomological Goatherd'! Can any Member give me any information as to my chances of success in the calling (polite answers only, please!) —*Editor*.

COMPOSITE SPECIMENS

Mr Staines's article (above) reminds me of two of the many entomological experiences after which I have felt a sadder and a wiser man. Being of a truly experimental turn of mind, I rebel against implicit acceptance of categorical statements made by those more experienced than myself (a pretty wide section of the community, in fact) and prefer to find things out for myself.

Accordingly, when I had at one time collected some three dozen ova of the Orange Tip Butterfly (*Anthocaris cardamines* Linn.), and had read that the larvae were 'notorious cannibals', I kept them all on their own individual fruiting-heads of the foodplant, in this case Lady's Smock (*Cardamine pratensis* Linn.), standing in a jam-jar in the dairy. I had no cages with me on the farm where I was then living, and thought that the steady diminution in numbers might have been due to larvae wandering off and getting lost, or to my inability to find them all (they're the very Devil to see!). They seemed too sluggish either to wander far or to rampage about attacking their neighbours, and I can only suppose that they are night-feeders.

It was not until their numbers could be counted on the fingers of one hand that I noticed the head-capsules littering the (rather appropriate) stone slab on which the jar was standing. However, it was then too late to do anything about it, and I finished up with—yes, that's right—one big, fat pupa, which eventually produced a fine, large female butterfly. (The diet seemed to agree with her!). I still have that female and it is amusing to reflect that she is the product of about thirty-six eggs.

Some years later, I exhibited the same independence of mind (my more forthright friends called it pig-headedness), but this time my victim was a batch of a dozen ova of the Purple Hairstreak Butterfly (*Thecla quercus* Linn.). Of course, exactly the same thing hap-

ened, except that this time there were tell-tale head-capsules to give the me away, and for all I knew, the tiny rvae were invisible only because they ere skulking inside the unopened ids of the Oak (*Quercus* sp.), in which ey feed—or so I had read. I now ossess a truly magnificent specimen of e butterfly—once again a female, d the thought did occur to me . . . ut I digress.

At least I now know *from my own perience* that these species are indeed otorious cannibals, and do not regret e means by which I became convinced. /hat I do find *really* interesting is the onspicuously large size of the imagines sulting from this multiple cannilism, apart from its fairy-story implitions. Have other Members ever oticed a similar phenomenon in the me or other cannibal species, the un-bar Moth (*Cosmia trapezina* Linn.), r instance?

.9.62. Peter G. Taylor (719).

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UNIOR NEWS SECTION

It is at this time of the year that we ook back over the previous season and art to sort out those captures which e have not had time to mount and entify. By now most of you will ave read my first article appealing r letters, and if you have not already ritten I hope you will do so soon, elling me what you have been doing ntomologically during the season. hose of you who are keen lepidoperists must excuse my ignorance of our Order, but I am nevertheless nly too interested to hear more about from you.

I must confess that the only serious ollecting I did this year was while n holiday in Ireland with my parents. he rest of the season, when time ermitted, was taken up with remounting, re-labelling and generally tidying up my collection, which over the last year or so had become rather disorganised. I wonder whether any other Members have found a card-index infinitely preferable to a record-book for recording captures, as I have done.

While tidying up I found three rather old home-made setting-boards and two boxes of pins (sizes 4 and 6), which any Junior Member can have by writing to me as I have no use for them.

Wesley Caswell (3133J) writes :—

"I was wondering if the Painted Lady Butterfly (*Vanessa cardui* Linn.) seems to be common in other districts this year, as it has been here in Kingsbury (London, N.W.). I saw four specimens on the second of this month (September) three of which I caught while they were feeding on flowers. I have never seen this butterfly wild before, and I was very surprised when I discovered these specimens by accident.

"In case these should be wanted for records, other species of butterfly which seem to be common here are the Peacock (*Nymphalis io* Linn.), Red Admiral (*Vanessa atalanta* Linn.), Large and Small Whites (*Pieris brassicae* Linn. and *P. rapae* Linn.), and the "Browns" (Satyridae). I have not seen any Commas (*Polygonia c-album* Linn.) here yet (these were quite common here in 1960-61, and the Small Tortoiseshell (*Aglais urticae* Linn.) is not quite as common as in previous years.

"Other new species of Lepidoptera here this year include the Five-spot Burnet (*Zygaena trifolii* Esper) and Lime Hawkmoth (*Mimas tiliae* Linn.), and the Swallow-tailed Moth (*Ourapteryx sambucaria* Linn.) has also been very common. I hope these lists may be of use to someone."

Last week I led a small excursion from our school Natural History Society to neighbouring Delamere Forest, where we were fortunate enough to enjoy one of the few fine sunny days this year. It was not primarily an entomological

trip, and among other things I found a Badger's set (*Meles meles* Linn.), some of the insectivorous plant Sundew (*Drosera* sp.) and a kind of beetle that I have looked for but never before found, *Endomychus coccineus* Linn., which was under the bark of a stump of Beech (*Fagus sylvatica* Linn.). The Sundew was growing quite plentifully in an ominous-sounding place, the Black Lake. This is an old lake which is gradually being transformed into a peat bog. The deeper end of the lake is a very good spot, in the right season, for larvae of the Odonata (Dragonflies and Demoiselle-flies).

Lastly, I feel I owe you some apology for not turning up at the Annual Exhibition, but unfortunately I had 'flu. I had very much wanted to come this year and meet some of the Juniors, but perhaps I can do this at the Annual General Meeting next Spring which I hope some of you will go to.

Don't forget to write, please, and if you want to, illustrate your articles as described in the January issue this year (*Bull. amat. Ent. Soc.*, **21**: 4, para. 15).

12.10.62. Martin Birch (3048),
Youth Secretary.

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REVIEW

The Nigerian Butterflies. An Atlas of Plates with Notes.

By John Boorman.

Part VI: Acraeidae. Pp. 8. 57 plates (black-and-white). 1961. Price 15/-.

Published by Ibadan University Press and obtainable from the University Bookshop, University College, Ibadan, Nigeria.

This is the third of the series to be published, the first two being reviewed in the *Bulletin* last January (*Bull. amat. Ent. Soc.*, **21**: 8).

What I said in that review also applies to this part. The Nigerian fauna includes two genera, *Bematistes* and *Acraea*. These butterflies are slow fliers and are protected to a large extent by their unpleasant taste. They are difficult to kill and it is possible that the method of killing by dropping lighter-fuel on their bodies is the best.

This book maintains the quality of the previous two and is a good buy for those interested in African Lepidoptera.

D.O.

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LETTERS TO THE EDITOR

Sir,—Referring to the reports in the *Bulletin* this year (*Bull. amat. Ent. Soc.*, **21**: 16-7 ; 55-6 ; 84) on the subject of *Thymelicus lineola* Ochs. (Essex Skipper) it may be of interest to Members to learn that I have the following records for this species in Surrey and Kent:—

1 male at Thames Ditton, Surrey on 27.6.59;

1 male at Thames Ditton, Surrey on 21.7.60;

(both found on waste ground which has now been cleared).

1 male and 2 females at Long Ditton, Surbiton, Surrey on 17.7.59;

(found on rough, very damp ground which has now been cleared, drained and built on).

1 female at Headley Heath, near Leatherhead, Surrey on 24.7.59.;

(found on rough ground on chalk [or was this on the clay-with-flints that normally overlies the chalk at Headley?—*Ed*].

1 female at Folkestone, Kent on 30.7.60;

2 females at Folkestone, Kent on 3.8.60;

(all three on rough ground).

All of the above specimens were captured and their identity confirmed before release.

Owing to reasons given above I have ɔt seen this species at Long Ditton or ıames Ditton since 1960, and although have visited Headley Heath on many :casions during the past four years have only caught the specimen menɔned above. I have not returned to ɔlkestone since 1960.

I have visited many places within a /e-mile radius of Thames Ditton ncluding parts of Middlesex) but I ıve been unable to find any new ɔlonies of *T. lineola*.

I would be most interested to hear ' any species of insect found at Headley eath, as I am compiling a list of ɔecies to be found there.

).12.62. D. Keen (3309).

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r,—Last August (1962) I was lucky ıough to take, in my mercury-vapour ıoth-trap, 3 specimens of the Speckled ɔotman moth (*Coscinia cribraria* Linn.) : my home in Ferndown, Dorset ıear Bournemouth).

I have taken this species before, in 960, at the same time of the year, when took two specimens, one in a bedɔom: another I netted on Parley ommon, a mile away. This common a reserve for this species and no nd development can take place on it: think it has been reported from there uite often.

The interesting thing about the three ɔecimens I caught last year was that one ad very little black marking, this being educed to about 15 small black dots n each wing. It is not as white as the ɔecimen portrayed on Plate xx of . B. Ford's book *Moths*, but much whiter ' than the one portrayed at g. 6 on Plate 90 of the older editions f ' South'.

Dr E. B. Ford says in his book, and quote from page 80:

" A further instance of confusion etween native and immigrant races of a ɔecies is provided by the Speckled Footman, *Coscinia cribraria* L., Arctiidae, which is an exceedingly local species found only *on heaths in Dorset and the New Forest*. Our race is white, freely speckled with black dots (Plate xx, figure 4). On very rare occasions a *different and nearly immaculate form* (figure 3) has been taken *elsewhere in the south of England*, and such individuals are *immigrants*." The italics are mine.

Do you think that, though the species occurs in this district, it may be that the whitish specimen was not a migrant but a locally bred one: its condition is fairly good?

I also took, in Tiverton, Devon, a specimen of the White-L Wainscot (*Leucania l-album* Linn.): apparently this species has recently established itself quite well in South Devon.

7.2.63. S. R. Spencer (3460J).

REFERENCES

FORD, E. B. (1955): *Moths*. P: 80; Plate xx.
SOUTH, R. (1939): *The Moths of the British Isles*. 3rd edn. Plate 90.

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Sir,—I am a recent Member of the AES and have taken an interest in the family Trichoceridae (Diptera).

Therefore I should like to receive, from Members of the Society, any records of the species of *Diazosma* Bergroth and *Trichocera* Meigen which have been taken in Kent, especially N.W. Kent.

11.1.63. J. E. Brown (3513J).

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QUERY

Is there any expert who can tell me how to obtain pairings from *Gastropacha quercifolia* Linn. (Lappet Moth)? The first year I reared the moths from larvae, I kept them indoors in a fairly airy room, with negative results.

" Oh, you should have put them

outside in the open air," said a dealer when faced with my problem.

The next year, the larvae died during hibernation, but this year (1962), a fortnight or so ago from the time of writing, seven adults emerged, two males and five females. Out they went, in a roomy *wooden* cage (see my other article on pp. 27-8 of this issue) and for five days they sat there, giving no pairings. I tried moving the cage to different places in the garden. By then, the males were weak and the females had begun sterile egg laying.

So before next season when I pay my money for my dozen larvae at the Annual Exhibition, will someone divulge his secret of immortality amongst *G. quercifolia*?

(Signed) 'Bewildered, Edmonton,' *alias*

1.7.62. L. R. Staines (3238J).

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NOTES AND OBSERVATIONS

HIGH BROWN FRITILLARY IN SOUTH ESSEX

During the morning of the 5th August 1962, I took a worn male specimen of the High Brown Fritillary Butterfly (*Argynnis cydippe* Linn.) in a wood six miles from Upminster. It was netted whilst feeding on the Woolly Thistle (*Cirsium eriophorum* (Linn.) Scop.).

14.8.62. A. M. Freebrey (3359).

ATTRACTING OVIPOSITING EYED HAWKMOTHS

I have found a very good method of obtaining ova of the Eyed Hawkmoth (*Smerinthus ocellata* Linn.).

A couple of years ago I had a tree-planting mania, and planted two Balsam Poplar trees (*Populus gileadensis* Rouleau) and two Willow trees (*Salix* sp.) in my garden. They were all grown from cuttings taken from large trees.

By this year they had all grown considerably, and while last year I obtained only four eggs from the lot, this year I found a total of sixteen. I feel pretty sure that the scent of the Balsam Poplar, which is very strong and aromatic, attracted the moths, whereupon they found the Willow trees on which to oviposit. This is backed up by the fact that only four eggs were on the poplar, while all the rest were on the willow (there may be more as yet undiscovered). However, I am quite prepared to be criticised for this theory.

6.7.62. L. R. Staines (3238J).

ENTOMOLOGICAL WELDING

A neat, clean method of mending torn wings of Lepidoptera has not yet, to my knowledge, been devised. This attempt, Entomological Welding, was shown to me by an ex-Member of the AES, Mr D. H. Peel (1218), and does away with the unsightly method of 'patching' which, as every Lepidopterist knows, leaves a lot to be desired.

The *modus operandi* is simple and quick. The torn wing is pulled together and secured on to a flat surface (one side of a large setting-board does admirably) with paper strips passing across the wing. Globules of entomological mending-glue are placed across the tear in the wing by means of the *head* of a pin. The head of the pin is used so that one can control the width (which should never be over 0.02 in.) of the globule. When this procedure has been completed the insect should not be removed until the glue has had time to set.

Entomological Welding when properly applied, should be invisible.

15.10.62. A. M. Freebrey (3359).

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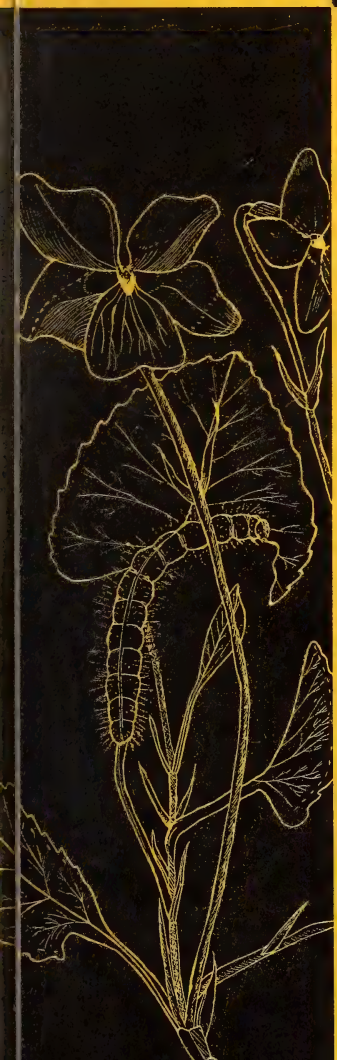

THE BULLETIN OF THE AMATEUR ENTOMOLOGISTS' SOCIETY

World List abbreviation : Bull. amat. Ent. Soc.

EDITED by PETER G. TAYLOR, B.Sc., F.R.E.S.
with the assistance of
H. V. DANKS

AES NOTICE

WHERE TO WRITE

Membership applications, offers of help, changes of address, and non-arrival of Bulletins *to:* D. E. Dodwell, *28 Summerleaze Park, Yeovil, Somerset.* *Yeovil 928.*

Advertisers to: R. D. Hilliard, *54 Gyles Park, Stanmore, Middlesex.* *EDGware 1604.*

Offers to lead Field Meetings, exhibit, etc., to: B. F. Skinner, *85 Elder Road, West Norwood, London, S.E.27.* *GIPsy Hill 0057.*

Manuscripts, drawings, and books for review to: H. V. Danks, *7 The Ridge, Surbiton, Surrey.* *ELMbridge 4156.*

Subscriptions (15/- per annum, 10/- for Juniors) to: B. R. Stallwood, *17 Claremont Avenue, Sunbury-on-Thames, Middlesex.* *Sunbury 2687.*

Youth matters to: H. Berman, *St Ivo School, St Ives, Hunts.*

HOW TO WRITE FOR THE *BULLETIN*

In good English.

Preferably typewritten, double-spaced, with wide margins, and on one side only of quarto paper.

Heading in capitals, NOT underlined. Correct scientific names, consisting of name of genus (capital initial, and underlined), name of species (small initial, and underlined), authority (conventionally abbreviated, NOT underlined).

English names of species, etc., with capital initials.

Your name at end, on the right, followed by your AES Membership Number in parentheses.

Date of writing, all in figures (e.g., 15.8.27.), opposite your name.

Number of words, in pencil and ringed round, in top right corner of first sheet.

Return proofs promptly.

AES BULLETIN

No. 259

MAY, 1963

EDITORIAL

Members will no doubt be surprised to learn that this is the last *Bulletin* that I shall be editing — for some considerable time, at any rate. You will all recall the difficulties under which I started my task as Editor, and the persistent way in which others accrued later. Since I have now had to add to these a number of personal ones — to such an extent that the continuation of my editing of the *Bulletin* has been seriously impeded — and since I have in any case been greatly assisted by a younger Member, Mr H. V. Danks, whom I have been preparing during the past year as a possible successor when eventually I needed a rest, I have great pleasure in handing over Editorship of the *Bulletin* to his able care, and have every confidence that under his guidance — and with your cooperation — it will flourish.

Of course, my pleasure at seeing the *Bulletin* passing into his very able hands — *and* at the prospect of having a 'breather' — is tempered by sorrow that I have felt it necessary to give up the responsibility for all the things that make the *Bulletin* what it is, and especially the innovations that I have introduced and hope will be maintained. However, it is not fair to drop such a load of responsibility and work suddenly on to the shoulders of any young man, be he never so able, and I shall be hovering in the background with advice and assistance for some time to come. Moreover, I shall still continue to contribute articles in the future, and hope that very many of you will follow suit. I expect Mr Danks will be introducing his own modifications of style and format into the *Bulletin* — we all have our own idea of what the *Bulletin* should be like — and I do ask you most sincerely to make it easy for him.

In this issue will be found the usual 'administrative' notices and reports, which I should like to feel were read by *all* Members, and continuations of all of the serial articles except the *Junior News Section*, which has suffered a brief pause. Among these I have initiated one called *Echoes of Times Past*, whose aim is to resuscitate discussions that raged long ago; show how the problems and difficulties that concern entomologists have changed in some ways, yet remain obstinately constant in others; present views some of which seem to us quaint and some, on the other hand, quite amazingly prophetic: in short, to put younger Members historically 'in the picture'. I hope you like it.

Lastly, good bug-hunting, and success to all your researches!

Peter G. Taylor (719).

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THE ANNUAL EXHIBITION 1963

The Annual Exhibition will be held on Saturday 5th October, from 2 p.m. until 5.30 p.m., at the Hugh Myddleton Secondary School, Corporation Row, London, E.C.1. A fuller notice of this Exhibition, and a map showing how to reach it, will appear in the next edition of the *Bulletin*.

The Exhibition is being held at the same place as last year, when the meeting was a great success. I hope

that a large number of Members will come again this year, with their exhibits, and that we shall have the usual large number of guests visiting the Exhibition.

Members of the Council will be there and ready to discuss with other Members anything which the latter may wish to put to the Council. Do make an effort to come to this, the Society's main meeting of the year — it will be very well worth doing so.

H.V.D.

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THE FUTURE OF THE SOCIETY

As President of the Society for the year 1963 I take the opportunity of using the pages of the *Bulletin* to convey my greetings to old and new Members of the Society and to discuss the future aims and ambitions of the AES. The aims of the Society are to promote friendship and co-operation amongst entomologists, both established and budding, in this country and abroad, in order to make our hobby and studies more pleasant and more fruitful. Arising from such cooperation there should be a mutual increase in knowledge and opportunity and, by functioning as a Society in conjunction with groups having similar or allied interests, we can assist in the preservation of our native fauna and extend our knowledge of it. To this end we must maintain an up-to-date *List of Members* with a geographical and interest key, publish the *Bulletin* and the *Wants and Exchange List* at regular times, have a comprehensive advisory service for identification and advice on all Orders of insects and publish reference leaflets and booklets to bridge the gaps in the publications available from other sources. The Council considers the Annual Exhibition of utmost importance, not only as an exhibition, but as a chance for Members to meet and talk. It is also the intention that the *Bulletin* shall be regularly published in future and the matter of publications is also under review. Many Members would welcome the re-printing of an up-to-date version of *The Hymenopterist's Handbook*, and any suggestions on the matter of publications should be sent to the Secretary.

I should like to suggest to Members some of the ways in which they can assist the aims of their Society and, indirectly, themselves. Subscriptions are unfortunately a necessity and their prompt payment takes a weight off the shoulders of the Treasurer. As all the work of the Society is carried out by volunteers, the whole of the moneys received is devoted to the interests of those who provide it. The Editor has been somewhat forthright in his demands as to the standards of copy submitted for publication but if you honestly have any difficulty in finding out scientific names and references then leave a space for the Editor to insert them. If you find difficulty in expressing yourself in the mother tongue, please do not let this deter you from writing down your ideas or experiences. Leave plenty of space between lines for the Editor to do his work and if you have no typewriter nor access to one, use a pen. It was good enough in the days before the typewriter and if your writing is kept at the level of legibility then most printers' compositors can cope. We should look upon the *Bulletin* as our vehicle for communication and I have always found the most interesting material to come from the ordinary Members. Reports of outings, experiments, observations and new ideas are what

he Editor requires to keep the rinters working.

My own interest in the Society s more on the personal level as I alue the friendships which it has rought. To this end I would velcome more contact at local level nd think that an extension of the ocal group meeting as held at Croyon would do much to give vigour o the Society. Members should lso make much more use of the Membership List by correspondence nd visiting. The local man often as the knowledge which will save nany fruitless hours when visiting new area: the list will help you o make the necessary contacts. In he matter of an advisory group, we re still needing assistance from our nore senior Members in this field, nd any person who is able and villing to advise on any group of nsects or special facet of our interests hould inform the Secretary of this. There is need for Members to offer heir services in this work so that he young entomologist shall have he assistance and guidance that he expects when he joins our ranks. A further matter which would help Members is the building up of a small collection of colour transparencies suitable for lecture purposes so that these could be obtained on loan from the Society when needed. Duplicates of suitable photographs could be sent to the Secretary so that such a collection could be assembled.

A further matter which is of urgent concern to all groups interested in natural history is the preservation and conservation of our native flora and fauna. Our Members can do much to help in this field by bringing to the attention of the Council all instances of species in danger of elimination and also the destruction or damage of areas which have an important part to play in our native ecology. This would include indiscriminate spraying, burning off and clearing, as well as destruction on the larger scale brought about by town development, etc. Mr T. G. Howarth of the British Museum (Natural History) is our representative in this sphere but he needs material evidence if he is to assist in saving our rarer insects for posterity.

I hope that from my remarks you wil appreciate that every Member in the Society has a part to play in order to help us achieve our aims and I hope that the coming year will see a revival in the fortunes and an attainment of some of the immediate aims of the Council and the Society.

P. W. Cribb (2270),
President.

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SECRETARY'S LETTER

I am asked by people from time to time what they can get out of the AES by being a Member, and I answer their question in this way.

One of the main principles on which the Society functions is the production of its *Bulletin*. Without this, there would be no Society at all.

Therefore, to get something out of the Society, one must first put something in. To do this, and in order that the *Bulletin* may have many interesting topics and observations to print, you, the Member, can put this something into the Society by sending in copy expressing your points of view, notes of interesting findings and observations, articles on apparatus and methods of collecting and breeding, and so on.

The Society was formed many years ago in order that its Members might exchange ideas, discuss prob-

lems and the like. The *Bulletin* is your medium for doing this, so please let the new Bulletin Editor, Mr H. V. Danks, have your copy now. It does not matter how small the item of news is, so long as it can be of interest to others. You will find Mr Danks's address and instructions on how to write your copy on the inside of the front cover of this *Bulletin*. [Fuller notes for your guidance were printed in the last issue (*Bull. amat. Ent. Soc.*, **22**: 3-6) — *Editor*.]

I would also like to take this opportunity of reminding Members of the Society's *Handbooks*, *Pamphlets* and *Leaflets* that are still available, and these are obtainable only from our Official Agent, Mr L. Christie, 137 Gleneldon Road, Streatham, London S.W.16. Mr Christie will be pleased to supply a list of those publications still in print.

Offers of help are always welcomed by the Council. We shall be pleased to hear from any Member, and your offers should be addressed to me. You will find my address inside the front cover.

May I wish you all a good season for 1963.

Douglas E. Dodwell (3482),
Hon. General Secretary.

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ANNUAL GENERAL MEETING

The Annual General Meeting was held in the Linnean Society's rooms at Burlington House, London W.1, on the afternoon of Saturday, 30th March 1963.

It was preceded by a conversazione and two films: *Evolution in Progress*, a film showing bird predation on the two forms of *Biston betularia* Linn. (Peppered Moth); followed by *The Melanism of Northern Lepidoptera*, a film shown a few months ago by Granada TV Network Ltd in a programme called *Breakthrough*. Both films are by Dr H. B. D. Kettlewell, MA, FRES.

The AES Council for 1963 is now [March] constituted as follows:-

Hon. President
P. W. Cribb
Hon. General Secretary
D. E. Dodwell
Hon. Treasurer
G. D. Trebilcock
Hon. Assistant Treasurer
B. R. Stallwood
Hon. Bulletin Editor
P. G. Taylor
Hon. General Editor
R. W. J. Uffen
Hon. Advertising Secretary
R. D. Hilliard
Hon. Youth Secretary
M. C. Birch
Hon. Meetings Secretary
B. F. Skinner
Councillors
H. V. Danks, T. F. Knight, A. F. McGeeney, A. R. Middleton, D. Ollevant, C. B. Pratt, L. S. Whicher, N. Wilding.

One vacancy remains on the Council, to be filled by the Council. This was due to the last-minute resignation of Mr K. H. Bobe.

A total of 29 Members and friends signed the Attendance Book.

D. E. Dodwell (3482),
Hon. General Secretary.

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COUNCIL'S REPORT FOR 1962

The number of subscriptions paid for 1962 was 754, and together with those Members joining since 1st September 1962, whose subscriptions

over 1963, the final membership for ne year was 790. This comprised 70 Ordinary and Affiliate, 272 unior, 1 Life and 7 Honorary Mem-ers.

Five issues of the *Bulletin* were ublished, it being found once again uite impossible to publish these egularly and on time. Our new Dutch printers produced the January umber, but as they were unable o meet our demands at all satis-actorily it was found necessary to hange printers yet again, this time o a firm in Croydon. The first umber produced by them was the March one which, owing to the omplications of the change of printers, came out before the in-ended February issue. In an effort o catch up, the April and May *ulletins* were combined into a single ssue of increased size. The next *ulletin* was also a combined number, mbracing the months June-October. The final number for the year was et another combined issue, in a inal effort to regain our schedule. This was the November-December ssue, marking yet another change n printers — our third for the year. At the time of writing, however, his issue is still awaiting publication. At an emergency meeting of the Council to review this state of ffairs it was decided that in 1963 he *Bulletin* would be published quarterly, in February, May, August and November. It will be of greatly ncreased size, and it is hoped that his will be the answer to our prob-ems, and that we shall, in 1963, see he *Bulletin* once more on time.

At the Annual General Meeting n March, a rewardingly large as-embly of Members and friends enjoyed two films. The first, *The Marsh Fritillary Butterfly*, was intro-duced by Mr C. L. Bell, FRES, who was responsible for the entomological direction and research. We are most grateful to Mr Bell for coming along. The second film, *The Life History of the Alder Woodwasp and its Insect Enemies*, was the prize-winner in the BBC/Council for Nature Film Competition, 1960.

The Annual Exhibition was again held at Hugh Myddleton Secondary School, and was again a success. A full report has appeared in the *Bulletin*.

Towards the end of the year the Society's new Hon. General Secretary, Mr Michael J. Friend, resigned. He was succeeded by Mr D. E. Dodwell. Mr B. F. Skinner replaced Dr K. J. Fox as Hon. Meetings Secretary, and Mr B. R. Stallwood replaced Mr K. H. Bobe as Hon. Assistant Treasurer.

Once more we were grateful to the Entomological Section of the London Natural History Society and other local societies for inviting us to their field meetings. However, many Members were unable to attend these owing to insufficient notice being given, as a result of the *Bulletin* situation.

The long-awaited *Membership List and Geographical Key* was published, the old policy of combining it with a *Bulletin* being abandoned. This, therefore, marks the first of a new series of Membership Lists which, it is hoped, will be published every three years, with supplements annually.

The Council met eight times during the year, for the first quarter under the Chairmanship of Mr D. Ollevant and for the rest of the year under Mr G. D. Trebilcock.

The Society's only real obstacle in 1962, which was unfortunately a very serious one, was that of producing the *Bulletin* on time. The Council received many offers of help throughout the year, and it is in a very stable position in regard to administrative assistance.

Douglas E. Dodwell (3482),
Hon. General Secretary.

TREASURER'S REPORT FOR 1962

The financial position during the last year has remained satisfactory, the most pleasing aspect being that the Society has now £700 invested with the Halifax Building Society. This is £300 more than I reported to the meeting last year.

However, with some reflection, Members will realise that the Society has not an abundance of money. Our reserves are not sufficient to launch as much of the publication programme as the Council would like. With the introduction of the four quarterly issues of the *Bulletin*, there will be a reduction of our printing costs. This reduction, it is hoped, will boost our reserves and aid the Society's publication programme.

It is hoped that the difficult period of the Society has now passed, and that, consequently, we can look forward to a successful year.

G. D. Trebilcock (2976),
Hon. Treasurer.

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THE ANNUAL REPORT OF THE SOCIETY'S REPRESENTATIVE ON THE NATURE CONSERVANCY'S ENTOMOLOGICAL LIAISON COMMITTEE FOR 1962 - 1963

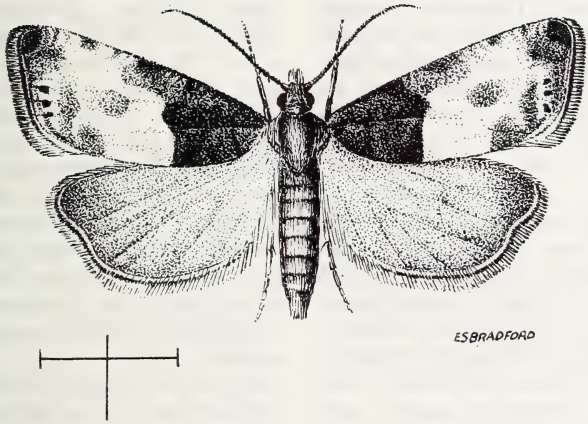
Your representative on this committee is very pleased to report that once again the usual biannual meetings were attended at the Headquarters of the Nature Conservancy last November and again this month. The most important point to emerge from these meetings is that something is going to be done about the Devonshire localities of the Large Blue butterfly (*Maculinea arion* Linn.). The Committee has at last persuaded the Conservancy to act, and a graduate of Exeter University is undertaking a research project on the known localities of this insect with the financial backing of the Conservancy and under the supervision of a committee set up by the Devon Naturalists' Trust. In this way it is hoped to gain much exact knowledge which will enable a proper Reserve to be made for this remarkable butterfly. Two or three of our Members have written regarding this subject, and as your representative will be attending this committee, he will still be pleased to hear from any Members with suggestions regarding this extremely interesting matter.

Another matter of considerable importance to lepidopterists is the preservation of the very confined habitat of the extremely local geometrid moth, the Lewes Wave (*Scopula immorata* Linn.). In the past there has been a very real danger of the area becoming completely overgrown with bracken and shrubs, and this season the Conservation Corps of the Council for Nature is taking a hand in the necessary site clearance under the direct supervision of a knowledgable lepidopterist.

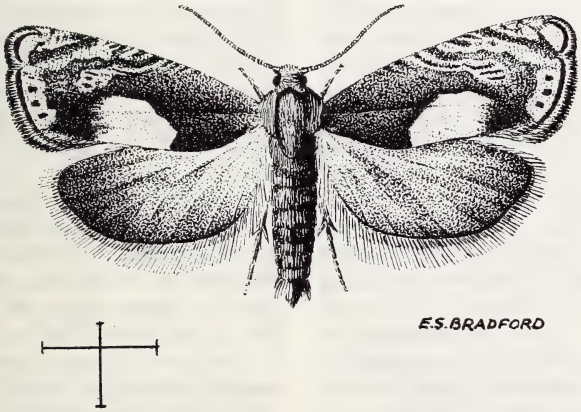
The matter of payment for permits from the Forestry Commission for collecting in the New Forest was brought up again, and the Conservancy was left in no doubt that amongst the entomologists present, there was very strong feeling against this practice, but it remains to be seen if the Forestry Commission can be persuaded to modify their attitude.

Amongst the other subjects discussed were the management plans for some of the Reserves, progress with Nature Reserves, toxic chemicals, and the introduction of alien species and systematic entomological surveys.

T. G. Howarth (196).



Eucosma tripunctana Schiff



Hemimene flavidorsana Knaggs

COLLECTING NOTES
— Summer

The Smaller Moths

Eucosma tripunctana Schiff. (*cynosbatella* Linn.) was drawn by Mr E. S. Bradford from a specimen taken in his garden at Boreham Wood, Hertfordshire, where it occurs quite commonly. His notes on the colouring read: "the forewings are an off-white with dark vandyke-brown and grey markings. The hindwings are greyish-brown." This common Eucosmid occurs on the wing in May and June; the larva feeds in a spun leaf of Rose (*Rosa* spp.), or Bramble (*Rubus* spp.).

Hemimene flavidorsana Knaggs was only comparatively recently separated from *H. alpinana* Treits. (or should I say separated again!). The

larva of *H. flavidorsana* feeds on the roots of Tansy (*Tanacetum vulgare* Linn.). It is also similar to *H. petiverella* Linn. Mr Bradford's notes read: " the orange-yellow patch on the dorsum of the forewing is on the whole of richer hue than in *H. alpinana*. The rest of the forewing is a chocolatey brown with lighter, more orange streaks from costa to termen. When seen under a lens the patches in between the streaks have a metallic bluish sheen. The hindwings are a lighter brown." He took two specimens in his garden at Boreham Wood in 1962. The moth is on the wing in July and August, the larva overwintering in the root-stocks of the foodplant.

It is easy enough to collect plenty of specimens during the summer by the usual methods of collecting the Lepidoptera. All the rules which apply to the Macrolepidoptera can be used for the ' Micros', but for many of the species this will mean that they are more difficult to identify. Of course, species which occur in habitats which can only be visited in the summer holidays, such as Alpine ones, can only be collected with a net or by attraction to light if they happen to be on the wing at that particular time.

Here are a few suggestions on searching for larvae which may simplify the identification of these species.

The larva of *Peronea boscana* Fab. spins together two leaves of Elm (*Ulmus*) during June, discolouring the leaves.

Also in June the larvae of *Anacampsis populella* Clerck may be found rolling the leaves of Poplar (*Populus*) and Sallow (*Salix*), and those of *A. betulinella* Vari behaving in a similar fashion on Birch (*Betula verrucosa* Ehrhart). These two species were separated in 1941: *A. betulinella* is a darker moth than *A. populella*.

Common Skullcap (*Scutellaria galericulata* Linn.) is a plant which grows by fresh water and in wet grassy places. In July look for ' windows ' in the leaves, and the larvae of *Choreutis myllerana* Fab. or *C. punctosa* Haw. may be found feeding on the underside. " The imago of [*C.*] *punctosa* differs from [that of *C.*] *myllerana* in not having two patches of white scales on the underside of the forewings at the termen. The patches may consist each of a single scale, though usually more, and this character seems to be constant " (from notes by L. T. Ford).

July is a month for collecting the leaf-miners. The larvae are best collected when nearly fully grown, and the mines must never be interfered with. A quick check that the larva in the mine is not dipterous, is to see whether the frass is in a line down the centre of the mine (although it could still be coleopterous or hymenopterous). Fairly good light and a lens are necessary for the examination. Some mines can only be seen from one side of the leaf.

There are several ways of breeding the larvae. One is to put the leaves in glass tubes or small jars. The bottoms of these are covered with slightly damp sand or fine earth (*not* clayey earth) and a little moss. In the case of large leaves the area around the mine may be cut out. The tube is then corked or a plug of cotton wool inserted. A second method is to put the stalks of the leaves into a plant-pot of soil (or sand) and cover it with a plastic cylinder topped by muslin. A third method is to put the leaf between layers of paper handkerchief in a tin or plastic box. Always stand pots or tubes in the shade. Make careful notes of the foodplant and the characteristics of the mine, and, if possible, press the leaf afterwards with proper data cross-referring to the specimen. I have probably said

all this more than once before but that may serve to emphasise that the study of the leaf-miners is most interesting and rewarding.

About the middle of August the spun leaves of Aspen (*Populus tremula* Linn.) may be searched for the larva of the local moth *Nephopteryx hostilis* Steph. When the larva is young it rolls the Aspen leaves, but when fully grown it spins several together. As there are several other species which feed in a similar manner, the identity of the larva needs to be carefully checked, unless the finder is also interested in breeding these others.

In late August and early September the berries of the Spindle-tree (*Euonymus europaeus* Linn.) may be collected for the larva of *Alispa angustella* Huebn. The larva leaves the berries to pupate, so provide it with a piece of cork or rotten wood.

Finally may I wish my readers (or reader?) an enjoyable Summer's collecting? I hope that you will write up your findings and send them for publication in the *Bulletin*, for I could certainly do with some assistance in keeping up the interest in the 'Smaller Moths'.

D. Ollevant (1514).

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FROM OUR NORTHERN CORRESPONDENT

In my article on moorland species (*Bull. amat. Ent. Soc.*, **21**: 92-4) I made reference to the fact that there is a constant two-year life-cycle in the case of *Lasiocampa quercus* Linn. var. *callunae* Palmer (Northern Eggar moth). I remarked that the strange thing about this fact was that this period remains constant, and that only larvae are to be found in certain years but only imagines in others. Our Editor added a footnote giving some very helpful comments on the usefulness of a longer life cycle. I must return to the point because it seems that he, and probably other readers, had entirely misunderstood my reference to the strangeness of this situation in this splendid species. I was not actually referring at all to the length of time taken in reaching the perfect stage, but to the fact that there are definite 'larva' years and definite 'moth' years. This article will be used to enlarge a little on this aspect.

I first came across the larvae of *L. q. callunae* on the famous Ilkley Moors in 1932. They were fine, fully grown specimens and commenced spinning up during late July and August of that year. I was immediately attracted to the study of this species and have remained fascinated by it ever since. The following year, 1933, I scoured the moors from April until late Summer for further supplies of larvae, but without any success at all. At that time I thought that the fault was my own, or that it must be a bad year for *L. callunae*. The year 1934 produced fine larvae again without difficulty, as did each year of even number (1936, 1938, etc.) from then onwards — but it was always the same: larvae in even years and moths in odd years.

Anyone who has reared and studied this family of moths will be aware that they are all very much given to response to variations in temperature and light conditions. In a very warm Spring and early Summer it is most clearly noted that the overwintered larvae of the Eggars will feed up in about half the usual time, and that a small proportion of them will spin up during June. These moths emerge during late July or early August in much the same way as does the southern form of *L. quercus*.

Now here is the point which puzzles me. It would appear, on the

face of it anyway, that it would require only one very good Spring, as in the case of 1948, for instance, to induce the larvae of *L. callunae*, or at least a fair number of them, to feed up and spin before the end of June, so as to produce a fair number of moths which would in turn establish a first-year colony of larvae in what had been until then a purely 'moth' year. During the early part of 1948 quite twenty per cent of the wild larvae on our moors were fully grown by June 30th. The moths emerged a month or so later, but the following year I failed to find any larvae which had wintered and, what is more, I have never discovered any since. One feels certain that over the years there have been many partial emergences of *L. callunae*, and yet so far as the Ilkley Moors are concerned there has been no variation at all in the clear pattern of 'larva' years and 'moth' years.

Shortly after the war-years I was lecturing on moorland species and this particular point was mentioned. A certain well-known entomologist challenged the validity of the facts I had put forward, and it may be that some readers may wonder whether in fact there is at least a partial emergence which might be overlooked. Confirmation of the facts was forthcoming, however, from expert sources. A few years ago a team of geneticists from Oxford, under the direction of Dr H. B. D. Kettlewell, commenced close study of *L. callunae* from a genetical standpoint. One of the first things which they confirmed was that there is a constant and absolutely clear definition between the two year broods.

It only remains for me to add that this is the sort of interesting problem which Members can study, and to which there is no easy answer. There has always been a school of thought which maintains that there is no such creature as *L. callunae*, but that it is merely *L. quercus* with a life-cycle modified to suit northern weather-conditions. Against this theory one could point out that in many places, the West coastal regions for instance, there are some moors which have an Eggar with a two-year cycle and moths out in June (*L. callunae*) and later in the year the normal emergence of *L. quercus* with a one-year cycle. Both populations (? species) remain quite distinct in habits, and even in years when weather conditions bring about almost synchronised emergences, so that the late specimens of one are still about when the early ones of the other appear, there is no evidence of the clearly defined life-cycles being broken down.

This year I hope, with the aid of incubator and controlled light conditions, to get *L. callunae* of the normal two-year type, through in one year. The resulting moths (if one may literally count them before they hatch) will be released on a small patch of moorland near Halifax where they will not interfere with normal 'wild' colonies. It will be most interesting to see whether a clear two-year cycle is then established, but with moths in what is normally a 'larva' year.

W. E. Collinson (247).

When I wrote my footnote to Mr Collinson's earlier article (*Bull. amat. Ent. Soc.*, **21**: 94-5) I limited my remarks to an introduction to the view I tried to put across, in the hope that hinting at the implications of what I actually said would be sufficient to convince at least some Members that the tenability of the view that *L. q. callunae* Palmer is a separate species from *L. quercus* Linn., being based on — as I believe — inadequate information both as

o the nature of a species and about he race itself, is seriously in question. t would appear, however, that I was little optimistic, and I should like o take this opportunity of expanding he argument further.

Perhaps it would be as well to tart by defining our terms, and ince the point in question is a natter of whether a kind of organsm is a species or not, it would lo no harm to say what is usually neant by the term 'species'. As pplied to animals, at least, a species s regarded as comprising all those ndividual organisms that can interreed *to produce fertile offspring*. Of course, this is only a 'potted' lefinition, since it leaves out several necessary but rather obvious prosos, such as, that the organisms nust be *able* to reproduce sexually — if sexual reproduction is unnown in any kind(s) of organism, s, for instance, in *Amoeba*, it makes he defining of a species a very omplicated business—and, supposng that it can, both sexes must be resent in the sample taken as reprenting the individuals under conideration: the definition I have iven would be difficult to apply to ny species of Aphid during the arthenogenetic stages in the annual ife-cycle. It would be equally diffiult to apply to social insects where here are sterile 'castes'. However, vhere the test can be applied, it is f great value.

Concerning the life-cycle of *L. q. allunae* very large amounts have lready been written, not least by . W. Tutt in *British Lepidoptera* nore than 60 years ago, but also by nany other authors before and ince. Without intending any peronal slight, I can't help feeling that Mr Collinson hasn't done as much nomework as he might have done efore committing to print his ideas bout its status. I have not myself nade an exhaustive study of the possible sources of information on the subject, but have looked up a number of likely ones and give a list at the end of this note.

In climatic zones where favourable and unfavourable seasons alternate, a species can have only a limited number of kinds of life-cycle:-

(i) one generation per year;
(ii) two or more generations per year;
(iii) one generation every two or more years.

Of course, this classification of life-cycles ignores periods of quiescence such as extended pupal diapause leading to 'lying-over', which does not really affect the issue under consideration. However, within the scheme given, if a species takes more than one year to complete its life-cycle, it cannot easily take other than a whole number of years, since this would either land it in a most unfavourable time of year for continued activity or involve the sudden evolution of a highly complex control mechanism compensating for the irregular incidence of the unfavourable season (*i.e.*, winter) in the life-cycles of successive generations. Of course, such a phenomenon could occur as an exception to what usually happens in a particular species — the essential feature of biological evolution is the constant occurrence of exceptional individuals — but the chances would be very high against the organism concerned finding itself accompanied by another of the same species in a suitable condition for breeding and therefore perpetuating the new habit, even if this were possible in the circumstances.

Thus, as has already been pointed out, in exceptional circumstances the Northern Eggar (*L. q. callunae*) may complete its life-cycle in just over a year — May/June until the July/August of the following year — and the 'ordinary' Oak Eggar (*L.*

quercus) may take longer than its usual year, but in neither case does a *regularly repeated* life-cycle occur whose duration is a whole number of years plus a fraction of a year. In the Oak Eggar, which appears every year anyway, we do not notice so readily the limited continuity of any deviations of this kind, whereas, in the Northern Eggar with its sharply defined two-year life-cycle, we find not only the exceptions but also the fact that they produce no offspring, most conspicuous.

With regard to the inability of the Northern Eggar to jump the gulf between odd years and even years, I should like to draw the attention of Members to a passage consisting of four paragraphs from *A Moth-hunter's Gossip*, by P. B. M. Allan, in which, while discussing another large moth — with, therefore, many biological problems in common with *L. quercus* and *L. q. callunae* — namely, the Death's Head Hawkmoth (*Acherontia atropos* Linn.), he suggests that the reason why the latter species, and possibly many other migrant Sphingidae, cannot survive the winter here is that, while they cannot withstand frost while in pupa, they require either a low temperature during the early pupal stage, or a protracted period as a pupa, or both, for the ovaries of the females to develop properly. If, as I should like to suggest, this also applies to the Northern Eggar which, however, is not so susceptible to frost, it would mean that a generation of moths resulting from larvae that completed their development earlier in the same summer would be unable to reproduce (even though they might be able to mate). Obviously, this would effectively prevent any 'colonisation' of the 'moth' years by the species in the larval stage.

On this score, I think Mr Collinson's idea of 'seeding' an isolated area of moorland near his home with artificially accelerated adults or pupae of *L. q. callunae* is an interesting one, although I am far from happy about the consequences, and shall try to explain why.

At the present time we have in the Northern Eggar an unique example of a population with a strictly 'alternate-year' life-cycle, and as such it is something of a curiosity. If Mr Collinson's experiment were to succeed, then, as he points out, a population would be initiated having 'larva' years when all other populations of Northern Eggars were having 'moth' years, and *vice versa*. Despite the isolation of the area in which he proposes to carry out his experiment, considering the large size and powerful flight of the species, there is little likelihood of his intermediately-timed local population remaining isolated from other populations with a hitherto normal life-cycle. Thus, as soon as the two populations had become mixed, the uniqueness of *L. q. callunae* with its 'larva' years and 'moth' years would be destroyed for ever and another fragment of the interest and beauty of the world around us would be lost. Is the destruction, or even the risk of destruction, of such an extremely interesting phenomenon, a fair price to pay for the chance of finding out a little more about it? It is to my mind a very strange approach to biological research which runs the risk of destroying the very situation that has aroused the interest of the experimenter — and by means of *his* investigations, at that! If Mr Collinson, despite my cautionary remarks, proceeds with his experiment, I, for one, fervently hope he does not succeed: certainly not out of any personal feeling towards him, but out of concern for the preservation of an uniquely interesting feature of natural history and the apprecia-

:ion of it by future generations of entomologists.

Supposing, on the other hand, Mr Collinson takes heed of what I have written and tries another mode of attack, how can he arrive at valuable conclusions without involving himself in the grave responsibility for such a drastic interference in the natural happenings around us? This all depends on what he wants to find out. If he wants to collect further evidence bearing on his contention that the Northern Eggar (*L. q. callunae*) is a separate species from the Oak Eggar (*L. quercus*), which seemed to be his original intention, I should suggest that he tries to obtain fertile matings among the hybrid progeny of several different pairings involving one individual of *L. quercus* and one of *L. q. callunae*, and rears the offspring through to adulthood. This would, of course, involve some not altogether easy preparation, since the two populations are adult at different times of the year, and might be difficult to obtain at the same time as adults in a suitable condition for pairing: otherwise, even though copulation might occur, it might not result in the production of fertile offspring merely because the ova and spermatozoa were not in a suitable physiological condition for fusion to take place, and a false impression might be acquired that the inability to produce fertile offspring from a first generation pairing had settled the matter of the separateness of the two populations as distinct species once and for all.

The only way round this difficulty, it seems to me, is to engage in three parallel experiments as a first stage. Having collected together sufficient pupae of both *L. quercus* and *L. q. callunae*, four different kinds of pairings are planned: male *quercus* x female *quercus;* male *callunae* x female *callunae;* male *quercus* x female *callunae;* and male *callunae* x female *quercus*. It would be preferable to obtain several pairings of each kind, since one cannot validly argue scientifically from an isolated set of observations (this is what makes astronomy so difficult). The first two kinds of pairings that I have listed would come under the heading of 'control' experiments, which does not mean that they really *control* anything, but is a technical expression for an experiment carried out to find out what *would have* happened had the material under actual investigation not been interfered with by the experimenter. In this particular experiment, the object of the 'control' pairings is to see whether the parents themselves were in a suitable condition for fertile mating to take place at all at the time of the experiment.

Given adults of both kinds in a suitable condition for pairing, *and at the same time of year*, there should be no difficulty in obtaining first generation hybrids, since this has already been done (see Tutt: *British Lepidoptera*, **III** : 33 *et seq.*) as long ago as 1897. However, no clear indication is given as to whether pairings were obtained — or even attempted — between the hybrids themselves. It might be argued that if such pairings were possible, they would have occurred in nature, but I hold that this would be precluded by the separation in time of the adult populations of the two races, any pairing of atypically occurring adults of one race with those of the other race flying at their appropriate time being prevented by some sterilising process such as the high temperature during the pupal stage that I have already suggested.

Next, then, Mr Collinson would have to try to obtain pairings between the hybrids of *quercus* x *callunae* and rear to adulthood any larvae

that hatched from the resulting ova. This would be a ticklish matter, and, apart from the work involved, might not appeal to Mr Collinson since inter-fertility of the hybrids would be very strong evidence that his contention that they are separate species was wrong, *i.e.*, in as much as you can prove anything in science, he would have proved himself wrong, but would have the satisfaction of having solved a mystery that has been puzzling lepidopterists for many years. On the other hand, if the hybrids proved to be inter-sterile, this would not be incontrovertible evidence that the two populations are specifically distinct, but might merely mean that the conditions of the last part of the experiment were unsuitable for fertile pairing to take place! However, if a number of such pairings were obtained, with the parents of different ages, this would be pretty good evidence that *L. q. callunae* was a separate species and should from henceforth be known as *Lasiocampa callunae* Palmer.

Species become separated off from the parental stock by isolation of a population of that stock, either in space (geographically or topographically), or in time (of appearance of adults), or by means of behavioural or physiological incompatibility: all of which lead to the production of separate races within which genetical changes (mutations) may continue independently, leading to both genetical incompatibility (when the two populations may be regarded as distinct species) and adaptation to differing sets of environmental conditions (thus 'setting the seal' on the isolation of the two new species for all time). Provided that the sharp distinction between lichen-covered trees in country and western districts (no musical allusion intended!) and soot-begrimed trees in industrialised and easterly regions continues for long enough for further changes to occur within the two populations of *Biston betularia* Linn. (the Peppered moth) — 'normal' and var. *carbonaria* Jordan — we may be witnessing just such a change in that species, taking place while we watch.

If the Northern Eggar turns out to be after all merely an inter-fertile local race of the species *Lasiocampa quercus* Linn., I should think that the conditions of its present isolation from the normal form of that species were quite sufficient for incipient specific isolation to be well on the way, but feel that the very existence of only one population of *L. q. callunae* with its adult stage in odd years suggests that it is of very recent origin, not yet having had time to 'colonise' the even years — say, by 'lying-over' in numbers of pupae for an extra winter. Moreover, if this is indeed the case, I should think it was far more interesting to wait until such speciation occurred naturally than to meddle with the species in its natural surroundings and thereby run the risk of creating a situation in which the two races might become approximated towards each other once more so that their isolation is destroyed, and with it the possibility of their becoming distinct species.

By the time such colonisation of the intermediate years had occurred naturally (if ever it did occur), I should think that the chances of the two populations having become genetically isolated — and therefore specifically distinct — would be pretty good, so that the risk of re-integration and consequent loss of a natural 'experiment' was diminished. In addition, if and when that happened, it would be quite 'on the cards' that the population of the 'other' years might, through genetical isolation from that with the

present two-year cycle, itself develop sufficient genetical difference from it to be regarded as a *third* species! Would not that be far more interesting than taking the machine to bits to see what makes it tick, or cutting open the drum to find out where the bang comes from?

Mr Collinson could still do his experiments to see if he could breed a strain of *L. q. callunae* occupying the opposite years to those within which the present population goes about its business, but I cannot help feeling that there is a very strong case for carrying them out in the confines of rearing-cages. In the hope that he will take my protest to heart, may I suggest that, in the course of such an enclosed experiment, he would stand a much greater chance of success if he subjected some of the pupae resulting from his accelerated larvae of *L. q. callunae* to an artificial 'winter' by putting them in a cool place for a few days, transferring them to a refrigerator for, say, a week, and then returning them gently to more seasonable temperatures. Even this might not be adequate. but it is at least an idea, and might save the loss of months of work.

In his book *Moths* Dr E. B. Ford suggests that the two-year habit of *L. q. callunae* may have originated even further north than its present range extends, and that it has subsequently spread southwards, confining itself to the bleaker upland moors of northern and western Britain. I should like to expand on this idea by suggesting that the habit may have originated, either in its present localities or even further south, during a recent transgression (advance) of the North polar ice-cap. We have ample evidence from pollen analyses and other palaeobotanical studies that much of Britain was covered, not all that long ago, by just the kind of moorland vegetation that is now typical of areas at present occupied by the Northern Eggar, and it is evident that the climate of such times would be far more unfriendly (even) than it is now. The great advantage of this suggestion over that made by Dr Ford, it seems to me, is that it would involve no anomalous southward spread of a cold-adapted form such as *L. q. callunae*.

While on the subject of isolation of populations by differences in their times of appearance as a result of their having different numbers of so-called 'broods' (*i.e.*, generations) within a given time, it might not be out of place to refer to the two species of Geometrid moth, *Ectropis crepuscularia* Schiff. and *E. biundulata* de Vill., which were thought for a long time to be one and the same species. The resemblance between them is very close indeed in all stages of the life-cycle, but whereas *E. biundulata* (the Engrailed) has two generations in a year, *E. crepuscularia* (the Small Engrailed) has only one. Here, as with the two Eggars, cross-pairings have been obtained, resulting in what are referred to rather vaguely as 'hybrids' by both Tutt and South, but once again there is no indication that second-generation pairings were or were not obtained, and one is left to infer that recognition of the two forms as distinct species has been arrived at by some means unspecified: whether it was by failure of attempts to obtain offspring from hybrids or as a result of genitalial examination, or both, my own homework has not been sufficiently exhaustive to discover.

With regard to these species too, I should like to suggest that their separation may have been a result of the decrease in average tempera-

ture and, therefore, of effective length of the favourable season for active development that would have resulted from a glacial transgression. Of the two species, it would appear that *E. crepuscularia*, with its single generation in the year, is the one that would have been affected in this way, *E. biundulata* having followed the receding tongue of the ice-sheet northwards from a reservoir of double-brooded population on the area that we now know as continental Europe, but which, at least once since then, was almost certainly very near to, if not actually connected with, parts of what is now the South-east Coast.

I'm afraid that I've written far more than I intended to, but felt that it was necessary in the circumstances, and can only hope that, if I have offended any Member with my long-windedness, there are others whom I may have stimulated into a greater interest in the study of speciation, particularly with regard to the status of the Northern Eggar (how do its genitalia compare with those of the ' ordinary ' Oak Eggar?). Needless to say, I hope especially that the latter include Mr Collinson, and, if my opinions can be of any use to any Member interested in studying this problem I should be only too pleased to discuss it with him.

Peter G. Taylor (719).

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INSECT PESTS OF GARDENS

Scale Insects

Scale insects belong to the Order Hemiptera, sub-order Homoptera, and comprise the family Coccidae. Their distribution is world-wide, and many species are to be found in the British Isles. Several of these are serious pests, on both outdoor and glasshouse decorative plants. Generally the species concerned are sedentary in the adult stage, and small in size. The adult stage of every species is covered with a protective chitinous scale, which is usually quite hard. It is the shape and size of this scale that affords the easiest method of identification.

The feeding-habits are typical of the Order, being concerned with piercing and sucking. The nature of the damage caused is therefore similar to that produced by Aphids, and manifests itself in the weakened growth of the plant. Secondary effects are the appearance of sooty moulds — a good ' give-away ' when one is searching for the insects — and the unsightly masses of scales which occur in severe attacks. The spread of viruses is another possibility, but they would have to be picked up and passed on during the nymphal stages — a common enough occurrence in other insects. However, I know of no recorded instance of virus transmission by Coccids.

The collector is likely to find only females, the males being extremely rare and very small. The females, in fact, are by far the more conspicuous of the sexes. The body of the female scale insect is usually oval, with no distinct divisions between the segments. The mouth-parts consist of a short, tubular labium (lower ' lip ') enclosing four long stylets, which are inserted into the tissues of the host plant, and by

means of which the sap is extracted from it. The eggs are usually deposited under the scale of the female, whose body shrivels up after oviposition.

On emerging from the egg, the nymphs are at first active and move about on the host plant. They appear to have a migratory phase, as do many Aphids and also many mites, but this can only be described as a chancy affair, as they depend on the wind or the feet of passing birds for dispersal. This migratory phase would be important in any spread of viruses by the insects.

Later the nymphs settle down and lose their legs, remaining in the same place for the rest of their lives. By late Summer they have developed a scale, which consists of the cast skins of the nymphal stages, cemented together by a gummy secretion. The female adults are parthenogenetic and, in several glasshouse species, continuously brooded.

There now follows a short list of species that attack cultivated plants:-

Aspidiotus hederae Vallot (Oleander Scale). — Mainly found in S. England. Attack Japanese Laurel (*Aucuba* spp.). The scale is white and conspicuous, and occurs on both leaf-surfaces.

Mytillococcus ulmi Linn. (Mussel Scale). — A widespread pest often found on neglected fruit-trees.

Eulecanium corni Bouché (European Brown Scale). — Attacks a wide range of ornamental shrubs and fruit-bushes. Mature scales are reddish-brown and highly convex.

E. corni var. *crudum* Green (Yew Scale). — This scale is a serious pest of Yew hedges in the Home and Southern Counties; its range is extending. It is somewhat flatter and paler in colour than typical *E. corni*.

E. coryli Linn. (Nut Scale). — Occurs on Apple (*Malus* spp.), Elm (*Ulmus* spp.) and Hawthorn (*Crataegus* spp.), as well as Hazel (*Corylus* spp.).

Coccus hesperidum Linn. (Soft Scale). — Mainly a pest of glasshouse plants, though it occurs outdoors in sheltered places on Ivy (*Hedera* spp.), Holly (*Ilex* spp.) and *Camellia*. This scale remains soft throughout its life, and produces living young.

Aspidiotus britannicus Newstead is a common pest of the Bay tree (*Laurus nobilis* Linn.) when this is grown in tubs.

Cryptococcus fagi Baeren. (Felted Beech Coccus). — Often abundant on Beech trees (*Fagus* spp.), especially specimen trees. The mature females are enveloped in a white felty mass.

Aspidiotus camelliae Sign. (Camellia Scale). — A greenhouse pest attacking *Begonia*, *Camellia* and several species of fern.

Diaspis boisduvali Sign. — Mainly found in tropical houses on orchids and some palms.

Hemichionaspis aspidistrae Sign. — A mussel-shaped scale occurring on *Aspidistra*, *Pteris* and *Asplenium*.

Icerya purchasi Mask. (Fluted Scale). — A species which may be introduced on plants from abroad. Its presence must be notified immediately to the Ministry of Agriculture, Fisheries and Food, as it is illegal to allow its existence in this country. It is very conspicuous, being surrounded by a mass of waxy secretions. It is found mainly on *Acacia* spp.

4.12.62. A. J. Tuton (2639).

CONSERVATION

2. LOCALITY COLLECTORS

In this article, the second of a series, I have chosen to deal with what might be termed the ' locality collector '.

Such collectors are those who deliberately visit given areas in order to obtain a particular species known to occur there, and they are a danger from the conservation point of view for a number of reasons, not least of which is that in the main rarities are sought, since their capture is considered to justify the travel involved in reaching the locality concerned. The very fact that these rarities are local is an indication that areas with the habitat conditions which the insects require are relatively infrequent, and consequently their elimination in one of these areas is serious. Common, widespread species, even if locally wiped out, can usually enter the locality from regions around it, and so re-establish themselves fairly quickly. In the case of rare insects, however, such reinforcement cannot generally occur because the distances between different populations may be quite considerable. Thus any great damage is liable to be permanent. Furthermore, the very fact that local species are restricted in this way means that their areas of occurrence are likely to be subjected to a relatively greater intensity of collecting than are those of commoner species.

As soon as a mention appears in print of the locality of a particular species, many of these locality collectors visit the area in a short space of time: in particular, those species with a short emergence period stand little chance of survival if subjected to the attentions of large numbers of this type of collector, for the latter will obviously converge on the locality during this short period of emergence. Because they are chiefly concerned with obtaining rarities to show off in cabinet displays, they prefer unworn specimens. Hence they tend to take specimens at the beginning of the emergence period before the insects can become worn, and before the latter have had a chance to pair or lay ova to continue the species.

The insect now stands little chance of survival in this region; and the locality collectors turn their attentions to other areas, with the same result. In this way a species may be rapidly eliminated, and it is probable that extinction of several of our butterflies occurred in this fashion — although, as indicated in the previous article, they may also have been undergoing a temporary or permanent decrease in numbers because of other factors.

Another influence causing the decrease of local species is the variable quantity of different insects taken by collectors. As I have written before (*Bull. amat. Ent. Soc.*, **21**: 105-6), each series of a species should, unless the species is a subject for special study, contain male and female upperside and underside and three or four specimens showing the range of variation. In many collections, however, this is not the case, although the moderately common species tend to approach this ideal. The two extremes, on the other hand, are treated differently. The very common insects are either not collected at all (because " they are so common that they are not worth it " — a truly blind outlook), or are amassed in numbers because they are easy to come by. The rarities are taken in as large numbers as possible, because they are a ' prize ' for display — so that frequently the series of a rarity in a locality collector's cabinet is longer than that of a common species; or

the series of the latter may consist of large numbers of more or less identical specimens (I have seen such a collection of *Mamestra brassicae* Linn., the Cabbage Moth.)

The effect of the locality collector, then, is chiefly the elimination of rare and local species. But what can be done about it? This is where conservation can be practised by the conscientious amateur: the longer-sighted entomologist, who appreciates these factors and is prepared to act on them, would never deliberately collect in particular areas for rarities found there. In fact, by frowning on those who would, he can help to create an atmosphere in which the pure 'collector' is scorned; can change, by his words and actions, the outlook of those too ignorant or stubborn to read about conservation; and, by studying conservation and ecology, can hope to influence those who are not entomologists to act, in matters involving conservation, on the advice of those who are.

Industrialisation and the march of civilisation (of which more in subsequent articles) must occur; but their effects can be modified for the better by conservation. Let us first, however, 'put our own house in order', and stop thoughtless collecting for its own sake. On this point I will have more to say in the future — but what of the present?

Are *you* a locality collector?

10.2.63. H. V. Danks (2907).

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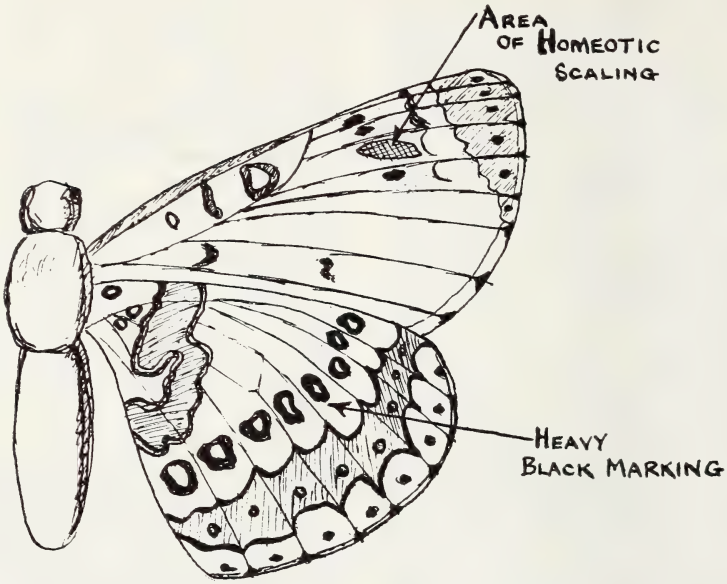
A PROBLEM OF HEREDITY

Of all our native butterflies, the small Fritillaries (Argynninae) seem to offer greatest scope for breeding experiments in the field of variation and the inheritance of variable factors. Of these *Melitaea cinxia* Linn. (Glanville Fritillary), *M. athalia* Rott. (Heath Fritillary) and *Euphydryas aurinia* Rott. (Marsh Fritillary) are all species which it is fairly easy to overwinter in large numbers owing to their habit of gregarious hibernation as larvae. Furthermore, all three species are subject to continual minor variation in both colour and the pattern of the spotting. Size and wing-shape are also noticeably variable, and cases of homoeosis also occur. In the case of the Marsh Fritillary it is difficult to find two specimens which are nearly enough identical.

Since 1950 I have tried to sort out some pattern in the jumble of shapes, sizes, markings and colours. I have been able to segregate a homoeotic form in *M. cinxia*, and the factor causing it would seem to be a simple Mendelian recessive, since back-crossing it with the normal form gives rise to offspring of which a quarter are homoeotic. However, although matings between homoeotic individuals gave 100% of homoeotic progeny, the number reaching the imago state was noticeably reduced. Unfortunately the second season (1961) of breeding this strain pure ended in failure as all the larvae died in the last instar following a very severe frost on June 2nd.

Another form of *M. cinxia* which has been known for a very long while is that in which the underside of the hindwings is heavily marked with a row of black elongated spots, as shown in the accompanying sketch. In one of my experimental crosses there appeared about a quarter of the imagines having this marking in a varying degree. They ranged from very heavily marked specimens to those of the normal form, and the variation appeared in both sexes. I crossed a heavily marked male with a similar female but the offspring,



M. cinxia (Underside).

of which there were over 200, did not include one specimen of the parental form. This indicates how complex the genetic factors controlling wing-pattern in this species must be. I had presumed that there was only one recessive factor controlling black spotting, but this is obviously not correct — indeed, I might have deduced that this was so from the fact that there was a gradation of the markings in the parent stock. I have crossed the stock of this form back in again, but I shall not know the results until this Summer.

E. aurinia presents a very confused picture, and although I am satisfied that size variation is in the main an effect of feeding, I have been unable to segregate any variations in shape or pattern. In 1962 I was able to produce several specimens with radiate markings on the upperside of the forewings, and hope to go further with these this year. The ground colour ranges from reddish through ginger to almost transparent, and there is considerable scope for experiment here. Some specimens have been almost indistinguishable from the Irish form *praeclara* Kane, but they are only of occasional occurrence, and it has not so far been possible to get a pairing of this form.

With regard to *M. athalia*, I have found some difficulty in mating specimens of the same parentage, and this has restricted work on them. Moreover, the species is more difficult to overwinter than are the others discussed. I have obtained a wide range of forms of colouring and pattern, and one specimen of an extreme form, ab. *eos* Haworth, but I have found it difficult to obtain the necessary matings, and it is

possible to continue breeding the species only by introducing new stock from time to time and experimenting with foodplants, methods of overwintering, etc.

One thing that I have observed with all these Fritillaries is that there are recurrent minor variations in markings which occur in the same part of the wing from generation to generation. In butterflies with involved wing-patterns, is each part of that pattern controlled by a separate genetic factor? If not, it would seem strange that a controlling factor could lay down a pattern correctly over the greater part of the wing-surface but 'miss out' in the same section of wing in a number of different specimens. In the homoeotic variation that I have described, the area of the wing that was affected was always the same, and it is possible that there could be a linkage between the homoeotic control mechanism and that controlling the pattern of the area of wing concerned. I should welcome any comments on this point.

1.1.63. P. W. Cribb (2270).

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METHODS OF PRESERVING CAPTURED MICROLEPIDOPTERA AND OTHER INSECTS

It is not always convenient to kill and set one's captures immediately after returning from a field-trip or after an evening at 'light'. Personally, I prefer to go to bed! There are also times when large numbers of moths emerge at the same time in the breeding-cages, and in order to make a careful examination it is necessary to set quite a lot of them.

It is a risk to keep these small-bodied insects relaxed in the normal way, as bacteria soon break down the tissues of the bodies and these rot away. Keeping them alive and active results in many scales being lost and so makes wing-pattern identification difficult or impossible.

One easy way which I have used during 1962 is to put the glass tubes containing the moths into the freezer compartment of a refrigerator. This renders them inactive and, depending on how long they are in there, on the species, and on the powers of survival of individual moths, it may or may not be necessary to kill them before setting.

Another method is to kill the moths straight away and then keep them at or below freezing-point. This ensures little dehydration and no bacterial activity.

A different method of preserving insects * has been used in Australia. In this method granular crystals of Chlorocresol are placed in a rectangular plastic sandwich-box, or other suitable container, and are covered with a layer of cotton-wool (or cellulose wadding) and layers of tissue-paper.

The dead insects are then placed between the layers of tissue-paper (or paper handkerchiefs), and finally the box is sealed with a Scotch tape. This should be done in shade and when conditions are not too humid. The boxes should be kept out of direct sunshine, and if stored for a long time should be kept chilled. The author of the paper has found material ready for setting after being stored for a year in this way. Only a small amount of Chlorocresol need be bought as the boxes can be used several times.

'Perspex' boxes are an advantage as the data can be put next to the lid and then read through it, when necessary.

*TINSDALE, Norman B. (1961): *The Chlorocresol Method for Field Collecting*. Journ. lepid. Soc., **15**: 195 - 197.

This seems to be a very useful idea for long expeditions, and, as far as the British amateur is concerned, could be useful for holidays. The box or boxes could be kept in the suitcase whilst on holiday, and the insects taken out and set on returning home. If this is soon enough the use of a refrigerator may not be necessary.

D. Ollevant (1514).

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REARING THE JERSEY TIGER —THE STORY OF A FAILURE

Thanks to the kindness of one of our Members I gratefully acknowledged the present of about 200 ova of this attractive moth (*Euplagia quadripunctaria* Poda), and looked forward to being able to fill a gap in my 'Tigers' which stuck out in my cabinet like a lost tooth. Little did I know what was in store for me!

Textbooks showed Honeysuckle (*Lonicera*) high up in the list of foodplants, and this appeared to be a stroke of luck as I had two brands of this creeper close to the kitchen door; Rose (*Rosa*), Groundsel (*Senecio vulgaris* Linn.), Dead-nettle (*Lamium*) and Dandelion (*Taraxacum officinale* Linn.) were also on the list.

Late on in August the ova began to hatch out and were accommodated in 2″-diam. plastic boxes with a variety of the above foodplants, but it was noticeable that Honeysuckle got the cold shoulder, Dead-nettle being preferred to everything else. The boxes were kept on top of a kitchen cabinet situated between the refrigerator and a continuous-burning coke stove.

The larvae appeared to make satisfactory progress for two or three weeks and very few died during the first three changes of skins, but soon afterwards the effects of condensation began to be felt: in spite of every care and constant drying out with tissue a number got drowned, particularly those which stayed on the sides of the box, so I transferred them to plastic sandwich-boxes to give them more space.

The rot continued, three or four dying each day, and by the end of October half of them had died. Thinking that the top of the cabinet might be too warm, I brought them down to the top of the refrigerator, but the mortality continued undiminished, and by January 1962 the last one, now about $\frac{3}{4}$″ long, 'conked out' — and with it my hopes of getting a series.

Later on in the year I turned up an article in the *Entomologist's Record* for May 1958 by Mr A. T. Postans, where he described his astonishing success in rearing 164 imagines out of about 200 ova; what puzzled me was the fact that my methods were not radically dissimilar from his. He kept his larvae in $3\frac{1}{4}$″-diam. glass-topped boxes in a warm bathroom, whereas I kept mine in the aforesaid plastic boxes in a warm kitchen with a normal temperature varying between 10 °C. (50 °F.) and 16 °C. (60 °F.), with short periods of 21 °C. (70 °F.) or so whenever cooking was in progress.

In November Mr Postans transferred his larvae to a breeding-cage and managed to provide them with sufficient foodplant until they pupated the following May. By November, however, 95% of mine had died, and it was difficult to understand how the results could have been so divergent under conditions so narrowly removed from his. The solution to the problem remained obscure until 1962, when I obtained a further supply of ova from my sporting friend.

It is early yet to talk about success, but in the last six months I have lost only about six larvae

through natural causes, and have a considerable number of (I hope!) healthy pupae on which I pin high hopes, particularly since a female moth emerged on March 12th (though she was slightly under-developed on the right side), followed on April 2nd by a perfect, full-sized female.

I hope a future article will point the way to success in dealing with this notoriously difficult species.

2.4.63. L. G. F. Waddington (169).

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FURTHER THOUGHTS ABOUT THE PURPLE EMPEROR

Some seasons ago I wrote a little item for the *Bulletin* (*Bull. amat. Ent. Soc.*, **17**: 29) entitled *In Search of Iris*, this being an account of a weekend spent in Hampshire looking for the larva of the Purple Emperor Butterfly (*Apatura iris* Linn.). Since then I have on several occasions spent the odd afternoon or morning in the same occupation, with an occasional success. This year on the 11th May I joined forces with another Member of the Society, Mr Ron Jarman, and we journeyed by car into Surrey to some fairly extensive oak woodlands in which the Purple Emperor had been seen flying during the previous summer, and where Mr Jarman had procured some ova by searching the Sallows (*Salix* spp.) in August.

The day was very windy but quite sunny, and we found it warm and pleasant in the cover of the woodland. In view of the lateness of the season we anticipated that the larvae would be fairly small, and intended to try beating for them. For the first hour or so we beat a large number of sallows of various kinds, but without any success. Beating these bushes and trees is not an easy matter as the smaller clumps are very thick, while the older trees are so large that it requires two people to accomplish the task, one to haul the tree over and the other to hold the tray and beat. I was not at all confident that our beating would dislodge the larvae, even if they were on the trees beaten. The caterpillar positions itself on the upperside of the leaf with its head towards the petiole, and seems to be pretty securely fixed. Beating shakes the leaves violently but the caterpillar must be quite accustomed to agitation of the foliage by wind, and it would seem that only a direct blow on the spray supporting the larva would dislodge it. Such a blow would account for the faith of some other collectors in the beating method. The morning's results gave us little confidence in it, however, and we sat down to our dinner of bacon sandwiches and '*Thermos*' tea without success.

During the morning I had found about a dozen ova of the Orange-tip Butterfly (*Anthocaris cardamines* Linn.) on the odd flowering-heads of Lady's Smock (*Cardamine pratensis* Linn.) which were dotted here and there in the rides. Such scattered plants always seem to produce results, whereas I have had little luck with the very large assemblages found in meadows.

After lunch we decided to abandon the beating-trays and return to our tried method of searching. Along a damp and fairly narrow ride we found a single bush of Alder Buckthorn (*Frangula alnus* Mill.) on whose sprays were ova of the Brimstone Butterfly (*Gonepteryx rhamni* Linn.) laid here and there on the undersides of the leaves. On the opposite side of the ride was a fairly mature specimen of the Great Sallow (*Salix caprea* Linn.): a female tree with catkins

almost ripe. In searching for the larvae of *A. iris* the method we use is to look the tree over carefully from below to see whether any of the leaves have been eaten from the edge inwards, towards the central rib. Without such indications it is very unlikely that the larvae will be present. Of course there are several other lepidopterous and hymenopterous larvae which eat the Sallow leaves in this way but this only makes the task harder.

On this particular Sallow I spotted a spray just so eaten, and Ron shinned up the tree to where the spray hung about nine feet up. It was one of those side-shoots which project only a little way from the main stem. He grasped the spray and it broke away in his hand. On descending the tree he searched the leaves, and I had difficulty in believing him when he said, " You know what is eating these leaves? It's ' *iris* '. Do you want it? " There, motionless on the upperside of a leaf just below the eaten ones, lay the caterpillar. It was less than an inch long but plump and secure on the right-hand side of the leaf lamina. As the excitement subsided I disturbed a bird from the bush below the tree, and found in the undergrowth the nest of a Nightingale (*Luscinia megarhyncha* Brehm.). In the nest were four olive eggs of the Nightingale and a fifth which had been placed there by a Cuckoo (*Cuculus canorus canorus* Linn.). It was the first time I had found a Cuckoo's egg in the nest of this species.

We went over the rest of the tree very carefully and also searched those around it in the same glade, but with no success. We then moved on to the woodlands on the far side of the road and spent the rest of the afternoon searching likely-looking trees, and a few unlikely ones as well. In my previous experience of looking for larvae I had found that success came from those trees which were wholly or partly shaded by nearby trees or bushes. As we walked back along a well-lit, sunny ride towards the edge of the wood and the car, there stood beside the ride at its junction with another, a bush of *Salix caprea* which was again a female plant and fairly mature. It was in full sunlight but we decided to have a last look. Almost immediately I spotted a larva of *A. iris*. It was at eye-level and basking in the sun on a short spray of leaves. I saw the caterpillar before I saw the leaves which it had eaten. As I boxed it Ron, who was at my elbow, said, " And here is its mate! " — and sure enough, on the adjacent spray, there was a second caterpillar in an almost identical position on the leaf.

The larvae moulted once only after they were found (on 23rd May), and pupated almost simultaneously on the 5th June. I observed them to bask in the morning sun and feed a little afterwards (up to about 8 a.m.). They occasionally fed during the day if it was dull, and again each evening for a short period. Before the final moult the larvae frequently changed their resting positions and wandered about over the foodplant while feeding. After the final moult each returned to the same leaf after feeding, and they eventually pupated on the undersides of these leaves, the pupae being within an inch of one another.

P. W. Cribb (2270).

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CALLOPHRYS RUBI LINN. (GREEN HAIRSTREAK) AND ITS CONNECTION WITH *VIBURNUM LANTANA* LINN. (THE WAYFARING TREE)

In the appendix to his *Study of the Insects Living on the Wayfaring Tree*

Mr K. C. Side says, "There were also many different species of adult butterflies and moths found resting on the leaves or branches. Among those noted were the Green Hairstreak, the Common Blue, and the Angle Shades moth."

I have found that in Spring, apart from visits to the flowers of *Fragaria vesca* Linn. (Wild Strawberry), *Callophrys rubi* feeds exclusively at the flowers of this shrub, which has a characteristic colour concealing the insect incredibly well.

Through the dense cyme of white flowers project the tips of five or six fairly broad calyxial leaves. These resemble the resting butterfly to a remarkable extent — so much so, in fact, that I've been quite often 'taken in' by them. Furthermore, the Green Hairstreak never 'basks' with wings half open like most other Lycaenids, so its camouflage is practically perfect.

Unfortunately for the insect, however, the shrub is in bloom only until about the last week of May or first week in June, after which individuals are found feeding mainly at the flowers of *Rubus fruticosus* Linn. (Bramble).

31.3.63. Patrick J. S. Miles (3343J).

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SOME LEPIDOPTERA OF THE HONFLEUR DISTRICT

The three weeks between 21st August and 11th September 1962 I spent as a guest of a French family in the picturesque little town of Honfleur in Normandy, 'twin' to my home town of Sandwich. It is situated in a small alcove at the estuary of the Seine directly opposite Le Havre, and depends on fishing and the 'tourist trade' for its livelihood. Primarily I went there to become more efficient at the language, but in between dashing around 'doing' places and eating I managed to see or collect some of what I imagine to be the commoner species which frequent this very promising region. This article, then, is meant to give some indication of what anyone going there might expect to find.

Overlooking the town is a fairly high hill called the Côte de Grâce which I visited the day after my arrival. Young elms (*Ulmus campestris* agg.) lined the lane up the steep hill, and very soon *Nymphalis polychloros* Linn. (Large Tortoiseshell) — La Grande Tortue—appeared. Discounting the fact that I had no net with me, it would have been extremely difficult to catch these impetuous insects as they dashed to and fro along the level of the elm-tops. Because of its peripatetic habits, it is difficult to say with any conviction how common this species really was, but for that one afternoon I have five specimens recorded, and on more than one occasion I saw it in the town itself ("Jusque dans les villes", M. Le Cerf rightly says in *Lépidoptères de France*). At all times, though, it was completely out of net reach, and always flew at a tremendous speed.

A species which certainly was not so common was *Nymphalis antiopa* Linn. (Camberwell Beauty) — La Vanesse Morio. The only time I saw this splendid insect was on the same day (23rd August) and in approximately the same circumstances as *N. polychloros*. However, its flight was much less boisterous and allowed it to be easily identified, and even this short glimpse did full credit to what was once justifiably called the "Grand Surprise".

In the whole of my stay I saw only two Holly Blues (*Celastrina argiolus* Linn.), both in rather poor con-

dition. This suggests that the state of the species in Honfleur was similar to that reported for its population in England — *i.e.*, it was in a trough in its cycle of abundance. It may interest Members to know that French *C. argiolus* seem to be as amorous (or curious) as English ones: this male was fluttering hopefully round a bird-dropping on a leaf of Bramble (*Rubus fruticosus* Linn.)! (See *Bull. amat. Ent. Soc.*, **22** 260).)

Both *Pieris brassicae* Linn. (Large White) and *Pieris rapae* Linn. (Small White) were common, and on the same spot I saw a bedraggled Bath White (*Pontia daplidice* Linn.) — surprisingly enough, since it seemed to have been a good year for migrants, the only one I ever saw. This concluded an interesting afternoon of introduction.

In my own area, in Kent, I find that the best way to get an overall picture of the butterfly population is to let the local people, who are very patient, know that I am interested in any insects which they come across. This is, I suppose, comparable to sending out native hunters in Africa, on a smaller scale, and similarly you get your fair share of disappointments: gross exaggerations of size (" It's about five inches across " — *Laothoë populi* Linn. (Poplar Hawkmoth), *et cetera*. But ultimately it always pays dividends (*e.g.*, pupae of the Death's Head Hawkmoth (*Acherontia atropos* Linn.) from potato fields), and so I decided to take some of the Honfleurais living just outside the town into my confidence. They produced nothing startling, but from them I did gather that the Red Admiral (*Vanessa atalanta* Linn.) — Le Vulcain — was reasonably common, and I also came by my only example of *Polygonia c-album* Linn. (Comma) through their efforts. This indicated, once more, that the local populations of certain species of butterflies were in a similar state to those at home.

On the 24th and 25th August I managed to branch out in a different direction: into the country just North of Honfleur. *Maniola tithonus* Linn. (Gatekeeper) was abundant, in varying condition, *Pieris brassicae* and *P. rapae* were common, and *P. napi* Linn. (Green-veined White) appeared for the first time during my stay. There were also numbers of *Colias croceus* Fourcr. (Clouded Yellow), *Pararge megera* Linn. (Wall), *Pararge aegeria* Linn. (Speckled Wood), *Lycaena phlaeas* Linn. (Small Copper), and *Polyommatus icarus* Rott. (Common Blue). On the 24th I again had no net with me, but managed to capture a perfect Jersey Tiger (*Euplagia quadripunctaria* Poda) in mid-air with a polythene bag! (*Thought:* Is this an addition to Mr Tuton's article 'The Use of Plastics in Entomology' (*Bull. amat. Ent. Soc.*, **21**:62)?).

So far I had confined myself to the area immediate to Honfleur, but on the 27th August we visited the newly constructed 'Pont de Tancarville' which is a suspension bridge further upstream. The main attraction here was some large fields of Wild Carrot (*Daucus carota* Linn.), Red Clover (*Trifolium pratense* Linn.), Dutch Clover (*Trifolium repens* Linn.), Field Melilot (*Melilotus arvensis* Wallr.), Lucerne (*Medicago sativa* Linn.), Horseshoe Vetch (*Hippocrepis comosa* Linn.), and Common Vetch (*Vicia sativa* Linn.). The largest of these lay almost literally in the shadow of the bridge and with net in hand I visited this first.

As I stepped in, a beautiful sight greeted me as about 200 Common Blues (*Polyommatus icarus* Rott.), nearly all males, fluttered up in one scintillating swarm from the grass.

took a sample of these: five females which later proved quite interesting. As well as having abnormally large eyespots and terminal orange markings on the underside, the number and positioning of these, although not spectacular, was curiously irregular. It usually took the form of an elongation in all forewings of the post-discal spot in space 1b and the addition of another spot merging with it in space 1a. In one case this was abbreviated to one large spot, and in some was present on the left forewing only. Another had extra spots added to *both* the post-discal spots in spaces 4 and 1b (the former added anteriorly) on the right forewing and none at all on the left. There was also a specimen in which the three anterior spots on the hindwing were noticeably elongated.

It would have been interesting to have inspected this colony as the butterflies rested in the grass, but as it happened there were plenty of less common insects to catch the eye: *Cyaniris semiargus* Rott. (Mazarine Blue), for instance. The first of these I caught among a 'sample' of *P. icarus* and it was so tattered as to be almost unrecognisable. Evidently it was a late 'hanger-on' from the previous generation (presuming it has two broods [very doubtful: probably a protracted period of emergence — *Ed.*]) for subsequent specimens were beautifully fresh. The beauty of this little insect makes the exploits of the nineteenth-century collectors (which culminated in its extinction in this country) understandable but not, I hastily add, justifiable.

I received another mild surprise shortly afterwards when a slightly worn specimen of *Everes argiades* Pall. (Short-tailed Blue) appeared. I had been told not to expect anything like this, and I'm apt to conclude from the evidence that it had in fact come from further South, possibly in a migration of *Pieris* spp. spread over the previous three days.

In another part of the field I came across two *Colias croceus* Fourcr. (Clouded Yellow), and other species present included: *Maniola jurtina* Linn. (Meadow Brown) at the end of its season, four or five *Lycaena phlaeas* Linn. (Small Copper), *Coenonympha pamphilus* Linn. (Small Heath), the three common *Pieris* spp., *Aricia agestis* Schiff. (Brown Argus), *Aglais urticae* Linn. (Small Tortoiseshell — La Petite Tortue), *Nymphalis io* Linn. (Peacock — Le Paon de Jour), *Vanessa atalanta* Linn., and *Vanessa cardui* Linn. (Painted Lady — La Belle Dame). The last three were on the Bramble which bordered this large field. Similar adjoining fields produced the same commoner butterflies and proved (15 different species) that you do well to pay attention to the odd clover field.

On the 31st August we were scheduled to leave for Paris, and as it rained incessantly from the day we returned to the day of my final departure, the last opportunity I had to look for butterflies was on the 30th.

In the morning I decided to make the hills flanking the town to the East my goal for the afternoon, and after a tiring climb I found myself in 'rural' Normandy, as it seemed.

Every 200 yards, between one low, flat farmhouse with its adjoining orchard and the next, was a field on the hillside. These fields proved very popular with insects, as they consisted of Hardheads (*Centaurea nigra* Linn.) and Greater Knapweed (*Centaurea scabiosa* Linn.) —both great favourites of the Vanessids—in addition to the usual Carrot (*Daucus carota* Linn.) and clovers (*Trifolium* spp.).

Painted Ladies swarmed drunkenly

over the *Centaurea*, in company with many Noctuids (*Plusia gamma* Linn. (Silver Y) predominating). The most unlikely species turned up in the course of the afternoon, including the following: a female Brimstone (*Gonepteryx rhamni* Linn.) which had also been seen in the town itself, five specimens of *Argynnis paphia* Linn. (Silver-washed Fritillary — Le Tabac d'Espagne), *Maniola tithonus* Linn. (Gatekeeper), and *Pararge aegeria* Linn. (Speckled Wood), among which was an almost white specimen. These fields usually also had three or four *C. croceus* to them in addition to the usual *C. pamphilus*, *M. jurtina*, *V. atalanta*, *A. urticae*, *N. io*, *L. phlaeas*, *P. icarus*, *P. brassicae*, *P. rapae*, and *P. napi*, while one *Colias hyale* Linn., and a few *Lysandra bellargus* Rott. showed themselves towards the end of the afternoon. Finally, at about 4.30, I went down into the town, and over a much-needed drink congratulated myself on an enjoyable afternoon.

So my stay finally drew to a close. In all, 27 species of butterfly were seen, although there are surely others awaiting any Member with time on his hands who visits this very beautiful district in the future. For that person, I hope this article has been a rough guide.

The only book I took with me to France was Meyrick's *Handbook*, but on my return I bought M. Le Cerf's *Lépidoptères de France* (Fascicule I), and this proved invaluable in learning about the French butterflies that don't occur over here. It is in fact a fairly exhaustive handbook, and I thoroughly recommend it.

Patrick J. S. Miles (3343J).

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THE NATIONAL PARK OF THE CÉVENNES

The National Park of the Cévennes covers an area of about 375,000 acres or 580 square miles of the three adjoining Departments of Lozère, Ardèche and Gard in southern France. Compared with, say, the Kruger National Park in South Africa, with its 7,340 square miles, it is tiny; compared with the Cairngorms Nature Reserve in Scotland, which is a large reserve for Britain, extending to 62 square miles, the Cévennes Park is extensive.

This Park is of interest for a number of reasons. In the first place it is associated with Robert Louis Stevenson's enchanting little book, *Travels with a Donkey in the Cévennes*, first published in 1876. It is also a tract of land with strong historical associations, for in this area a fierce fight for religious freedom was put up by the Protestants who came to be known as the *Camisards*, early in the eighteenth century. That a handful of determined men should have kept the royal armies at arm's length for two years is an indication of the difficult terrain in which the Park lies.

This National Park came into official existence in 1960, and the organisation which brought the Park into being and will help to guide its destinies is called *l'Association du Parc National Culturel des Cévennes*. This association was founded in 1957. Its official journal, *Cévennes et Mont-Lozère*, started life in January 1963. It is all rather new, but the idea of such a national park began back in 1913 when E.-A. Martel published an article in the journal of the French Alpine Club, in which he suggested the area that ought to come under protection and the function of such a park in the

évennes mountains. Martel, who ied in 1938, was the father of peleology or caving. Much of the évennes consists of limestone formaions in which there are many caves. y now some of them have been pened to tourists. Speleology, in hich the need for physical skill, xperience, judgment and responsiility is obvious, is in many respects ne of the most fascinating branches f natural history, in the widest ense of the words. The sheer beauty f the underground caves with their ubterranean water-courses, glaciers, olours and bizarre formations has een described by Martel and subequent enthusiasts of whom the est known is Norbert Casteret. In peleology, a number of scientific isciplines are fused. With the eginning of caving towards the end f the last century, the wonderful ave frescoes of Spain and France vere brought to light, and their liscovery changed the dating and onception of art, and shed light n the life and customs of primitive uropean communities. Later, inestigation of the depths opened up new field of biology with the liscovery of the types of creatures hat could live in the demanding onditions of deep caves. Much of he systematic work has been in he province of entomology; we an thank René Jeannel, whose ame is familiar to every coleopterist, for pioneering speleological ntomology. No doubt there is urther work to be done on the nsects in the Cévennes caves.

There are two peaks in the National Park that reach over 5,000 eet — Mont Lozère in the North and Mont Aigoual in the South. The whole area of the Park consists of eroded, greyish crests and valleys, ew of which lie below 1,500 feet, hat succeed one another in waves. This kind of terrain is always of special interest to students of geographical varieties in insects. During the Secondary Era the central plateau to the North, consisting of Primary rocks, was surrounded by warm seas. During this time the limestone beds were laid down at the ocean bottom. In the Tertiary, these beds were forced up against the granite and schist of the central plateau and folded to give the chaotic rock-structure of today. To the South of the Park, the land slopes away to the Languedoc plain and the Mediterranean coast, so that the Cévennes region stands with one foot in central European climates and the other in the Mediterranean. This is reflected in the clear light and warm summers which are, however, short, for the winters are sharp and protracted. The last wolf shot in the Cévennes was in 1907.

The vegetation similarly reflects the climate. Central European and Mediterranean meet on the southern flanks of the Park's hillsides. Hoary Oak (*Quercus languinosa* Thuill.) and Service-tree (*Sorbus torminalis* (Linn.) Crantz), Maple (*Acer campestre* Linn.) and White Beam (*Sorbus aria* (Linn.) Crantz) and Wayfaring-tree (*Viburnum lantana* Linn.) are common. Where the forest is thinned, Common Box (*Buxus sempervirens* Linn.) is everywhere, along with *Genista* and yellow-flowered *Cytisus* (Broom). These represent the central European flora on a calcareous soil. Box spreads because it is deep-rooted and thrives as soon as woodland is cleared; most important of all, it is a shrub which the ubiquitous sheep of the region leave alone. The Box descends into the Languedoc plain to mix with the Mediterranean plants making up the scrubby *garrigue*, the aromatic, spiny, low shrubs, typical of great tracts of the Mediterranean basin, and in Languedoc dominated by Rosemary (*Rose-*

marinus officinalis Linn.). On the South-facing slopes of the Cévennes are Sweet Chestnut forests on which a number of peasants depend for their living. Sweet Chestnuts (*Castanea sativa* Mill.) are found on the more acid soils between about 1,500 feet and 3,000 feet. The undershrubs are reminiscent of the Mediterranean *maquis* with their arborescent Heaths (*Erica* spp.); here central European, Mediterranean and Atlantic flora merge.

This intermingling gives an idea of the variety the naturalist can expect to find in this part of France. Here are a few indications of what the entomologist might look out for if he spends a summer holiday in the Cévennes.

Among beetles, for instance, *Carabus hispanicus* Fab. is found in only one place in France outside the Cévennes. The same is true of *Pterostichus femoratus* Dej.

Those who have a taste for myrmecology should look out for *Manica rubida* Latr., and *Proformica nasuta* Nyl., while *Formicoxenus nitidulus* Nyl., not uncommon in parts of Britain as a guest of *Formica* spp., is much more local in France; the Cévennes are a centre where it is to be found.

Among the sub-alpine species of butterfly found in the National Park, the following may be mentioned:-

Parnassius apollo Linn. (always a fascinating sight swooping over the summer pastures in the uplands) and *P. mnemosyne* Linn., *Anthocharis euphenoides* Stdgr, known popularly as *l'Aurore de Provence* and a close relative to the Orange Tip, *Satyrus cordula* Fab., *Argynnis daphne* Schiff., as well as a good number of ' Blues ' (Polyommatinae), among the less common of which are *Polyommatus meleager* Esper, *P. escheri* Huebn., *P. dolus* Huebn., and *P. damon* Schiff.

Mediterranean France is relatively rich in Orthopteroidea compared with the rest of the country but there are species peculiar to sub-alpine levels and some of these the collector may find in the National Park of the Cévennes:-

Orphania scutata Brunner, found only on Mont Aigoual (which means, in the ancient language of Oc, ' mountain of water ') and in one place in the Basses-Alpes and Alpes-Maritimes, *Antaxius sorrezensis* Marquet, *Pholidoptera aptera* Fab., *Pteronemobius lincolatus* Brullé, *Stenobothrus festivus* Bolivar, *Arcyptera carpentieri* Azam, *Celes variabilis* Pallas, and *Chelidura aptera* Charp.

This is a very poor part of France and does not share in the rapidly rising prosperity of so many other parts of the country. When Stevenson went through the Cévennes it had more than double today's population, whose density in the rural areas is as low as six or seven people to each square kilometre. Young people have been attracted away from the little isolated hamlets of this mountainous region where communications are comparatively poor. Agriculture is unrewarding in such a terrain and with such a scattered population. The traditional industries of exploiting the Sweet Chestnut and silkworm-rearing are marginal. Reafforestation is the major hope, for although the region is quite well wooded, much timber is lost annually through forest fires started by shepherds who hope thereby to gain more pasture. This is a problem that occurs throughout the Mediterranean where sheep and goats are in excessive numbers and whose cropping prevents forest regeneration.

A major reason for the coming into being of the National Park of the Cévennes was the wish to help

he thinly spread and aging population towards a reasonable prospect or the future. Consequently, *Le Parc National Culturel des Cévennes* s not merely an area marked off or the preservation of wild life and pleasant rural amenities, though these actors are important. It is much more than this. It is perhaps the ast hope of a region whose life is ebbing and needs a transfusion.

One of the ways in which this very beautiful part of France can be helped is by tourism; the Cévennes have always lain away from the main streams of traffic. The naturalist on his holiday is a tourist and therefore brings a little much-needed money to the area; the outlay of this in the Cévennes is, as a matter of fact, appreciably less than in the better-fancied resorts along the not-so-distant coast.

There is no certainty that the ambitious and imaginative scheme to revive human life in the National Park will succeed but the Association which has its interests at heart deserves support from every point of view. If any Member of the AES feels he would like to give a little moral and tangible support by joining *l'Association du Parc National Culturel des Cévennes* and receiving its quarterly magazine, he can obtain particulars from me.

19.3.63. A. N. Brangham (18).

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ARTIFICIAL HEAT FOR WINTER BREEDING

The winter breeding of insects has much to recommend it, since little other entomological activity is possible at that time of year: however, a source of heat for breeding-cages, etc., is imperative.

A method which I have been using for this purpose is as follows. An '*Oxo*' or similar tin has a hole punched in one end and a light-socket fitted into it by means of a locking-ring. The hole, once started, can be cut with an old pair of nail-scissors. From the socket, the required length of flex is connected to a plug, if a power-point is available, or to a bayonet-adaptor for a light-socket.

Inside the tin I use a 25-watt bulb, but lower power can be used, as the tin gets quite hot because of the lack of air circulating within it to cool the bulb.

The method really involves standing the rearing-cage (I use an old glass-sided aquarium, but any flat-based cage will do) on the tin, which should be insulated from the table, etc., beneath it.

If the type of cage has a perforated zinc top, say, a number of plastic boxes can be stood on this and will receive their share of the warmth, as will those stood near the tin, underneath or beside the cage.

With a 25-watt bulb even a relatively large cage is maintained at 15 - 20 Farenheit degrees above external temperature. (A large cage is evenly heated because of the circulation of air caused by convection currents.)

Resist the temptation to juggle about with the times of switching on and off in order to save electricity — the insects do not like it, and I lost several *Philosamia advena* Packard and *Actias selene* Huebn. larvae because I tried to do this, although both species are reputed to be quite hardy. I think that keeping larvae warm renders them more susceptible to cold conditions which larvae normally kept at lower temperatures would survive.

The electricity used will cost about 5*d*. or 6*d*. per week, but since, under steady warm conditions, metamorphosis is rapid, the cost is not

excessive.

A useful hint if you have a few cocoons of a tropical or subtropical species, is to let them stay cool until a short time after they would normally have emerged — then keep them well warmed. With any luck several almost simultaneous emergences will occur and this renders pairings much easier to obtain. Contrary to what the *Silkmoth Rearer's Handbook* suggests, I do not think that one reasonably rapid cool-to-warm change harms pupae. I consider that it is the reverse change which is injurious. If spraying of cocoons is practised (and cocoons dry out quickly in the warm atmosphere), *remember to use warm water, at the same temperature as the cage.* The moths themselves, however, will 'keep' best if reasonably cool.

One or two warnings:- be very wary of condensation in the plastic boxes — some species like moisture, but young larvae are liable to be trapped and drowned by it, and others will contract diarrhoea and die.

When feeding larvae, take care when lifting them out of plastic boxes, etc., not to expose them to cold draughts, and incidentally, try to keep the cages out of draughts at all times to prevent uneven heating and general lowering of temperature.

Do not let British species become too hot, or they use up their energy literally rushing about 'trying' to find somewhere cooler.

Finally, take care that overwintering pupae are not stored near warmed cages, or embarrassing emergences are liable to occur in mid-Winter.

Why not try your hand at winter rearing?—it's great fun, and trying to find the optimum temperatures for various species is an exercise in itself.

18.12.61. H. V. Danks (2907).

ECHOES OF TIMES PAST

Since this year is the centenary of the demise of the last of three entomological *weekly* periodicals that had been published during the preceding eight years, *viz.*, 1856 - 63, I thought it would be appropriate to mark the occasion by printing in the *Bulletin* some extracts from these courageous ventures. The passages I have selected were chosen for various reasons, but will include quite a substantial proportion of editorial comment on matters regarded at that time as topical. It is interesting to compare the persistence of some complaints about the attitude of the general run of entomologists — most of whom, in those days, were amateurs perforce — since many of these still apply to the amateur entomologists of the present day. It is likewise very instructive to note how markedly other ideas have changed: it makes one wonder which of our present-day ideas will be regarded as equally quaint after the passage of another century, assuming that there still is somebody to regard them as anything!

If the notion proves popular, I hope to continue the regular inclusion of such passages in future *Bulletins*, since it will help our younger Members — and perhaps some of the not-so-young — to see entomology more in perspective, and — who knows? — it might even encourage some of them to take a deeper and more serious interest in the antiquarian aspects of our hobby.

But to return to the periodicals themselves, their names alone carry the savour of life in more spacious and peaceful times. There was, for instance, *The Entomologist's Weekly Intelligencer*, the word 'intelligencer' meaning a means by which information (which military authorities still

all 'intelligence', whereby hangs tale!) could be spread as rapidly as ossible. This appeared on twenty-x successive Saturdays in the Sum-ıer of 1856, and again six months ıter, after which it appeared con-nuously every week until September 8th, 1861. The Editor, H. T. tainton, who also wrote, among ther works, the celebrated *Manual f British Butterflies and Moths* (the rst practical and full pocket text-ook on our Lepidoptera), originally ıtended to publish *The Intelligencer* nly during the entomologically ıore productive months, and de-lared with some feeling at the end f the first Volume that even editors eeded a rest from time to time! lowever, he does not appear to ave succumbed to 'human frailty' gain, for so long as *The Intelligencer* urvived after that, it came out hroughout the year — *every week!* ı fact, there was so much demand ɔr the continuance of the paper hrough the Winter of 1856-7 that n equally famous entomologist, J. V. Douglas, brought out and edited substitute, and called it—quite imply, but with the most charming ub-titles—*The Substitute; Or, Ento-ıological Exchange Facilitator, and ntomologist's Fire-side Companion.* 'his originally cost twopence a veek — twice as much as *The Intel-igencer!* — but is now very rare, nd one is very lucky to obtain a opy at all. It lasted but the one /olume, and was much smaller in ormat than the other weeklies.

Lastly there was *The Weekly Entom-logist*, also priced at twopence a veek, and appearing after a gap of ıine months from the cessation of 'he *Intelligencer*. It survived for 65 veekly numbers, from August 1862 to Nlovember 1863, and comprised three /olumes, the first consisting of Numbers 1 - 26; the second of parts ılso numbered 1 - 26; and the third :ontinuing this sequence from 27 to 39. It was originally edited by T. Blackburn for the Altrincham and Bowdon Entomological Society, but latterly J. B. Blackburn joined with him, and these two gentlemen appear to have taken over publication of the periodical too. It is interesting to note that they had some diffi-culties over printers, since even in that short space of sixteen months the printing of the journal was transferred from the original printer to a second. However, this may have been merely for the convenience of employing a firm whose premises the Editors could call at quite easily.

The Intelligencer was printed by Edward Newman of Ashford, Kent, who was himself an entomologist of tremendous energy and enthusi-asm (always a help for an entomolog-ical periodical!) and a prolific writer of books on entomology and general natural history: for instance, it was he who ran *The Entomologist* (still hale and hearty today), and who wrote, printed and published *The Illustrated Natural History of British Butterflies* and *The Illustrated Natural History of British Moths*, which were sometimes bound up together under a common title, and of the 'standard textbooks' on the Lepidoptera, are the ones most frequently met with even today in secondhand-book shops. Since Stainton lived at Lewisham; since there were far more postal deliveries per day at that time; and since the railway services linking these gentlemen were at least as good as, and probably better than, they are today, they had quite a lot in their favour.

On the other hand, *The Intelligencer* is full of errors and their corrections, indicating that Stainton's editing was decidedly scrappy . . . but I must remember those glass houses! How-ever, this could not be said of his opinions any more than it could be said of those of Edward Newman, as can be seen from the two passages

that follow: both are editorials; they have quite a lot in common; and much of what they express still holds good today.

A word of caution, if it is not presumptuous of me to offer it, for those unfamiliar with the reading of old texts: the meanings and usages of some words have changed over the years, and I have indicated their new meanings in square brackets where necessary.

Peter G. Taylor (719).

WHAT IS THE MEANING OF AN INSECT BEING BRITISH?

(From *The Entomologist's Weekly Intelligencer*, **1** (4), Saturday, April 26, 1856).

Some persons are very much puzzled with this question; we will endeavour to clear up the difficulties by which we admit it to be surrounded. A lioness was once found at large on Salisbury Plain, but it is not on that account numbered among the British Mammalia. No doubt had there been a 'Zoologist' in existence at the time, in which to record such *notabilia*, some Wiltshire naturalist, zealous to increase the catalogue of animals in his native county, would have called attention to the fact of a new British Mammal! and an interesting discussion would probably have arisen.

Ornithologists include in their lists of British birds any bird that has been shot at large in our islands, whether its home be America, China or Australia; but entomologists have never acted on that principle, and, if the study of the Entomology of a single island district is to be of any practical value, it is to be hoped that they never will. There are very few parts of the globe which have not contributed to furnish us with living insects, but as they are not generally consigned to any particular party, nor even entered in the manifest of the vessel that brings them over, we do not receive a certificate of their foreign origin, and when we first meet with such things they frequently get entered into our lists of indigenous species quite innocently. A subsequent discovery of the real habitat of the 'stray beastie' enables us to purify our list by expunging the foreigner.

Those insects are held to be British which breed here permanently, whether originally indigenous or not. It is extremely probable that *Lithocolletis messaniella* has been imported along with its favourite food-plant, the Evergreen Oak, but it is so completely naturalised here that no one thinks of rejecting it from his collection as a non-British species. Again, *Oecophora pseudospretella* and *Gelechia cerealella* have probably both been domiciled here through the agencies of commerce; but the former is quite as much at home in the metropolis as the cockroach, which also was not originally a native.

Some insects are occasional visitors, not breeding regularly here, but coming across the Channel voluntarily in particular seasons; thus *Chaerocampa nerii*, properly at home in the South of France and in Italy, occasionally wanders over Germany, the North of France, and visits our southern coast. It evidently does not belong to the same class of visitors as those beetles which we import from tropical countries in the larva state in logs of wood.

If *Callimorpha hera* has similar periodic fits of migration northwards, we might expect it occasionally on our southern coast, but there is little doubt that, were the South of Ireland and all the counties bordering the British Channel well searched, several species we do not at present number as British would

be met with, and perhaps *hera* would be among them.

H. T. Stainton.

BRITISH INSECTS

(From *The Substitute*, No. 3, Saturday, November 8, 1856.)

Most of our British entomologists collect only British insects; and this is frequently made a matter of reproach against them. At home they are accused of a want of philosophy [love of learning], and on the Continent it is believed that a kind of patriotic feeling induces them to restrict their collections to the insects of their own country. There is possibly some truth in both of these allegations, but in the majority of instances neither of them is true, the reason for the practice of English collectors being that they have neither time nor means to do otherwise. They have little time for collecting; frequently they are obliged to confine their attention to one Order, or even part of one, or else they have no means of providing accommodation for more than a very limited number of specimens. This is true of the bulk; the few exceptions must answer for themselves as to their pseudo-patriotism, want of philosophy, or whatever else may induce them not to extend their studies beyond the limits of this sea-girt isle.

There exists against this exceptional class a cause of complaint of much greater importance to the mass of our collectors, namely, their practice of paying extravagant prices for British insects, simply because they are British, for not only is far more than the intrinsic value given, but a temptation is held out to pass off foreign specimens as British, and even to introduce, as natives, species which have no claim to be so reckoned, and thus the very principle of collecting only British insects is rendered nugatory. We say nothing about the spirit which prompts to the possession of rarities at any cost, so that the end be obtained of saying of any one of them, "it is in *my* collection". Such a spirit has nothing to do with Science, nor is its possessor worthy to be reckoned among scientific men.

But, after all, looking beyond a mere possession of species to a knowledge of them, there is nothing like hunting for and taking them oneself: far more will be learned in one day, by having the insects alive, than in a week's study of their dry bodies; indeed, we once heard one of the most learned coleopterists say, "that he never knew a beetle until he had seen it walk across the table". And further, let the British collector console himself with the reflection, that although the most of the insects found in Britain are also common to Europe, the field of observation of their habits is everywhere very little worked. Here then, it seems to us, that English entomologists, hampered as most of them are with hindrances, have scope for employment quite within their means. Not only would the occupation be greatly pleasing, but the result would be of immense advantage to Science.

Edward Newman.

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NOTES AND OBSERVATIONS

THE SMALL RANUNCULUS MOTH (*HADENA DYSODEA* SCHIFF.) IN HERTFORDSHIRE

A little over a year ago I found a small brownish larva on Wild Lettuce (*Lactuca serriola* Linn.) in my garden

at Baldock. I fed it on cultivated Lettuce (*L. sativa* Linn.). It grew rapidly and finally attained full size, whereupon it stopped feeding and went to ground in a peat mixture provided for this purpose.

In September a greyish moth emerged with yellow tints on its forewings. I was extremely puzzled when I could not find the description of this moth in any book. It was not until some days ago that I found a picture of it in E. B. Ford's book *Moths*. It was labelled the Small Ranunculus (*Hadena dysodea* Schiff.). Closer examination showed that this was indeed the moth I had found. The species is, however, marked as extinct by Ford, although South mentions a number of records of it in Hertfordshire.

6.5.63. M. D. Reed (3438J).

While recognising the possible implications of Mr Reed's discovery and the importance of making it known to responsible entomologists in general, it is to be fervently hoped that this announcement will not initiate the kind of stampede that followed the publication of precise information about the rare Lepidoptera to be found in the Ham Street woods, which I have heard referred to as "an entomological Piccadilly Circus". Reading between the lines of the most recent and readily available texts referring to this species, one is driven to the conclusion that it might be just holding on 'by the skin of its teeth' in North Hertfordshire, and therefore an easy target for the dedicated exterminators of rarities: perhaps this time they might give it a chance to recover its status.

It might be worth mentioning, in passing, that the species is not mentioned (at least, in any appropriate place in the alphabetical order) in the Index to Dr E. B. Ford's *Moths*. — *Editor*.

REFERENCES

FORD, E. B. (1955): *Moths*. Pp. 224 - 5. Plate 32.
SOUTH, R., *et alia* (1961): *The Moths of the British Isles*, 4th edn. Pp. 179 - 80. Plate 67.

OVERWINTERING THE LARVA OF THE FOX MOTH (*MACROTHYLACIA RUBI* LINN.)

This year I have successfully hibernated a larva of the Fox moth. The larva was put in a large plastic box measuring 6" x 5" x 5" and two-thirds full of bulb fibre. On 21st October 1962 the larva burrowed just below the surface, making a cell in which it curled up to hibernate. This is the same method of hibernation as that observed by Mr J. E. Knight (*Bull. amat. Ent. Soc.*, **20**: 36).

The box was left closed in a garage through the worst of the weather, the condensation on its sides freezing. In the middle of February the larva was brought indoors in the box, which was stood in the sun. I put the larva on the surface of the bulb fibre, but it burrowed down to the bottom immediately and stayed there, curled up, until it came to the surface naturally on 15th March and started spinning up.

30.3.63. J. Muggleton (3253J).

SILVER Y MOTH — AN EARLY RECORD

On the 14th March 1963 I noted in the garden here at Frome, Somerset, a specimen of *Plusia gamma* Linn. sucking the nectar from the Crocuses.

G. H. W. Cruttwell (118).

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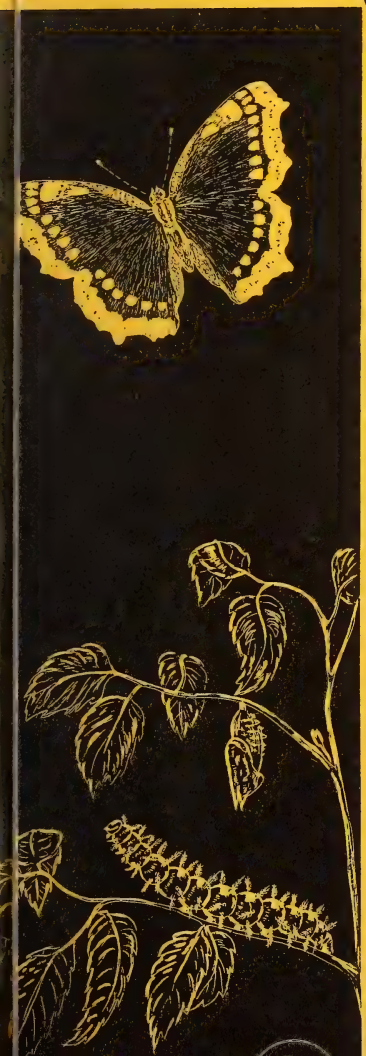
AUGUST, 1963



THE BULLETIN OF THE AMATEUR ENTOMOLOGISTS' SOCIETY

World List abbreviation : Bull. amat. Ent. Soc.

EDITED by H. V. DANKS

AES NOTICE

WHERE TO WRITE

Membership applications, offers of help, changes of address, and non-arrival of Bulletins *to:* D. E. Dodwell, *28 Summerleaze Park, Yeovil, Somerset.* *Yeovil 928.*

Advertisers to: R. D. Hilliard, *54 Gyles Park, Stanmore, Middlesex.* *EDGware 1604.*

Offers to lead Field Meetings, exhibit, etc., to: B. F. Skinner, *85 Elder Road, West Norwood, London, S.E.27.* *GIPsy Hill 0057.*

Manuscripts, drawings, and books for review to: H. V. Danks, *7 The Ridge, Surbiton, Surrey.* *ELMbridge 4156.*

Subscriptions (15/- per annum, 10/- for Juniors) to: B. R. Stallwood, *17 Claremont Avenue, Sunbury-on-Thames, Middlesex.* *Sunbury 2687.*

Youth matters to: H. Berman, *St Ivo School, St Ives, Hunts.*

HOW TO WRITE FOR THE *BULLETIN*

In good English.

Preferably typewritten, double-spaced, with wide margins, and on one side only of quarto paper.

Heading in capitals, NOT underlined. Correct scientific names, consisting of name of genus (capital initial, and underlined), name of species (small initial, and underlined), authority (conventionally abbreviated, NOT underlined).

English names of species, etc., with capital initials.

Your name at end, on the right, followed by your AES Membership Number in parentheses.

Date of writing, all in figures (e.g., 15.8.27.), opposite your name.

Number of words, in pencil and ringed round, in top right corner of first sheet.

Return proofs promptly.

AES BULLETIN

No. 260

AUGUST, 1963

EDITORIAL

The first thing that Members will have noticed about this *Bulletin* is that (as was foretold in the May issue) a new Editor's name appears on the front cover. As the new Editor, I must first thank the retiring Member, Mr P. G. Taylor, both for the work which he has put into the excellent *Bulletins* which he has produced, and for passing on to me most of what I know about the duties of an editor. I think that very few Members realise the tremendous amount of time and effort which Mr Taylor spent on editing the *Bulletin*, and it seems a pity that his present lack of time has forced him to retire so completely from supervising its production. I only hope that I shall be able to maintain the high standard of editing which he has achieved.

Let me say at once, however, that ultimately the quality of the *Bulletin* depends on what you, the Members, write — and although it may seem at first to many of you that you have nothing worthwhile to contribute, you would be surprised how interesting other Members find articles which are written about *your* experiences, ideas and problems.

The *Bulletin*, in its new quarterly form, should contain more material than ever before in a full year, but this can be the case only if enough articles have been written. In this edition you will notice that a small number of people have written several articles each, for I have been extremely 'short' of copy. These people realise how much I appreciate the material which they produce. I should imagine, however, that it is not altogether to your liking to receive a *Bulletin* written by a small number of contributors, and especially by the Editor, who is always left with the task of filling up any space which remains! A shortage of articles, therefore, results in a *Bulletin* which is not really fair on you, the Members — and nor is this really fair on me, for I am unable to produce a properly balanced magazine. The remedy lies in your hands though, not in mine, and if the November issue (which, given normal good fortune, will be produced on time) is to be of a full thirty-six pages in length, contributions must be received *now*.

Although your new Editor does not wish to make himself unpopular in the first *Bulletin* which he has produced, I am afraid that bullying Members for articles is a necessity!

The second thing that Members will notice about this number is that a whole new leaf of advertisements appears inside the front and back covers. I hope that you will not regard this merely as another page to be turned over before the *Bulletin* proper starts, but as something to be read for its interest: many are the improvements in my hobby that have come about as a result of examining advertisements concerned with natural history and entomology.

I am delighted to announce that another Member, Mr D. H. Smith, has very kindly offered to illustrate for authors who feel that they are themselves unable to produce adequate illustrations if these are needed to clarify their articles. I am sure that, following the generous offer of Mr Smith, and the similar offers of other Members, the less artistic-

Front cover illustration: Stages in the life-cycle of the Camberwell Beauty Butterfly (*Nymphalis antiopa* Linn.), drawn by Mr A. M. Freebrey (3359).

ally gifted Member who wishes to publish illustrations in the *Bulletin* need no longer hesitate: his sketches will be transformed into a suitable form. An example of Mr Smith's fine work may be found elsewhere in this issue.

You will notice that the first of a series of Collecting Notes on the Hymenoptera Aculeata appears in this *Bulletin*. This series of notes will be written by Mr J. C. Felton, of Sittingbourne in Kent, who has very kindly agreed to produce them for some time to come. No Collecting Notes on the Hymenoptera have appeared before, and I am sure that all Members will find these most interesting.

You will also see that a list of the AES Advisory Panel appears in this issue — the Panel has been extended into a fully functional body largely by the efforts of our General Editor, Mr R. W. J. Uffen. I hope that Members will obtain full value from the Panel, using it as it is intended to be used, and helping its members if possible in return for their services — by allowing them, for instance, to retain part of any material sent to them which they find to be of particular interest.

In the following pages are published several articles concerned with the light-trapping of moths. Interest in this subject is evidently very great, for these articles were written by different Members quite independently of one another. Perhaps, through the pages of the *Bulletin*, some further interchange of ideas on the matter would be valuable.

Finally, may I add that I should be pleased to hear from anybody who has any comments on the *Bulletin*, on the types of articles that appear, etc. — and I shall be especially pleased if they send me some copy too!

H. V. Danks (2907).

THE ANNUAL EXHIBITION 1963

As was announced in the May issue, the Annual Exhibition this year will be held on 5th October at the Hugh Myddelton Secondary School, Corporation Row, London, E.C.1, beginning at 2 p.m.

A full notice of the Exhibition, and an indication of how to reach it, appears on the back cover of this issue.

The Annual Exhibition, as you all know, is the main annual meeting of the Society, and provides an opportunity for Members to meet one another, to form new friendships and to discuss ideas. The exhibits are always a focus of interest and often lead to new contacts between the exhibitors and other Members. I hope that all those Members who can possibly come to the Exhibition will do so, and will bring exhibits with them. Your insect captures, livestock which you are rearing, a piece of apparatus which you have made, etc., all form exhibits which are extremely interesting to other Members and to the many guests whom we welcome to the meeting each year.

The entomological dealers who always attend the Exhibition, too, make a visit even more worthwhile: they give you a chance to inspect livestock, specimens and items of equipment so that these become more than simply reference numbers or illustrations in various catalogues. And, last but by no means least, the lectures and demonstrations which are arranged are always enthusiastically attended.

I am sure that I speak for the whole Council when I say that we hope to see *you* at the Exhibition: *we* shall be there if you want to see *us*.

H.V.D.

THE AES ADVISORY PANEL

New Members have not been receiving the list of AES advisers for some time and have been writing to the Society's officers to locate sources of information on various groups. These enquiries have made it clear that some additional Advisers would be welcomed. The Panel has therefore been extended, as detailed below, to provide for Members a service of advice on and identification of most groups of British insects. A few other topics are covered, too.

How and when to consult the Panel

Members of the Panel will advise you on the study of their special groups and will identify small numbers of British specimens which are of particular interest to you. Large collections should be taken to a museum for identification. Try to use a copy of the relevant standard work if you know of one, before approaching the Panel.

Always mention that you are approaching the Adviser as he is a member of the Panel and give your own **Membership number.** You must **enclose postage stamps** to cover the cost of a reply or return of specimens. Members of the Panel are busy people, so try to send dead material to them during the winter when their own time is less likely to be taken up with field work. You are recommended to **send a stamped addressed envelope** for acknowledgement of the receipt of material which may have to await time for its identification. **Labelling** — with details of locality, foodplant, date, time and mode of capture, etc. — often greatly simplifies identification. Every specimen should be fully labelled on the same pin as bears the specimen or its mount. Details of locality will be treated as confidential if this is desired.

The Society is most grateful to the many specialists who serve on this Panel, without any remuneration other than the occasional specimen taken, with permission, from an interesting series that has been sent in. It is hoped that Advisers on those groups that are noticed incidentally or as pests will be sought after as frequently as members of the Panel willing to identify commonly collected Orders.

New advisers on appropriate subjects not covered below are always welcomed by the Hon. General Secretary.

ADVISORY PANEL

Coleoptera (Beetles)

General advice and identification
D. TOZER (36), 98 Copdale Road, Leicester.

Staphylinidae
H. R. LAST (117), 12 Winckworth Road, Banstead, Surrey.

Water-beetles
Prof. J. W. A. F. BALFOUR-BROWNE, M.A., c/o British Museum (Natural History), Cromwell Road, London, S.W.7.

Diptera (Two-winged Flies)

General advice
L. PARMENTER (895), 94 Fairlands Avenue, Thornton Heath, Surrey.

Larvae (approximate identification)
K. G. V. SMITH, c/o British Museum (Natural History), Cromwell Road, London, S.W.7.

Tachinidae (Parasitic Flies) *and Muscidae*
E. C. M. FONSECA, 58 Woodstock Road, Redland, Bristol 6.

Tipulidae (Crane-flies)
R. M. PAYNE (2982), 8 Hill Top, Loughton, Essex.

Ephemeroptera (Mayflies)

General advice and identification

of larvae and adults
T. T. MACAN, M.A., Ph.D., Stevney, Outgate, Ambleside, Westmorland.

Heteroptera (Het-bugs)
General advice and identification
T. R. E. SOUTHWOOD, B.Sc., Ph.D., Imperial College Field Station, Silwood Park, Sunninghill, Berkshire.
Aquatic species
T. T. MACAN, address above.

Homoptera
Aphidoidea (Greenflies, Blackflies)
H. L. G. STROYAN, M.A., c/o Insect Pathology Laboratory, Hatching Green, Harpenden, Hertfordshire.
Auchenorhyncha (Leaf-hoppers, etc.)
Dr W. J. LE QUESNE, Anne Cottage, Lye Green Road, Chesham, Buckinghamshire.

Hymenoptera
Aculeata (Bees and Wasps)
J. C. FELTON, 16 Park Drive, Sittingbourne, Kent.
Formicoidea (Ants)
C. A. COLLINGWOOD, B.Sc., c/o National Agricultural Advisory Service, Coley Hill, Reading, Berkshire.
Parasitica (Chalcids, Ichneumons, etc.)
G. J. KERRICH, M.A., c/o British Museum (Natural History), Cromwell Road, London, S.W.7.
Symphyta (Sawflies)
Dr V. H. CHAMBERS, 12 Douglas Road, Harpenden, Hertfordshire.

Lepidoptera (Butterflies and Moths)
'Microlepidoptera' — identification
S. WAKELY (1860), 26 Finsen Road, London, S.E.5.
ditto — *general advice*
D. OLLEVANT (1514), 3 Salcombe Drive, Morden, Surrey.
Noctuidae and their larvae
B. F. SKINNER (2470), 85 Elder Road, West Norwood, London S.E.27.
Saturniidae (Silkmoths)
B. O. C. GARDINER (225), 43 Woodlark Road, Cambridge.

Odonata (Dragonflies)
General advice and identification
A. E. GARDNER, 29 Glenfield Road, Banstead, Surrey.

Orthopteroids (Cockroaches, Grasshoppers, Mantids, Earwigs, etc.)
General advice and identification of British and imported species
A. E. GARDNER, address above.

Plecoptera (Stoneflies)
General advice and identification of larvae and adults
T. T. MACAN, M.A., Ph.D., Stevney, Outgate, Ambleside, Westmorland.

Thysanoptera (Thrips)
General advice and identification
T. LEWIS, B.Sc., Ph.D., c/o Rothamsted Experimental Station, Harpenden, Hertfordshire.

Trichoptera (Caddisflies)
General advice and identification
T. T. MACAN, address above.

Insect Migration
Recorder and Adviser
R. A. FRENCH, B.Sc., (2129), Rothamsted Experimental Station, Harpenden, Hertfordshire.

Botany
Identification of foodplants
H. K. AIRY SHAW (545), Royal Botanic Gardens, Kew, Surrey.
Selection, propagation and cultivation of foodplants and floral attractions
R. C. DYSON (91), 112 Hollingbury Park Avenue, Brighton 6, Sussex.

Photography
35mm. still and general advice
R. W. J. UFFEN (1660), 4 Vaughan Avenue, Stamford Brook, London, W.6.

PROTECTING RARE BUTTERFLIES

An extract from the Monthly Press Bulletin, dated June 1963 and issued by the Council for Nature, reads:—

"The Devon Naturalists' Trust is to organise a wardening service as part of its campaign to protect the Large Blue Butterfly (*Maculinea arion* Linn.), one of Britain's rarest butterflies, which survives only in Devon, Cornwall, and the Cotswolds. The Trust will also ask the Devon County Council to make a bye-law prohibiting its capture in the County.

The Trust is also joining with the Cornwall Naturalists' Trust in applying to the Nature Conservancy for a contract to carry out an ecological study of the Large Blue."

(Devon Naturalists' Trust Report for 1962 - 63).

Douglas E. Dodwell (3482),
8.6.63. *Hon. General Secretary.*

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APHIDS

I have, in my possession, a small number of information sheets issued by the Ministry of Agriculture, Fisheries and Food on the subject of 'Aphid Technique for Entomologists'.

Should any Member be interested and require a copy of this paper, will you please send a 3d. stamp to cover postage (*not* a stamped envelope), and I will be pleased to send one on to you.

D. E. Dodwell (3482),
1.8.63. *Hon. General Secretary.*

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AES FIELD MEETING

Box Hill, Surrey, 12th May 1963.

Only three Members attended this meeting, probably owing to the fact that Members only had short notice of it, and that the day was dull, with a slight drizzle until about 1 p.m.

The party worked the northern slopes of Box Hill itself and then the woods north of the Fort until Juniper Valley was reached. Here the party had lunch (a little marred by the sight of one Member ruefully contemplating a shattered '*Thermos*' flask), and afterwards the Yews (*Taxus baccata* Linn.) were thoroughly worked towards the Caravan Site.

The main purpose was to find the larva of *Eilema deplana* Esp. (Buff Footman), which is normally quite common on the Yew trees in this area. About three hours were spent beating the lichen-covered branches and examining the tree trunks, but only one larva was found (by the leader). This larva was fed on lichen-covered twigs and wilted leaves of Dandelion (*Taraxacum officinale* Weber), and the moth emerged on the 20th of June.

It has been reported since this meeting that the larva was found to be quite common on the more sheltered part of the North Downs in the Betchworth area.

The following larvae were found during the day:—

Cleora ribeata Clerck (Satin Beauty) on Yew.

Allophyes oxyacanthae Linn. (Green-brindled Crescent) on Hawthorn (*Crataegus monogyna Jacq.*).

Cosmia trapezina Linn. (Dun-bar) and *Operophtera brumata* Linn. (Winter Moth) were amongst the commoner larvae also found on Hawthorn.

Stinging Nettle (*Urtica dioica* Linn.) provided the larvae of *Plusia chrysitis* Linn. (Burnished Brass), *Notarcha ruralis* Scop., and *Anthophila fabriciana* Linn.

Euchloris immaculata Thunb.

(Lesser Emerald) on Travellers' Joy (*Clematis vitalba* Linn.).

Lathronympha hypericana Huebn. on Common St John's Wort (*Hypericum perforatum* Linn.).

Ypsolophus nemorellus Linn. on Honeysuckle (*Lonicera periclymenum* Linn.).

The following moths were taken on the wing (conditions were too cold and damp for butterflies):—

Gymnoscelis pumilata Huebn.
(Double-striped Pug)
Nemophora swammerdamella Linn.
Eriocrania semipurpurella Steph.
Mnemonica subpurpurella Haw.
Diurnea fagella Schiff.

D. Ollevant (1514),
Leader.

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COLLECTING NOTES — Summer, 1963

The Smaller Moths

Mr Bradford's notes about the two species of moths illustrated are as follows:

"*Tinea granella* Linn. Forewings light brownish-white speckled with light and dark scales and with darker black-brown marks, streaks and spots. Hindwings grey. It has been recorded in bran, dried fruit, Pistachio nuts and corn grains. I discovered specimens feeding in dried mushrooms which I had bought."

"*Argyresthia goedartella* Linn. The imagines of this species can be found from June to August. Last year I found it very common in St Leonards Forest, Sussex. The head is buff coloured. The forewings are white with dark vandyke-brown markings. Hindwings are dark grey-brown. It flies during the day and the wings have a bronzy-golden shimmer. The forewings of some specimens are much paler than others. The larva feeds in the shoots and catkins of Alder (*Alnus glutinosa* Gaertn.), and Birch (*Betula verrucosa* Ehrhart)."

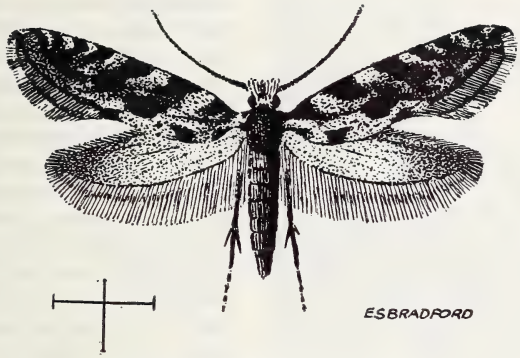
This is a very common moth wherever these two kinds of trees occur.

In my Spring Collecting Notes (*Bull. amat. Ent. Soc.*, **22**: 6) I asked if *Salebria fusca* Haw. had been taken in June as the book I was referring to at the time did not record it as flying then. I have been pleased to hear from Mr E. A. Sadler who took two specimens in Sussex on 4th June 1961, and he bred another which emerged on 16th June 1959: so please amend the Spring Notes to read " . . . . during May, June, July and August ".

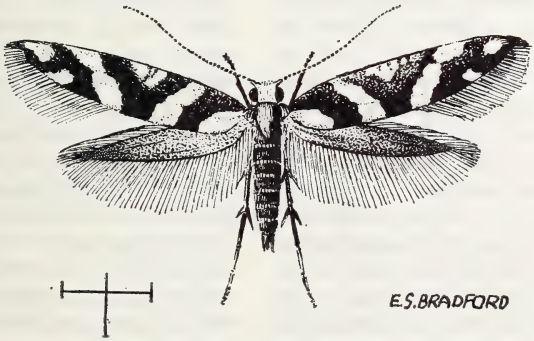
I would like to repeat my plea that any correspondence, especially if it helps me with these notes, is very welcome.

Late September and early October is the right time for collecting larvae of the leaf-miners, and, indeed, some species may be collected until the end of November. Pay particular attention to the leaves of bushes and young trees. A green patch on a fallen leaf frequently indicates the presence of a mine made by a species of *Nepticula*.

Keep the mined leaves in plant pots. Prepare these by filling the bottom with a layer of Plaster of Paris or other porous filler, followed by sand and topped by pebbles. Each pot is covered by muslin and left in a sheltered place out of doors. A further refinement is to start by grinding the edge of the pot flat and smooth by rubbing it on wet fine sand on a hard smooth surface. If this is done, then a piece of glass (weighted down) may be put over over the pot in the spring so that the emerging moths can be more easily seen. Always label carefully with a label which will last through the winter.



Tinea granella Linn.



Argyresthia goedartella Linn.

I seem to have covered the usual collecting methods in my previous notes; *i.e.*, the collecting of seed-heads, berries, nuts, stems and roots.

I will, therefore, finish with an item of news. The '*Entomologist's Gazette*' Vol. 14, No. 3, contains for the most part 'A Revision of the British Scoparias' by P. E. S. Whalley and M. W. F. Tweedie. This paper includes eleven Plates (66 Figures). This is in the main a "Museum" type of publication, carefully sorting out the species, but giving no keys, and no information on life histories or distribution. The photographs (not coloured, of course) show half-moths (in some cases three-quarter-moths!) and include most of the principal forms, and are fairly good. This work is an aid to identification and clarifies the taxonomic position of the species, but it is a bit expensive at twenty shillings per copy to non-subscribers.

D. Ollevant (1514).

REFERENCE

WHALLEY, P. E. S. and TWEEDIE, M. W. F. (1963) *Entomologist's Gazette*, **14**: 81 - 98. A Revision of the British Scoparias.

The Hymenoptera Aculeata

High summer is the best time of year for bees and wasps, and so is perhaps a good time for the appearance of the first of a series of notes on collecting the Hymenoptera Aculeata. Bees and wasps are pre-eminently creatures of the sun, and are particularly active on those hot, still, cloudless days with which we should, at any rate, be blessed at this time of year. The unpredictable nature of the English summer adds to the fascination, and frustration, of studying the group.

Anyone starting to collect bees and wasps would do well to pay attention to those present in his or her own garden. After all, more spare time is probably spent at home than anywhere else, and so the chance of being able to take advantage of a good spell of sun, if only of a few hours duration, is most likely to occur at home. Nor should there be any lack of variety of species. My own suburban garden is only some twenty-seven rods in area [about one sixth of an acre], and yet over the past eight years I have taken 91 species of Aculeate in the garden, while the Kent total stands at 379.

Summer is the time to accumulate as many specimens as possible, to be studied during the quieter winter months: but this collecting should not be indiscriminate. Make every specimen add to your knowledge of the species. Apart from the locality, date and collector's name normally entered on the data label with which each specimen should be provided, enter other details into a field notebook. Details of the habitat as well as the habits of the captures, the flowers visited by the latter, their prey, their nesting sites, all should be noted.

On any calm sunny day in July or August in my garden I can rely on seeing fifteen or twenty species looking for food, a mate or a nesting site. *Crepis capillaris* Wallr. (Smooth Hawk's-beard) flowers attract *Halictus calceatus* Scop., *H. villosulus* Kirby and *H. morio* Fab. Nearby, females of *H. tumulorum* Linn. and *H leucopus* Kirby will be quartering the ground to select sites for their nesting burrows, and the cuckoo bee *Sphecodes ephippius* Linn. waiting for a suitably stocked burrow. About the fence palings, *Trypoxylon* spp. search for beetle holes in which to nest. *T. clavicerum* Lep. is the commonest, but *T. figulus* Linn. occurs, and once also I have found *T. attenuatum* Smith. Other wood-nesting species include *Pemphredon lugubris* Fab. and *Osmia coerulescens* Linn. and *O. leaiana* Kirby. Small wasps search hurriedly over the Raspberry (*Rubus idaeus* Linn.), Blackberry (*R. fruticosus* Linn.) and Elder (*Sambucus nigra* Linn.) foliage for prey, these wasps including *Passaloecus corniger* Shuck., *P. gracilis* Curt. and *Cemonus lethifer* Shuck. *Crossocerus elongatulus* van der Linden is abundant in my area, though if you are in a region with sandy soil, *C. wesmaeli* van der Linden will probably be the species to turn up there.

Bombus pratorum Linn. workers at flowers of Raspberry, and *B. hortorum* Linn. at those of Foxglove (*Digitalis purpurea* Linn.) and Runner Bean (*Phaseolus multiflorus* Willd.) are also regular visitors. *B. terrestris* Linn. and *B. lucorum* Linn. visit short-tubed flowers, though they may ' rob ' Runner Bean flowers by biting through the bases of the tubes, and thus obtain the nectar without pollinating the flowers. And everywhere the workers of the social wasps, *Vespula* spp., are searching for the caterpillars and other small creatures which provide the food for their larvae. Once, in my garden, I watched a *V. germanica* Fab. worker successfully overcome a Hive Bee

(*Apis mellifera* Linn.), which would have been taken back to the wasp's nest had I not taken both specimens.

This first article has been of a rather general nature, but I hope it has been sufficient to raise an interest in this fascinating group. I hope in future notes to deal more fully with the identification and habits of smaller groups of species.

J. C. Felton.

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FROM OUR NORTHERN CORRESPONDENT

The mercury-vapour light-trap

Much has been said and written about the use of the mercury-vapour moth-trap, and the object of this article is not to add to the long list of arguments for or against the use of these traps. In contributing this series of articles to our *Bulletin* I have sought mainly to provide helpful comment for those of our Members who have to live and work in the entomologically less favourable areas of the North, and particularly for those who have to overcome added difficulties because they live in built-up industrial districts. For these Members a moth-trap can be the source of constant interest and can be the means of providing accurate and most helpful records of local species.

My own moth-trap has been in use for just ten years. It is a portable type, although it remains static throughout the year. I use a 'black' bulb and find this very satisfactory, for although it is as attractive to the insects as a brilliant white light would be, it does not cause the annoyance to neighbours which the latter would be likely to. The trap is used every night, regardless of weather, from April until October each year. In the remaining five (winter) months it is only switched on for nights when the weather is unusually favourable — and that isn't very often in my part of the world.

The trap is emptied before breakfast each morning. This is necessary because sunshine will cause not only discomfort and damage to the trapped insects, but will also cause almost immediate dehydration and death. After listing the insects, and *en route* to work, I take the great majority of them to be released at a distance from the garden so that they will not appear on the following nights and affect the records. I consider the careful releasing of unwanted insects as being of the utmost importance. It appals me to think that there are some collectors (I would hesitate to call them naturalists) who regularly use some killing-agent in their traps so that all the moths, valuable or otherwise, many quite useless for setting anyway, rare or common, are killed out of hand. This is quite deplorable and serves no good purpose. It is perfectly possible to preserve hundreds of moths in good condition without resorting to such methods.

The traps should contain a few empty egg-trays. These will be used by the moths as hiding places and they make the naming and counting of the species next morning very easy. This is simply a matter of removing the trays and counting the neatly arranged rows of moths. If it happens to be raining heavily there is the added advantage of using such trays that one is able to take them indoors for listing.

The recording of numbers and species is the main object of the exercise in my opinion and is of greater scientific importance than the mere collecting of insects. Recording can become quite a task

in the busy summer months and it is necessary to have a system to ease the burden and enable one to reach the end of the season with details which are both accurate and easily finalised. Members will no doubt have their own ideas as to the best system to follow but an outline of my own method may help. At the outset of the season I prepare several large ruled sheets. These have narrow columns headed with the dates of the main summer months. Down the right-hand side I enter the names of all the expected species of moths in alphabetical order, leaving several spaces between each group of names beginning with the same initial letter, for adding the unexpected species. Each morning I enter a list of the previous night's captures at the trap in a small pocket note-book. This job can be done quite roughly. Once a week I enter the details into the main list. At the end of the season it is a very simple but very satisfying task to finalise the list and obtain full details of all species taken and numbers of each. Finally these details are used to report to the local society or county society of which one is a member.

I maintain a record book for the light-traps, giving full annual details, and a most interesting picture is being built up over the years. One is able to note how the numbers of common species vary greatly, sometimes building up to vast quantities and then becoming greatly reduced. One notices too that the numbers in which the rarer species appear are far more steady. Dates of appearance add further interest, together with length of season for each moth. The greatest delight of all, of course, is that of adding new species to the local list. Each season I prepare a drawer of insects of particular interest for exhibition at the local society. One need hardly add that although the majority of moths are released there are a few which enhance the collection, and because great numbers are constantly coming to the trap, there are fine varieties to be taken which could hardly be obtained in any other way. From the breeder's point of view it is disappointing that almost all the better things taken are males, but the occasional female comes in and most years I have had something worth breeding from.

In a later article I hope to mention some of the more interesting insects which might be obtained at light in a Northern industrial district. During the ten years I have been trapping, my garden has produced 220 different species, and of these no fewer than 21 species have been new records for the district. Apart from these results one has had the constant daily thrill of listing fine moths, many of which would certainly never be seen without the use of the ' m.v. ' trap.

One or two final points about trapping might be made. It is very helpful to allow the light from the bulb to extend upwards but this means that one cannot cover the trap. On the other hand heavy rain will certainly break the bulb and cause expense and inconvenience. This situation can be overcome by arranging a cover made of some transparent material (I use a thick plastic panel) which enables the light to penetrate and protects the bulb very effectively. The consideration of wind is important in an exposed situation. I once had the entire trap blown away and the bulb was shattered. Since then my trap has been firmly anchored with a retaining wire to the wall. I will close this contribution by noting the results of last night's trapping in my garden (less than five miles from the centre of industrial Halifax):

Total number of moths, 272; Total number of species, 38. There was nothing completely new or very exciting — but there may be tonight!

W. E. Collinson, F.R.E.S. (247).
31.7.63.

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CONSERVATION

3. MASS COLLECTING

Any natural animal community, as we have seen, survives because it has achieved a balance with the various factors which operate upon it. The spread of 'civilisation', to which I will refer in the next article, can upset this balance by altering the topography of the habitat, by destroying directly the organisms in it, etc. Equally dangerous to the inhabitants of such a community, however, is the selective artificial annihilation of numbers of particular species made possible by the use of methods of collecting which are fairly specific for the organisms concerned.

Such methods are used mainly for moths, of course: fortunately for our British butterflies it is not generally possible to attract them to any area in numbers, although with the moths there are at least three methods which are effective — *i.e.*, sugaring, assembling, and the use of light, particularly the mercury-vapour light-trap.

Perhaps because its members are more beautiful at first sight than those of other Orders, or because they are among the first insects which, as children, we really *notice* on account of their colours, the Lepidoptera are the group in which most amateur entomologists are interested. But because there are such large numbers of lepidopterists, they can, by misusing the above methods of collecting, inflict a considerable amount of damage on certain species. That is not to say, of course, that these methods should never be employed — indeed, if properly used the 'm.v.' trap is a most valuable means of carrying out population studies, or of becoming acquainted with the moths of an area. Far too often, however, it is instrumental in the extermination of rarities in given localities where it is used in conjunction with a portable generator: and the trap, in a sense, gives a false idea of the moth population in any area. It is all too easy to think that if a dozen or so moths of one species comes to light, killing these will not do any harm since the species is apparently common. But that very dozen may have been the entire imaginal population of a given small community of the species, the inhabitants of which had all, during their flight that night, happened to come within range of attraction of the light. More often than not, though, this type of trapping is carried out by the 'locality collector', whose sole object is to obtain as many specimens as possible of the local species for which an area is known — and the slaughter which he perpetrates is deliberate and selfish, rather than thoughtless.

I have already mentioned that the mercury-vapour light-trap is a means by which it is possible to become familiar with many of our moths — but there is more to familiarity with a species than the appearance of its members or how they behave when tipped out of the packing from inside a moth-trap. Insects, essentially, are living things and their modes of life are as much a part of them as their appearance. Even though more knowledge of insect habits is gained by sugaring than by light-trapping (since the former involves moving about after dark so that the natural behaviour

of moths is more likely to be seen) this does not compare with the amount of information resulting from deliberate observation. For an entomologist armed only with a net, a ' night out ' in a nearby wood or even a back garden is for this reason more rewarding than a trek far afield with ' m.v. ' trap and portable generator; rewarding, that is, in practical knowledge of habits and in enjoyment, although, it must be admitted, most unremunerative in specimens obtained.

A great deal of worthwhile information can be obtained in this way: data such as the flight patterns of moths, their methods of attempted escape, the flowers which they prefer, etc., are very rarely mentioned in entomological literature, and whilst everyone probably knows the normal ' nervous ' halting low-level flight of the Silver-Y Moth (*Plusia gamma* Linn.), I should imagine that the flight-patterns of other species are less well known. Even the normal flight of the various species within a group may differ quite considerably, and often two types of flight-pattern are evident in the same species. Frequently this is a sexual difference (as in the ' Swift ' moths), but sometimes it is associated with feeding or the prevailing weather conditions such as wind strength. The halting flight-pattern as shown by *Plusia gamma* seems to be common in Noctuids which are feeding freely at flowers, and gives no indication of the speed with which the insects can fly when escaping.

In most of these Noctuids the escape method is peculiar, for generally if a moth of this group is disturbed whilst hovering it increases the wing-beat rate slightly, hangs suspended for a fraction of a second, and then accelerates at an amazing rate as it shoots off into the night. The whole process is rather reminiscent of a helicopter accelerating forward from a hovering position.

In some species, however, escape is immediate, and in the Geometers other methods are generally employed. In the larger species, such as *Ectropis biundulata* de Vill. (Engrailed) and *Ourapteryx sambucaria* Linn. (Swallowtailed), escape follows a short rapid flight upwards which is presumably the result of very powerful initial wing-beats. I remember on one occasion investigating a clump of flowers and disturbing a ghostly shape which leapt upwards in front of me in just this way. My reflex net stroke was so hard that I broke the costa of one wing of what, in fact, was a Swallowtailed Moth!

During flight not associated with feeding further types of escape method become evident. The Brimstone Moth (*Opisthograptis luteolata* Linn.), for instance, usually flies downwards if disturbed during level flight.

The habits of even the few common examples which I have named are interesting, and I hope that other Members will make similar observations and publish their notes in the *Bulletin*. The flowers preferred by moths are also little known, although observation is an undertaking of some difficulty because all the relevant species of flowers are rarely found together. I must admit that I have only been able to confirm that *Plusia chrysitis* Linn. (Burnished Brass) prefers the blooms of Mint (*Mentha* spp.) to even the rich spikes of *Buddleia*, but I hope that in future I shall be able to find out more on this subject.

I hope that entomologists will carry out more fieldwork along these lines and also in other directions, for if we collect insects we ought at least to know how the living animals behave. Here indeed is a vast field of study, and in addition explanations for the habits observed

must be sought. Armed, too, with such practical knowledge of our insect fauna, it will be possible to direct the work of conservation with more effect — for in order to determine what must be done to conserve the fauna of a habitat, a knowledge of its ecology is necessary. Ecology, primarily, is the dynamic inter-relationship of organisms in that habitat, and an essential requirement to appreciate this is a thorough knowledge of the *lives* of those organisms. Is it possible, furthermore, to obtain full value from our hobby if we concentrate on amassing insects by the use of modern methods of mass collecting, to the exclusion of observation such as that described? The answer is certainly in the negative — an examination of the ways of moths reveals far more than the regimented specimens of a collection. And of course, although I have chosen moths as an example, the principle involved can easily be extended to any group.

Observation, rather than excessive collecting, will surely become the modern entomology — an entomology, in fact, which is essentially linked with conservation.

13.6.63. H. V. Danks (2907).

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A SURVEY OF BRITISH MOTHS

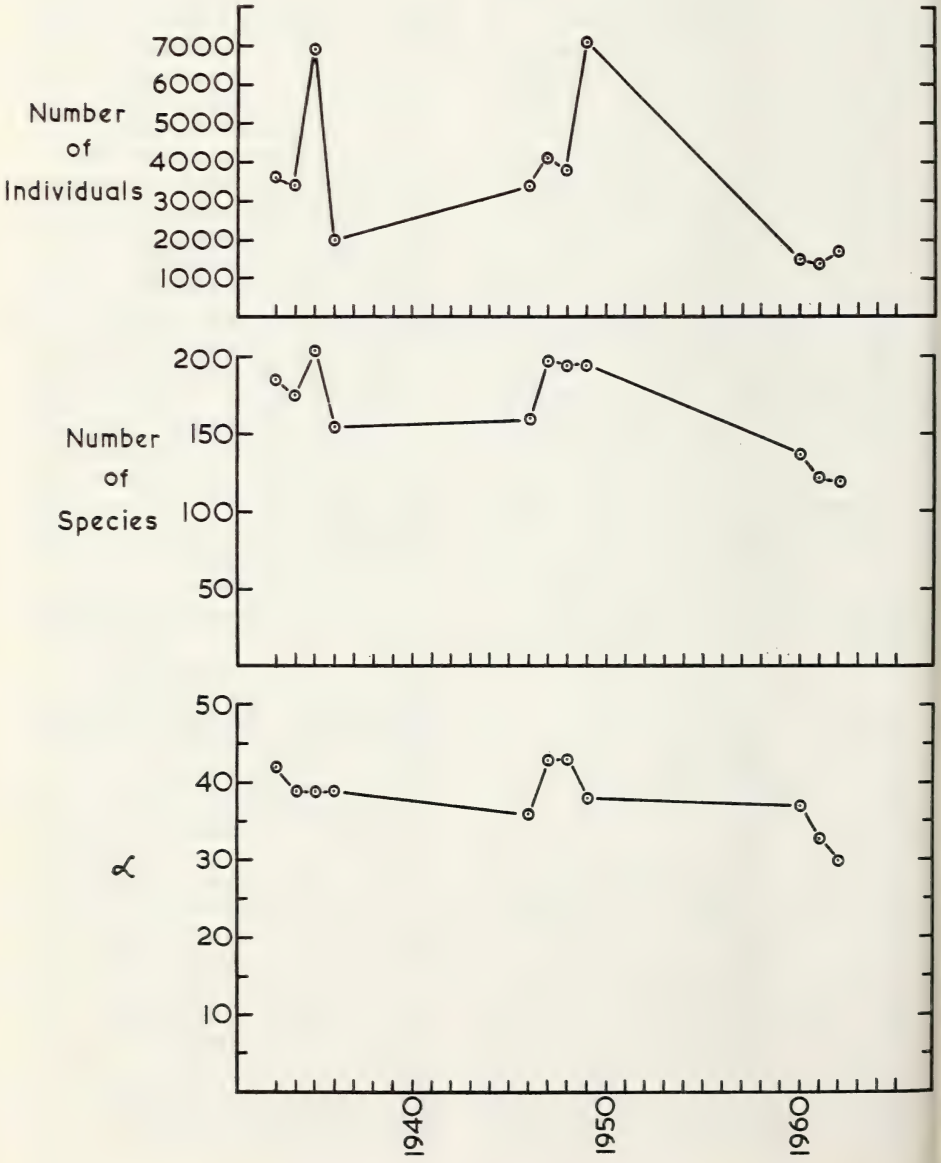
Recent letters and editorial comment in the *Bulletin* on the controversy among entomologists, particularly amateurs, about the ethics of collecting appear to spring from the claim that some species are becoming scarce. How valid this claim is we cannot judge because quantitative information is lacking. Collectors who have visited the same area repeatedly could have collected the information in addition to the insects but most have not. Many Members of the AES may want to just collect insects, a perfectly legitimate occupation provided it does not seriously deplete the population. Without first collecting insects, many people would never develop an interest in entomology. However, one may reasonably ask, "Does collecting decrease the population?" C. B. Williams (1952) answered this question simply and unequivocally for light-trapping and he also discussed the ethics of collecting. At Rothamsted a tungsten-filament light-trap had been used continuously for the four years from 1933 to 1936, and again from 1946 to 1949, and, in spite of killing many thousands of moths of hundreds of species, there was no sign of a decrease in the population in general or of any species in particular. The catch from a light-trap of this type is so small a part of the local population that the effect on the latter is negligible. Even six traps, used continuously for a month in a fourteen-acre wood (French, 1949), had no measurable effect. Intensive *selective* collecting from populations of limited size occupying restricted habitats, may have a more serious effect not easy to assess, but far more species are eliminated by habitats being destroyed by agriculture, industry and urbanisation than by collecting.

Agricultural practices, such as the use of toxic chemicals, might have two effects on insect populations. Firstly they may permanently diminish the total numbers, which seems unlikely and is exceedingly difficult to demonstrate because of the long-term fluctuations in numbers and the mobility of insects; secondly they may lesson the diversity, or richness of the population in species, which is more relevant and fortunately more easily assessed.

Williams Index of Diversity (α)

depends for its use on a population having the number of species and the number of individuals related in a logarithmic series, and many insect populations appear to have such a relation when sampled by light-trapping — in such samples the Index of Diversity measures diversity independently of population density.

Light-traps have been used at several places on Rothamsted Farm since 1933 and there are enough



records to study the variability of the values of α obtained from different traps, different sites and different years. This is now being done and preliminary results indicate that α varies less with site than might be expected and that there has been a significant decrease in α at the permanent trap-site at Rothamsted since 1950.

Light-trap catches for the periods 1933-36 and 1946-49 (see Figs.) show that trapping had no effect on the population. The total number of individuals, the number of species and particularly the value of α remained large. However, the catches in 1960-62 appear to be consistently lower than in previous periods of trapping and α decreases from about 40 in 1933-49 to 30 in 1962. It is difficult to say what caused this decline. Between 1948 and 1960 a nearby small orchard was removed and replaced by a tennis hard-court. There have been changes in farming practice, there are fewer weeds near the trap, cottages have been built nearby, and insecticides and herbicides have been used all round the trap. Some of the population changes may have been caused by the loss of specific foodplants, but the reasons for others remain obscure. The decline in the value of α may indicate a general decline of insect species but to test this a long-term programme of trapping in many places simultaneously is needed. This is where the amateur can collect and at the same time produce data of great value. Anyone who is willing to run a light-trap continuously, anywhere, can take an integral part in a survey of the changing moth population of the British Isles.

Simultaneous daily counts from different localities of the numbers of all species of Macrolepidoptera taken at light are needed. Such replicate measurements of α in different regions would record any progressive decrease in diversity and relate it to current local agricultural practice. Eventually any such changes could be anticipated and perhaps prevented. The survey would also produce valuable and interesting material on insect distribution and abundance which could be published at intervals in the *Bulletin*.

Will anybody interested in such a scheme please write to us at Rothamsted Experimental Station, Harpenden, Hertfordshire?

R. A. French (2129).
L. R. Taylor (441).

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WILLIAMS, C. B. (1952). *Entomologist*, **85**: 271 - 279 Some notes on killing insects for collections and for scientific research.

While I am in sympathy with the basic purpose for which the above article was written — to try to interest amateurs in making records of their moth captures and so to build up worthwhile data on the distribution of these insects — I feel that there are a number of points in the article which cannot be allowed to remain unchallenged.

To start with, the records do not show as clearly as is claimed that light-trapping does not affect the moth population of an area. I would not consider that four years, let alone a month, is a sufficiently long period of study from which reliable conclusions about such matters could be drawn — particularly as the effects of a technique such as that described may not become clear for a number of years. It is evident, too, that moth-trapping would have a more serious effect than usual in years when very bad weather conditions had been experienced (and when the moth

population was naturally low). Indeed, factors which may reduce the number of members in a population to a figure where any further reduction would be critical seem to have been ignored. The graphs are also rather misleading, in a way, for the lines which have been drawn between the points on each graph for 1936 and those for 1946 should certainly not be completed as though they were straight, since between these years no observations were made.

In addition, it must be borne in mind that certain species can only survive in localities where their population density is relatively high (see *Bull. amat. Ent. Soc.* **22**: 14), so that, being unable to exist in a sparse community, they will die out *entirely* in a region unless they are 'common' there.

Readers will have noticed that, for the purpose of my argument, I have assumed that all the moths taken at any particular light-trap will be killed, for the above article implies this to be necessary. In actual fact, of course, such a procedure is entirely *un*necessary, and after a light-trap has been used for a short period of time one becomes so familiar with the moths which are caught, that it is possible to identify the vast majority of species without having to kill the insects — and surely even the really lazy collector, who might use a killing-agent inside the trap, would cease this practice (unless he had no conscience) after he had been forced to dispose of several 'trap-loads' of dead moths.

I would query, too, by what method the workers at Rothamsted showed that a light-trap sample is "so small a part of the local population that the effect on the latter is negligible". Such large numbers of moths appear at any light-trap that some of these must come from areas at a relatively great distance from the particular locality where the trap is situated. That this is the case can often be confirmed by an examination of the distribution within the whole area of the food-plants of certain species, and sometimes by marking techniques.

In any case, the area of occurrence of a species may be severely restricted, even within a larger habitat — the colony of the Scarlet Tiger Moth, *Panaxia dominula* Linn., described by Mr Cribb elsewhere in this issue is an example of an insect community restricted in this way — so that without a really full study of any region, large or small, it is impossible to say that a habitat is large enough to prevent any particular species there from sustaining damage as a result of the killing of insects taken at light. Certainly it *seems* that in many habitats (although we can never be sure) limited slaughter of insects has no effect on the population as a whole, but it surprises me that two scientists of the undoubted standing of Mr French and Mr Taylor should be prepared to generalise in saying that such slaughter has no effect. This is a statement by which only harm can be done, and I prefer, if I am forced to generalise, to take a viewpoint by which only good to our insect species can be done, saying that species in *all* habitats are liable to be affected by overcollecting. Even some ecologists, who ought to know better, summarise their conclusions in the same way as the authors of the above article have, and I have actually heard it said as a result of this sort of generalisation that it is perfectly all right to collect anything, anywhere, because "so and so says so, and he is an *ecologist*"!

A point of major interest in the article, too, is the statement that the amount of damage caused by

collecting is negligible when compared with that resulting from the use of certain agricultural techniques — for collectors are generally a source of danger to rare species because they *selectively* exterminate them. Admittedly the use of various agricultural practices is responsible for more total destruction of individuals than collecting is, but this is no justification for overcollecting. "Two wrongs don't make a right" is an old saying that can be applied here. Most important, though, is the consideration that we cannot possibly expect farmers and other interested parties to co-operate with us in preserving our insects if we occupy ourselves with helping to eliminate the very species which are threatened with extermination. "Agricultural practices should not be allowed to destroy harmless insects, but collectors can", is a form of reasoning which makes sense to no one!

Having 'got that lot off my chest', and, I hope, made some points which may prevent any damage to our insects resulting from the too literal interpretation of certain parts of the article (damage which I am sure would not be intended by the authors, to whom I mean no offence), perhaps I could be forgiven for saying something in favour of the suggested survey.

As mentioned above, I am in full agreement with the basic idea behind this survey, and I trust that Members who can make, or have already made, records of the type required, will co-operate with the authors in this very interesting and valuable scheme. The authors, in fact, have very kindly offered if necessary to carry out identifications of the very 'difficult' species. I hope that what is perhaps the most significant sentence in the article — "Collectors . . . . could have collected the information in addition to the insects but most have not" — will no longer apply, and that information will be forthcoming from all areas.

I certainly hope that useful data will be produced which can be published in the *Bulletin*. — *Editor*.

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INSECT PESTS OF GARDENS — IV

Leaf-miners

The term 'leaf-miner', in horticulture, is strictly reserved for those members of the order Diptera whose larvae tunnel between the upper epidermis and lower epidermis of leaves, so forming either of two main types of mine — these types being the 'blotch' mine and the 'serpentine' mine. Other insect larvae, especially those of several species of the smaller Lepidoptera, feed in a similar manner, though the larvae of Diptera are easily distinguished from these Lepidopterous types with the aid of a hand-lens (standard equipment for gardener and naturalist alike).

By means of the difference in the type of mine already mentioned, a rough and ready system of identification can be drawn up. Using this system, I have divided those leaf-mines most easily found in the garden into two groups, as follows.

A. Blotch Mines

1. On leaves of *Anchusa italica* Retz. caused by *Agromyza rufipes* Meig.
2. On leaves of Shasta Daisy (*Chrysanthemum maximum* Ram.) caused by *Euribia zoë* Meig.
3. On leaves of Giant Hogweed (*Heracleum mantegazzianum* Somm. *et* Lev.) and Celery (*Apium graveolens* Linn.) caused by *Philophylla heraclei* Linn.
4. On leaves of Holly (*Ilex aqui-*

folium Linn.) caused by *Phytomyza ilicis* Curt.

B. Serpentine Mines
1. On leaves of Columbine (*Aquilegia vulgaris* Linn.) caused by *Phytomyza aquilegiae* Hardy.
2. On leaves of *Chrysanthemum* spp. and Cineraria (*Senecio cineraria* DC.) caused by *Phytomyza atricornis* Meig.

The life-history of these insects is fairly typical of the group and can best be shown by giving an account of one species from each of the two very artificial sub-groups just described.

The Holly Leaf-miner (*P. ilicis*) is well-known in many parts of the country, especially on trees and bushes grown close together. Isolated trees seem to be seldom affected. The leaves of both wild and cultivated forms of the Holly may be found to be heavily affected in some years.

The small black adults appear at about the end of May, and the females lay their eggs singly on the undersides of the leaves, near the mid-rib. When the eggs hatch, the young larvae make their way into the mid-rib, and then into the soft tissue between the upper and lower epidermis of the leaf-blade. This method of feeding results in the formation of a large olive-brown 'blister'. Usually only one larva is found in each 'blister' or blotch mine.

The larvae are fully grown by the following March or April, and then cease feeding and pupate in the mines. The pupa can be found encased in the old larval 'skin' (which forms a puparium) and lies protected thus in the mine.

Obviously the method of feeding of the fly larvae reduces the ability of the leaves to carry out their normal functions of photosynthesis and respiration, and extensive damage may be inflicted on heavily-infested plants, especially on variegated forms, which already have a reduction in the amount of photosynthetic tissue owing to the presence of large yellow or white areas which lack chlorophyll.

The Chrysanthemum Leaf-miner (*P. atricornis*) must be a familiar species to all people who grow Cinerarias or Chrysanthemums, attacks being particularly severe when the plants are grown under glass. The fly also attacks a wide range of other plants, mainly members of the Compositae, including many common weeds especially saw-thistles (*Sonchus* spp.) and groundsels (*Senecio* spp.). This fact must be borne in mind when considering the control of the leaf-miner, because weed-control must play a part in any successful attack against this pest.

The mines are extremely noticeable, especially in advanced stages, and are pale straw-yellow. At first sight the larvae seem to wander haphazardly within the leaf, but in fact they usually move from the centre outwards. The apparently random way in which the mines are formed is often accentuated by the presence of several miners in one leaf. I have counted up to thirty larvae in one Cineraria leaf.

Breeding is continuous under glasshouse conditions, and only cold weather slows down the rate of breeding out of doors. The larvae are visible within the leaf, and appear as whitish legless maggots. When fully grown they pupate within their last larval 'skins'. The puparium is at first white, but shortly before the adult is due to emerge it turns black. The adult escapes by pushing off one end of the puparium and bursting through the thin epidermis and cuticle of the leaf underside.

27.1.63. A. J. Tuton (2639).

ECHOES FROM TIMES PAST

I hope in my second contribution under this heading to show that what is still today a very vexed question — that of the use of English or scientific names — is far from being a new one, yet its resolution seems now just as far off as it must have done more than a hundred years ago, to judge by the sentiments expressed by the passage quoted below.

ENGLISH NAMES

Once upon a time there was a little boy; this little boy was not a very good little boy, and when they did not give him anything he wanted he began to cry. His mamma did not like to see or hear him cry; so that, as soon as he began to cry, she gave him whatever it was that he wanted. One night, as he was going to bed, the maid had not put the shutters to, and the moon shone in very brightly, and this little boy saw the reflection of the moon in a pail of water; he was so pleased that he wanted to have the moon in his hands to play with, and so he told Mary to give him the moon out of the pail of water. Now Mary knew that the little boy was rather spoilt, so she told him he could not have the moon out of the pail: thereupon the good little boy began to cry, and made so much noise that his mamma came up stairs to see what was the matter, and asking him what he was crying for, he said, pouting and whining, " Because Mary won't give me what I want. " Then the mamma began to scold Mary for teasing her dear boy, by not giving him what he wanted; so Mary explained that that would be rather difficult, as the young gentleman was crying for the moon which he saw in the pail of water. So when the mamma heard this, she laughed heartily at the absurdity of the thing, and she told her son that he could not always have everything that he wanted; and, though he thought it very strange at first, he dried his eyes, and was a better boy in future.

Now, there are some little boys who want to have English names for every one of our insects; but, you see, we have several thousand sorts of insects in this country, and most of these go by no other name in ordinary conversation than *a* moth, *a* bee, *a* beetle: there are others which are generally known by particular names, as *the* Tiger-moth, *the* Willow-bee, *the* Stag-beetle; but all the species have had scientific names given them, but these are in Latin, and many persons fancy it is very difficult to remember a Latin name, and some writers have pandered to a vulgar error by coining English names, generally merely translations of the Latin names, and these are sometimes very long and stupid; thus we have seen in print the names of two moths, one called the Bright-line Brown-eye, the other the Brown-line Bright-eye: this is sad gibberish, and must be very apt to puzzle simple people. Many insects are so much alike that one needs to be a tolerably skilled Entomologist in order to tell them apart, and the person who is clever enough to know one from the other is clever enough to talk of them by the Latin names; and, mind you, if he don't learn to call them by the Latin names, he will find great difficulty in making himself understood, as the great majority of our entomologists don't know them by any other. Those who were to learn the English names of every moth would find that they would *afterwards* have to learn the Latin names, and they would thus give themselves a deal of unnecessary

trouble.

In the 'Manual of British Butterflies and Moths' the English names are given for all those species which have generally received English names, such as the Brimstone Butterfly and the Peacock, but for those that have only made-up names, and of which you never meet with any one that uses them, no English names are given.

The moon is not fetched out of the pail of water; does the little boy still cry for it?

H. T. Stainton.

(Editorial of No. 8 of *The Entomologist's Weekly Intelligencer* for Saturday, May 24, 1856 — Price 1d.)

It would appear that the unequivocal reproach of 'Mamma' Stainton was inadequate in showing the little boy how ridiculous his behaviour was, for in the 107 years since it was administered the little boy has howled so loudly that certain other motherly bodies (who seem to approve of the practice of spoiling the younger generation, not realising the difficulties that subsequently come the way of those subjected to the character- and mind-softening effect of indulgence) have not only thought fit to provide artificial 'English' names for all our larger Lepidoptera, but have even gone to the ludicrous extremity of manufacturing them for those of the smaller ones usually (and unscientifically) dubbed 'Micros'. I wouldn't mind betting that if any of the unfortunately select few among us who take an interest in the latter assemblage, actually use these so-called 'English' names at all, they could be counted on the fingers of one hand! I wonder if the authors of these absurdities themselves use them in communicating with others interested in the group?

Despite the bitter complaints of those who, starting as schoolboy amateurs, get into the habit of calling the Lepidoptera which they meet with at that time by the English names used in a certain popular handbook often rather euphemistically referred to as a 'standard work'; and who, progressing to a more serious study of the group, during which they meet further species that they learn by their scientific names (thus becoming completely confused): there are still people who, though otherwise intelligent and reasonable beings, advocate the maintainance of a situation which, could they but recognise the fact, was responsible for those very difficulties that they themselves complain of so bitterly.

It is plain that the first name (or fact) that one learns is the first one to be recalled to mind in later years: why, then, do we, more than a century after Stainton wrote his chiding parable, persist in demanding for the next generation of 'up-and-coming' entomologists a lifetime of the same confusion that has tortured us for so long? Is it the same typically English pigheadedness that has left us to sort out, for example, the chaotic tangles that we call our legal 'system', our road 'system', our urban development — in fact, all of the products of compromise and lack of forethought that have until recently bedevilled all our activities?

I wonder if the little boy will ever grow up?

Peter G. Taylor (719).

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A METHOD OF ENTICING THE HOLLY BLUE BUTTERFLY TO THE GROUND

When I was fairly young I had great difficulty in obtaining specimens

of the Holly Blue Butterfly (*Celastrina argiolus* Linn.) for my collection, because the butterflies have the habit of flying along the tops of the hedgerows and around the tops of the Holly bushes (*Ilex aquifolium* Linn.) quite out of reach of a net. Even when flying fairly low in gardens they very quickly soar up and away under the slightest provocation.

There seemed to be no solution to the problem until one day I saw, stuck to a leaf of Bramble (*Rubus fruticosus* Linn.), a small white goose feather to which two male Holly Blues were paying court, apparently mistaking it for the conspicuous white underside of a female. I did not have my net with me at that particular time. Later, however, I 'planted' one or two feathers of the right size on Bramble and Holly, and also a few drops of white paint were splashed over the leaves of a garden Snowberry (*Symphoricarpos rivularis* Suksdorf). All this produced the desired result: in one day four of the insects were caught, all males.

The natural inference would be that the males were deceived into responding to a 'bait' representing a female. However, certain other ubiquitous Lycaenids, notably *Polyommatus icarus* Rott. (Common Blue) — several of which I have seen flying around and settling on a pair of bright-blue plimsolls — *Lycaena phlaeas* Linn. (Small Copper) and *Callophrys rubi* Linn. (Green Hairstreak) seem just extremely inquisitive of anything new to the scenery. It may be, then, that the male Holly Blue responds to an object which is unusual, rather than (or as well as) to one representing a female.

31.3.63. Patrick J. S. Miles (3343J).

[Perhaps, too, the insects are attracted to brightly coloured objects because the latter appear to them to be similar to flowers, although in view of the fact that only males seem to be attracted, Mr Miles' original suggestion — that such objects are mistaken for females — is probably correct. Have any other Members ideas about this or similar behaviour? — *Editor*.]

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THE PROBLEMS OF OVERWINTERING LEPIDOPTERA

The breeding of insects in captivity would be very much simpler if it were not for the fact that for several months of each year it is necessary for the individual insect to overcome the hazards of limited sunlight, low temperatures, and long periods of rain or snow. In all types of insects which in the wild state have to undergo the winter there has evolved a satisfactory way of surviving this period. When being bred in captivity it is the rule that each insect tends to adhere to its normal life-cycle and prepares to overwinter in the special way peculiar to it in nature. It is possible by the use of artificial heat, ultra-violet light and similar devices to delude insects into behaving as though they are living in an unending summer, but not all can be tricked in this way and even with those that can, the problems of foodplant, mating and the continued simulation of natural conditions require more attention to detail, and more work, than most amateurs can afford.

The best method for the amateur to adopt in the matter of overwintering is to follow the natural course as closely as possible. This does mean that the breeder must study the insect in its normal winter

state and then reproduce these conditions in his own garden or home.

The overwintering of Lepidoptera which hibernate as imagines can be effected by housing them in wooden tubs or boxes which have been made insect-proof and which are covered at the open end with butter-muslin. A few pieces of rough (sterile) bark afford more natural roosting and as soon as the insects become active in the spring, it is necessary to move them into proper breeding-cages for feeding and mating. Wooden containers simulate best the hollow tree or pile of logs in which many of our butterflies and moths pass the winter.

Those species which pass the winter months as eggs should be placed in sealed plastic boxes and kept in a cool place. This prevents them from drying out or being attacked by moulds or other natural enemies. As the normal date of hatching approaches it is essential to examine the ova night and morning so that the larvae may be given a small sprig of foodplant as soon as they emerge. Once on the foodplant they should be transferred to a breeding-cage or sleeve, although by changing the foodplant regularly and by cleaning out frass and moisture from the boxes daily it is possible to keep the larvae in the boxes until they are large enough to handle with safety. Small larvae should always be handled with a clean, moistened paint-brush.

The treatment for pupae has been mentioned in many previous articles in the *Bulletin* and these cover most of the relevant points. The pupal state for hibernation, next to the ova stage, is the easiest for the breeder to handle, but it has its snags. The main difficulties are the prevention both of the growth of moulds and of drying out of the pupae. My own method is to use a sealed plastic container, keeping it in a cool place out of direct sunlight. This gives equally good results with the pupae of butterflies and moths. As emergence-time approaches, the pupae are moved into emergence-cages and lightly sprayed from time to time with water. When using a spray it is essential that full ventilation is provided or pupae will 'damp-off' very quickly.

By far the greatest amount of difficulty is experienced with the overwintering of larvae, and I have tried various devices. The dangers to the larvae are again lack of moisture which causes drying out, excessive moisture which allows moulds to grow, and the depredations of other organisms. I have found the only method which gives satisfactory results is to keep the larvae outside. I use bell-jars, open end upwards, or glass or plastic cylinders sunk into the ground. Bell-jars should be pierced at the bottom so that excess water may filter through into the ground. The bottom of the jar or cylinder is filled to outside soil level with a mixture of sterile soil, sand and peat and the foodplant is inserted in a flower-pot in the centre. The larvae are transferred to the foodplant just prior to hibernation. (For some species this means as early as July). A layer of sterile moss around the flower-pot gives additional cover for some species. Cover the jar or cylinder with a piece of fine-meshed netting or butter-muslin and fasten this all round with a strong elastic-band or length of waterproofed sealing-tape. Many larvae overwinter on the underside of pieces of bark which have fallen from trees, or among dead leaves, and I always add pieces of oak-bark and dead oak-leaves, having made sure that they are insect-free. It is not possible to

overwinter the larvae of the Heath Fritillary Butterfly (*Melitaea athalia* Rott.) without the use of dead leaves. Over the top of the cylinder, and supported on two slats of wood, I place a sheet of glass so that it almost covers the open top, leaving only a small area for the direct entry of rain. This ensures that humidity is maintained inside the container, without excess, and ventilation is also maintained. Maximum light is also afforded through the glass.

There are some species which will only overwinter on the foodplant and in these cases it is necessary to construct a breeding-cage around the growing plant or to use sleeves. The latter are sometimes unsatisfactory in that when wet they may kill the larvae either by clinging round the plant, or by lack of proper ventilation. I have found that a wire 'skeleton' inserted into the sleeve and secured to the main stem keeps the sleeve taut and away from the hibernating larvae. One of the insects which must be treated in this way is the Purple Emperor Butterfly (*Apatura iris* Linn.) and another is the White Admiral Butterfly (*Limenitis camilla* Linn.).

As soon as the foodplants of the various insects become available in the spring I go through the overwintering groups carefully and transfer the larvae on to fresh food in suitable cages. This enables me to assess the winter losses and ensures that the larvae get as good a start as is possible. This winter (1962-63) seems to have proved that intense cold for long periods has little or no effect on overwintering larvae and they seem more vigorous and healthy this spring than in previous recent winters.

12.5.63. P. W. Cribb (2270).

"WHAT COST DISCOVERY?"

For many years I was content to watch the insects in my own district. Later, after meeting other entomologists through membership of societies, I began to look at the varied habitats further afield. Finally, I specialised on certain groups and started to go on 'campaigns' to unearth the least-known members of them. I suppose most people's collecting follows a similar pattern. It is fortunate that we do not often stop to compare the cost of a 'campaign' with that of learning something new about a common insect in the garden!

Take as an example a little saga of mine which describes how my effort in one direction has just borne its first fruit. One of the biggest puzzles amongst the British case-bearing moths (Coleophoridae) was the fate of *Coleophora tricolor* Walsingham, described as new to science from Norfolk in 1899. This insect was taken in several localities in Norfolk between then and 1914, but no evidence of its foodplant was recorded, beyond Walsingham's description of the original locality. Two further specimens were recognised in a collection made at that time in Seaford, Sussex. I decided to find this insect and to discover its foodplant.

Whilst on holiday in Norwich two years ago, I decided to try to find Walsingham's type locality. I found that Walsingham's estate is now part of a battle-training area of restricted access. I therefore chose a Sunday for my visit, hoping that the Queen's soldiers would 'hold their fire' on the Sabbath. I hired a bicycle, for what was the first and certainly will be the last time in my life. I was puzzled as to why the machine canted first to the left and then to the right, and discovered that the front wheel was

loose on its axle bearings! Having spent three-quarters of an hour making the machine roadworthy I peddled off in exquisite torture because of the novel design of the seat! I never reached the precise spot that I was heading for, but I did find a small corner resembling Walsingham's description of his locality for *C. tricolor*.

I then had a good idea as to what the flora of this area was. I looked through the section of '*Flora of the British Isles*' on Labiatae — the group of plants attacked by young larvae of related moths — for a plant species local enough to explain how the insect had been overlooked for 50 years. The Basil Thyme (*Acinos arvensis* Dandy) seemed a 'good bet'. I had seen a little of it on my day trip, but never before.

Since that time I have been on four trips to Norfolk and Suffolk by car with other people who have been looking for various insects. Two of these trips, with John Bradley and Arthur Smith from the British Museum, who were looking for Tortricids as rare as the Coleophorid which I sought, lasted several days each. On none of these occasions did I see the plant that I was looking for.

On 22nd July this year (1963), when the date was just right for finding the adults of *C. tricolor*, the weather was too perfect to ignore. I stuffed a few requisites in with my collecting gear and took my own bicycle to the Breck. I was obliged to stay in a very impoverished café, all the 'pubs' being full of motorists. This at least meant that I needed to pay far less for my accommodation than I had expected! My luck was in, for I was able to spend the first evening working the whole length of one road through the battle area, examining every likely-looking field. In an uncultivated dip in a corner of one field I found two rather elusive species of Trypetid flies emerging. These were *Oxyna flavipennis* Loew and *Dithryca guttularis* Meig., both of which gall the rootstocks of Yarrow (*Achillea millefolium* Linn.). I had not yet seen the hypothetical foodplant of the moth which I was interested in.

Next day I found the Basil Thyme plentiful in a felled plantation of Pine (*Pinus sylvestris* Linn.) in Thetford Chase, but it must have been very scarce there before the felling, for I did not see it in adjoining rides. There were no moths to be found, so on I went. Eventually I came upon a field that had lain fallow for very many years. The soil was so barren that there was still only an incomplete covering of plants. The grey, dusty sand kept getting in my sweepnet and for several inches depth was bone dry and powdered. Large patches of this field were blue with Basil Thyme, so I swept it assiduously and was rewarded with half-a-dozen specimens of *Coleophora tricolor*. It is a beautiful little moth, marked like *C. lixella* Zell. with silver lines along the dark-margined yellow wings, and quite exciting to see as it sits distinctively in the net.

Now that I know the foodplant, I am looking for this insect in Surrey. If I find it there, I shall wonder why I spent fifteen pounds on going to the Breck to seek it!

28.7.63. R. W. J. Uffen (1660).

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THE SCARLET TIGER MOTH IN NORTH BERKSHIRE

Many Members will be aware of the occurrence of the Scarlet Tiger

Moth (*Panaxia dominula* Linn.) in a restricted area in North-west Berkshire. Much work has been done in this locality in regard to the aberrant form of the moth (ab. *bimacula* Cockayne) which is found in the colony. Details of this work are given in the book *Moths* by E. B. Ford.

The bulk of the larvae used to feed in a very small marshy area which was thickly covered with Bulrush (*Scirpus lacustris* Palla), amongst which stood well-established plants of the Comfrey (*Symphytum* spp. and hybrids). I know of two forms in which the plant Comfrey appears. One has a shortish flowering-stem and pale yellow corollas, while the other has a flowering-stem three to four feet high and dark purple corollas. It is the latter form which occurs in this area and although the Comfrey is spread throughout the whole woodland in this region and abounds in several other parts of the marshy land, the larvae were concentrated into an area of not more than a quarter of an acre. Mr R. Jarman and I in past years visited the swamp and found the larvae in hundreds, almost every plant having up to a dozen larvae on it. The species was so abundant there that we always puzzled over its restriction to this small area and did not appreciate its vulnerability. The moth occurs in some woodlands nearby, where Comfrey grows beside some fish-ponds, but searching other clumps of Comfrey near the marsh yielded only the occasional larva. The larvae overwinter in the debris at the base of the plant crowns and are easy to find in the early spring when feeding commences.

In 1961 during the spring the area was visited and it was found that a fence which used to exclude cattle from the marsh had been extended to include the very small corner in which the Scarlet Tiger overwintered. Cattle had entered the marsh and completely destroyed all the Comfrey plants, and had reduced the area to a bog. Diligent search of the surrounding area produced a few larvae but it was clear that what had been an abundant species in this locality carrying a very special genetic factor was now on the verge of extinction. In 1962 Mr Jarman checked the area again in the spring, the best time of the year for a count of the population of the moth, and was able to find about eighteen larvae in the whole area. In view of this apparently precarious position of the species Mr Jarman and I again visited the area this spring and spent nearly a whole day, in intermittent rain, searching all the Comfrey plants in the woodland surrounding the marsh and in the adjoining marshy fields. Our careful and intensive search produced sixteen larvae, ten of which were on plants in the woodland and six on those amongst the Bulrush beds. The original marsh is still denuded of vegetation by the cattle and it seems that the moth is unable to survive in the other areas. I cannot think that more than one or two females survived to lay ova in 1962. I have some of the larvae from these eggs in captivity and with luck hope to produce sufficient specimens to try to reintroduce some to the area but I feel that either the destruction of the marsh or some other factor of which I am unaware has put an end to a unique colony of this beautiful moth.

12.5.63. P. W. Cribb (2270).

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KEY TO THE SPECIES OF *VESPULA* THOMSON, C. G.

This key is primarily intended for young naturalists and students. For this reason I have attempted to limit the specific characters to external features. A better key would have resulted without this limitation.

When I produced a preliminary key to the British species, resort was had to the unscientific method of overcoming the difficulties set by the presence of gaps in my collection by using Step's description of the species (Step, 1932). It has since become abundantly clear, a fact that I should have realised from the start, that one should either possess or obtain access to quite long series before attempting something as ambitious as a key. This is particularly important if the key is to be based on the relatively artificial and occasionally variable colour patterns of the species.

I had the good sense to forward the original (preliminary) key to Mr I. H. H. Yarrow of the British Museum (Natural History), to whom I am indebted not only for the correction of the many untruths that I had unwittingly set down but also for a considerable amount of information on certain species and castes, particularly the males.

Figs. 10 to 14 inclusive are also based on Yarrow's diagrams which accompany his article in No. 1100 of the *Entomologist* (Yarrow, 1955). The remainder of the illustrations have been drawn by myself from specimens. These were placed on the microscope's revolving stage and illuminated with a 500 watt Aldis projector. A two inch objective was used with its lower lens unscrewed and removed. The barrel of the microscope was tilted horizontally and a mirror held at an angle of 45 degrees near the eyepiece to project an image on to the drawing paper. Half of the resulting image was pencilled in carefully by checking visually, the paper then being folded in two down the middle and a copy of the drawing produced by rubbing over the back, so completing the other side of the diagram. Owing to an enforced change in the intended reduction for printing of the original drawings, the scale on Figs. 4—7 of ×5 and ×13 should read approximately ×3 and ×5 respectively.

Since this key does depend mainly on colour patterns it should be remembered that the occasional aberration does turn up from time to time. The possible confusion that such an aberration might cause has been offset to some extent by the addition of other specific characters which are independent of external features, and which will be found in the original article by I. H. H. Yarrow.

HYMENOPTERA — VESPIDAE

Key to the *VESPULA* species — based on external features

1 (6) Scape of antennae yellow in front (Fig. 1*), hind tibia of male with long hairs.
The two Tree Wasps and Cuckoo Wasp

2 (5) Eyes not nearly touching base of mandibles.
Tree Wasps

3 (4) Black mark down clypeus, of various shape (Fig. 3). Metathoracic marks very variable, either similar to *sylvestris* or reduced to small dots. The second abdominal black band replaced, at least in the male and worker, by a dull orange mark, clearly

*Fig. 1 is not intended to represent either one of the Tree Wasps or the Cuckoo Wasp; it is, in fact, *V. germanica* Fab.

visible from above.
norvegica Fab., Norwegian Wasp

4 (3) Small to minute black dot on clypeus, sometimes absent. Second abdominal black band disappearing unbroken ventrally, when viewed dorsally. The pair of metathoracic spots fairly uniform in all three castes (Fig. 2).
sylvestris Scop., Tree Wasp

5 (2) eyes almost touching base of mandibles (a feature also possessed by the ground wasps). Second abdominal band parallel and thin except in the middle where it is extended into a rectangle or triangle.
austriaca Panz., Cuckoo Wasp

6 (1) Scape black in female and worker, male with yellow scape but no long hairs on

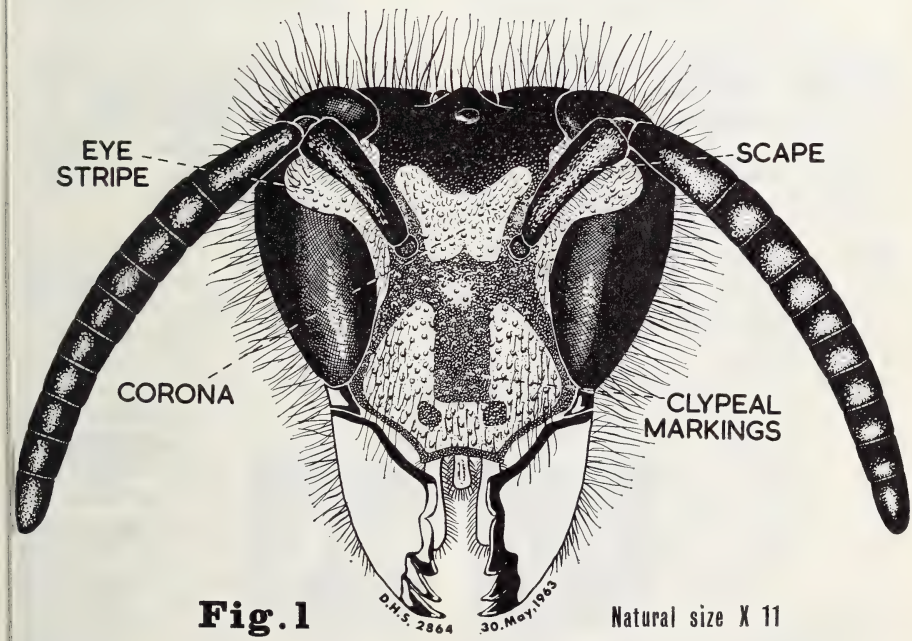

Fig. 1 Natural size X 11

Fig. 2

Fig. 3

the hind tibiae.

7 (8) Abdomen with black hairs. The yellow stripe which marks the excavation of the inner edge of the eye (usually hidden by the scape of the antennae) thin and straight in female and worker, not thicker than antennal scape, often less than half that thickness (Fig. 6). In the male, variations occur from the typical female to a boomerang shape, where the upper end of the boomerang sometimes expands to almost fill the eye excavation. Abdominal markings varied, usually tinged with dull orange (Fig. 7). Black clypeal mark usually composed of single spade-like shape, similar to *norvegica*. Propodeum of worker entirely black.
rufa Linn., Red Wasp

8 (7) Abdomen with pale hairs. Eyestripe otherwise. Propodeum of worker with yellow spots.

9 (12) Queens.

10 (11) First abdominal segment markings of constant shape (Fig. 4a). Third, innermost tooth of mandible straight-sided (Fig. 10). Yellow mark from neck to wing-base usually as Fig. 9a.
vulgaris Linn., Common Wasp

11 (10) First abdominal segment markings of constant shape (Fig. 5a). Third tooth of mandible curving inwards and appearing more pronounced (Fig. 11). Mark on pronotum usually as Fig. 8a.
germanica Fab., German Wasp

12 (9) Males and workers.

13 (16) Males.

14 (15) Some yellow of corona extending downwards below level of antennal sockets, either as lobes or as isolated yellow spots (Fig. 12b). Apical (visible) tergite of male of constant shape (Fig. 13).
vulgaris Linn.

15 (14) Yellow of corona never extending below antennal sockets (Fig. 12a). Apical tergite of male specific (Fig. 14).
germanica Fab.

16 (13) Workers.

17 (18) Third tooth of mandible straight-sided (Fig. 10). Mark on pronotum often as Fig. 9b. Abdominal markings varied (Figs. 4b, c, d).
vulgaris Linn.

18 (17) Third tooth of mandible curving inwards (Fig. 11). Pronotal mark often as Fig. 8b. Abdominal markings varied (Figs. 5b, c, d).
germanica Fab.

The true first abdominal segment of the abdomen is the vertical, posterior face of the thorax clearly differentiated from the metathorax with its pair of yellow spots, by a transverse suture. The remainder of the abdominal segments form the gaster. The abdominal segments referred to in the key, pertain to the gaster. In order to observe some of the above characters, the specimens should be set with the jaws apart and the antennae raised and the apical tergites of the male distended.

22.6.63. D. H. Smith F.R.E.S. (2864).

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Fig.4

queen

RED WASP

Fig.6

GERMAN WASP

Fig.5

Natural size X 5

Fig.7

GERMAN WASP

Fig.8

COMMON WASP

Fig.9

Fig.10

Fig.11

Fig.12

Fig.13

Fig.14

THOUGHTS OF MEETING OTHER MEMBERS

One wonders what are the simple explanations for a person to start to collect insects. In my own case I am sure that the main reason was the example of Mr C. Brind whose interest and enthusiasm fired my own. Looking back, memories of my early years of collecting seem to have made the strongest impression on me: the capture of my first fritillary between Cubert and Cramstock in Cornwall; or the wonderful evening in the public gardens at Newquay when *Herse convolvuli* Linn. (Convolvulus Hawkmoth) was as common as *Triphaena pronuba* Linn. (Large Yellow Underwing).

Since that time I have made friends whose interests are similar to mine. However, it seems that the older we become, the less willing are we to contact other entomologists in our neighbourhood or county. Perhaps as our responsibilities increase our leisure becomes less. I have been living in Hertfordshire since 1958 and only once have I been out on a field trip with one person from the same county — yet on glancing through the last AES *Membership List* I find thirty-two names listed under Hertfordshire!

One of the many joys of being an amateur entomologist is to be able to meet fellow Members of this Society, to discuss interests and go out together. We have a lot to learn from each other, yet few of us ever make opportunities for such meetings. I am guilty of this very offence for several reasons. I have to rely on public transport and this in itself is a discouragement. Perhaps there is a certain shyness about my character and there is the feeling, too, that the contribution that I have to make at any meeting or on any field trip is small. These seem weak excuses when written down, but in fact are some of the reasons for my not being more active in this respect.

The Society offers some means of contact between Members, but it is usually only at the Annual Exhibition that we meet. Many strange faces are there, most of which are hoping to be approached by another, but rarely does anyone make the first step himself.

There seem to be many wasted opportunities of meeting other Members. I would be interested to hear if any other Members have views similar to mine, or that my apparent splendid isolation is not shared by others.

G. D. Trebilcock (2976).

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JUNIOR NEWS SECTION

I hope that Juniors will forgive me for taking over their section in this issue in order to tell them what is happening. I must first congratulate Mr M. C. Birch on winning a place at University: he regrets very much, however, that this means that he can no longer continue as our Youth Secretary, but we have been fortunate enough to find a new Youth Secretary in Mr H. Berman, who has agreed to fill the gap left by Mr Birch's resignation. I am sure that you will all remember Mr Berman as the ' master mind ' behind the excellent exhibits of St Ivo School at the Annual Exhibition each year.

He has, however, been unable to write your News Section in this *Bulletin* because of the timing of his appointment as Youth Secretary, for he is going to Luxembourg with

a party of young naturalists. This will mean, I am sure, that he will have something interesting to tell you (in the next News Section) about the visit, but so that some sort of item appears in *this* issue, have attempted below to put down a few thoughts which may nterest you, even though they may not apply to many of you until next year.

Those of you who breed insects will have discovered that a major problem is how to keep your charges alive during any period that you may be on holiday away from home. In my case, it is my long-suffering mother who is usually burdened with this job! When I was away for a couple of weeks at the beginning of July this year (1963), she was busily engaged on feeding the larvae of a number of species, most of which were foreign and of large and, to her, revolting size.

The only pleasant task for her, or so she told me, was handling the adults of the lovely Spicebush Silk-moth or Cherry Moth (*Callosamia promethea* Drury) — a North American species — as they emerged from the cocoons. I am glad to say that a successful pairing was achieved between moths which emerged while was away, the fertile eggs from which are hatching in numbers as write this.

While the whole family is on holiday, the problem of keeping livestock healthy is more difficult to solve — for the maintenance of an adequate supply of fresh foodplant s necessary. To the difficulties set by any prolonged period of absence, leeving out of doors seems to be the only really satisfactory answer, although for only a couple of weeks, pot-plants may be used indoors, or f trees or shrubs are the foodplants, twigs of these stood in water will generally 'last' for over a week. The *less* woody the twigs are, the better they seem to 'last': plenty of the stem dipping below the surface of water in a medicine-bottle, is the technique which I usually employ, for the narrow neck of the bottle (plugged with cotton-wool) minimises evaporation of water.

Pot-plants can be stood in small dishes of water, each dish and flower-pot being *loosely* enclosed in a large polythene bag tied at its top around the stem of the plant. This ensures a supply of water for the plant, while preventing both the drowning of larvae, and excess evaporation from the dish or soil surface. Make sure that there are several pieces of broken flowerpot, etc., in the bottom of the pot so that the soil in it does not become waterlogged. Be sure, too, to provide suitable pupation sites or pupating media for your larvae if the latter are likely to pupate while you are away.

The trouble with such plants is that they must be potted up well before they are used so that they can 'settle in', and that they never seem (this is my experience at least) to be big enough for the purpose of feeding larvae if they are of a convenient size to fit in an ordinary rearing-cage. I think that the answer to this problem is that I shall have to make myself some more large plastic-cylinder cages, which have the necessary height to hold plants growing in flowerpots, yet are economical on materials for their construction. Perhaps Juniors who have developed cunning ruses to overcome problems of this nature would like to contribute a note about them to the *Bulletin*.

I am sorry that I have no *News of Members* to report, but I am sure that Mr Berman will make good this omission next time.

25.7.63. H. V. Danks (2907).

REVIEW

Practical Entomology, by R. L. E. Ford, F.R.E.S., F.Z.S., Pp. 180. Illus. Frederick Warne and Co. Ltd., London, 1963. Price 17/6.

This book sets out to help the young and the amateur entomologist by offering advice on preservation, collection and observation of insect life. It is far superior to the volume, published some years ago (1951) by the same publishers, *Collecting and Breeding Butterflies and Moths* by B. Worthington-Stuart, F.R.E.S. In the present work the author, in the space of 180 pages, does not confine himself to dealing with Lepidoptera but offers advice and useful hints on Coleoptera, Diptera, Odonata and Hymenoptera.

Presentation of material is well thought out and the author's style and the large print of the text make the book interesting and easy to read. Included are three appendices, the first two being "Time of Appearance of British Butterflies" and "Foodplants of British Butterflies". These will prove useful to those beginning to take up entomology as a hobby.

In the section concerned with the killing of insects the use of cyanide of potassium is dismissed within two paragraphs. I feel the author could have spent more space emphasising the dangers of incorrect use of a killing-bottle charged with this killing-agent. I am concerned for the young entomologist having obtained such a bottle attempting to find out its effectiveness by trial and error methods. More emphasis on the fact that the other agents are almost as good and on the advisability of using these until one has gained more experience would have been a useful contribution.

Apart from this criticism, one is left with the impression that here is a book written by a well-known entomologist who is offering advice which he has found useful by experience. Those with less experience of methods of collecting and preservation of insects would be well-advised to read this book. Even the more experienced entomologist will find information that will certainly interest him. I was particularly pleased to read a book of this type which gave some consideration to the 'other orders' of insect life.

G. D. T.

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LOUGHBOROUGH NATURALISTS CLUB

Secretary: J. Crocker, 66, Outwoods Drive, Loughborough, Leicestershire.

The above club is an Associate Member of this Society. Since its inception it has produced ten typed-sheet Bulletins, and these are quite informative. The last issue contained a summary of the activities of the previous three months. A major proportion of this publication was devoted to classified notes on such subjects as the mammals, amphibians, birds, Lepidoptera and Coleoptera which had been captured in the Loughborough area.

During National Nature Week the club organised an exhibition which 2,814 persons, including 1,337 children, visited during the week. Two nature trails were organised and the total attendance on both trails was approximately 1000.

The Club's programme for 1963/64 contains six winter meetings and seven field meetings. I am sure that anyone living in the Loughborough area would certainly profit by becoming a member.

G. D. T.

LETTERS TO THE EDITOR

Sir, — I am interested in the relations between Diptera and garden flowers and should be pleased to hear of any observations made by your readers.

If possible records should contain the following details:—

1. Name of shrub or other plant, including species if possible.
2. Name of fly, including species if possible.
3. Date.
4. Place.
5. Time of day.
6. Indication of weather, *e.g.*, sunny, wet, etc. Temperature would be an added refinement.

All information would be gratefully received.

8.6.63. David A. Barton (3506).

[Mr Barton joined the AES too late for his name to be included in the *Membership List*, and his address is:— Hillcrest, Darley Hillside, Darley Dale, Matlock, Derbyshire. — *Editor*.]

Sir, — I am interested in the insects found in haystacks during the winter, and I would appreciate help from other Members of the Society in obtaining records. If interested Members would take samples as described below and let me have their results, I would be very much obliged to them.

It is advisable, if possible, to first ask the permission of the farmer to whom the stack belongs — and he may also be able to provide extra information.

Samples should be taken during the cold winter months, and consist of a 'standard fistful' (or slightly more in the case of a small-handed person!). Each sample should be put into a separate polythene bag, which can then be securely closed by fastening an elastic band *tightly* round the neck. The following data about each sample should be recorded.

1. Date taken.
2. Locality of stack.
3. Age of stack (*e.g.*, "stack made in autumn 1962 — no years old"; or, "stack made in autumn 1961 — one year old".)
4. Rough idea of humidity of sample. (*e.g.*, "very dry"; "dry"; "damp"; "moist"; "wet".)
5. Position of sample in stack. (*i.e.*, approximate height from ground and depth into stack.)
6. Crop grown the previous year on field where stack stands.
7. Direction in which sampled side of the stack faces.
8. Direction of prevailing wind at stack site.
9. Type of soil at stack site.
10. Method used for sorting the sample.

The samples may be sorted by any method provided it is a thorough and complete one. For dry samples I find sifting through a sieve the best, after a preliminary inspection for the large active species. Each sample should be sorted at least twice (the residues left after Berlese funnel extractions may be sifted when dry), and well examined for very small inactive insects such as *Micropeplus* spp. Each species occurring in the sample should be recorded, together with the number of that species found. I will endeavour to identify examples of any species which are sent to me (but if the return of specimens is desired, please supply return postage).

Provided enough information is obtained, I will publish any results in the *Bulletin* at a later date.

One last point might be made — ensure that it is a *hay* stack and not

a *straw* stack that you sample, and that it is a *stack* and not a pile of bales.
8.8.62. J. Vincent (3027).

Sir, — While looking through the October issue of the *Courier* (UNESCO publication, Oct. 1962) I came across an article by Karl von Frisch called *Prodiges de l'odorat chez les insectes*. In this article was a short passage which interested me very much. Roughly translated it runs as follows:

"Every collector of butterflies can distinguish, at the first glance, the difference between male and female from the antennae."

Having often had difficulty of sex determination with certain species, I was naturally interested although taken aback at the generality of the statement. I would be extremely grateful to anyone who would inform me as to whether there actually be any difference between male and female antennae of normal butterflies. I am under the impression that only the males are capable of smelling and there are known cases of a male insect following a female at the somewhat incredible distance of one to one and a half miles. This has been especially studied with reference to moths. It is also known that male moths can be distinguished (I refer here to *certain* moths and not to moths in general) from their females owing to the male alone having side-branches on the antennae. I wonder if it was to these species that Mr von Frisch was referring and not to butterflies and moths in general.

I should be very glad of any information on the subject, and anyone who wishes to write to me need only drop a line to my address, which is:— c/o H. Wirth, Parkstrasse 23, Wabern / BE, Switzerland. Any correspondence on butterflies, even in general, would be most welcome.
14.5.63. Basil W. Wirth (3218).

[Please note Mr Wirth's correct address (as above), which is fuller than that given in the current *Membership List*. — *Editor*.]

Mrs Sheila Ashworth (3529) has kindly written to inform me of a severe plague of the larvae of *Yponomeuta padella* Linn. (one of the Small Ermine Moths) which is regularly found each year, in early June, in the Fylde area of Lancashire. This region consists of Blackpool and the area around it up to about fifteen miles East of the town, and the numbers of *Y. padella* which appear there have steadily increased each season for the past four or five years.

This year (1963) the larvae attacked fruit trees and ornamental shrubs, which in earlier seasons were not affected — for previously the species has been found only on Hawthorn hedges (*Crataegus* spp.), though nevertheless in considerable numbers. A Ministry of Agriculture spokesman has been reported as saying that hedges which have been completely defoliated for two consecutive years are likely to die, and such is the scale of the outbreak that serious damage has been caused in this way.

Y. padella is one of a number of species of 'tineid' moths of the genus *Yponomeuta* whose larvae feed gregariously, in a dirty-white web, on the leaves of various trees and shrubs, being particularly common on certain types of hedges (e.g. *Crataegus* spp., *Euonymus* spp.). The different species of the genus, over the classification of which there is considerable controversy, generally feed on different foodplants, *Y. padella*, of course, feeding chiefly on

Hawthorn.

Now that Mrs Ashworth has drawn attention to the occurrence of these yearly plagues of *Y. padella* in the Fylde, perhaps some Member living in this part of Lancashire would like to make a fuller study of the phenomenon, investigating, for instance, the reasons for the failure of the natural enemies of the species to control it for so long a period. I am sure that some interesting results would be obtained which could be published in the *Bulletin*.

H. V. Danks (2907), *Bulletin Editor*.

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NOTES AND OBSERVATIONS

THE YELLOW FORM OF A SPECIES OF *PIERIS*

On the morning of Saturday June 15th this year (1963) while walking outside Wing Rural District Council Offices in Bridge Street, Linslade, Leighton Buzzard, Bedfordshire, I saw a specimen of the yellow form of either *Pieris rapae* Linn. (Small White Butterfly) or *P. napi* Linn. (Green-veined White Butterfly). I had the specimen clearly in view for some twenty to thirty seconds, and there was no mistaking the genus although I could not identify the species. The insect was flying at a height of about ten feet and so I was unable to get very close to it, or to capture it as I had no net with me. All four wings of the butterfly were of a uniform clear yellow and the insect appeared to be in first-class condition.

Terence F. Knight (3190).

THE INDOOR WINTER ACTIVITY OF A TORTRICID LARVA

In his *Handbook*, Meyrick states that the common garden Tortricid *Cacoecia* (=*Tortrix*) *unifasciana* Dup. feeds on Privet (*Ligustrum* spp.). In our garden it also feeds on *Lonicera periclymenum* Linn. (Honeysuckle), but is in fact more or less polyphytophagous and, as events showed, will eat the most unappetising-looking leaves.

Our particular Honeysuckle bush grows against a wall and overhangs near some large French windows facing the back garden. At about the end of September small numbers of the sickly-looking larvae of *Cacoecia* (=*Tortrix*) *unifasciana* travel down the panes on their way from the foliage above the windows to that near the bottom of the shrub.

On about Christmas Day 1961, I discovered that for the first time a larva had actually come into the house and had made its 'tent' amongst the leaves of one of the Cyclamen plants (*Cyclamen europaeum* Linn.) ranged along our windowsill. It had, evidently, been feeding well on these somewhat tough leaves, and to my surprise it looked as though the larva had also attacked the succulent stems and even the flowers!

It pupated soon after I had first discovered it, at about the end of January (no record!). A female moth subsequently emerged on 31st March 1962, and was a very dark specimen, the usual ferruginous striations being replaced by ones of a greyish-black colour.

My first record of a wild specimen of this moth, it is interesting to note, was for the fifth of June. Could we please hear of any other Members' experiences of indoor

overwintering resulting in premature emergences?

1.4.63. Patrick J. S. Miles (3343J).

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A HABIT OF SOME MUSCID FLIES

On Oxshott Heath, on 14th July 1963, Mr L. Christie and I settled down to watch some Aculeate Hymenoptera digging their nesting-tunnels in the sand. We became aware of two grey flies which sat on stones and flew after any solitary bees that passed them. Such bees were usually followed from below and about six inches behind. The day was dull and the bees not very active, so that nothing more than this happened. I expected to find that these flies were Calliphorids, but they were obviously Muscids.

I suspect that few entomologists are aware that the larvae of *Hammomyia* (=*Leucophora*) *grisea* Fall. and of related Muscids raid the provender of nests of the fossorial Aculeate Hymenoptera. Colyer and Hammond (1951) do not mention this very special habit, which is restricted to a very few genera.

Mr K. G. V. Smith kindly identified the species of fly for me.

R. W. J. Uffen (1660).

REFERENCE

COLYER, C. N. and HAMMOND, C. O. (1951). *Flies of the British Isles*. Frederick Warne, London.

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LUCANUS CERVUS LINN. (STAG BEETLE) IN ESSEX

Following the recent correspondence under the above heading in the April-May edition of the *Bulletin*, I would like to report that a male Stag Beetle (*Lucanus cervus* Linn.) was found in the garden of a house in Briscoe Road, Rainham, Essex on 16th June 1963.

A local newspaper reported that a Stag Beetle was destroyed by being run over purposely by a 'bus. This beetle was said to measure four inches in length [presumably after it had been run over — *Ed.*], and was also found in the vicinity of Rainham.

12.7.63. R. Edwards, B.Sc.(3479).

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AN APPEAL

Was there any subject in this issue which interested, amused or annoyed you? If there was, I am sure that you could write some sort of article on that particular subject for a future *Bulletin* — if there was not, why not write on something in which you *are* interested?

Because of the delay which has built up in the publication of the *Bulletin*, this August issue will have reached you still behind schedule — and in order to produce the November issue on time, articles for the latter (which must be passed on to the printer well in advance of the publication date) should be sent to me very soon. But please do not delay for this reason until the February number, as articles are required NOW to form a full-sized November *Bulletin*.

Please send me some copy!

H. V. Danks (2907), *Bulletin Editor*.

Printed by Ellis & Phillips Ltd., East Side Press, Spellbrook, Bishop's Stortford, and published by the Amateur Entomologists' Society, 42 Normandy Avenue, Barnet, Herts. 1963.

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THE AMATEUR ENTOMOLOGISTS' SOCIETY

ANNUAL EXHIBITION, 1963

SATURDAY, 5th OCTOBER

from 2 p.m. to 5.30 p.m.

HUGH MYDDELTON SECONDARY SCHOOL,
Corporation Row, London, E.C.1

ADMISSION FREE

EXHIBITS. The Hall will be open from 11.30 a.m. for receipt of Members' exhibits. Bring along your specimens (any Order, living or set), equipment, apparatus, photographs, drawings, etc. If you require a large space, notify the Meetings Secretary in advance. Please label exhibits clearly.

DEMONSTRATIONS. Members will demonstrate setting of insects of several Orders.

GROUPS. Members of Groups who have been corresponding will be able to meet for discussion.

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Light Refreshments will be available.

Offers of help and enquiries to Hon. Meetings Secretary, B. F. Skinner, 85 Elder Road, West Norwood, S.E.27. GIPsy Hill 0057.

BRING YOUR FRIENDS AND AN EXHIBIT !

To get there: Farringdon Station (Underground) connects with most main stations, and numerous buses serve the area. Cars may be parked in permitted areas of the School grounds.

Notice is hereby given that neither the Amateur Entomologists' Society nor the London County Council can accept any liability for damage to vehicles or property, which are left in these grounds entirely at owner's risk.

VOL. 22

No. 261

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NOVEMBER, 1963

THE BULLETIN OF THE AMATEUR ENTOMOLOGISTS' SOCIETY

World List abbreviation : Bull. amat. Ent. Soc.

EDITED by H. V. DANKS

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In good English.

Preferably typewritten, double-spaced, with wide margins, and on one side only of quarto paper.

Heading in capitals, NOT underlined. Correct scientific names, consisting of name of genus (capital initial, and underlined), name of species (small initial, and underlined), authority (conventionally abbreviated, NOT underlined).

English names of species, etc., with capital initials.

Your name at end, on the right, followed by your AES Membership Number in parentheses.

Date of writing, all in figures (*e.g.*, 15.8.27.), opposite your name.

Number of words, in pencil and ringed round, in top right corner of first sheet.

Return proofs promptly.

AES BULLETIN

No. 261

NOVEMBER, 1963

EDITORIAL

I am hoping, as I write this editorial, that you will receive this November *Bulletin* more-or-less on time. I would ask you, however, to ensure that the February issue reaches you on the first of that month by sending a large number of contributions for that issue to me by the 'deadline' of 12th December—for by doing so you will not only be fair to the Members (particularly of the Council) who have responded so well to my appeals for copy whilst the *Bulletin* was behind schedule, but you will also enable me to be fair to our hard-working printers, who have had a very trying time in making up the 'lost time' on our magazine.

The *Bulletin* is our chief means of exchanging information and ideas, and even what are the most trivial-seeming items to you are of great interest to the majority of Members. I hope that an appeal for copy will not be necessary again!

I am pleased to announce that this *Bulletin* contains, as extra centre pages, a pull-out supplement to the 1962 *Membership List*. This supplement will enable Members to continue to keep in touch with their fellow-entomologists in the Society.

Apart from providing opportunities of contacting other Members by means of an up-to-date *Membership List*, the Society holds a number of meetings each year. Of these the Annual Exhibition in October and the Annual General Meeting in March are the most important. In addition there are a large number of field meetings organised either by the AES or by affiliated societies which welcome AES Members to their meetings. I hope that our Members will take these opportunities of making new friends and of discovering aspects of entomology with which, perhaps, they are not so familiar, for by so doing they will contribute to the well-being of an active Society.

H. V. Danks (2907).

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PRESERVATION OF WILD LIFE

An extract from the Council For Nature's Intelligence Unit Monthly Press Bulletin, No. 42, August 1963, reads:

"Wild Life on Road Verges Saved

Leicestershire Trust for Nature Conservation has made an agreement with Leicestershire County Council that ten stretches of road verges in the County, important for their wild flowers and butterflies shall not be mown. The Trust will carry out observations as the basis for a scheme of management for these verges that will both preserve the plants and fulfil the county council's maintenance obligations."

10.8.63. D. E. Dodwell (3482),
Hon. General Secretary.

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COLLECTING NOTES

—Autumn, 1963

The Smaller Moths

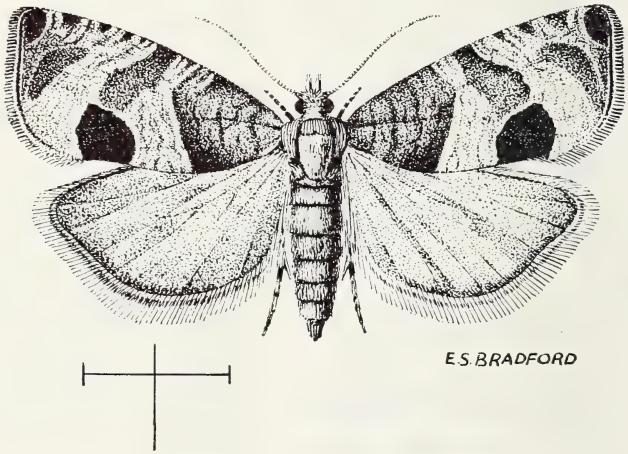
The request for these notes unfortunately comes at a time when I am very short of spare time, and, at this moment much of what I have

Front cover illustration: Pupa and imagines of the Large Tortoiseshell Butterfly (*Nymphalis polychloros* Linn.), drawn by Mr A. M. Freebrey (3359).

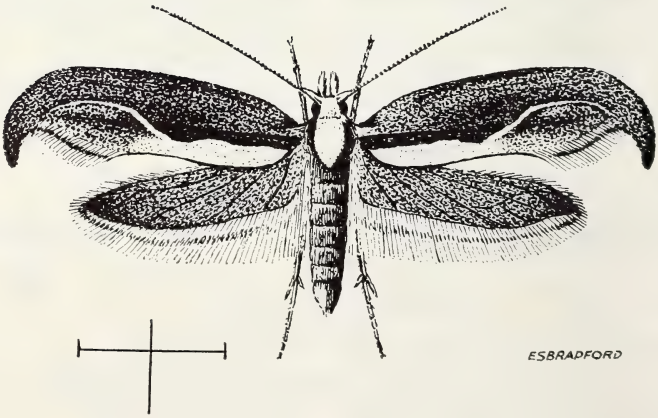
written in these last few months hasn't yet reached the Members, so I can't 'pad' the article with any comments from Members. I regret, therefore, that this time I shall have to confine my article to notes on the moths that Mr Bradford has kindly illustrated.

Notocelia uddmanniana Linn. Mr Bradford writes: "The imago can be found in June and July. The most notable feature is the dark chocolatey-black patch on the dorsum of the forewings. The rest of the wings are a dull brownish grey, also the hindwings. I have taken larvae feeding in the shoots of bramble" (*Rubus fruticosus* Linn.).

This common moth seems to be widely distributed in the British Isles, but Meyrick does not mention it as occurring in Wales. I should have thought that it occurred there, but I don't seem to have taken it there



Notocelia uddmanniana Linn.



Ypsolophus xylostellus Linn.

myself.

On Banstead Downs in Surrey in late May I noticed that almost every new shoot on some bramble bushes had the young leaves pinched together by the larvae of *N. uddmanniana*. The moths emerged in early July.

Ypsolophus xylostellus Linn. Mr Bradford's notes read: "Head and thorax pale yellow. Forewings chocolatey-brown with pale yellow dorsal streak. Hindwings grey. The larva feeds on Honeysuckle (*Lonicera periclymenum* Linn.), and the imago can be found in July and August".

This moth is particularly easy to distinguish, and so is its larva. It is common throughout the British Isles.

D. Ollevant (1514).

The Hymenoptera Aculeata

This year swarms of wasps are again attracting everybody's attention. Although it might appear that this common occurrence is scarcely worth the attention of a serious hymenopterist, much of interest remains to be learnt about these interesting insects. Their very abundance, in fact, makes them particularly suitable for certain types of study.

The general life-history of the social wasps is well-known. Fertilised females (queens) emerge from hibernation in the spring and, singly, found nests, either underground or in bushes and trees according to species. Soon the first brood of sterile females (workers) emerges. The workers take over all the jobs of the colony except egg-laying. They obtain food —sweet things for the adults and animal matter for the larvae—and also building material for the growing nest: and so several broods of workers are reared. Towards autumn, males and queens are produced. After fertilisation the queens go into hibernation, while the males and workers die off with the onset of colder weather. So we come to the numerous workers paying unwelcome attention around the house this autumn. 'Wasp years' have been recognised for many years and the factors that lead to high populations of workers in the autumn have been considered by Fox-Wilson (1946). It is not, as might have been expected, mortality of the overwintering queens that is critical, but rather the weather conditions during the early stages of nest-building. The two commonest species nest underground and until the first brood of workers is active such nests are very susceptible to flooding. Years with low rainfall during May and early June are therefore, in general, good 'wasp years'.

Such is the overall picture. Now let us turn to the relative abundance of the individual species. Edward Saunders (1902) published figures on this for two localities. He found that *Vespula vulgaris* Linn. was five times more common than *V. germanica* Fab. in an Irish locality, while precisely the reverse was true in an area of Berkshire. The factors affecting this relative abundance are not fully known, but, in general, dampness may favour *V. vulgaris* (see Yarrow, 1955). This should mean that there are some years which are damp enough to prevent *V. germanica* becoming abundant, while still allowing high populations of *V. vulgaris*. This is an obvious field in which much data can be collected relatively easily by the amateur entomologist.

Ideally, data on the number of queens emerging from hibernation, of established nests, and of the resulting workers should be obtained. The workers present the simplest problem because of their numbers and inquisitiveness. For instance, it is easy to record the number of specimens of each species caught inside the house. While few may be caught each day, over the season the number will

mount up. The numbers captured can be increased greatly by the use of traps, and this opens up a whole field for experiment. The attractive ingredient of the bait used in the trap, the type of trap and its siting, can all be varied. Beer is certainly a potent attractant, and the area of a dustbin is a good site.

When assessing the abundance of workers, it must be remembered that individual colonies can be very populous, and so if one nest is very near the sampling point, this will introduce a bias into the results. This is particularly so when traps are being employed, and can be avoided by using two pairs of traps placed some distance, say fifty yards, apart. An added advantage of traps sited in this way is that the data from them are amenable to statistical analysis.

An example of trapping on a large scale was given by Dohring (1960). In 1959 in the public parks and gardens of Berlin, 3,783 specimens of *Vespula vulgaris* and 3,652 of *V. germanica* were taken in baited jars. I have myself an example of sampling bias. Over a period of ten days during this year (1963) a light-trap yielded 70 individuals of *V. vulgaris* and only two of *V. germanica*, yet random captures in neighbouring buildings gave sixteen specimens of *V. germanica* to four of *V. vulgaris*.

If collections of queen wasps in the spring, and records of actual wasps' nests, can be combined with such counts of the worker wasps, an overall picture should quickly emerge. Such data become even more interesting when they can be compared with others recorded under very different conditions. For instance, our *V. germanica* has been introduced into New Zealand, and its life-history there has been described by Thomas (1960). Perhaps the most interesting difference which the species shows there from the insect in this country is that under New Zealand conditions the whole colony can overwinter. This enables colonies of enormous size to develop.

The above only touches the fringe of the subject of social wasp ecology. For those stimulated to study the group, I append a short key to the British species. It is designed as a preliminary sorting key when dealing with large numbers, and is based on characters that can be seen when the wasp is viewed 'head-on'.

1. Colour of head orange-brown and yellow..... *Vespa crabro* Linn.
— Colour of head black and yellow ..... *Vespula* spp.
2. Face short. Only a narrow strip between eye and mandible..3.
— Face long. A squarish area between eye and mandible....6.
3. Whole sinuation of the eye filled with yellow.....4.
— Only a narrow line of yellow on the lower edge of the sinuation of the eye ..... *rufa* Linn.
4. Scape black. (In male, tibiae without outstanding hairs) ..... 5.
— Scape yellow in front. (In male, tibiae with outstanding hairs) ..... *austriaca* Panz.
5. Inner margin of yellow in sinuation of eye concave .. *vulgaris* Linn.
— Inner margin of yellow in sinuation of eye convex .. *germanica* Fab.
6. Clypeus with a small black central spot ..... *sylvestris* Scop.
— Clypeus with a broad central black line ..... *norvegica* Fab.

The above key is somewhat simplified, and should be used merely for sorting in conjunction with a full key such as the one published in the last (August) number of the *Bulletin*. The main difficulty will be the separation of *Vespula vulgaris* and *V. germanica*. This has been fully dealt with by Yarrow (*loc. cit.*), and my attempt to elucidate the character of the broad or narrow black stripes above the antennal bases is in the key above.

J. C. Felton.

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FROM OUR NORTHERN CORRESPONDENT

Apology : The May issue of the *Bulletin* contained an article under the above heading, by Mr W. E. Collinson, which was followed by the comments of Mr P. G. Taylor, who was editor at that time. The AES Council had no knowledge of these remarks prior to their publication aud regrets their inclusion. The Council tenders its sincere apologies to Mr Collinson.

The 'plusias' (Plusiinae)

Amongst the most beautiful of all the British moths are the 'plusias'. When these moths are newly emerged their metallic markings are most striking and I am sure that on many occasions people have reported to most of us that they have seen moths "with polished metal on their wings". The northern entomologist is fortunate in that several of the finest 'plusias' are more easily obtained in the North than elsewhere. All the members of this group seem equally attracted to light but they can also be obtained by many other means. The older collectors used to take the 'plusias' by netting them at dusk as the moths hovered above flowers. This method was known as 'dusking', and I have experienced the thrill of taking members of almost all the species of the Plusiinae on a warm summer evening in a field full of thistles. Requiring less effort but producing almost as satisfying results is to have a bank of Cat-mint (*Nepeta cataria* Linn.) in one's garden. On a favourable evening the flower-heads are almost alive with 'plusias' and the glint of the metallic markings of the insects is lovely to behold. It need hardly be added that most of the species which occur in any given area will turn up from time to time at the mercury-vapour light-trap.

Golden Plusia (*Polychrisia moneta* Fab.)

This is one of the least striking in appearance but one of the most interesting moths of the entire group. In my early days of collecting it was still regarded as something new and very rare. Nowadays most of our Members will encounter it very soon in their experience, although I never find it to be common and take only two or three specimens per year. The larvae are very interesting and are taken on well-established perennial *Delphinium* plants. I have never come across them on larkspurs (annual *Delphinium* spp.) although these are stated to be the main foodplants. It is particularly exciting to come across a newly spun, bright yellow cocoon, which looks quite exotic.

Burnished Brass (*Plusia chrysitis* Linn.)

The commonest member of the Plusiinae, this handsome moth appears in considerable numbers in any warm summer. There are two quite distinct forms, and my own district is favoured by having the type which is almost completely metallic in appearance.

Gold Spangle (*Plusia bractea* Schiff.)

I always feel that this moth is not aptly named. It would be much more suitable to refer to it as "Silver Spangled". The true home of this lovely insect is, of course, Scotland.

One of our Members wrote to me some time ago, after going to live in the far North. He said that one of his greatest delights had been to witness scores of newly emerged specimens of *P. bractea* coming in to light and gleaming like jewels. No such delight awaits the naturalist of the industrial north of England, but the Gold Spangle does appear there and I have taken occasional specimens in most years.

Gold Spot (*Plusia festucae* Linn.)

This magnificent moth is far more abundant than most people realise and my garden light-trap has attracted 120 specimens in the last eight years. There are two distinct forms of this moth, although this is not generally noted in the text-books. We have the usual fine variety with darkish colour. There is in addition a smaller, much lighter form of the species. In good years a second brood can be obtained in September. The larvae are easily reared in captivity and the resulting moths are very beautiful when newly emerged.

Plain Golden Y (*Plusia iota* Linn.)

How often has one seen moths nicely set out in a well-kept cabinet and labelled as this species, but in fact being quite wrongly named? It seems that there has always been error over the identification of this moth and its near relative the Beautiful Golden Y (*Plusia pulchrina* Haw.). Indeed, South (1961) indicates that there used to be actual confusion as to whether a specific distinction was valid. Very often trouble over identification arises because many specimens of *P. pulchrina*, a few days after emergence, turn a rather dingy brown colour. They are then so different from the newly emerged moths that they really do appear to belong to a different species, and are often labelled *P. iota*. The result is a fine drawer of 'plusias' with perhaps four lovely, rosy hued specimens of the Beautiful Golden Y, newly emerged and properly named, but alongside these are four moths, rather drab and a little worn, also specimens of *P. pulchrina* but bearing the proud name of Plain Golden Y! In my own area at least, the Plain Golden Y is much the rarer of the two species, but it is easily recognised by the solid rectangular dark mark on the forewings. It is generally slightly larger than its more handsome relative.

Silver Y (*Plusia gamma* Linn.)

So often, common species are regarded too lightly by the entomologist, and the beautiful Silver Y is one of the moths which most suffers because it is too familiar. Newly emerged moths display such a range of lovely shades and markings that a whole series of them would hardly produce two alike. Of course, the specimens obtained in early summer are almost all migrants and look like weary travellers, but the autumn offspring have a rich beauty of their own. The Silver Y sometimes turns up in amazing numbers. On the heather moorlands of the north of England there are sometimes literally clouds of *P. gamma* flying in bright sunshine and feeding from the purple heather flowers. The species seems equally capable of flying by night, and can be taken by any of the usual means.

Dark Spectacle (*Abrostola triplasia* Linn.)

This is by far the rarer of the two 'spectacles' in the North, and only occasional specimens occur in my own district. In a similar way as with the two 'Golden Y' species, it is possible to confuse specimens of this moth with worn examples of the Spectacle (*Abrostola tripartita* Hufn.). The best method of distinguishing them is, of course, by the 'spectacle' marks which occur only on *A. tripartita*.

Spectacle (*Abrostola tripartita* Hufn.)

Readers will be weary of my references to the beauty of newly emerged specimens of all the species of the Plusiinae, but it will be found that in

almost every member of the group, and particularly with *A. tripartita*, there is no comparison between the beauty of a moth fresh from the pupa and one which has flown for even so much as one hour. This fact, together with the added interest of studying the life-cycle, should encourage Members to rear every member of the 'plusia' group where it is possible to do so. In my opinion a fine drawer of 'plusias' is the highspot of a good collection.

W. E. Collinson, F.R.E.S. (247).

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CONSERVATION

4. THE EFFECTS OF 'CIVILISATION'

In this article I plan to 'grind the other edge of my axe', and to deal not with the effects of collecting but with those of civilisation and industrial expansion. Let me first emphasise that conservation as we visualise it today does not involve a total ban on the use of insecticides, just as it does not suggest that only limited access should be allowed to nature reserves—for the modern aim is to *educate* the industrialist, collector and general public to appreciate some of the factors involved in the complex dynamic relationships which exist between organisms and their habitats and which we call ecology. With this appreciation will come a willingness to cooperate, to take advice on how to avoid upsetting these relationships, and a pride in doing this.

A little progress has already been made (towards the control of insecticides) but there is so much apathy about the subject that this advance is very slow. It seems that most entomologists either do not care if we lose some of our insect species, or are too lazy to do anything to prevent such loss, and much of the progress which has taken place has come about as a result of agitation by ornithologists, poisoned birds being more readily noticed than dead insects. We all know, too, that some species of birds are in danger of dying out because sterility has been induced in many individuals of those species by the presence of insecticides in their bodies—the Peregrine Falcon (*Falco peregrinus peregrinus* Tunstall) in Britain, for instance, and the Bald Eagle (*Haliaeetus leucocephalus leucocephalus* Linn.) in America are endangered in this way.

In addition to reduction in fertility and direct poisoning of animals, as mentioned above, the use of insecticides may have other consequences. One of these is upsetting the ecological balance between a pest and the organisms which feed on the latter. If the pest decreases in numbers during one year because chemical pesticides have been employed, so will most of its predators, parasites, etc., and in the following year, the pest (unless chemicals are used against it once more) will often appear in large numbers because many of its normal controlling influences are absent.

In areas of plentiful food supply (as in crop plantations) animals using that food supply can build up from small populations into very large ones unless correspondingly large predator or parasite populations are present too. This is chiefly because a small number of predators is unable to find *all* of the small scattered pest colonies, so that some of the latter can reproduce undisturbed for at least a generation. It is virtually impossible for the parasite, etc., to control all of the larger colonies so produced, and damage to the crop will result. All this means that, generally, when pesticides have been used for one year they must be applied in subsequent years in order to maintain control over the pest—and in any case they

seem nowadays to be applied automatically whether they are strictly necessary or not—so that the problem of the *accumulation* of a dose which is lethal to harmless animals arises.

This is particularly important in cases where insecticides such as D.D.T. (which breaks down only slowly) have been used, although those of the aldrin group lose their activity fairly quickly: nevertheless, some of the latter would accumulate in the soil if normal quantities were applied annually.

On the other hand, a proper study prior to the use of any insecticide enables quantities and methods of application to be so adjusted that the chemical *reinforces*, rather than reduces, the effect of the natural enemies of the pest whose control is desired. It has been shown that such adjustment is fully possible and usually results in a minimum amount of damage to organisms other than the pest.

Much damage to wild life also occurs in areas where double applications of pesticides have been given by accident, and when full treatment must be ensured, such areas are very difficult to prevent.

Although the problems set by the use of toxic chemicals are probably most acute in America (where a weight of some 350 million pounds of insecticides was used in 1962), the effects in this country are very serious, and it is only by ensuring that full studies of the effects of insecticides, of different application methods, etc., are made that we can in turn ensure that the minimum amount of damage to our wild life ensues.

Some progress, as I have already said, has been made—British farmers have agreed, for instance, to restrict the use of aldrin, dieldrin and heptachlor (three of the most dangerous of the commonly-used insecticides) in the spring, when pesticides are liable to cause considerable damage to wild life because of the timing of the reproductive cycle in most animal species.

It is theoretically *possible*, then, given a means of carrying out research and of giving advice on the use of insecticides, that the effects of toxic chemicals can be minimised, particularly if modern methods of biological control are used more widely to supplant those of chemical control. This *possibility* will only become reality, however, if sufficient interest and (for want of a better word) 'drive' is shown by entomologists and others interested in the conservation of our fauna.

The problems of urbanisation, in its broadest sense, although at present given less attention than those posed by the increasing use of toxic chemicals, are theoretically less easy to solve. The problems of pollution by factory effluents, etc., however, are surmountable, and I think that wider controls than at present exist must be introduced to prevent water extraction and pollution. We are all aware, as earlier comment in the *Bulletin* has indicated, that our waterways and ponds are fast becoming more sterile: but by far the greatest menace which urbanisation holds for wild life comes from housing schemes, which involve levelling of and building on areas of unspoiled countryside. Accommodation must be built, of course, for the population of Britain is expanding at a very rapid rate. Conservation can here act so that the minimum effect on wild life is produced.

One solution to this problem is to build upwards rather than outwards, or to revolutionise house design, and research in this direction (although probably insufficient) is being done. I think that the 'green belt', although decried by some, has an important role to play as a 'buffer' for wild life. It provides a means whereby reserv-

oirs of animal population can be left undisturbed and so, to some extent, offset the spread of housing on either side of them.

The above are just some of the problems with which we are faced today, and we must be prepared to help in solving them ourselves, and not simply wait for others to do the work involved. It is often asked, too, whether we should not give these problems far more consideration than the "comparatively minor" effects which we entomologists produce. Certainly these matters require a great deal of thought, but I stress that we must first show that *we* are willing to conserve our insects before others can be expected to give us the co-operation which we require; particularly as it is those species whose populations are in the most precarious positions for survival which have the greatest damage inflicted upon them by 'entomologists'.

How tragic it would be if the agencies outlined above were to cause the loss of some of our fauna—but how much more tragic if we, as entomologists, should allow this to happen through indifference on our part, or worse, should accentuate these effects by our own lack of foresight and imagination.

29.8.63. H. V. Danks (2907).

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INSECT PESTS OF GARDENS —V

Rose Sawflies

The rose (*Rosa* spp.) must surely be one of the most popular British garden plants, mainly because it is easy to grow and requires a minimum of staking and attention, attributes which anyone who has only a limited amount of time to devote to gardening will find to their advantage.

Although many varieties are prone to certain fungal infections, most of the Species roses, and the modern varieties, are very resistant to attacks from fungal or insect pests. However, the members of one group of insects can be particularly troublesome. These are the rose sawflies.

The sawflies belong to the Order Hymenoptera, which includes bees, wasps and ants. Although the adults superficially resemble dipterous flies, they can be identified because they have two pairs of wings, and usually very shiny, dark-coloured (black) bodies. The body colour does, however, vary with species.

The larvae are characteristic and, though they may be mistaken for lepidopterous larvae by the uninitiated, they are very easy to distinguish, for sawfly larvae curl their rear ends in a characteristic manner.

Sawflies are ideal subjects for observation, being easily visible, and also easy to breed. Mounting cabinet specimens of adults may be done in either of two ways, on card points, or mounted on pins. Which method is adopted is left to the discretion of the collector, but careful labelling is essential. Larvae can be preserved by pickling or, where anatomical details are not required, by inflating and drying the skins, as is done with lepidopterous larvae.

There are three species of sawflies which attack roses. The effects of all of them can be serious in some years, particularly during hot, dry seasons. Different varieties of roses may vary in their susceptibility to attacks from the different species of sawflies.

The Banded Rose Sawfly, *Emphytus cinctus* Linn.

The larvae of this species feed at first on the leaves, which they eat away entirely. Later they tunnel into the branches, feeding as they go. Eventually cells are formed, in which the larvae pupate in spring.

The female sawfly lays her eggs in June on the underside of the leaves. The eggs are laid in minute slits which are made by the female with her saw-like ovipositor.

The larvae are greenish in colour and about half-an-inch long just prior to pupation. They feed on the foliage from July to October, spend the winter in the shoots, and emerge the following spring. This procedure is convenient from a gardener's point of view, because pruning of bush and standard hybrid tea and polyantha roses removes many of the pupae. However, the pest may be prevalent on Species roses, and on 'ramblers' and 'climbers', owing to the fact that these types of roses are not pruned so heavily as others, if at all.

The Rose Slug Sawfly, *Endelomyia aethiops* Fab.

This sawfly often attacks wild as well as cultivated roses, and hedge-row roses may therefore constitute a locus of infestation. An alternative name for the species is Slug-worm.

The larvae are responsible for skeletonising the leaves of roses. The shiny black females lay their eggs in May or June in incisions in the edge of the rose leaflets. The yellowish, hump-backed, slug-like larvae feed mainly on the underside of the leaflets, so that these become at first blotched and later whitish. Finally the leaves turn brown, and shrivel.

When fully grown the larvae enter the soil and spin cocoons in which they hibernate until the spring, when they pupate. Adults and young larvae may easily be destroyed with D.D.T.

The Leaf-rolling Sawfly, *Blennocampa pusilla* Klug.

The damage caused by the larva of this sawfly is very characteristic and takes the form of a lateral folding of the leaflets on bush and climbing roses. This rolling not only disfigures the leaves, but reduces the effectiveness of the latter for their normal functions of photosynthesis and respiration.

The life-history of this sawfly is very similar to that of the preceding species in that the eggs are laid near the edge of the leaflets. The folding over of these leaflets commences almost immediately. Later the pale greyish-green larvae can be found within the folded portions. When fully grown the larvae fall to the ground, where they hibernate in a silken cocoon until spring, when they pupate.

The adults are very shiny, and black, and resemble winged ants.

The pest is difficult to control by spraying or dusting with insecticides because of the protective cover afforded by the folded leaves. On a small scale, picking off the affected leaves by hand is the easiest control. The use of D.D.T. to kill the female adult as she lays her eggs is also advocated. On a very large scale—as in a rose-nursery—the pest can be controlled with one of the systemic organo-phosphorus insecticides like 'Metasystox'.

17.3.63. A. J. Tuton (2639).

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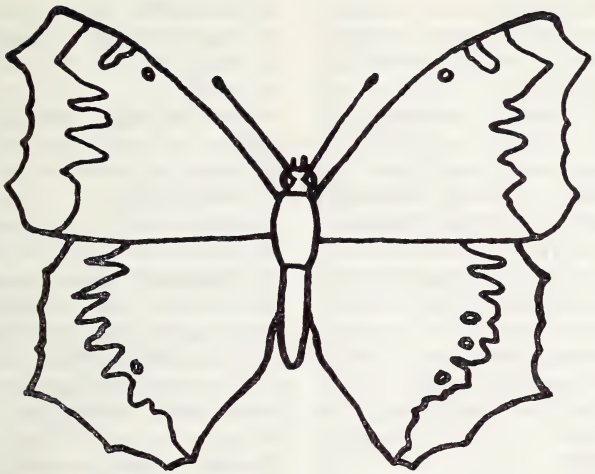
ABERRATION OF THE CAMBERWELL BEAUTY BUTTERFLY

On the 11th June 1963 I obtained six larvae of *Nymphalis antiopa* Linn. (Camberwell Beauty Butterfly), which I was to rear on twigs of Sallow (*Salix* sp.).

Although I accidentally killed one of the larvae, the other five all pupated successfully by 21st June, all hanging from the roof of their cage.

Emergences took place between 13th July and 19th July. The first four 'out', three males and one female, were typical specimens. The fifth, a female, was typical in shape



only: as the sketch shows, the straw-coloured border was of a most irregular pattern, varying from one eighth of an inch to half an inch in width. The row of blue spots that typically comes within this border was missing altogether, and one or two odd white spots appeared in some places. The size of the specimen in question was also larger than normal, measuring some 90mm. across the wings.

I have checked, in respect of this freak specimen, with several publications, and can find no mention of anything which is at all similar to it.

29.8.63. D. E. Dodwell (3482).

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THE SPREAD OF THE ESSEX SKIPPER BUTTERFLY: A POSSIBLE EXPLANATION

In the dunes between Sandwich and Deal in South-east Kent the Essex Skipper Butterfly (*Thymelicus lineola* Ochs.) first became established in about 1945. By 1955 (Chalmers-Hunt, 1961) it was firmly established at Sandwich Bay, and it is whilst describing its spread in this district that I hope to offer an explanation for its extension elsewhere.

On 25th July 1962 I was amazed to find that it had spread, from a small colony near the seashore, to all over the area, particularly along the road into Sandwich Bay. It outnumbered *Thymelicus sylvestris* Poda (Small Skipper Butterfly) — which several years ago was the more common species — by at least twenty-five to one, and was positively abundant. Then, a day later, I found it had appeared two hundred yards from my doorstep (I live in the middle of a Council Estate!), on some waste ground abandoned only a couple of years ago. Here, however, it was about as common as *T. sylvestris*. It had also extended its range in nearby Betteshanger Woods which has, however, been a recognised locality since before 1949 (Embry and Youden, 1949) and was commoner than *T. sylvestris* here, too. To the West of Sandwich, in the countryside around Ash, it seemed common, again fast becoming more frequent than the Small Skipper. In 1957 and 1958, when I spent my summer holidays in this area, it was only just established.

Having described the insect's status here, I will now give some characteristics of the Sandwich Bay colony.

The first obvious characteristic that I noticed after watching the colony for three years was its slight peripatetic tendency. Although the three sections of the Sandwich community, mentioned above, stayed in the same square mile, their exact location varied annually by distances of up to a furlong. This is comparable to the shifting colonies of *Lysandra coridon* Poda (Chalkhill Blue Butterfly) (see, for instance, British Museum (Natural History), 1930).

All the sites had a property in common, though: they were all very moist. Just as a Bedouin tribe moves from oasis to oasis as each dries up, so the drying up of their original sites seemed to force the colonies of *T. lineola* to a nomadic existence.

Whether the insect itself needs moisture is not really relevant, because it is a fact that the foodplant, *Holcus lanatus* Linn. (Meadow Soft Grass or Yorkshire Fog) — the *only* one *here* in my experience — can only grow where there is the requisite humidity. I seem to have been the first to assert that this is the foodplant; Chalmers-Hunt (1961) says, " Foodplant unknown ". Now, the wet patches and hollows where the insect breeds are only temporarily existent, and ' new ' ones are formed in July, August and September, in the hollows where water has collected, and when the Meadow Soft Grass is in seed. It is evident that as each temporary wet patch disappears, the grass would eventually die off from lack of moisture and the butterfly colony would presumably be extinguished. Clearly, however, the latter is not the case: evidence shows that the colonies move with the ' oases ' — and the Yorkshire Fog Grass obviously does so too, shifting to centres where its requirements for moisture can be met.

This beautiful grass manages to survive in this way by producing many minute seeds, which in addition are very light — " It has been estimated that in a pound there would be two million " (Stokoe, 1942). Consequently these seeds can be carried for long distances and so the grass survives by colonising new damp patches. Thus I contend that areas where the Skipper's foodplant grows shift in keeping with shifts in moist spots. Communities of *Thymelicus lineola* necessarily move too, although at the moment how this is done is not really clear, as the adult insect does not seem to wander much. In any case, because the insect originally occupies a wet spot and a new one takes a year to evolve, a ' move ' would only be imperative every other year.

So we have the Essex Skipper leading a rather precarious existence until quite suddenly (like last year) it appears everywhere and is more common than the formerly predominant *T. sylvestris*. Members elsewhere (see *Bull. amat. Ent. Soc.* **21**: 17, 55, 77, and 84) reach for their pens and write to the *Bulletin* about this, and ' Letters to the Editor ' is full of it!

I shall now put forward a theory which I feel at least applies for this district. As already stated, *Holcus lanatus* produces a lot of widely-dispersed seeds, the few which germinate being those which come to rest on one of the previously-mentioned ' oases '. It has also been asserted that it is only when a year or so has elapsed between the drying up of one spot and the formation of another that the insect appears in the latter. Now let us suppose that during one year there are more ' oases ' formed, so that

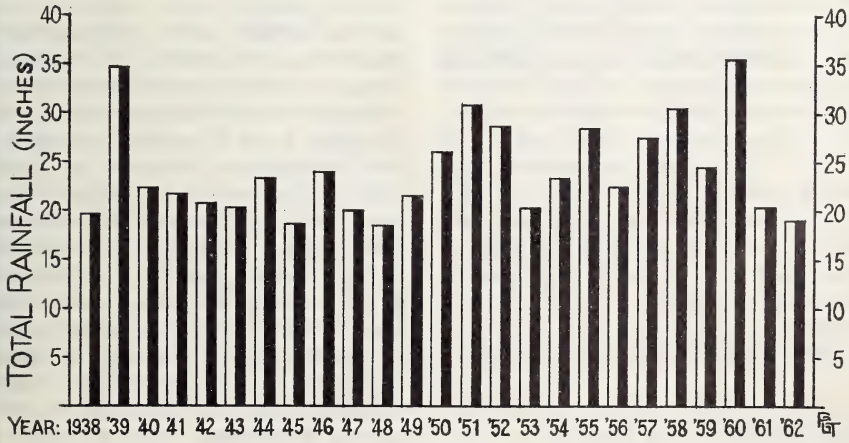
more than the usual number of *H. lanatus* seeds survive. It may be concluded that in all these 'oases', Yorkshire Fog Grass will spring up the following year. Then when the Skippers of the generation whose foodplant-site has dried up emerge, they have more opportunities for expansion because of the increased number of humid patches — the latter being covered by the foodplant, on which eggs can be laid. In fact, perhaps those Skippers which we see in the fresh wet patches, 'dodging about' like Noctuids, may not be on the ground where they were reared. If this subject is to be carried further, then some research is necessary to find out what the real flying capabilities of the species are, and how far its 'wanderlust' is in fact developed — so some of this is conjecture.

Putting aside this fact, though, it is evident that when there was an abundance of the required moist hollows, female Skippers would have a wider selection in which to lay their eggs, the colony would expand, and conditions the following year would be as they were in this area in 1962. At the moment I do not necessarily mean this to apply, for example, in Mr Bigger's region.

Here in Sandwich at any rate, then, we get a superabundance of *T. lineola* when a lot more moist patches than usual have been formed two years before. (In the first year the females find the spots, a year later their progeny appear in large numbers.)

It boils down to this: after an exceptionally wet year, there is an abundance of *T. lineola* two years later, following expansion of the species, and after a series of wet years there is the sort of cumulative effect that we have seen everywhere in the past season. (Why the wet spots don't always form in the same places is a problem which may have something to do with the nature of the surrounding dunes).

This seems all very well in theory, so I went to Sandwich Town Hall to obtain the rainfall figures for the past twenty-four years. The histogram of amounts of rainfall is reproduced here. First, let us take 1960, the wettest year for twenty-two years. Now, applying the theory, more ideal spots than usual would be produced. The following year (original 'oases' dried up or not) the wandering *T. lineola* females would reach these areas, and a spread such as that actually ex-



perienced would occur — a spread only, mind you. The *abundance* I put down to the cumulative effect of all the previous above-average wet years in this district: starting in 1949, mounting, up to 1951, dropping slightly in 1952 and again in 1953, then increasing again until the peak rainfall of 1960 — 36.31 inches.

I *could* almost go to the extreme of saying that the species' first appearance in the dunes in 1945 was caused by its expansion following the wet year of 1939 (34.92 inches), but that would be mere surmise, and the above, after all, is only a theory. All the same, I would be pleased if Messrs Swindells, Cribb and Bigger were to do a little bit of research (visiting their local Town Halls) and it would be very profitable if we could see — *via* the pages of the *Bulletin* — whether what applies here is valid in their areas. Mr Cribb, I noticed, talked of *dry* waste ground, so maybe in his case there is a different explanation, whilst Mr Swindells tells of filled-in ponds — which sounds as though his site may be similar to mine. On the other hand, again, Mr Taylor's sounds 'dry' (no offence!).

The question certainly is an interesting one, and one with which I have toyed for a long time. I would like to go into it a little more deeply, and possibly keep in touch with the latest movements of the species. This would involve the drawing up of a map similar to that of E. B. Ford (1945), but summarising the latest data. In order to do this I shall need offers of help — will anyone who would like to help in following the spread of this species, therefore, please send information to me.

5.4.63. Patrick J. S. Miles (3343J).

[Mr Miles' address is in the current *Membership List* — *Editor.*]

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NOTES ON THE HABITS OF THE TWIN-SPOT WAINSCOT MOTH

It is a commonly held opinion that it is useless to search for *Nonagria geminipuncta* Haw. (Twin-spot Wainscot) anywhere except in the East Anglian fenland; this, however, is a fallacy, and so I thought a few notes on the best way to work for this species might be of interest.

The best way to obtain a good series, amongst which well-marked varieties will almost always occur, is to obtain it either in the larval or the pupal stage, and as this species spends but a comparatively short time in the latter, it is perhaps better to obtain the fully-fed larvae.

Any marshy locality where the common Reed (*Phragmites communis* Trin.) flourishes should be tried, tidal estuaries being among the most likely places to find larvae. The more luxuriant, well-grown clumps growing actually in a dyke or watercourse will repay a thorough search better than the larger areas of young plants growing in drier situations; this, however, adds materially to the difficulty of obtaining specimens, but who with a

little spirit would be deterred by the necessity for a little rowing exercise? (The little spirit may conveniently be carried in the waistcoat pocket!)

The best time to search for the larva of this species is about the middle of July, or earlier in a forward season. By this time the effects of the internal feeding of the larvae are beginning to be apparent in the brown and withered appearance of the youngest top shoots of the reeds. This appearance gives a ready method of discovering a new locality, and reeds affected in this way should be carefully examined, when a small circular hole will be found, made by the young larva in its wanderings from one stem to another, or even from one joint to another in the same stem, the hard joints not allowing it a free passage. Should the search be postponed too long, however, the quicker growth of the healthy reeds causes them to over-reach the stunted stems in which the objects of the search are concealed, rendering the detection of these withered stems much more difficult.

When a locality is definitely known, it is unnecessary to cut the reeds before the last week in July, when it will be found that, as a rule, only the larger stems contain larvae, which, even when fully-fed, often come out of their food plants to wander and attack fresh ones, evidently in search of more roomy pupating quarters. When a search is made at this time it may be seen at once with certainty which reeds are tenanted, as the fully-fed larva prepares its future exit in advance by eating its way through the inner layers of the stem, leaving only the outer skin; this procedure gives a transparent appearance to the exit hole, which is therefore very easily detected. The fully-fed larva does not pupate for some time after making these preparations.

When cutting the reeds it will be found that the future exit holes are almost invariably in the lower and stouter sections of the reeds, and care must be taken to cut each stem under the next joint below the hole, as otherwise the pupa is likely to slip out and be lost, or, even if this be avoided, the cut section of the reed soon shrivels, frequently destroying the enclosed larva or pupa by compression even if stems are stood, as they always should be, in moist silver sand. A convenient way of ensuring the necessary degree of constant humidity is to lay very damp moss on top of the sand.

The pupa is usually positioned a few inches above the hole; sometimes two, or occasionally three pupae, may be found in the same stem, or even in the same joint.

Two or three weeks after pupation the imago will emerge, and if the procedure outlined above has been adhered to, the proportion of cripples should be very small, whereas if the reeds are cut too early, even though kept very damp, the larva is apt to wander out again, doubtless seeking healthier stems.

The imago invariably emerges in the evening, usually between 6 p.m. and 9 p.m. B.S.T. Although its wings develop very rapidly, it is as well not to kill a specimen for the cabinet too soon, as the wings are for some time deceptively flaccid and the insect consequently difficult to set.

Joy O. I. Spoczynska F.R.E.S

23.6.62. (751).

•

BEGINNERS' MYSTERIES

Those of us who took to keeping things in jam-jars at an early age

have all come across mysterious creatures which were not portrayed in our first books on entomology. In my case at least, some of these mysteries still remain unsolved. Some are now recalled with amusement. Perhaps a few will interest other readers.

One of my first entomological memories is of watching a butterfly emerge from its pupa on the wall of my school, when I was six years old. I was therefore a 'veteran' at the age of ten when the aged biology master, brought out of retirement for the war period, showed us a display-case illustrating the life-cycle of the Large White Butterfly (*Pieris brassicae* Linn.). Tucked away at the bottom of the case was a tiny *Apanteles* parasite — the type that spins those masses of little yellow cocoons. This, the master boldly announced, was how the butterfly looked as it emerged from the pupa, before its wings had expanded! The precocious youngster who proclaimed his faith in his own observations of emerging butterflies was not at all popular with the master that day!

My early experiences show very clearly why such a division exists between the study of 'Macro' moths and that of 'Micros'. The wretched little book that I had at that time and which crudely illustrated a random selection of about 50 'Macros' (and did not so much as mention that any more existed) was too obviously incomplete to deter me from looking for other insects. It was fairly obvious, however, that all the fat caterpillars I found produced moths of much the same types as those in my book. I very rarely reared anything like the little jewels of 'Micros' that came to lighted windows or could be disturbed from the plants in the garden — one must look for the damage caused by these insects, for the leaf-mines and turned leaf-edges, and not expect to see their caterpillars feeding openly. The Macrolepidopterist samples the fauna with a beating tray or light-trap and only uses his eyes as a last resort. The successful Microlepidopterist, on the other hand, is always a man who is interested enough in learning the habits of the creatures which he studies to search for them by sight.

'Other orders' were always a problem in my wartime isolation. The curious black-spotted green caterpillars which curled their 'tails' beneath them instead of clinging tightly with hind 'legs' to the currant bushes (*Ribes* sp.) on which they fed, went for years unrecognised as sawflies. They were not so easy to rear as were moths.

The Willows (*Salix* sp.) at the bottom of the garden had bean-galls on their leaves every year. I was forbidden to touch them. "They are red — they must be poisonous!"; "Warts are infectious!"; "Those trees ought to be cut down — the potatoes might get infected!" So ran the tale of parental fear each year. A youngster needs to be unusually careful with his captures to have much chance of rearing the *Pontania* sawflies which produce those galls. The insects are likely to be thrown away as parasites when they emerge, anyway!

A favourite pastime, too, I remember, was 'pond-dipping'. In those wartime days of no motor cars and few insecticides, almost any pond or stream within a stone's throw of the edge of a town would produce a rich haul of animals. How sad it is now to see youngsters around London 'dipping' for a few tadpoles and the occasional Corixid water-bug. I blame this present sterility on the effects of oil running off the roads, and of motorists'

children and dogs paddling in any water that can be found, more than on the use of insecticides and herbicides.

One tantalising mystery remains with me to this day. Each year, the Marrow (*Cucurbita* sp.) bed was dug up and composted. Anything in the soil that was not an earthworm was declared to be a pest and had to be chopped in half. Numbers of grey-brown, legless, nearly headless, fat grubs were remarkable in defying the spade or other blunt instrument. Furthermore, they retaliated when provoked by emitting a most evil-smelling fluid, which clung tenaciously to prying fingers. Does any reader know which leatherjacket this could have been?

Do any other Members have puzzles such as the above, that could be related in these pages? Why not write a note about them — now, before they slip out of mind again.

R. W. J. Uffen (1660).

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TWO PROBLEMS

The following is an account of the observation of two phenomena, inexplicable to me at least, which some more learned Member may like to enlarge upon.

The story began one evening about an hour before dusk, when the light was still fairly good, but after the bees and flies which frequented the garden flowers during the day had disappeared — although here and there a hoverfly, its shiny metallic thorax catching the light, was detectable as it rested motionless on a leaf. The stillness characteristic of the later evening was broken only by the occasional Calliphorid or Muscid fly noisily quartering the ground, and by the screams of the Swifts (*Apus apus apus* Linn.) which swooped and twisted overhead. The Swifts flew until dusk itself, when the rather more deliberate flight of the occasional Blackbird (*Turdus merula merula* Linn.) could no longer be observed — but the former, on this mild, windless summer evening, were obviously feeding well on the aerial populations of aphids and other small insects which floated silently above the ground.

I was looking at a leaf of *Buddleia* when suddenly a small greenish-bodied Nematoceran (possibly a midge) alighted there. Raising its smart black and white-banded fore-legs off the substratum, it quivered them up and down almost like the antennae of an ichneumon fly: then, replacing them on the leaf, the fly ran forward for a few inches and repeated the process, only to leap away at a nearby disturbance and climb unsteadily upwards into the air.

Still thinking about this observation, I was idly watching a leaf of Apple (*Malus* sp.) when another Nematoceran, this time a Tipulid with extremely long legs, appeared. Alighting on the leaf, this insect 'vibrated' its whole body up and down, rapidly raising and lowering it between the legs which, with the movement, were bent imperceptibly to and fro at the 'knee' joints. As I had observed this phenomenon before at mercury-vapour light, I took care to identify the specimen (a species of *Limonia*). By careful observation I was able to watch a number of the species, and came to the conclusion that this peculiar movement was performed either when the insect was slightly disturbed (as by being gently blown on) or just after it had settled. Further observations were prevented as dusk fell, and first the Crambids, Tortricids and 'tineids' flew feebly in the twighlight, before the

larger moths too rose on the wing in the fuller darkness which followed.

I was left, however, with the memory of the strange behaviour of the two specimens of Nematoceran. These phenomena may be commonplace — but can some Member explain either or both of my observations for me?

23.7.63. H. V. Danks (2907).

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THE PUPA OF *CALLOSAMIA PROMETHEA* DRURY

As I was able to observe the pupation of a larva of *Callosamia promethea* Drury (Spicebush Silkmoth) last year, I thought that a note about this might be of interest to Members.

To obtain the subject I forced a larva to spin on a flat surface, where the construction of a proper cocoon was impossible. The larva was therefore compelled to pupate on top of the sheet of silk formed, and luckily was in a position where I could observe it fairly closely. As Members may recall from the *Silkmoth Rearers' Handbook*, the larva of *C. promethea* in the final instar has a pale green head and bluish-green body, with prominent coral-red dorsal tubercles on segment two. Only these tubercles and the caudal one of a yellow colour are well-developed.

Pupation occurred as follows seventeen days after the larva had begun to spin the silk:

A rosy-golden flush spreading from the head backwards was followed, just before the larval cuticle was shed, by a change in colour of the caudal tubercle to waxy-white. The newly-formed pupa was the palest golden-yellow at first, but rapidly darkened except ventrally on the first abdominal segment visible behind the wing-cases, and soon a black dorsal suffusion appeared, which became most extensive on the prothoracic region. Another pupa which was cut out of a cocoon to indicate whether this description applied to normal specimens, showed that typically all the abdominal segments darken uniformly.

The fully-formed pupa, which was fairly active when disturbed, was a female, and had the black suffusion spread faintly down the sides of each segment just posterior to the intersegmental rings, and evident as far as the level of the very dark brown slit-like spiracles. The intersegmental membranes themselves — fully visible only between those abdominal segments which lay behind the wing-cases — lacked the dorsal blackish suffusion, which elsewhere had intensified to charcoal in the mid-dorsal line. The ground-colour was pale brown, darker on the segments behind the first of those which were broken mid-ventrally, and at the posterior edges of the others. The very slightly translucent cases of the wings and antennae were somewhat darker than the ground-colour, and of a similar shade to the more posterior segments mentioned above.

Some time before emergence the wing-cases started to darken, and eventually the whole of the thoracic and head region reached a uniform black colour. A slightly deeper brown colour was evident on parts of the abdomen, which itself now had a distinctly greasy appearance, and the pupa at this 'soft' stage remained entirely motionless.

After the pupa had 'dried', emergence was delayed, presumably until conditions were suitable, and it seemed with all my pupae that a certain minimum temperature was required before the imago would emerge.

25.6.63. H. V. Danks (2907).

THE AMATEUR ENTOMOLOGISTS' SOCIETY

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ENGLAND

BEDFORDSHIRE
Ampthill
Nourish, R.
Leighton Buzzard
Farr, H.
Luton
Johnson, R.

BERKSHIRE
Bracknell
Wakeford, R. J.
Didcot
Heard, M. J.

BRISTOL
Foxwell, D. J.

BUCKINGHAMSHIRE
Bletchley
Ellerton, Capt. J.

CAMBRIDGESHIRE
Cambridge
Hawkins, R. P.

CHESHIRE
Frodsham
Fraser Hay, Mrs M.
Wirral
Clarke, Mrs F. M. M.

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Woodman, A. J.
St Mawes
Tulloch, R. C.
Truro
Stanton, P. R.
Williams, D. P.

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Duffield
Humphries, N.
Ilkeston
Mizuro, R.
Matlock
Barton, D. A.

DEVONSHIRE
Sidmouth
Dyer, J. A.

CO. DURHAM
Sunderland
O'Neill, P. F.

ESSEX
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Chigwell
Sloan, C.
Sloan, D.
Rochford
Sutton, S.
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Hordle
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Overton
Sadler, E. A.

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Manchester
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Lurie, D. H.
Rochdale
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E.18
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E.C.1
Prendeville, M. J.
N.16
Thomas, A. W.
N.19
Fretwell, S.
N.W.5
Connor, J. D.
N.W.6
Carrel, Mrs I. E.
S.E.3
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S.W.16
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Shephard, G.

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Northolt
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North Wembley
Mason, M. G.
Pinner
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Ruislip
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Solihull
Ledbury, J. L. R.
Sutton Coldfield
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York
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Coole
Ballard, J. C.

SCOTLAND

CO. SELKIRK
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MIDLOTHIAN
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Elderslie
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STIRLINGSHIRE
Stirling
Coates, D. L.

WALES

CARDIGANSHIRE
Aberystwyth
Davies, R. H.

GLAMORGANSHIRE
Barry
Watts, N. M.
Merthyr Tydfil
Lewis, A. D.
Pontypridd
Noyes, J. S.
Swansea
Divett, A. W.

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Malaya
Beng, Tan Kong

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Dansie, K. L. L.
Gibbs, G. W.

EUROPE
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The highest Membership Number on this Supplement is 3582. All corrections and address changes are included up to and including 31st August, 1963. Should any Member find a mistake in their entry, I will be pleased to receive the correct information.

D. E. Dodwell (3482),
12.9.63. *Hon. General Secretary.*

BREEDING THE SOUTH AMERICAN SILKMOTH *DIRPHIA CURITIBA* DRAUDT

Ova of this species were received from Brazil on the 29th September 1962, after being a month in transit. They hatched on October 5th and partly consumed their eggshells. All readily started to feed on Walnut (*Juglans regia* Linn.).

During the fourth instar they were offered Oak (*Quercus robur* Linn.) and Peach (*Prunus persica* Batsch), which were eaten, and Plum (*Prunus domestica* Linn.), which was refused.

By November 7th they were in the fifth instar and the Walnut leaves had dropped off the tree. Evergreen Oak (*Quercus ilex* Linn.) proved to be an acceptable substitute. Holly (*Ilex aquifolium* Linn.), Portuguese Laurel (*Prunus lusitanica* Linn.) and Wild Privet (*Ligustrum vulgare* Linn.) were refused.

The first pupa was obtained on December 15th and the last by the end of the year, a total of 75 pupae being obtained from 90 ova.

The small larvae were kept in plastic lunch-boxes and the larger larvae in cages in a heated room at about 25 °C. Under these conditions there were six instars, the duration of which are shown in *Table I.*

Instar	Duration
1	9 days
2	7 ,,
3	7 ,,
4	8 ,,
5	10–15 ,,
6	30–45 ,,
Pupa	3–4 months

Table I: Duration of instars of *D. curitiba*

Some difficulty was experienced in getting the larvae to pupate. They will not pupate in a cage. Success was obtained by removal of the larvae when ready to pupate (at which stage they turn a dirty pink colour) to half-pound tins containing a layer of moist peat on top of which was a layer of moss. All the larvae then spun their cocoons between the moss and the peat and pupated successfully. The cocoons were removed from the tins and stored for the Winter on moist peat in a wooden box, being kept throughout at from 15 - 20 °C.

The first moth, a female, emerged on March 27th, 1963, and a male the following day. Pairing occurred about 10.30 p.m. with the temperature 25 °C. and about 70% relative humidity. It lasted for 90 minutes, and the female then commenced to lay her eggs.

Little appears to be known about the early stages of the *Dirphia* group, and none has previously been reared in this country. The latest edition of *A Silkmoth Rearer's Handbook* says:- " A few species appear to spin cocoons not unlike *Saturnia pyri* [Schiff.]. The larvae are said to be long, cylindrical, with long slender single spines emerging directly from the body without basic tubercles. At least one species is thought to have large lappets . . . "

While it is possible that this may apply to some species it is not true of *D. curitiba*, nor of others of the group with which I am acquainted, such as *D. avia* Stoll, *D. lombardi* Bouvier, and *D. eumedide* Stoll, an account of which is being given elsewhere. The ovum is large, in the shape of a slightly flattened ovoid, in colour white with a black micropyle. Some ova have a wide grey band on the upper half and a very large micropyle; these are infertile. This stage lasts about a month.

The first two larval instars are brownish in colour with spines rather similar in appearance to those of *Automeris io* Fab. In subsequent instars the larvae become greenish-

grey with black markings.

The full-grown larva is a magnificent beast, 3 - 4 inches long, greenish-grey in colour dorsally, more whitish-grey ventrally, the whole being covered with an intricate series of black markings, variable in extent between larvae, in some coalescing to form large blotches continuous from segment to segment. The spiracles are white, tinged with black. The whole larva is densely clothed in spines, each consisting of a central chalaza from which setae arise. These are denser and larger on thoracic segments 1 and 2 and abdominal segment 9, where they are at least 15 mm. long and project beyond the head and anal segment respectively. Each seta can inflict a very severe sting.

In general the larva resembles that of *Automeris*, but gives the impression of being a sturdier-built animal, and the spines especially are stronger.

The larvae are gregarious throughout their lives. They will wander in columns. They feed only at night, and during the day form a dense cluster at the base of the foodplant.

When ready to pupate the larvae turn a dirty pink colour and charge madly round their cage. This they will keep up for three or four nights, getting darker in colour as they do so. When removed to a tin, as already mentioned, they settle down almost at once to spin their cocoons. These are rather flimsy affairs of silk incorporating bits of moss and peat. There seems little doubt that in their natural habitat the larvae select some specialised site for pupation.

The moth itself is interesting; the figure in Seitz's *Macrolepidoptera of the World* does not do it justice. When freshly emerged it is a beautiful olive-brown in shade and is more marked with black than the illustration shows. There is very considerable variation between specimens.

D. curitiba shows to a marked degree two of the behavioural characteristics of the Hemileucid moths. When disturbed it exhibits a ' sustained static display ' by dropping to the ground, folding the wings over the back, and tightly curling the abdomen. The curled abdomen presents a series of black and crimson rings which is probably some form of warning colouration.

On coming to rest after a flight the moths rock wildly from side to side . The length of time for which they do this, and the extent of the movement, are governed in part by the duration of the previous flight. Both of these displays are most prominent in freshly emerged insects.

Brian O. C. Gardiner, F.R.E.S. (225).

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SEITZ, A. (1906 et seq.) *The Macrolepidoptera of the World.* **6**: plate 117 B.

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" MADEIRA M'DEAR? "

Invitation to the dance

Last autumn it was suggested that I might like to join an expedition which was being organised to collect insects for the British Museum on Porto Santo and Madeira in February 1963. Autumn turned to winter and winter turned to the New Ice Age. I joined the expedition.

The insects from the Atlantic Islands that were collected by Wollaston in the 19th century are now in the British Museum at South Kensington. In most groups there is, unfortunately, little material taken by subsequent expeditions (from the Continent) which his work inspired. I was therefore unable to familiarise

myself with many endemic species which have been described this century, and we were told that in several large groups of insects anything we could find would be of interest. It was impracticable to take all the equipment that this situation demanded, because we could not spare the time to go by sea. I took the most generally useful apparatus so as to leave myself as free as possible to collect whatever was most in evidence.

Dress optional

On February 9th, four gentlemen, slung about with rucksacks and petrol-lamps to defeat the excess-baggage man and the careless luggage-handlers, met at London Airport amongst the throng of people to whom flying is such an exciting event that they must wear their best clothes for it.

The members of the expedition were: the Society's Honorable Member for Hampton, Eric Classey; an Honorary Member, Timothy Tams; your Hon. General Editor and — shocking admission — a non-member, one Eric Gardner, of whom more anon.

At the time we were supposed to leave, the *Caravelle* air-liner had not arrived in London "because of technical trouble". We sat and fretted as it got progressively foggier, and finally took off four hours late.

The car awaits

Porto Santo is an island 7½ miles long (S.W. to N.E.) and 1½ miles to 3½ miles wide, lying 25 miles north-east of Madeira and about 500 miles south-west of Lisbon. An airstrip has recently been completed across the width of the Island on a belt of loose sand. This is the only long stretch of ground on either island which is more nearly horizontal than vertical. Most passengers are still wafted away by steamer to their dream island, Madeira. It currently takes as long to get from Porto Santo Airport to Funchal as it does to get from London to Porto Santo. Such is the Jet Age.

It was a dark and dirty night as the aircraft came in to land. The pilot circled the Island and took too short a run-in. He drifted off course in the strong cross-wind. Back went the stick and up went the under-carriage in a hurry as we climbed away to try again. In the few seconds that the jet was below the clouds we saw the wan flickering of the naphtha flares lining the runway in the rain. At each end there was just darkness — cliffs and the sea.

Whilst the other passengers were removed in a typical airport 'bus, we were shown into a taxi for the trip to Porto Santo town along the only metalled road on the Island.

Grand entry

As we entered the boarding-house we were greeted with a great display of familiarity, because two of us had stayed there on a previous expedition. The occasion was very amusing because we spoke scarcely any Portuguese and our hosts spoke no English.

The *pensao* has an interesting fauna. Each night as I switched on my bedroom light a different animal would scuttle for the nearest dark corner. Spiders, woodlice, millipedes, cockroaches, beetles and moths appeared from time to time. It was an eerie experience to wake up one night, switch on my bedside lamp and see a ghostly, translucent, two-inch long Crustacean patter across the wall above my head. It is easy to see why *Scutigera* should be feared as allegedly poisonous.

Our temporary home was remarkably well appointed for such an isolated spot on this earth. There was running hot water in the bathrooms after midday, and every way one turned one knocked over vases

of plastic flowers whose real equivalents few of the Islanders could ever have seen. The great luxury was electric light, but oil-lamps would have served just as well and would have had the advantage that the omnipresent radio could not have been run on the same fuel. Our dull glimmer pulsated rhythmically in step with the laboured " putt-putt " of the Diesel motor driving the generator. When I was trying to see in the gloom where to stab a pin through a fly 3 mm. long, this pulsation was like Chinese water-torture to my eyes. Sometimes the light failed altogether for hours at a time.

First waltz

The first two days quickly set the pattern of our collecting. Frequent cold northerly winds prevented insects from flying freely, except in a few sheltered hollows where the sun was so hot that they would rocket up from the ground to be caught up by the wind and be blown out of reach down the soft, treacherous volcanic slopes. Sweeping was unprofitable in most places because the plants are very short. A vacuum cleaner would have been more useful! On sandy areas one simply swept up a slimy mass of snails, which covered the plants like white flowers. We were compelled to resort to searching for most of our captures.

This was where our Gardner came in useful, for he was quite happy to spend his time turning over stones, of which an inexhaustible supply litters the ground of Porto Santo. This technique was so successful that we began to think that all the insects on Porto Santo must live under stones. We all took to turning things over, in our hands by day and in our minds by night.

Tombola

The most abundant prizes were carabid and tenebrionid beetles, few under half an inch in length. We rarely saw their larvae, but pupae which we found in cells in the soil beneath stones matured and provided us with an additional species. Two large species of spiders were found lying in wait for the beetles. *Lycosa insularum* Kulczynski is an endemic Madeiran species, whilst the orange-legged *L. maderiana* Walckenaer occurs nowhere else but on Porto Santo. The coloured legs of *L. maderiana* are displayed in courtship. It is a large species with powerful chelicerae. One was found dismembering an inch-long *Calosoma* beetle.

Our biggest surprise was the discovery of Embioptera (*Haploembia solieri* Rambur) making their wonderfully fine silken tunnels, within which they run both backwards and forwards with equal facility, around and beneath stones. The silk glands of the web-spinners are situated on their feet. When spinning they make mystic passes through the air with the front legs, without any apparent result. The silk is invisible until it is several layers thick. The Embioptera are a tropical group and stretch no further north than the Mediterranean area. They feed on dead vegetable matter.

Night life

After dark, weather permitting, we lit our lamps and took interested spectators on a tour of inspection of the town's night life. Heads popped out of shutters and fishermen came out of their windowless hovels on the beach in their pyjamas to see what we were up to with our prying lamps. Cockroaches and beetles had the streets largely to themselves. On these occasions Eric Gardner's habits as a coleop-

terist had to be kept under control, for he would turn over anything from a rotting fish to a lorry when given the chance.

Few moths were found, because of the cold wind, so we retired to the bar to await their arrival at the more-or-less fluorescent lamps there, which appeared, from their colour, to transmit a good deal of ultra-violet radiation.

Madeira m'dear?

The vineyards of Porto Santo are almost unrecognisable as such, for the vines are grown on the sand above the beach, where they straggle as feeble shoots horizontally and untrained, just above the ground. The grapes trail on the ground. They have a high sugar content because the island is stricken by drought during the summer. Substantial areas of vineyards were obliterated by the construction of the airstrip, so that the genuine Porto Santo wine, *Verdelho*, is in short supply. We were able to sample it, but found it very sweet. The Madeiran imitation is a better wine.

In the bar Timothy Tams was able to demonstrate his clear linguistic superiority. He knew the Portuguese for beer before we started.

Eric Classey's appearances in the bar were commonly punctuated by triumphant cries and much clambering over the (fortunately indestructible) bar furniture in pursuit of the moths which buzzed from one inaccessible corner to another. Various species of *Plusia* and endemic Noctuids were the principal visitors. The odd Spurge Hawk (*Celerio euphorbiae* Linn.) probably derived from larvae feeding on spurge (*Euphorbia*) that grew on the beach. The Madeiran form (*C. e. tithymali* Boisd.) is now thought to be a distinct species. The principal 'Micro' moths were species of *Blastobasis* Zell., of which there are several endemic to Madeira. Those Blastobasidae whose life-cycles are known are rubbish feeders.

Hangover

One morning I awoke in damp darkness to a repetitive thumping. The last blocks were being dropped into place in the hotel extension outside my bedroom window and my room was henceforth to be in permanent darkness. I felt like a slave being entombed alive in some pyramid.

We decided that two things remained to be done before we left Porto Santo. One was to check the report of the Curator of Funchal Museum that he had seen dragonflies when visiting Porto Santo. An expedition last summer showed that the only semi-natural permanent water on the Island was a small pool where in winter a stream leads into a torrent. In June a trickle keeps the mat of green algae on the bottom of the pool wet, and water-bugs and beetles congregate in it. From this pool Eric Gardner dredged up dragonfly larvae at the first attempt. One imago emerged the day before we left and so he returned to look for adults. He was rewarded by finding two species flying, one a new record for the Madeiran Islands.

The Hill of Our Lady

Meanwhile Eric Classey and I had embarked on our other venture: to investigate a limestone ridge overlooking Porto Santo town. On the flank of the hill stands a chapel, whence the name Serra de Nossa Senhora. Here trees are being planted to replace the native forest, which, many years ago, was completely burned off by the inhabitants, presumably with its fauna. An indigenous species of Heather, *Erica*

scoparia Linn., grows on the leached soil on the rocks. We found larvae of a *Cosymbia* species feeding on it in company with large numbers of a tiny Heteropteron. The ground flora was comparatively rich, but it was too early in the season to look for some of the insects we expected to find. The sori of ferns were attacked by the larvae of a species of *Teichobia*, a ' Micro ' moth. Bryophytes abounded. Algae on the rocks were the food of a psychid moth. Under stones we found more beetles and a curious, white Proturon.

Ponta de Santo Lourenço

At the end of our stay we visited the main island of Madeira. In Madeira the steep hillsides are terraced for cultivation and water is far more plentiful. On the steepest high hills some natural forest is left. On weedy hillsides around Funchal insect life was abundant amongst the many species of plants.

One day we visited the eastern tip of Madeira, Ponta de Santo Lourenço, which we thought would more closely resemble Porto Santo because it is low-lying and receives little rain. We found the collecting very poor, but there were several things of interest. An asilid fly, *Machimus maderensis* Schiner was common. The British Museum will no longer be in the position of having only the type specimen in its collection! We came upon a very few Black Widow Spiders (*Latrodectus* sp.) with spots on their backs. These cannot be recognised and are now being pampered in the British Museum in the hope of rearing them to maturity.

Homeward bound

All good things are said to come to an end. As the steamer chugged out of Funchal into a grey day, paper bags were distributed. We passed the Ponta de S. Lourenço and shuddered into a long sea and half a gale. Two of my colleagues mysteriously disappeared and did not reappear until the ship reached the comparative calm of Porto Santo Bay. They looked as yellow as Chinese through their suntan. We might just as well have been spared the ordeal, for the aircraft could not land until the weather improved next day.

R. W. J. Uffen (1660).

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OBSERVATIONS ON BUTTERFLIES IN THE SOUTH OF FRANCE, 1963

Having visited the Pyrenees in 1962 (see *Bull. amat. Ent. Soc.*, **21**: 95-7), Messrs W. L. Coleridge, H. J. Cribb and I decided that the venue for the 1963 trip should be the Maritime and Eastern part of the French Alps. We left Dover on 10th July and by using the *Auto-couchette* train service we were in Lyons at 8 a.m. on the 11th. Our first stop was to be at Digne, after a drive of about 150 miles *via* Grenoble. Just north of Grenoble we made a stop amongst rolling downland from which the huge shapes of the Alps were just visible. In a previous year we had taken *Maculinea arion* Linn. (Large Blue Butterfly) on these slopes but we soon found that the season was very late, owing to the very prolonged winter in Europe, and *M. arion* was only just emerging. I netted several fresh males of the Large Blue, and also newly emerged specimens of the fritillary *Melitaea didyma* Ochs. On the slopes there was an abundance of the Essex Skipper (*Thymelicus lineola* Ochs.) and several Lulworth Skippers (*T. actaeon* Rott.): in this part of France these two species seem to be very much commoner than our Small Skipper (*T. sylvestris* Poda).

Leaving Grenoble we climbed the Col de la Haute Croix towards Sisteron, stopping on the top of the Col to have a roadside lunch and to collect on the grassy slopes below the rocky peaks. Here we took several specimens of *Erebia ceto* Huebn., and *Argynnis niobe* Linn., those of the latter being of the mountain form *eris* Meig. which has the typical silver spots absent. We arrived at Digne during the afternoon and after some enquiries booked rooms in a small hotel beside the town square. We found that hotel charges had risen considerably since our last visit, from 15 NF to about 22 NF per day *demi-pension*. We bought victuals for our midday meal, which was taken in the field each day.

Our call at Digne was for the purpose of a brief visit to some old 'happy hunting grounds' and Mr Coleridge wanted to take one or two specimens of the Southern Swallowtail (*Papilio alexanor* Esp.). The next day provided blazing sun and we spent the best part of the day in the

fields of Lavender (*Lavandula spica* Linn.) below the thermal springs. Here there were masses of butterflies, bees, beetles, crickets, grasshoppers and cicadas. We took only two specimens of *Papilio alexanor* but the other two species of *Papilio*, *P. podalirius* (=*sinon*) Linn. and *P. machaon gorganus* Fruhst., were common. Specimens of both the Clouded Yellow (*Colias croceus* Fourcr.) and the Pale Clouded Yellow (*C. hyale* Linn.) were passing through the fields in numbers, and several Bath Whites (*Pontia daplidice* Linn.) were migrating at some speed north-westwards. We took several specimens of the Queen of Spain Fritillary (*Argynnis lathonia* Linn.) in fresh condition, and several of the very dark form of Large Blue. In all I netted 51 species of butterfly during the day.

During the hottest part of the day the numbers of butterflies in the Lavender fields declined and we moved into the valley, where a stream ran. A splash in the deeper pools, where the trout (*Salmo* sp(p).) lie, gave us some relief from the heat and we found the butterflies there also wherever the water oozed out of the stones, or the stream shallowed out over shingle or mud. There were literally hundreds of 'blues' sipping at the moisture, and as I climbed up a path down which a trickle of water flowed the ground was covered with groups of fritillaries of the genera *Argynnis* and *Melitaea* (including *M. athalia* Rott.), and sprinkled amongst them were the 'blues' and several huge specimens of the Apollo Butterfly (*Parnassius apollo* Linn.). Here I also netted a very worn specimen of the Camberwell Beauty (*Nymphalis antiopa* Linn.), still flying strongly despite the fact that it had emerged in the previous July. Fresh specimens of this butterfly are on the wing towards the end of the month. My father spent the afternoon chasing and netting the fast-running and fast-flying beetle *Cicindela hybrida* Gebler, which haunts the rocky edges of the streams.

Leaving Digne we moved to the high land overlooking the plains behind the Cote d'Azur and booked in at a hotel in Fayence, Department Var. This town is ideally situated on the southern slopes north of Frejus and in the middle of the Lavender country. Grasse is to the east and Draguignan to the west. We found that the plants growing in the town were most exotic, with Oleanders (*Nerium oleander* Linn.) lining the streets, mingling with palms and cacti, and in the evenings we tried to catch the gecko lizards which ran on the stone walls edging the village street.

Our first outing was to high land behind Cannes in search of the Pasha with Four Tails (*Charaxes jasius* Linn.). This butterfly is an African species which has colonised the Mediterranean littoral wherever its foodplant, the Strawberry Tree (*Arbutus unedo* Linn.), is to be found. We found the tree everywhere in the Esterel near Cannes but searched for the larvae of *C. jasius* in vain. Mr Coleridge took the Long-tailed Blue (*Lampides telicanus* Lang), which is very similar to *L. boeticus* Linn., and I netted a specimen of *Satyrus statilinus* Hufn. Both were new species to us. We stopped on the roadside in the valley where a stream ran through a wood and found there a tree full of ripe (and over-ripe) figs (*Ficus carica* Linn.). The sweetness of these had attracted a host of insects (Coleoptera, Hymenoptera, Diptera and Lepidoptera) and round the tree flew three large dark butterflies, specimens of *Charaxes jasius*. We smeared a dead branch with the rotten fruit and then waited, meanwhile filling ourselves with ripe figs. We had not to wait long, for one of the whirling butterflies settled on the branch and Mr Coleridge quickly had it in the net. It was one

of the spring brood with short tails, and was in fair condition. A second butterfly landed but was in such poor condition that I did not take it. I took one or two Hornets (*Vespa crabro* Linn.) which were feeding on the fruit, and then I and my father had a swim in a delightful shaded pool, disturbing a large trout as we plunged about.

We left the Esterel and made our way into the hinterland which is fairly dense scrub or '*maquis*'. Most of the undergrowth is aromatic and its scent fills the air which roars all the while with the incessant din of cicadas. These cling to the stems and branches of the Pine trees (*Pinus sylvestris* Linn.), Olive trees (*Olea europaea* Linn.), Brooms (*Sarothamnus scoparius* Koch.) and scrub Oaks (*Quercus* sp.), piercing the bark with their sharp proboscides and playing their continuous cacophony. All is parched, and the butterflies are few and far between. The beautiful *Gonepteryx cleopatra* Linn. with its sulphur and flaming-orange wings is the only common butterfly, and its foodplant, *Hippophäe rhamnoides* Linn., is common amongst the scrub, especially where there is a stream bed.

Near to Fayence is a village called Seillans, and our next sortie was through this village to the heights above it. These are heavily wooded, and small Lavender fields, flanked by thickets of yellow, sweet-scented *Spartium junceum* Linn., edge the road. Here we found a 'feast' of butterflies, and during a day of hot sun and perspiration we accounted for 56 species of butterfly. The highlights of the day were the captures of the Large Tortoiseshell (*Nymphalis polychloros* Linn.), the form *valesina* Esp. of the Silver-washed Fritillary (*Argynnis paphia* Linn.), and some very fine forms of *Maculinea arion*. The Queen of Spain Fritillary was very common, as were the High Brown and Dark Green Fritillaries (*Argynnis cydippe* Linn. and *A. aglaia* Linn.).

We found a small spring beside the road near the Lavender, and were able to quench our thirst and eat our meal in the shade of an Ash tree (*Fraxinus excelsior* Linn.). There was a large water-tank below the spring and this was full of dragonfly larvae and the tadpoles of the Edible Frog (*Rana esculenta* Linn.). The woodland glades above the fields were reminiscent of an English downland wood, and Silver-washed Fritillaries and Continental White Admirals (*Limenitis sibylla* Linn.) skimmed overhead, while low down fluttered the regional forms of the fragile Wood White (*Leptidea sinapis* Linn.). This butterfly is often without any markings at all in Southern France, being completely white. *Papilio machaon gorganus* occurred everywhere, in the fields, on the hillsides and above the trees but at no time is it an easy butterfly to net and too frequently a netted specimen is found to have already lost one or both of the tails. By the roadside I watched females of *P. podalirius* laying eggs on dwarf Sloe bushes (*Prunus spinosa* Linn.) and upon searching the bushes I found several ova of the butterfly, and larvae in all stages, one larva being almost fully fed. This pupated in the hotel, and the others fed up when we returned to England. I also found batches of the yellow eggs of the Black-veined White (*Aporia crataegi* Linn.), which is very common in the mountains. The eggs are laid on the leaves in small batches rather like those of the Large White (*Pieris brassicae* Linn.). I also took a specimen of each of the Bee Hawkmoths, *Hemaris tityus* Linn. and *H. fuciformis* Linn., and the Humming-bird Hawkmoth (*Macroglossum stellatarum* Linn.) was also very common on the Lavender.

Apart from the Lavender fields at Digne, these hills above Seillans com-

prise the most fruitful area for butterflies that we have met with in our collecting in France. The combination of woodlands with Lavender and water is similar to that at Digne, the Lavender attracting all the butterflies from the surrounding woodlands and hillsides. I took one perfect female specimen of *Papilio alexanor* flying in the woodland glades: this was a surprise as those at Digne had been on the wing for some time.

The next day we packed and bade Fayence farewell. We drove north-east by Castellane and along the edge of a vast lake near St André. This lake is part of a new hydro-electric venture, and large plantations of Poplar trees (*Populus* sp.) raise their heads from the still, blue waters which still rise around them. Leaving the lake, we climbed into the mountains over the Col d'Allos. This is a long winding narrow pass, stretching for about ten miles up into the mountains and for ten miles down again. We did not stop on the way up as the road was in very bad condition as a result of the winter frosts, and work was in progress at many points. Near the top we met a large construction vehicle and had to back the car to allow it to pass—a ticklish business with a sheer drop on our side of the road. At about 7,000 ft, just over the Col, we stopped to have our midday meal of bread, cheese, peaches and dried figs.

It was very hot, and climbing above the pass I found the mountain *Colias, C. phicomone* Esp., flying strongly. *Erebia ceto* was abundant but there was very little else on the wing. At the bottom of the pass, above the town of Barcelonnette, we again stopped to examine the fields of Thyme (*Thymus* sp.) flanking the roadside. These fields were more fruitful and we found a new species, *Maniola lycaon* Rott.: the males were fresh but only a few females were to be found. The butterfly is like a small Meadow Brown (*Maniola jurtina* Linn.), but the female has two large eyespots on the forewings and is a very attractive insect. *Maculinea arion* was also flying, together with the bright little 'blue' *Polyommatus damon* Schiff. Everywhere there were Black-veined Whites, and many were in copulation. The females seem to lose their scaling very quickly and the upper wings are almost always found to be transparent when specimens are netted.

Here and there on our wanderings we came across small groups of beehives and occasionally quite large apiaries, often a long way from any habitation. The Lavender and the Thyme were always swarming with Honey Bees (*Apis mellifera* Linn.) and one could long for similar conditions in this country. The economy of beekeeping seems to be very backward, however, as many hives are extremely primitive and skeps [hives made of straw or wicker-work] are still in use in the mountains. Even the apiaries using apparatus similar to our National hives had, for the most part, hives with only a simple brood-chamber, and I felt that by halving the number of hives and doubling the size of the remainder, the honey yield would be made very much more profitable. The honey, '*Miel de Lavende*', is sold only in waxed-paper cartons and is useless to the tourist in the hot conditions of the region. The wild bees and the hunting wasps are present everywhere in great numbers and I collected some examples for my son who is interested in these groups. The largest bees were huge black insects with orange bands on the abdomen, and these were taken in the woods of Var.

We found a suitable hotel in Barcelonnette after wandering around the town for a while, and almost immediately a violent storm broke over

the surrounding mountains. The rain was torrential and we spent the evening in a small café with a bottle of *vin blanc* and some well-cooked omelettes. In the morning we were informed that the storm had closed the Col d'Allos because of a rock fall, but the morning had brought back the sun and we made off for the Col de Larche, the Italian border. The slopes above and below the Col are rich in flowers but we were surprised at the scarcity of butterflies. I feel that the winter was in part the cause of this as the local inhabitants and the state of the road both gave witness to its intensity and many of the evergreen trees and shrubs bore the signs of its effect. The Small Apollo (*Parnassius delius* (=*sacerdos*) Esp.) was still on the wing with many of the commoner butterflies which we had taken elsewhere, but the *Erebia* species were represented by only *E. stygne* Ochs. and *E. ceto*. The 'blue' *Lysandra eros* Ochs. occurs at higher altitudes. It is very like the Chalkhill Blue (*L. coridon* Poda) but about half the size.

On the slopes I discovered a colony of Alpine Marmots (*Marmota marmota* Linn.). These rodents live in warrens rather like Rabbits (*Oryctolagus cuniculus* Linn.) and when approached they emit a piercing shriek which echoes among the mountains, giving warning to all. They are quite large, about the size of a Coypu (*Myocastor coypus* Molina) and stand erect at the entrances to their holes, disappearing if anyone approaches. We trained the field-glasses on one for a while as it moved up the slopes in a hopping run. To the south of the Col de Larche is a French Nature Reserve and here the Marmots, Chamois (*Rupicapra rupicapra* Linn.) and other animals are preserved from the hunter.

We crossed the Col through the frontier post into Italy and found similar terrain to that below the pass. Sweeping the Sainfoin (*Onobrychis viciifolia* Scop.) resulted in several typical 'blue' larvae, and these later emerged as specimens of *Polyommatus damon*. Unfortunately, heavy rain stopped our activities and we drove back through Barcelonnette to explore the valleys towards Gap. We found a vast lake called the Serre Ponçon had engulfed the old road and a bridge spanning its end led to the new road skirting the lake. As the rain cleared a few butterflies started to fly and we took several specimens of the beautiful 'copper' *Chrysophanus* (=*Heodes*) *alciphron* Rott. The mountain form is ssp. *gordius* Sulz., and the male is a splendid insect with violet reflections in the wings. On the 'flats' edging the river leading into the *Lac* we also found plenty of beetles and my father had the best of a somewhat indifferent day.

We spent another day on the slopes of the Col de Larche but the weather continued to be unsettled and butterflies were not abundant. We met a French schoolmaster and his small son who were collecting, and we exchanged addresses. He confirmed that the winter had reduced the butterfly population and that the late spring had put everything back some weeks.

(To be concluded in Bull. amat. Ent. Soc. **23** *(162), with an account of the party's progress north from Barcelonnette, and their return to Lyons.)*

28.8.63. P. W. Cribb (2270).

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SOME USES OF PLASTIC INSERTS IN CYLINDRICAL GLASSWARE

It is sometimes very useful to be able to divide off special compartments in specimen tubes and other cylindrical containers. A simple way of doing this is to insert a tightly-fitting collar of stiff plastic sheeting,

using it as a ledge on which to rest a disc of similar plastic. If necessary a second collar may be sprung in on top of the disc to lock it in position.

The internal diameter of the tube must be carefully measured so that a collar of the correct length can be cut without time-wasting trial and error. Remember that tubes may be melted in or lipped out at the top. The circumference of a circle is 3.14× its diameter. Tubes of nominally the same size differ enough to prevent a collar cut for one of them from lying snugly against the wall of another and gripping it well, so individual fitting is unfortunately needed, unless the collars are stuck to the tubes. Stiff sheeting will not bend to fit small tubes if it is thicker than about 0.020 inch, so the discs must fit the tubes to this accuracy to ledge satisfactorily on the collars.

Fig. 1 shows a 'false lid' for a breeding-culture or emergence tube. It is especially useful when sending by post a number of small pupae that might emerge *en route*. A gauze-covered cut-out can provide ventilation, and a small hole, plugged with cotton wool, provides an aperture small enough to extract specimens one at a time into other tubes. The whole can be corked for transit to avoid evaporation loss and possible disaster should the cotton wool plug come loose. Insects can be made to do as required more easily in such a tube than in one with the cork bored in the same way as suggested for the 'false lid'. There is no gap round the edge to deter insects from walking from the sides on to the lid, and the tube seems the same at both ends to the insects until the captor shades the bottom and sides or places the tube on end.

A relaxing-bottle may be made on similar lines, with partitions to separate the specimens from the source of water and to retain them in the central portion where condensation is least likely to run on to them if the bottle is turned about in transit. Partitions without large holes may be made removable by knotting a piece

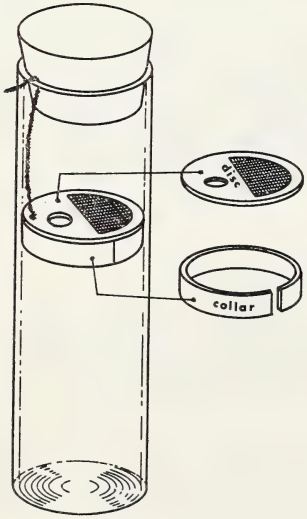

Fig. 1

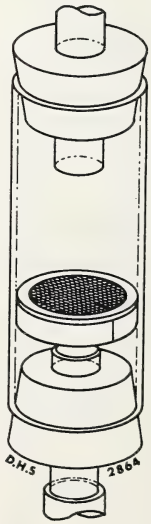

Fig. 2

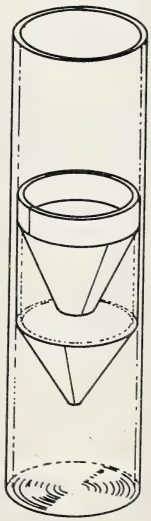

Fig. 3

of twine through them near one edge.

Fig. 2 illustrates a straight-through pooter with a gauze-covered chamber at one end. The gauze may simply be stretched over a single collar, no disc being necessary, although a disc is shown in the figure. This piece of apparatus eliminates the need for an awkward gauze and rubber band over the tube going to the mouthpiece. There is less pressure than normal across the much larger piece of gauze in the pooter now described, so dirt sucked into the pooter does not pass into the mouthpiece so easily for a given size of mesh, nor do insects that like to sit on the gauze obstruct the airflow.

There is no need to suck vapour of a killing-agent through this type of pooter, for the mouthpiece can be removed and a pad charged with fluid can be introduced without any risk of the contained insects escaping. A polythene collar with a nylon gauze forms a non-absorbent combination that will withstand normal killing-agents.

An emergence trap for segregating insects of different sizes appears in Fig. 3. All the parts are transparent. The trap is secured to a hole in the side of an opaque box inverted over a sample area of soil. Emerging insects are attracted to the light and pass down as many of the plastic cones as their size will allow. Large insects, which might damage or attack the small ones, are retained in the first cone. It may be necessary to put an opaque sleeve over all but the closed end of the tube to discourage small insects of some groups from returning to explore the wider cones. The catch can be readily inspected after the sleeve has been slid off the tube. The collars may be made as spacers, cemented to the cones so that these slide in straight.

R. W. J. Uffen (1660).

TROPICAL SPIDERS

The following lists those Members who responded to my appeal published in the January *Bulletin:* to ensure that the list summarises the situation fully I have added my own name to it.

Berman, H., St Ivo Entomological Society (2941), St Ivo School, St. Ives, Huntingdonshire.
Castle, M. E. (2490), 20, Boldre Close, Leigh Park Estate, Nr Havant, Hampshire.
Cooper, J. E. (2343), Quantocks, New Wokingham Road, Crowthorne, Berkshire.
Foxwell, D. J. (3270), 46 Bywater Road, Leicester.
Harman, A. J. E. (2721), 39, Avenue Terrace, Southend-on-Sea, Essex.
Horton-Omerod, S. (1370), 21, Somerset Road, Heaton, Bolton, Lancashire.
Parker, Miss D. (2840), White Swan Hotel, Stratford-on-Avon, Warwickshire.

Those Members who have attended the AES Exhibitions will be familiar with the superb display put on by Mr G. J. Ashby of London Zoo, who, although not listed above, is mentioned here to complete the complement of interested persons.

Strictly speaking the above list is the end product of my appeal, but in view of the enthusiasm shown in your letters I feel that it is worth trying to expand the subject a little further. I do not propose setting up a study group working independently of the AES but I do suggest that a series of short articles compiled on a questions and answers basis might be practical — at least it is worth a try.

M. E. Castle (2490).

JUNIOR NEWS SECTION

Jaquelin Ridley (3474J) has been busy this season rearing broods of larvae of both the Buff Ermine and White Ermine moths (*Spilosoma lutea* Hufn. and *S. lubricipeda* Linn.) as her contribution to variation experiments being carried out by the newly-formed AES Study Group.

While hunting on the Northumberland moors last year, she was lucky enough to collect two caterpillars of the Northern Eggar Moth (*Lasiocampa quercus* Linn. var. *callunae* Palmer). After numerous escapes from their cage they eventually pupated and, after the terrible winter, male and female moths emerged from the chrysalids.

The female laid almost one hundred eggs soon after mating. These took roughly five weeks to hatch. Jaquelin is thrilled with this success but feels that the caterpillars will do better in more capable hands. She hopes to sell them to an experienced breeder this autumn.

Fourteen-year-old Robert Mackintosh (2267J) is carrying out some very useful research into the distribution of lepidopterous larvae which feed on the foliage of a specific group of trees. This year he is concentrating on Poplars and Aspens (*Populus* spp.) and is busy charting the whereabouts of trees of these types which occur within ten miles to the south of his home. Robert hopes to become acquainted with many species of butterflies and moths by regularly searching these trees. He also hopes to make the acquaintance of other keen Macrolepidopterists, and is interested in hearing from people who have any experiences of 'assembling'.

Robert is still finding eggs of the Pebble Prominent Moth (*Notodonta ziczac* Linn.) on Poplar trees, and wonders whether these are of the first brood: if this were so, it would be an indication that the season is extremely late.

My own society, St Ivo Entomology and Natural History Society, returned from Luxembourg at the beginning of August after a most enjoyable expedition. I can only say enjoyable as we were not very successful: but I will write more about that some other time. I learned a very important lesson from this trip: that looking too closely at large carabid beetles can be dangerous. A large ground-beetle managed to spray my face with acid from its anal glands while it was being held firmly twixt my thumb and forefinger. Only spectacles saved me from a 'white stick'—take care!

I realise that adverse weather conditions have hampered the young entomologist this year, but I do hope more boys and girls will write to me about their work in all branches of our scientific hobby. As well as the lepidopterists, there must be a few coleopterists, neuropterists, orthopterists, hymenopterists or even dermapterists who can tell us what they have been doing (I, like Mr Birch, am not a lepidopterist). If you deal with common insects, do not let this deter you from writing to me. It is better to verify by observation than just by reading, and we should like to hear if the observations of the 'professionals' are quite correct after all.

Finally, two brief thoughts occur to me:

Has anybody seen those swarms of Cockchafer beetles (*Melolontha melolontha* Linn.) I have so often heard about but never seen?

Anyone wanting stick-insects (usually) or locusts and cockroaches (sometimes) please let me know.

18.9.63 H. J. Berman.

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REVIEWS

Silent Spring, by Rachel Carson. Pp. xxii and 304. Hamish Hamilton,

London, 1962. Price 25/-.

Make no mistake, Miss Carson's general thesis as expounded in this book is a challenge to us all. Expressed bluntly, this thesis is that a great many species of animals (including our own) are in grave danger of being slowly and subtly poisoned. The process is indirect, of course, for the primary targets for destruction are the teeming millions of economic pests. It is ironic that the problem is man-made. Agriculture has been rationalised and commercialised. This has meant two things: (1) that there are areas where large quantities of similar plants are grown together, and (2) that every effort has been made to make these areas economically profitable.

The effect of growing vast quantities of the same plant in close proximity is to create a paradise for insects. The result is an increase in the population of the latter until the existence of the crop or its profitability is threatened. To combat these noxious insects, the now powerful industry for the manufacture of chemical pesticides came into being. The beginning of this industry was innocent enough, but the demand for increasingly more effective chemicals has produced an arsenal of pesticides which are capable of dealing with almost any known pest. The fact that most of these are highly toxic (including, naturally, the most efficient!) unless used with care, has proved to have unfortunate consequences.

The hub of the matter is the discovery, in comparatively recent years, of really effective insecticides, their intensive manufacture and the development of efficient methods of application. The potency of some modern insecticides, as shown by the minuteness of the lethal dose, is remarkable. What is so disturbing is that unless the toxic compound decomposes fairly quickly into harmless by-products, the insecticide will persist as 'residues' or 'contaminants' on fruit and foliage, and in the soil. For pesticides, persistence is probably an advantage, but is probably the primary danger inherent in their use. Miss Carson gives numerous instances of disasters which have followed upon the widespread (and sometimes reckless) employment of considerable quantities of certain insecticides. Her citations and descriptions are well-documented should anyone wish to query any point.

The title of Miss Carson's book rather emphasizes the devastating consequences of the use of insecticides which have been recorded for bird populations. However, fishes and mammals of many species have not escaped the potential menace of the build-up of pesticidal residues. The danger to mankind resides in the devious and often odd manner by which the toxic compounds can find their way into our diet. Once in the body, it is only too possible for the substances to affect the general health, weaken the nervous system or (as is suspected for some compounds) behave as carcinogens. The really frightening aspect is that, under present conditions, this threat may never recede but may actually become greater.

One aspect of the subject, about which naturalists would share Miss Carson's concern, is that of the consequences of gross interference with the delicate ecological balance of natural life. Pesticides are such 'blunt instruments' that harmful and beneficial insects, pests and their predators, abundant and rare species are equally destroyed—apart from other ecological repercussions. Thus, from a naturalist's point of view, irredeemable damage may result in a number of directions. However, to view the situation in the right perspective, the balance was upset with the advent of large-scale agricultural production and, with the present level of human

population, there will be no reversal of this trend. The only alternative is to seek a new ecological balance, and one based squarely upon recognition of the present unsatisfactory situation.

This will certainly require a fresh and vigorous approach to the problem, for it is questionable who is actually winning the long-term struggle. To be sure, the application of insecticides usually produces spectacular results, but there is ample evidence that the reproductive powers of most pests are such that pest populations can withstand repeated decimations. Furthermore, latent genetic variation can produce new populations partially or completely resistant to killing-agents. The new approach would be that of biological control, combined, if need be, with the most prudent use of insecticides. If man creates conditions for almost unlimited proliferation of pestilent insects, then he should be prepared to discover highly selective countermeasures. These may take an amazing variety of forms: the liberation of predators or sterile males of the species to be controlled, or spraying with specific viruses, to mention the more well-known.

At first sight this may appear to be an expensive undertaking but this conclusion is questionable in the long term. The more that is known of complex ecological interdependencies, the more we avoid making errors in the too liberal use of pesticides. In any event, such studies would greatly increase our knowledge of natural life on this planet, a point which might not gain universal acceptance as justification for the increased expenditure, yet one which readers of this *Bulletin* will certainly appreciate. Miss Carson's book is recommended reading for thoughtful persons, particularly naturalists, whose interests are probably more affected than those of most other people.

9.8.63. Roy Robinson (3201).

Introduction to Entomology, by R. Jeannel. Translated by Harold Oldroyd, M.A., F.R.E.S. Pp. 344, numerous illustrations, 6 coloured plates. Hutchinson, 1960. Price 63/-.

This excellent textbook on entomology, written by Dr R. Jeannel, Professor of the Muséum National d'Histoire Naturelle in Paris, has a much wider scope than the usual ones.

The chapters are:-

1. *The Insects.* Their systematic position in the Arthropoda. A brief summary of their origin including summaries of the best-known theories.
2. *External morphology.*
3. *Internal anatomy.*
4. *Development.* Including parthenogenesis, etc.
5. *Classification.*
6. *Physiology.*
7. *Behaviour.* Simple behaviour-patterns, means of attack. Defensive mechanisms. Mimicry and protective colouration. Parasitism. Conscious behaviour.
8. *Social life.*
9. *Evolution.*
10. *Fossil insects* (divided into sub-Classes).
11. *How Insects spread over the Earth* — finishing with the natural regions of the Earth.

The coloured plates are somewhat mixed in quality — some good, some not so good. The illustrations are numerous and from many sources — here are some examples: Imms, Berlese, Weber, Tillyard, and Hundirsch.

It is an excellent book, but a little expensive, so if you can't afford it, ask your Public Library for it: it's well worth reading.

D.O.

To The Zoo in a Plastic Box, by John and George Newmark. Pp. 182. Illus. Pl. IV. Routledge and Kegan Paul, London, 1963. Price 15/-.

This book is concerned with the collecting of reptiles and insects for the London Zoological Gardens. The first fifteen chapters record the exploits of the authors, from childhood escapades to the adult approach to collecting. The remaining seven chapters give advice and hints on collecting equipment, feeding captive animals and first aid for snake-bites.

The authors have written this book with the younger generation in mind. However, this should not deter adults from reading it. I found the book amusing and entertaining, and the enthusiasm and love of the authors for the animal world pours out from the pages. The authors make no pretence of being experts, for the Newmarks are collectors and leave the scientific aspects of their subject to the experts. However, one feels that they are more expert than they are inclined to claim.

The stories of collecting in the army, Malaya, Morocco and Florida are well worth reading. They are delightfully amusing and anyone who enjoys reading about such topics is assured of an interesting and entertaining few hours. The book will not give much help to those who want scientific information about reptiles and insects, but there is a danger that as more people read this book the London Zoo (or any other zoo for that matter) will become inundated with aspiring collectors!

Remarks about this book would be incomplete without mention of the excellent drawings by George A. Gammon which are liberally sprinkled throughout the book.

G. D. T.

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LETTER TO THE EDITOR

Sir,—I have recently been breeding an Austrian form and a yellow form of *Pieris napi* Linn. (Green-veined White Butterfly). On the evening of 25th August this year (1963) I was in my room with the electric light switched on when a friend who was with me at the time pointed out a 'moth' which was flying round and round the light between the shade and the bulb. The insect was white and looked, at a glance, somewhat like an ermine moth, but when I caught it I was surprised to find that it was a specimen of *P. napi*. One caterpillar must have escaped from a rearing cage, pupated and emerged in my room unknown to me until it was seen, for the insect was of the Austrian form I had been breeding. What really amazed me, and this is the point of this item, was the fact that a *butterfly* should be flying round a light source. Is this a common occurrence, or was this specimen a little 'odd in the head' and 'under the impression' that it was a moth!?

26.8.63. Terence F. Knight (3190).

Although I have read reports of certain butterflies being attracted to mercury-vapour light-traps—the Speckled Wood (*Pararge aegeria* Linn.) and the Red Admiral (*Vanessa atalanta* Linn.) for instance—these seem to be only isolated instances, although, of course, South (1941) records that both the Red Admiral and the Painted Lady (*Vanessa cardui* Linn.) have been attracted to light on more than one occasion.

On the day that I received Mr Knight's letter, I caught several specimens of the Small White (*Pieris rapae* Linn.), and after keeping them in the dark for the rest of the day I released them that evening in *my* room with the electric light switched on. Every specimen, when disturbed, flew straight to the light and fluttered strongly around it (although the maximum distance from the latter at which I could release the butterflies was, because of the size of the room,

only four or five yards). The single female which I had netted seemed to show a somewhat stronger response than the males, although this single instance proves nothing.

It would appear, therefore, that the automatic response to light is very similar in all species of Lepidoptera, and butterflies are evidently seen at light so rarely simply because few of them fly at night: for South's note on the occurrence at light of *V. atalanta* and *V. cardui* mentions that individuals of these species frequently continue on the wing after dark.

An interesting series of experiments could be performed to test the strength of the responses in butterflies compared to those in moths: and, of course, different species could well show different responses. As far as I know, only a little work has been done towards a comparison of such responses in different species of nocturnal moths, and no doubt the day-flying species would present an interesting picture too. Has any Member further information on the sort of phenomenon recorded by Mr Knight?—*Editor.*

REFERENCE

SOUTH, R. (1941). *The Butterflies of the British Isles.* 3rd edn. Frederick Warne, London. p.80.

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NOTES AND OBSERVATIONS

A NOTE ON *VOLUCELLA ZONARIA* PODA

The hoverfly *Volucella zonaria* Poda has in recent years spread inland from the south coast of England where it was once only precariously established, and is now widespread over the Southern Counties. It seems that in N. E. Surrey the species is extremely common, and it appears more abundantly each year. I would be interested to hear, through the pages of the *Bulletin*, if this apparent increase in numbers is matched elsewhere, or whether I have just been fortunate in my observations of the species.

1.9.63. H. V. Danks (2907).

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SCARCE SILVER LINES IN NORTH DEVON

Following the successful rearing of a Scarce Silver Lines Moth (*Pseudoips bicolorana* Fuessl.) from a larva found last year, I have, this year, taken three adult specimens.

The first, on 31st July, was found on the lawn, having probably been attracted to the porch light, whilst the other two were taken in my mercury-vapour light-trap on the night of 3rd-4th August 1963. All three specimens were in perfect condition.

26.8.63. P. L. Norris.

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DISTRIBUTION OF THE ALDER MOTH

We do not know if the distribution of *Apatele alni* Linn. (Alder Moth) has greatly changed in recent years, but South in '*Moths of the British Isles*' and Stokoe in '*The Caterpillars of the British Moths*' both say of the larva: "... anyone who may obtain (collect) even a single example in a season may congratulate himself on a good find."

In case it may be of general interest we would like to record finding one larva at Little Haven in Pembrokeshire in August 1962, and another at White Downs in Surrey in August 1963.

R. J. Swindells (2619).
F. C. Brown (2414).

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SOUTH, R. (1961). *The Moths of the British Isles.* 4th edn. Frederick Warne, London. Series I, p.371.
STOKOE, W. J. (1958). *The Caterpillars of the British Moths.* Frederick Warne, London. Series I, p.160.

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