







Proceedings and Transactions of The South London Entomological and Natural History Society

The correct abbreviation for THIS Vol. is:—
“*Proc. S. Lond. ent. nat. Hist. Soc. 1965*”

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MEETINGS OF THE SOCIETY

are held regularly at the Society's Rooms, and include the well-known ANNUAL EXHIBITION, which takes place in October in the Libraries of The Royal Society and of the Geological Society of London at Burlington House, Piccadilly, by kind permission of those two Societies. Frequent Field Meetings are held at weekends in the Summer. Visitors are welcome at all meetings. The current Programme Card can be had on application to the Secretary.

Proceedings and Transactions of The South London Entomological and Natural History Society

EDITORIAL

With the publication of this, the first part of the Society's Proceedings and Transactions to be published periodically, the Society discontinues a method of publishing which has been in use since 1885. During this 80 years our publication has become a volume with a reputation of which our members can be justifiably proud.

Although there are many reasons for the change from annual to periodical publication, two stand out above the rest. First, and of prime importance, is a simple matter of communication. While the Society was a small local society, when the majority of its members could attend the meetings, an annual publication was adequate and served the Society very well indeed; but with the growth of membership, particularly since 1946, on a wider and national scale, with the inevitable result that meeting attendance represented a smaller section of the Society, a means of providing a scattered membership with a more frequent link with the Society becomes essential. Our Country Membership should now be drawn into much closer contact, and this must benefit both the individual and the Society.

The second reason lies in the time it took to get papers into print in our annual publication. A minimum of nine months elapsed under the most favourable circumstances, this could be extended into 17 months. There was no doubt in the minds of those who formed the committee appointed to consider and report back to the Council on the possibility of a publication change, that many members were deterred by these delays from publishing with the Society. Our new form of publication will undoubtedly reduce the time lag.

The success of periodical publication will depend on the support of all members. Providing a steady flow of papers and small notes is submitted, the Society cannot fail to increase the status of its publication, and its own prestige.

PRESIDENT'S ADDRESS

Read by C. G. ROCHE, F.C.A., F.R.E.S.
28th January 1965

It is this moment each year, Ladies and Gentlemen, which is the climax of your President's year of office. He looks forward to it with a mixture of apprehension and pleasure—apprehension because of the high standard set by his predecessors and pleasure because, once over this climax, he can become one of the crowd again.

So far as I am concerned, the start of the build-up towards this moment happened just over two years ago when the Secretary ruined the Annual Dinner for me by asking me, on the Council's behalf, if I would stand as Vice-President with a view to becoming President the following year. The surprise of this honour upset my gastronomic pleasure! For honour it is to be elected President of the South London, and one I shall always remember with gratitude.

I am grateful for more than the honour. During this last year I have had the chance of learning a tremendous amount about our Society and the ways in which it works. I hope that this knowledge gained will enable me to repay the South London for the pleasure and help it has given me.

We all join the Society because of our interest in things connected with natural history. In this interest we are helped and encouraged by those who are more experienced. We gradually gain the knowledge for ourselves and then, in our turn, we can help and encourage the newcomer. We are all greatly indebted and grateful to those who went before us. It is in this spirit that I would like to remember the nine members that we have lost through death this year—nine members to whom we are grateful for having been members. We have already stood formally in their memory as their deaths were reported to us. I would like now to think about them briefly again.

Air Vice Marshal P. S. Blockey joined the Society in 1960 during his last command as Senior Air Staff Officer, RAF Technical Training Command. He was interested in Lepidoptera.

Mr. F. H. Day, who was born in 1875, joined the Society on 25th January 1900. He became a Special Life member in 1951. He lived in Carlisle where he founded the Carlisle Natural History Society and was Honorary Curator of the City Museum until his death. Although he was interested in all groups of insects, he specialised in the Coleoptera and Hemiptera of Cumberland.

Mr. C. H. Hards was listed as a lepidopterist and in this capacity he took in the London area the only British specimen of an American noctuid. He was also keenly interested in Coleoptera. He had an intimate knowledge of the Thames Estuary and its insects. He joined us in 1943.

Mr. A. F. Hemming had a distinguished and varied career in the Civil Service. A recital of the posts he held would be of interest, but it is as an entomologist of international reputation that we shall remember him. He served for ten years as treasurer of the Royal Entomological Society. He was on the editorial panel of the *Entomologist*. Perhaps his greatest claim to fame in the natural history world rests with his 22 years as Secretary of the International Commission on Zoological Nomenclature. In this capacity he brought this vital and difficult subject forcefully before the zoologists of the world. He joined the South London in 1920.

Colonel S. H. Kershaw had a distinguished military career, serving in Palestine during the 1914–18 war. He collected foreign Lepidoptera and his collection

went to the Nottingham Museum. When he settled in England he collected varieties of British butterflies and moths. He joined in 1943.

Mr. F. H. Lyon joined in 1954. He lived in Devon and contributed to the *Entomologist's Record* about the Lepidoptera in his part of the county.

Canon C. E. Raven was another member who was well-known in widely different fields. Chaplain to the Queen, he was engaged in religious education for most of his life. He was formerly Regius Professor of Divinity and Vice-Chancellor of Cambridge University. As a naturalist he was a past president of the Botanical Society of the British Isles and his knowledge of the British flora was immense. He collected Lepidoptera all his life. He painted birds, caterpillars and flowers. In addition to his theological writings, he wrote *John Ray, Naturalist: His Life and Works* and *English Naturalists from Neckham to Ray*. These are contributions to the history of the science of a high order. He became a member in 1955.

Dr. E. Scott, who joined in 1927, was well known as an expert on the Lepidoptera and the botany of the Ashford district of Kent. His last publication was his *Annotated List of the Lepidoptera (Macro and Micro) occurring in the Neighbourhood of Ashford, Kent*. This appeared a few days before his fatal stroke and he expressed his pleasure with its format. Those who enjoyed his hospitality and that of his wife will have the happiest memories of him.

Lastly we remember Mr. L. G. Stimson who died at the untimely age of 34. He only joined us in 1961 and was interested in general entomology.

In addition to these nine members whom we have lost, I would like to refer to Mrs. Watson, the wife of our member Mr. R. W. Watson. Although she herself was not a member, she was well known to many of us and attended our meetings frequently.

You have heard from the Council's Report of the various changes that have come to fruition during my term of office and there is no need for me to repeat them.

There is, however, one point concerning our move to these splendid new premises that I feel bound to make. You will realise that every member of your Council—indeed all members of the Society—made extensive enquiries about possibilities, to no avail. We were at our wits' end. Then my immediate predecessor produced his trump card—the Alpine Club. Without Mr. Messenger's efforts and contacts we would not be here today. With characteristic modesty he omitted this piece of information when announcing the results of our successful negotiations to you. I would like to place on record now, at the second meeting and the first General Meeting that we have held in this lovely room, our great thanks to Mr. Messenger.

Apart from these finalised items of change, there are several other matters actively under consideration concerning the organisation and administration of the Society and possible ways of expanding it and extending its influence. Your Council have worked extremely hard in constructive thought and discussion and the various office bearers have all helped me very greatly in the diverse ways in which all these realised and projected alterations have necessitated more committee work. Without them indeed the office of President would be almost impossible and I should like now to express my personal thanks to them for the work they have put in.

By now you will have noticed that my year as your President has been very much concerned with matters administrative and organisational. I would like now to consider on a wider scale, on the national scale, the way in which the study of Natural History is organised. My reasons for this examination are not just academic, for the sole purpose of providing me with a subject for this

address. I am quite sure in my mind that the natural history movement is ripe for an overhaul. It is largely inefficient and ineffective; it is rambling with much duplication and overlapping of effort in some fields with equally large fields being left uncovered; it has got its priorities wrong, not achieving its objectives and probably in many cases not really being aware of what its objectives should be.

Before I try to justify these somewhat sweeping criticisms, I must fill in the background with a quick survey of the history of the movement to show how the present situation arose.

People in this country have been studying natural history and forming collections certainly since the middle of the sixteenth century. Not unnaturally these individuals liked to discuss their subjects with others sharing their interests, comparing notes and exchanging specimens. Towards the end of the eighteenth and in the nineteenth centuries, these relationships were put on a more formal basis by the formation of societies for this purpose. This followed the general pattern of the period, which might well be called the Age of Societies.

At first these societies were orientated entirely geographically. The reasons for this are not hard to find. Firstly, travel was much less easy than it is today; thus one collected entirely around one's home. Secondly, in those times so much less was known, so many fewer species, that it was the custom to collect everything without any form of specialisation. These first societies, then, were formed to study all the natural phenomena to be found in the areas in which they were situated. In many cases they were not even as limited as that. They also included the history and archaeology of the area. Many of these societies exist today with their original objectives unchanged.

There has been a tendency for these local societies to group themselves by counties. The Yorkshire Naturalists' Union is probably the best example to give of this. Most of the Yorkshire local societies belong to the Union with a considerable strengthening resulting from this banding together.

In due course, it was found that it was not possible to study adequately all insects, birds and mammals, as well as the plants, to be found in a district even if that area was severely limited. Thus came about the need for more and more specialisation. As the general scope of the field studied became more restricted so the study became more profound. This brought about the need for inter-communication between fellow specialists and the specialist societies and groups came about.

There are thus two distinct types of natural history societies—the general ones covering a particular locality and the specialist ones which deal with a section of the fauna or flora without regard to the geographical origin of the species forming the section.

Let us now turn for a moment to the question of conservancy.

In 1912 there was formed the Society for the Promotion of Nature Reserves, of which the present secretary is our own member, Mr. N. D. Riley. The first three of the nine objects for which the Society was formed contain the heart of it. They are:

- '(i) To collect and collate information as to areas of land in the United Kingdom or elsewhere in the Commonwealth, which retain their primitive conditions, and contain rare local species either of fauna or flora liable to extinction owing to building, drainage, disafforestation, or for any other reason.
- '(ii) To prepare schemes showing which areas should be secured as nature reserves.

- (iii) To purchase, take on lease, or in exchange, hire, or otherwise acquire any area of the kind above referred to, or any other real or personal estate which may be deemed necessary or convenient for any of the purposes of the Society.'

Perusal of the Society's Annual Report indicates the extent to which these wide and deserving objects are being carried out.

In 1958 it set up the Secretariat of what is now known as the County Naturalists' Trusts' Committee. This body co-ordinates the work of the various County Trusts which have been set up all over the country, very largely as a result of the work of Mr. A. E. Smith of the Lincolnshire Naturalists' Trust.

These trusts are conservancy bodies with the power to own land which is not of sufficient importance to become a National Nature Reserve.

It is necessary to mention here that local authorities have the power under the Local Government Act to create Local Nature Reserves—a power which is not widely enough used.

Realising the importance of all this work and the need for statutory legislation to be applied in some cases, the Privy Council set up by means of Royal Charter in 1949 the Nature Conservancy. The Charter recites the functions of the Conservancy in the following terms:

'To provide scientific advice on the conservation and control of the natural flora and fauna of Great Britain; to establish, maintain and manage nature reserves in Great Britain, including the maintenance of physical features of scientific interest; and to organise and develop the research and scientific services related thereto.'

How well the Nature Conservancy is doing its work may be seen by the fact that by the end of September 1963 there were 105 National Nature Reserves with a total area of over 218,000 acres.

The final paragraph in the history of the movement started in 1958 when the Council for Nature was founded with the help of a grant from the Society for the Promotion of Nature Reserves. The object of this was the creation of a central body which could co-ordinate the work of all the various natural history societies, encouraging them to assist in conservation and to stimulate wider public interest in this subject. Now, eight years later, there are 419 corporate members of the Council, comprising County Naturalists' Trusts, specialist and local societies, university and school societies and sundry other bodies.

There we have the existing structure. What are its weaknesses? Can it be improved in any way? If it can, what can we, the members of the South London, do about it? These, Ladies and Gentlemen, are king-sized questions and I am but a president. Still, I will attempt a brief analysis in the hope that this may stimulate some constructive ideas for which I am sure there is a need.

Of the two sections of the movement, let us think first of the Conservancy side. The organisation to my mind is sound. You have people who are expert in the conditions prevailing locally, who know what should be done to preserve the existing fauna and flora. They are the members of the County Naturalists' Trusts. These are grouped together to form the County Naturalists' Trusts' Committee. In this way there can be a ready exchange of knowledge and experience and a power useful in dealing with authority. The Nature Conservancy is there to provide the weight of a Statutory Authority; this is most important in facilitating the introduction of any legislation that may be necessary and in pressing for funds with which to take any large-scale action. It will be observed that I have not mentioned the Society for the Promotion of Nature Reserves.

This is because I have identified it with the co-ordinating committee of the Trusts, which it set up as I have mentioned.

On the other side of the movement—the natural history society side—the picture is much less happy. The present arrangements cause directly several serious weaknesses.

Firstly, there is the multiplication of memberships. It is quite common for a person to have to belong to several societies in order to cater for all his desired interests. This is because he is interested in more than one group or area.

Secondly, there is a considerable waste of administrative effort. The work involved in serving a membership of a few dozens is not increased pro rata when the membership is increased to several hundreds. I must interpose here that I am all the time considering an efficient organisation. Without efficiency what I have just said is quite untrue—indeed the work will increase in a geometrical progression with the numbers. Given, then, efficiency, the points that will increase with the size of the society are the mundane ones of circulation—the addressing of envelopes, the multiplication of notices and so on. These are all tasks which can be dealt with by junior labour and not by the senior officers of the society as is so often the case. In other words the larger society requires a more capable administrator supported by assistants to relieve him of the routine tasks.

Thirdly, there is the most important point of all—publications. Through the courtesy of the General Secretary of the Council for Nature, I have examined the publications of twenty local societies for a period of some three years. So far as I could see from these journals the contents fall into three basic categories:

- (i) information of purely internal interest—news of their own membership and activities.
- (ii) information of more general interest—distribution lists of locally found species is an example which comes to mind.
- (iii) information of general importance—descriptions of new species, revisions of groups and so on.

Apart from the publications of the various societies there are the, may I call them, 'professional' journals—the *Entomologist*, the *Entomologist's Monthly Magazine*, the *Entomologist's Record and Journal of Variation* and the *Entomologist's Gazette* in the field of insects.

This plethora of literature results in it being extraordinarily difficult to find out what has already been published on a particular topic. A possible example of this may be seen in Malcolm Burr's book *British Grasshoppers and their Allies* published in 1936. This gives distribution maps from which it appears that no species of Orthoptera occurs in either Shropshire or Worcestershire! This does seem rather unlikely. It could be that nobody has ever tried to collect this order in these counties; in other words the maps show the distribution of the collectors and not of the species. Another explanation of this phenomenon could be that the author did not have access to the records published in some local society's proceedings only available to members.

Surely some form of rationalisation is called for?

I think that by now there will have become apparent the direction in which my thoughts are running. I am sure that all the local societies have a duty to become less parochial and more positively co-operative towards national thinking. I believe that some form of federation is a necessary step forward. Perhaps the local societies could become members of county unions which in turn would have their centralising body in the Council for Nature. The specialist societies should each be national in their study and also be members of the Council for Nature.

At each level there should be publications suitable to that level. Thus, the local society should publish for the benefit of its members only such information which is of purely internal interest to them. Distribution lists and similar information should be forwarded to the County Union, which should have a journal propagating all information on a county-wide basis. Information of a more general interest still should be published either in a national journal by the Council for Nature or by the appropriate professional journal.

By having the publication organised in some way such as I have indicated, the information can be directed to the people interested in it at an economic price. What I mean by this is that local information about a society would have a limited circulation and a stencil newsletter would suffice. At the other end of the scale important papers can be produced in much larger quantities for wider circulation. The increase in quantity printed will be marked by an equivalent decrease in the price per copy. Apart from the purely economic factor, the important result is that all information published would be readily available to those who may need it.

Thus, it would be relatively simple to find out what work has been done on a particular group. It would be equally possible to see what field work is being done by a summary of such work in the County Unions' journals. This type of development would help to canalise the energies which are at present being dissipated in searching for information or straight duplication of work. I am conscious that I have not solved the problem with a few glib sentences! There will be innumerable obstacles to be met with and overcome before any solution can be acceptable. Not the least of these will be the understandable parochial pride of the individual societies in what they do at the present time. Many do a great deal of useful work—an amount surprising when considering the limited resources available to them.

This leads on to another difficulty—finance. The subscription rates of many societies are remarkably low. Some have the same rate of subscription as they had before the war. Presumably, the members are content to jog along in the way they always have done and pay five shillings a year for doing this. It will be extremely difficult to persuade them that by paying more they will get a lot more out of their hobby and also contribute to the advance of knowledge on the one hand and to the protection of wild life on the other.

What is wanted is a crusade. There is an enormous mass of people interested in natural history. This mass must be educated and its manpower harnessed.

An onslaught such as would be necessary must be very carefully planned. People hate having their nice little routines upset. They like to have the easy way, the way they are accustomed to. Any suggestion of change will immediately antagonise them.

The Council for Nature is well equipped with an Intelligence section. Because of this, I suggest that the most sensible way for the problem to be considered and attacked could be by a special committee set up by the Council for the purpose. This committee should conduct a much fuller fact finding survey than I have been able to; I have done just enough to convince me that a lot must be done.

Once in full possession of the facts, that is full details of all societies, their objects, their subscriptions, with analyses of their indoor and field meetings and of their publications, once armed with this information, the committee would be able to see more clearly the direction in which the reconstruction should take. It might find, for example, that in some counties some form of federation is already so advanced that it would be best to leave those areas alone and concentrate on the less well developed ones. Conversely, it might feel that some relatively slight

alteration to the existing federation would bring it into line with the ultimate ideas so that it could be run as a pilot scheme. There are many possibilities and speculation on them without the facts is idle.

Where does the South London come into this scheme of development? It seems to me that our field work is one of our strongest assets. Looking at the programmes of the activities of other societies, I felt that we did more constructive work than many others. We are less of a 'literary and debating' society.

As I have said earlier I dislike overlapping and duplication. This is one of our faults. We impinge on the activities of several other societies based on London and the Home Counties. Situated where we are it is difficult not to. During the last year, however, we conducted an experiment which has not yet been mentioned this evening. I refer to the special field meetings organised to look for a particular insect in an area either because it used to occur there years ago or because the conditions prevailing in the area would seem theoretically suitable for the insect. This seems a form of work eminently suitable for this Society to undertake. We have fairly wide-spread membership throughout the country. Perhaps we could extend this work in the coming year to include some meetings for our country members.

Another task I think the South London could undertake would be the educative one I mentioned earlier—once the pattern has been laid down. We are fortunate in having in our membership some extremely able naturalists. Would it be too much to ask them to tackle the more conservative societies or individuals?

I think that this Society has a most important part to play in any development. I think we would all like it to be in the forefront of these developments so that our members can act as catalysts for the furtherance of rational study and organised conservation.

WORKS CONSULTED

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Forty-seventh Annual Report, 1964. Society for the Promotion of Nature Reserves.
Six Years' Work of the Council of Nature—Speeches by the Right Honourable Lord Hurcomb, G.C.B., K.B.E., and Aubrey Buxton, M.C. at the Annual Meeting, 11th April, 1964. 1964, The Council for Nature.
Report of the Nature Conservancy for the Year ended 30th September 1963. 1963. H.M.S.O.
Fourteenth Report of the National Parks Commission for the Year ended 30th September 1963. 1963. H.M.S.O.

Dermestes haemorrhoidalis Küst. (Col., Dermestidae) damaging a book. During the winter my daughter bought a second-hand book and whilst reading it was unpleasantly surprised to find the head of a large coleopterous larva protruding from the page. The larva was carefully extracted from the book and placed in a jar with some more paper, but it did not feed. It pupated after a few days and an example of *Dermestes haemorrhoidalis* Küst. emerged 3.iii.65. The species, placed on the British list by Besant (1963, *Ent. mon. Mag.*, 99:30-1) has frequently been taken indoors. It would seem that this particular specimen had entered the book to pupate. In doing so it made a tunnel through the pages approximately one-eighth of an inch across.—F. D. BUCK, 9, Elton Walk, Tiptree, Colchester, Essex, 6th May 1965.

COUNCIL'S REPORT FOR 1964

The long fine summer proved ideal for field meetings, of which the Society arranged 30, spread over a wide area and covering many and varied habitats. A field meeting was held jointly with the International Congress of Entomology in the New Forest; this was joined by a number of local members and everyone enjoyed a successful day's collecting. The field meetings were well attended and have resulted in a number of interesting exhibits at the indoor meetings. Mr. Uffen is to be congratulated on arranging so successful a programme.

Twenty-three indoor meetings were held during the year and a stimulating programme was provided by Mr. Howarth, whom we thank for the success of these meetings. A feature of the meetings has been the increased number of exhibits in many orders. Less experienced members should not be discouraged by the number of rarities being exhibited; the presentation of more common insects in novel settings with proper notes can often provide the more interesting exhibit.

In July the Society held a special meeting in the rooms of the Linnean Society in connection with the International Congress of Entomology, when members and officers were at home to members of the Congress. The meeting was most successful and aroused much interest in the Society amongst foreign visitors. We thank the Council and Officers of the Linnean Society for allowing us to use their premises and for providing some interesting exhibits.

The Annual Dinner was once again held at the Grosvenor Hotel and 70 members and guests thoroughly enjoyed themselves. On the following day, Saturday, 31st October, the Annual Exhibition was held in rooms of the Royal Society. The exhibits were of a high standard and many unusual varieties and species were shown. We thank those who gave generously of their time to make the Exhibition a success, and the Royal Society and Geological Society for the use of their premises.

The Christmas cards continue to be increasingly popular and this year it was necessary to set up a special committee to look after this activity. Considerable expansion both as regards numbers of cards available and advertising was undertaken. Not only does the profit from the sale of cards provide a valuable addition to our income but it is beginning to be clear that the publicity will probably lead to increased membership.

The Society was most reluctantly forced to raise subscriptions during the year, but when it is realised that even the present ordinary subscription is equivalent to a shilling a week, it is clear that members are getting good value for their money.

During the past year our membership has decreased by 3. The nominal roll at 31st December was 583 and comprised: 6 Honorary, 3 Special Life, 14 Life, 238 Ordinary, 254 Country and 68 Junior members.

The move of the Society from Pepys House to the Alpine Club has overshadowed all else. This move, forced on us by the compulsory purchase of Pepys House has brought to an end our long association with the Junior Institution of Engineers in whose premises we have spent many happy hours. It is appropriate to thank the Secretary and Officers of the Institution for their help and kindness during our tenancy and to wish them as happy a solution of their difficulties as has befallen ourselves. We must thank also the Alpine Club for their welcome to us and for the friendly and helpful atmosphere in which negotiations were carried out. We look forward to many years of fruitful co-operation. Finally, we must thank the many helping hands that enabled the move to go through so smoothly without any damage to the library or collections.

Another step taken by your Council was the decision to alter the method of

publication of the Proceedings. Increase in printing costs and the passage of time have made the format of the Proceedings somewhat old-fashioned. It has been decided therefore to streamline the routine reports and to bring out the Proceedings in six parts, one part every two months. We hope in this manner not only to obtain more papers but also to obtain greater value from notes etc. by prompt publication and thus to increase the journal's circulation. Of course, any venture such as this must be somewhat of an experiment, but we hope that members will be encouraged to send in many more notes and short practical articles. As part of the process we are cutting down Council's Report and avoiding all duplication. Therefore some items will now be found only in the President's address.

This has been a busy and momentous year in which Council have had to make many far-reaching decisions, some of them with reluctance. We hope, however, that a firm foundation has been laid that will enable the Society to play its part in the many important actions in entomology and natural history that will have to be taken in the coming years.

The Hon. Curator reports that Dr. M. G. Morris has completed the arrangement of the Leston collection of British Hemiptera-Heteroptera housed in two Hills units. The nomenclature follows that of Southwood and Leston. Ample space has been provided for incorporating additional specimens.

Work on the Joy collection of British Coleoptera and the J. O. T. Howard collection of British Heterocera has continued and it is hoped to speed up this task now that the Society's collections are more accessible.

Two Hill units have been purchased to accommodate part of the British Geometridae.

Mr. G. M. Haggett has donated a large collection of preserved lepidopterous larvae made up from his own and the late Mr. Hammond's collections and arrangements have been made to add these to our collection at an early date. The thanks of the Society are due to Mr. Haggett for this valuable gift and to the following members who have presented many interesting and rare species: Mr. L. Christie (Mecoptera), Major A. E. Collier (Lepidoptera), Mr. A. E. Gardner (Coleoptera and Orthoptera), Dr. B. J. MacNulty (Coleoptera), Dr. A. M. Massee (Hemiptera-Heteroptera), Mr. R. M. Mere (Lepidoptera) and Mr. W. H. Spreadbury (Trichoptera). Mr. L. Christie has rendered valuable help as assistant curator.

Several members borrowed specimens for critical study, a service which is always readily available to specialists.

The Hon. Librarian reports that our new premises at the Alpine Club will enable us to enlarge the Library at last. It is hoped to start a collection of separates, as many members have kindly presented reprints of their papers to the Library over the past few years. Members will be allowed to borrow up to three separates at any one time, in addition to the maximum number of books. Our thanks are due to all who presented works to the Library, and particularly to Mr. S. N. A. Jacobs, who has once again given us many new books. A list of additions to the Library in 1964 is given, with a note of how the item was acquired in parentheses, so that members may be kept aware of the contents of the Library.

De Bach, P. (Editor), 1964, *Biological Control of Insect Pests and Weeds* (S. N. A. Jacobs). Barrett, C. G., 1892-1907, *The Lepidoptera of the British Islands*, 5 vols. (H. G. Denvil). Eason, E. H., 1964, *Centipedes of the British Isles* (S. N. A. Jacobs). Edwards, C. A. and Heath, G. W., 1964, *The Principles of Agricultural Entomology* (S. N. A. Jacobs). Ford, E. B., 1964, *Ecological Genetics* (S. N. A. Jacobs). Ford, R. L. E., 1963, *Practical Entomology* (review

copy). Von Frisch, K. (translated by M. D. Senft), 1964, *Ten Little Housemates* (S. N. A. Jacobs). Frohawk, F. W., 1924, *The Natural History of British Butterflies* (H. G. Denvil). Glasgow, J. P., 1963, *The Distribution and Abundance of Tsetse* (S. N. A. Jacobs). Harris, Moses, 1775, *The English Lepidoptera: or, The Aurelian's Pocket Companion* (Dr. J. Newton). Heslop, I. R. P., Hyde, G. E., and Stokely, R. E., 1964, *Notes and Views of the Purple Emperor* (S. N. A. Jacobs). Jones, F. G. W. and Jones, M. G., 1964, *Pests of Field Crops* (S. N. A. Jacobs). Kloet, G. S. and Hincks, W. D., 1964, *Handbooks for the Identification of British Insects: A Check List of British Insects*, Second Edition (Revised), Part 1: *Small Orders and Hemiptera* (purchased). Martin, H., 1964, *The Scientific Principles of Crop Protection* (S. N. A. Jacobs). Meyrick, E., 1928, *A Revised Handbook of British Lepidoptera* (Dr. P. Roche). Oldroyd, H., 1964, *The Natural History of Flies* (S. N. A. Jacobs). Dos Passos, C. F., 1964, *A Synonymic List of the Nearctic Rhopalocera* (S. N. A. Jacobs). Scott, Dr. E. (Revision), 1964, *Annotated List of Lepidoptera (Macro and Micro) occurring in the neighbourhood of Ashford, Kent* (Dr. A. M. Masee). Thomas, J. G., 1963, *Dissection of the Locust* (S. N. A. Jacobs). Verity, R., 1943, *Le Farfalle diurne d'Italia*, Vol. 2, *Lycaenidae* (Dr. P. Roche). Wigglesworth, V. B., 1964, *The Life of Insects* (S. N. A. Jacobs).

Many separates have been presented to the Library, and we continue to receive the usual journals.

Forest Refreshed by Norman E. Hickin, 9 in. by 5 $\frac{3}{4}$ in., 184 pages, 74 text figures. London, Hutchinson, 25s.

A delightful book, worthy of the attention of all naturalists and those who like the open air. The sub-title, the autobiographical notes of a biologist, is an apt and accurate description of the contents. The book touches the author's family, business and entomological life, and the way Hickin expresses his feelings for the outdoor life, and the Wyre Forest in particular, will undoubtedly cause South London readers to feel there is a little of each of us within these pages.

Emphasis is on entomology with a chapter devoted to his special interest, the caddis flies; and another on his professional entomology. The chapters dealing with his work for his degrees may be a revelation to some readers, and a clear indication of what can be accomplished with determination.

The book is copiously illustrated with the author's own excellent drawings, both ordinary line and scraper board. Hickin is one of the few entomologists who appreciate the value of scraper board in entomological illustrating.

If there is a criticism at all it is the length of the captions to the illustrations, which tend to detract from easy reading. Your reviewer is not sure whether it is better to examine the illustrations and read the captions before or after reading the book; but the reader should not disturb his enjoyment of the book by attempting to take in the captions and illustrations whilst reading. A highly recommended book.

F. D. BUCK.

Mecinus collaris Germ. (Col., Curculionidae) in N.E. Essex. Whilst working tidal refuse in the Essex Naturalist Trust Reserve at Fingringhoe Wick, 19.iv.65, two examples of *Mecinus collaris* Germ. were taken. The species is well-known from the Thames marshes on the Kent side at the roots of *Plantago maritima* L., though it is doubtful if it has previously been recorded from the Colne estuary.—
F. D. BUCK, 9, Elton Walk, Tiptree, Colchester, Essex, 10th May 1965.

PROCEEDINGS

14th JANUARY 1965
The PRESIDENT in the Chair

EXHIBITS

Dr. A. M. MASSEE—*Platyrhinus resinus* (Anthribidae), a beetle which occurs chiefly in the midland counties and the West Country. It is therefore of interest to record this species in Kent. It was first recorded in the county in 1949 by Mr. G. J. HITCHINS on the Charing Downs and at Little Chart. More recently it has been found at Little Chart and last spring in Blean Woods near Canterbury. The larva feeds within the black fungus, *Daldinia concentrica* Ces & de Nat., which is associated with ash and other deciduous trees, and also occurs on posts, etc.

Mr. A. E. GARDNER—Examples of *Cantharis pallida* Goeze and *C. cryptica* Ashe (Col., Cantharidae) from various Surrey localities. He drew attention to the differences.

Mr. J. E. COOPER—Some ectoparasites of veterinary importance from Crowthorne, Berks., 13.i.65, which demonstrated the two main Orders of obligatory parasitic insects. (1) Hairs of a retriever showing characteristic louse eggs or nits glued to the shaft. These eggs were of the dog louse, *Trichodectes canis* (Deg.) one of the two biting lice (Mallophaga) found on the dog. Young lice would emerge from these eggs within seven to ten days. (2) Examples of the common pig louse, *Haematopinus suis* (L.). A typical sucking louse (Siphunculata) with a narrow pointed head. Accidental ingestion of these lice may play a part in the transmission of swine fever virus. The louse also may cause irritation and skin damage, yet is a common parasite on a large proportion of swine. (3) The common dog flea, *Ctenocephalides canis* (Curtis), with an adult life span of up to 12 months. Both this flea and the dog louse are intermediate hosts for the dog tapeworm *Dipylidium caninum*.

COMMUNICATIONS

The meeting closed with a talk, illustrated by colour slides on 'Nigerian Spingidae' by Dr. B. J. McNULTY.

28th JANUARY 1965

93rd ANNUAL MEETING

(With which was combined the Ordinary Meeting)

The President, Mr. C. G. ROCHE, in the Chair

The following new members were declared elected: Mrs. M. B. Watson, Mr. M. J. Davies and Mrs. N. McIver Paton.

In the absence of Mr. D. W. Thorpe-Young the PRESIDENT introduced the accounts and said that the Treasurer would submit a formal report later.

The Secretary, Dr. B. J. McNULTY, then read the Council's report and moved its adoption. This was seconded by Dr. P. J. ROCHE and carried unanimously.

The PRESIDENT declared the following Officers and Ordinary Members of Council elected for the ensuing year: *President*, R. W. J. UFFEN, F.R.E.S.; *Vice-Presidents*, C. G. ROCHE, A.C.A. and J. A. C. GREENWOOD, O.B.E., F.R.E.S.; *Treasurer*, D. W. THORPE-YOUNG, F.R.E.S.; *Secretary*, B. J. McNULTY, PH.D., B.SC., F.R.I.C., F.R.E.S.; *Editor*, F. D. BUCK, A.M.I.P.T.G.M., F.R.E.S.; *Curator*, A. E. GARDNER, F.R.E.S.; *Librarian*, Miss C. M. WAGNER; *Lanternist*, M. SHAFER;

Ordinary Members of Council, R. F. BRETHERTON, C.B., M.A., F.R.E.S., T. G. HOWARTH, B.E.M., F.R.E.S., F.Z.S., Mrs. T. G. HOWARTH, P. HURWORTH, P. JERRARD, J. L. MESSENGER, B.A., F.R.E.S., P. J. L. ROCHE, M.R.C.S., L.R.C.P., F.R.E.S., A. SMITH, A.R.C.A., D. STIMPSON and S. A. WILLIAMS.

Under Bye-law 25 (b) Mr. B. GOATER asked if an addenda could be produced for the list of members, and the PRESIDENT replied that the list of members was now being compiled and that additions and alterations would be circulated each year. He added that it was hoped to revise the list every three years or so.

EXHIBITS

Dr. A. M. MASSEE—*Pachycoleus rufescens* Sahlb. (Dipsocoridae), the smallest British hemipteron, which is recorded from six counties, the most recent being Surrey. This bug lives and breeds in sphagnum moss and it is frequently associated with running water. The macropterous form has been found in a bog near Emery Down in the New Forest, Hants. The minute immature stages are pillar-box red in colour, otherwise they would be very difficult to find in the field.

Mr. R. W. J. UFFEN—A female spider, *Geolycosa blackwalli* (Johnson) with young, collected earlier in Madeira.

Mr. P. A. GODDARD—Photographs of the two tineid moths *Batrachedra praeangusta* Haw. and *Chelaria conscriptella* Hüb., showing their effective camouflage when at rest on the trunks of their foodplants, aspen and birch, respectively.

COMMUNICATIONS

The PRESIDENT read his Address, after which he called upon Mr. R. W. J. UFFEN to take the Chair. Upon doing so the new President moved a vote of thanks to Mr. C. G. Roche, with which he combined a request for permission for the Society to publish his Address. In his reply Mr. Roche acceded to the request.

A vote of thanks to the Vice-Presidents, Officers and Council was moved by Mr. R. F. BRETHERTON, seconded by Mr. L. PARMENTER, and carried. Mr. C. MACKECHNIE JARVIS replied.

Tribolium castaneum Herbst (Col., Tenebrionidae) in a Brazil Nut. A Brazil nut opened 26.xii.64 was found to be mouldy, and a quantity of frass was present. An examination of the nut produced three dead examples of *Tribolium castaneum* Herbst, two dead larvae almost full grown, and several larval remains. The kernel had been eaten over the entire surface and had been tunnelled in several places up to half way to the centre. *Tribolium* are well-known pests in stored foods, but nuts in their shell are probably a little outside the usual range of foods; especially those with such a hard shell as that of the Brazil which would seem a bit tough for a tenebrionid. Only one nut was noticed in this condition, and would hardly constitute an infestation. It is probable that a cargo of nuts was at some time stored in a place where an infested food had previously been stored and that the beetles had found entry through a damaged shell.—F. D. BUCK, 9, Elton Walk, Tiptree, Colchester, Essex. 11th January 1965.

SAND-FLIES AND BLACK-FLIES
(DIPT. PHLEBOTOMINAE AND SIMULIIDAE)

By D. J. LEWIS

(Scientific Staff, Medical Research Council)

SAND-FLIES

Sand-flies have little to do with sand but the name is convenient because it is well known. In certain countries it is used for biting midges and Simuliidae, therefore it is sometimes necessary to refer specifically to phlebotomine sand-flies. These minute insects are a subfamily of the Psychodidae and they include the vectors of several human diseases. Most of these are zoonoses (animal diseases transmitted to man), and the study of sand-flies must be related to pathogens, animal hosts and man, as well as to possible control measures.

Taxonomy. There are more than 500 species of Phlebotominae and new ones are often found. Sand-flies are much alike in general appearance, brown and hairy with the wings held upward and usually pointed. Classification was very difficult until 1926 when Adler and Theodor showed that cibarial (buccal) teeth and spermathecae provide useful characters. The taxonomy of sand-flies, however, is a specialised and time-consuming study. There are different opinions about classification but most writers place all species in the genus *Phlebotomus*. In the Old World there are two main subgenera, *Sergentomyia* and *Phlebotomus*. Many species of the former bite lizards and many species of the latter attack mammals.

Distribution. The larvae of many psychodids are aquatic but those of sand-flies inhabit soil or litter. Sand-flies in all their stages make use of microclimates, and these delicate insects, unlike many blood-sucking flies, are independent of rivers and inhabit vast areas. Some aspects of distribution indicate features of the subfamily and its members. Sand-flies occur in the tropics and subtropics and warm parts of adjacent regions. In the Old World the subgenus *Sergentomyia* is widespread but species of *Phlebotomus* are particularly numerous in the relatively dry southern Palaearctic area.

Many species flourish in forests, mainly those of South and Central America. Many others live in arid regions and some of them even in deserts. Such regions are more extensive in the Old than the New World tropics, and some of these sand-flies link the faunas of zoogeographical regions which are separated by deserts.

Species which bite mammals, including man if he is available, are numerous in tropical American forests. In the Old World there are many in the southern Palaearctic area owing to the importance of the subgenus *Phlebotomus* there. In eastern Africa several mammal-biting species occur which are related to sand-flies of the Palaearctic or Oriental Regions and may have spread up the Nile valley. Surprisingly, they are not found in West Africa, and it is possible that some past climatic barrier may have prevented them reaching that area.

Endophilic species, which bite in houses and remain there by day, are numerous among the sand-flies of the southern Palaearctic.

In America dermal leishmaniasis occurs mainly in forests and visceral leishmaniasis in dry areas. The distribution of certain sand-flies determines the distribution of these and other diseases which will be mentioned later.

The recent discovery of four species at 46° 50' north in the State of Washington suggests that sand-flies are more widespread than was thought. There is much

scope for more work on distribution, particularly in areas where sand-fly-borne disease is unknown but may appear.

Age. Until a few years ago little attention was paid in most countries to the estimation of the physiological age of insects. The subject is now widely studied in relation to disease transmission and the evaluation of control measures. Methods used for mosquitoes are difficult to apply to sand-flies, but in those of the Old World the relatively large salivary glands show changes which serve to distinguish most parous females. Many species require vertebrate blood for the development of their ovaries, and the recognition that a fly has laid eggs is of practical importance in showing that it may have ingested parasites from a vertebrate.

Resting places of adults. Sand-flies are nocturnal and often move by short hopping flights. By day they remain in crevices and other dark shelters. The vector of kala azar in Kenya rests in air spaces of certain termite hills, and their destruction may help to control this disease. In the northern Sudan the surface of the ground reaches a temperature of about 80°C. but soil cracks provide an extensive subterranean environment for sand-flies which appear in vast numbers at night.

Seasonal changes. Some Palaearctic species pass the winter in larval diapause, and in the tropics the sand-fly season may be in the rainy or the dry season according to edaphic and other factors.

Some associated animals. Little is known about the preferred hosts of most species because it is difficult to find recently engorged females and the amount of blood in their gut is very small for investigation. Sand-flies seem to have few parasites, possibly because the larvae are not exposed to aquatic organisms, but it may be that parasitism alters behaviour and causes infected flies to avoid traps.

Relation to disease. At least one species causes much irritation and some dermatitis, one transmits the virus of sand-fly fever in the Mediterranean and Middle East, and some are vectors of bartonellosis in Peru. The main importance of sand-flies, however, lies in the transmission of various species and forms of the protozoan genus *Leishmania*. The visceral form of leishmaniasis is known as kala azar and can cause deadly epidemics, and cutaneous forms include the Mediterranean oriental sore, the bay sore of British Honduras, and the espundia of South America which can be terribly disfiguring. The biology of species and varieties of sand-flies largely determines the nature of the forms of leishmaniasis. In British Honduras there are virtually no sand-flies around houses, bay sore is a disease of forest rodents, and sand-flies transmit it from them to chicleros who penetrate deep into the forest to tap the sapodilla trees for the valuable raw material of chewing gum. In many epidemiological situations man enters further into the *Leishmania* transmission cycle to a varying extent. In eastern Kenya people are infected with kala azar near their villages, and in the Middle East oriental sore is often an urban disease. In Indian kala azar the animal reservoir has evidently disappeared and the pathogen is transmitted from man to man by house-frequenting sand-flies.

Control. It is difficult to attack the subterranean larvae but DDT has proved very effective against adults of domestic species of *Phlebotomus*. Leishmaniasis, however, may increase when house-spraying operations of the malaria eradication campaign come to an end. Semi-domestic and peri-domestic species can be difficult to control, and some wild species impossible. Other forms of control are sometimes practicable, and Ansari (1962) has reported a decrease in oriental sore following urbanization in the centre of Tehran.

BLACK-FLIES

This is a well known and convenient English name for the Simuliidae although few species are really black and many are pale. The Simuliidae, like sand-flies and mosquitoes, belong to the series Nematocera but the adults, though only a few millimetres long, are robustly built and look like higher flies. The study of black-flies is devoted largely to species which transmit human onchocerciasis and others which attack man or domestic animals.

The distribution of black-flies is determined by their specialised breeding places, in running water, and is very different from that of sand-flies. Black-flies are absent from vast dry areas but occur in almost every part of the world where there are rivers or streams. Many species are restricted to a single zoogeographical region but occur in several of its faunal areas.

Taxonomy. More than a thousand species of black-flies are known and many are difficult to classify owing to scarcity of good characters in the females, the existence of sibling species (Stone, 1964), and the problem of relating species groups of different continents. An interesting case of subspecific variation occurs in *Simulium damnosum* Theobald which is a dangerous species in much of tropical Africa but does not bite man in many south-eastern areas.

Early stages. The egg is laid in water and the larva makes a silken pad on the substratum and attaches itself to the threads by abdominal hooks. A silken cocoon, with an opening downstream, protects the pupa and has useful taxonomic characters. The breeding places of the various species range from sluggish streams to raging torrents.

The older larvae and the pupae of some species live as epizites on mayfly larvae and those of the African *Simulium neavei* Roubaud complex live on crabs. The latter probably carry the pupae to safety from the hazards of desiccation and turbulent currents, and apparently enable *S. neavei* and its relatives to flourish in a variety of streams and rivers.

Age. It is often necessary to recognise parous black-flies because in some species of these diurnal flies the nulliparous and parous females have different biting cycles. At certain times of day all the females caught biting may prove to be nullipars, which have not sucked blood and cannot have become infected with human parasites. In a rather comparable way the age structure of the human population of a street will vary according to the time of day. It is, then, difficult to get a good sample of flies for calculating their rate of infection with *Onchoerca* (to be mentioned again later), but matters can be simplified by basing the rate on parous flies only.

Habits of the females. Thick forest impedes the movement of *S. damnosum*, which can fly far in open country, and the extensive clearing which is going on in many parts of Africa is likely to increase its distribution. Conversely, bush-clearing is inimical to another important species, *S. neavei*, by destroying its forest habitat.

Most black-flies probably feed on plant sugars which provide energy for flight, and many also suck bird or mammalian blood which provides protein for egg development. More information is required about the preferred hosts because some of them infect the flies with worms which can be confused with the *Onchoerca* parasite of man. C. B. Williams and L. Davies have obtained blood-gorged females for analysis, by means of light traps, in Scotland, but this method has hitherto proved disappointing in Africa.

Dry-season survival. Many of the rivers which breed *S. damnosum* cease to flow a few weeks after the end of the rains, and larvae and adults disappear.

Some weeks after the next rainy season has started adults reappear, and after a time rivers flow regularly and the species regains its numbers. The unfavourable or carry-over season, then, does not correspond exactly with the season of no rain. It includes a period (in this case the early rains) which occurs in the life of many tropical insects, when conditions are favourable to one stage but impossible for others. The means of survival is not yet fully known.

Relation to disease. Many thousands of cattle have died during outbreaks of black-flies, and several parasites of birds and mammals are transmitted by certain species. Man-biting pest species are becoming increasingly important as economic development brings thousands of susceptible people into remote areas. The major simuliid pests, however, are the species which transmit the nematode *Onchocerca volvulus* (Leucart), the cause of human onchocerciasis which occurs in Africa, Mexico, Guatemala and Venezuela. In some areas much blindness is associated with this disease. In West Africa blindness is much commoner in savannah than in forest, and a possible reason for this puzzling fact is that in the savannah the attacks of black-flies are seasonal and this may affect the biology of the worms in the human host.

Control. The main method of killing simuliids is to introduce DDT into their breeding places at the rate of one part or less per million of water for thirty minutes. The drifting insecticide is collected by the feeding brushes of the larvae. In the special case of *S. neavei* it is important to avoid a high dosage of DDT which would cause the crabs to leave the water and save the larvae on their backs. Larvicides have been used for some 20 years, and it is surprising that resistance has been unknown until it recently developed in Japan. It may be that slightly affected larvae usually leave their holdfasts and perish downstream, with the result that resistant individuals have little chance of survival.

Several repellents are useful in the hands of careful people, except in very hot humid climates.

Despite some remarkable achievements with larvicides, there are numerous tropical villages and towns which cannot at present be protected owing to the difficulty and cost of treating breeding places which are extensive or scattered or almost inaccessible. In many areas larvicides are difficult to transport owing to lack of roads, and satisfactory control may have to await economic development and prosperity.

Black-flies have many natural enemies, and some attention is being devoted to the use of parasites and the development of larvicides which will not kill predators. One method of control which might be applied in certain areas is the replacement of a dangerous black-fly by a harmless form with similar breeding habits. These and many other possibilities must be considered with a view to integrated control, a conception developed by agricultural entomologists in Canada. A great deal is known about black-flies and their control, but there is ample need for more research.

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- Ansari, N., 1962. 'The leishmaniasis as a world problem'. *Sci. Rep. Ist. Super. Sanità*, 2:63-7.
Stone, A., 1964. 'Guide to the insects of Connecticut; Part IV, Diptera or true flies of Connecticut; Fasc. 9, Simuliidae and Thaumaleidae'. *Bull. State Geol. nat. Hist Surv. Connecticut*, 97:1-126.

British Museum (Nat. Hist.)

15th July 1964.

ADDITIONS TO THE LIST OF MACROLEPIDOPTERA AND PYRALIDINA OF NORTH-WEST SURREY

By R. F. BRETHERTON, C.B., M.A., F.R.E.S.

Since the publication of the original list in 1957 (*Proc. S. Lond. ent. nat. Hist. Soc.*, 1955:94-151) some interesting early records have come to light, and current field collecting and light trapping have provided new material, which it now seems worth bringing together in a supplementary list. The area covered is unchanged, viz., that corner of Surrey which is bounded on the east and south by the main Southern Region railway line from Walton-on-Thames through Woking to (but excluding) the outskirts of Guildford, and thence by the branch line to Ash Vale; and on the west and north by the counties of Hampshire, Berkshire and Middlesex. It contains about 100 square miles, and except on its fringes, consists geologically almost wholly of Bagshot, Bracklesham and Barton Sands. There is little agriculture and, though urbanisation is increasing, about half the area is still heath, rough pasture or woodland.

Several residents who provided material for the 1955 list have since left the district; indeed, the author himself did so in September 1963. But others have taken their place, and the district still receives attention from outside collectors and from the Society's field meetings. This supplement adds 13 species of macrolepidoptera and nine Pyralidina to the 1955 total, besides further records of many of the species which are rare in the district, or immigrant to it. The very number of these additions suggests that there is still much to be discovered even among the macros and Pyrales; a systematic study has not yet been made of the Tortrices and Tineides. The west and south-west, roughly from Bagshot to Normandy, is still relatively unworked: a regularly run light trap in that area would certainly give interesting results.

The author has received a most valuable list compiled by Mr. Nigel Webb, of the macrolepidoptera captured in a light trap at Earleywood School, South Ascot, from 1952 to 1958. As this is some 500 yards within the Berkshire border, the records cannot be included in a Surrey list. Nonetheless, it may be noted that of the 340 species listed one, *Eupithecia trisignaria* H.-S., has not been found at all, and a dozen others only very rarely, within the north-west Surrey district.

Other important work has been done since 1955 on the Lepidoptera of the adjoining areas. The late Mr. A. W. Richards published in 1957 *The Lepidoptera of the Aldershot District of N.E. Hampshire*, covering an area which touches our south-west border, though it also reaches into the very different chalk country further west. Among a dozen macros and four Pyrales in his list which have not been found in north-west Surrey, he cites from Hawley or Aldershot, on its very border, *Antitype chi* L. (two only), *Lygris populata* L., *Nudaria mundana* L., *Evergestis extimalis* Scop. (one only), *Leioptilus carphodactylus* Hübn. and *L. osteodactylus* Zell. Baron de Worms ('The Butterflies and Moths of London and its Surroundings', *Lond. Nat.*, 1949:46-89, 1953:101-46, 1954:66-107, with later supplements) covers a radius of 20 miles from St. Paul's Cathedral and touches, indeed slightly overlaps, our district at its north-east corner. The Surrey segment of this circle includes a large part of the North Downs and has naturally yielded many species which are not found in our more restricted district. But, leaving this aside, it seems that few species which have been found in the Thames valley from Chertsey to London itself are unrepresented in our own district.

Within the district the balance in the composition of the fauna is certainly

changing over the years from a variety of causes, both natural and man-made. Of the latter the most menacing are the spread of building, the frequent heath fires, and the more general lowering of the water table, due to drainage and road works. The limited areas of relict marshland have suffered most, and some of their species are certainly in danger. But many bits and pieces remain, and the species with them; collectors are too prone to declare a species extinct, because it has disappeared from familiar ground, before they have made adequate search elsewhere. Chemical spraying is not a serious danger in the district because there is so little agriculture. The records do not suggest that many species which occurred regularly before 1950 have since disappeared from the district; while on the other side it is clear that at least half a dozen new species have established themselves in it. As regards total numbers, full counts have been taken at the light traps operated under standard conditions by the author at Ottershaw from 1952 to 1963 and by Baron de Worms at Horsell from 1951 to 1964. These show very large annual fluctuations in the average nightly catches, and in the total numbers of many species. These probably do reflect variations in real abundance as well as in climatic conditions favourable to trapping. But they give no evidence of any clear trend, upwards or downwards, in the average nightly catches over the period or even, except in a few cases, in the total numbers of the individual species. For the butterflies, for which no statistical check is available, observation of characteristic species in the district does not bear out the complaints of a general decline which are often made elsewhere. *Plebejus argus* L. (The Silver-studded Blue), for instance, had an apparently record year on the heaths in 1963.

A notable feature is the growing melanism of the district's Lepidoptera. Recent records of extreme melanic aberrations are given in this supplement, and a summary has been added giving a broad quantitative assessment of the proportion of melanic forms in a number of species. This has been based upon information originally assembled at the request of Dr. H. B. D. Kettlewell.

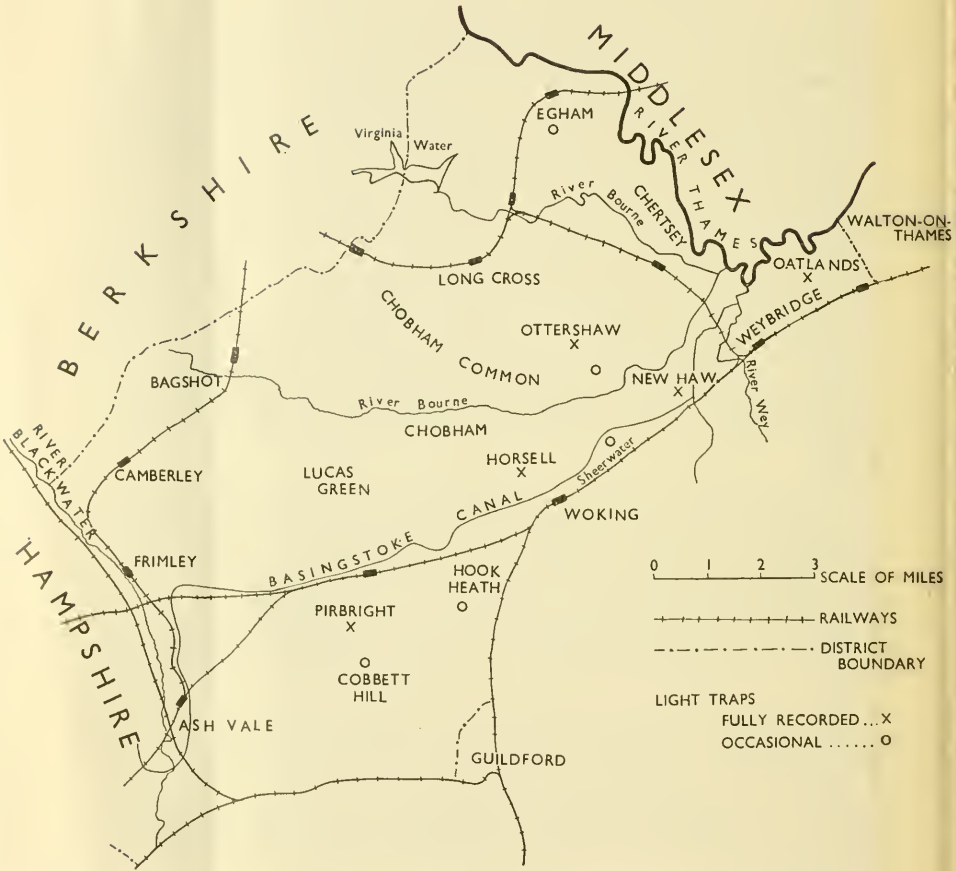
The attached supplementary list contains, first, species which were not recorded at all in the 1955 list; second, additional records of the rarest species and of some others whose distribution was not then adequately covered, and mentions some of the most notable aberrations captured since then. It is, of course, in itself in no way a comprehensive list; but for the convenience of readers the census of species attached to the 1955 list has been brought up-to-date, and the sketch map of the district has been reproduced. The nomenclature and order followed are those of I. R. P. Heslop (1947, *Indexed Check-list of the British Lepidoptera*, 2nd edition) and Beirne (1952, *British Pyralid and Plume Moths*, London). As the former is now much out-of-date, the specific names used in the revised edition of South's *The Moths of the British Isles* have been added in parentheses where they differ.

I am greatly indebted to the recorders who have helped me with this supplement; most of their names are given below.

NAMES OF RECORDERS FOR THIS SUPPLEMENT

(with the areas to which their records mainly refer)

Batten, A. G. M.	A.G.M.B. Hook Heath, 1964
Bretherton, R. F.	R.F.B. Ottershaw and general, to 1963
Greenwood, J. A. C.	J.A.C.G. Horsell Park, 1958-64
Messenger, J. L.	J.L.M. Oatlands and Weybridge, to 1958
Parfitt, R. W.	R.W.P. Western side, to 1960



The North-West Surrey area

Saundby, Air-Marshal Sir Robert	Ash Vale
Stoughton Harris, G.	G.S.H. Horsell, to 1964
Trundell, E. E. J.	E.J.T. Hook Heath, to 1957 (trap)
Wakely, S.	S.W. General, to 1964
Webb, Nigel	Earleywood (Berks), 1952-58
de Worms, Baron de	C.deW. Horsell and general (trap)

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SUPPLEMENTARY LIST

A. Species wholly additional to the 1955 list

PAPILIONES

LYCAENIDAE

Lampides boeticus L. Near Guildford, one perfect female in a stubble field, 14.x.59 (E. E. Johnson, *Ent. Rec.*, 71:267).

SPHINGES

SPHINGIDAE

Celerio lineata F. (*livornica* Esp.). Three only, a scarce vagrant. 1868: St. George's Hill, Weybridge (possibly just outside the area), one, 1.viii. (Barton, *Ent.* 4:149). 1906: Woking, 8.viii., one in the afternoon on a small shrub in the garden (P. Smith, *E.M.M.*, 43:211). 1958: Horsell trap, 9.v., one male (C.deW., *Ent.*, 91:162).

BOMBYCES

NOTODONTIDAE

Cerura bicuspis Borkh. Camberley. E. E. Green (*Ent. Rec.*, 51:23) writes: 'must occur at Camberley . . . though I have only taken a single larva . . . beaten from a birch bush in a much frequented street of the town . . . Unfortunately, the larva had been disturbed during the process of changing its skin, from which it never recovered. However, I had been able to establish the occurrence of the species'. Though the writer was an experienced collector, some doubt must remain, as the larva was not bred through.

ARCTIIDAE

Lithosia quadra L. Four only; certainly immigrants to the district, probably from abroad. 1956: Hook Heath, three in trap, 15 to 16.vii. (E.J.T.). 1957: Oatlands trap, one, 21.vii. (J.L.M.).

AGROTIDES (NOCTUAE)

CARADRINIDAE

Spaelotis ravida Hübn. One only: probably immigrant to the district. Ottershaw trap, one worn male, 31.viii.60 (R.F.B.).

Eumichtis adusta Esp. One only: probably a stray from the North Downs. Oatlands trap, 8.vii.56 (J.L.M.).

Gypsitea leucographa Hübn. One only: probably a stray from the breeding grounds south of Guildford. Horsell trap, one very worn, 15.v.56 (C.deW.).

GEOMETRIDES

GEOMETRIDAE

Xanthorhoe biriviata Borkh. Even before the announcement of this as a new British species by W. E. Minnion and B. S. Goodban in 1955 (*Ent. Gaz.*, 7:3), unsuccessful search had been made for it as a possible inhabitant of the patches of *Impatiens capensis* Meerb. which are common in and around the district. Renewed search in May 1956 disclosed a strong colony of *X. biriviata* beside the Wey Navigation a little beyond the border. Later in that year S. Wakely found a small colony at Byfleet, within the district, from which he and others obtained larvae and moths also in 1957 and later. One specimen appeared in the Ottershaw trap 14.viii.59 and another 9.v.60. The species appears to be extending its range rapidly. Though the original colony by the Wey Navigation was destroyed by its incorporation in a pig farm, it is now abundant in another marshy spot nearby where repeated searches in 1956 and 1957 had failed to reveal it.

Colostygia multistrigaria Haw. Two only: Ottershaw trap 5.iv.60 and 28.iv.63. Probably resident but overlooked. One of its foodplants, *Galium saxatile* L. is present though rather scarce.

Discoloxia blomeri Curt. One only, probably a straggler. Hook Heath, in trap 27.vii.56 (E.J.T.).

Eupithecia dodoneata Guen. Oatlands trap, 19.v.52; Horsell trap, 13.v.60; Ottershaw trap, 20.v.61. May be less rare than these records indicate, as it is easily missed among other pugs.

Chloroclystis debiliata Hübn. Colony Gate, Blackdown: five bred 28 to 31.v.61 from larvae found 12.v.61 on *Vaccinium myrtillus* L. (R.F.B.).

Anagoga pulveraria L. One only: Ottershaw trap, 6.vi.57 (R.F.B.). May be resident, but is certainly very scarce.

PYRALES

PYRALIDAE

Ephestia woodiella Rich & Thom. (*Cadra parasitella* Staud.). An *Ephestia* taken in the Ottershaw trap 9.vii.63 was thought to belong to this species because of traces, which rapidly faded, of a crimson flush at the base of the forewings. Mr. Paul Whalley kindly examined the genitalia of this and other Ottershaw *Ephestia*. He confirmed the identification, and made the surprising discovery that all but one of the other 15 also belonged to this reputedly rare species. The exception, trapped 17.vi.57, is *Ephestia elutella* Hübn., so that it is certain that both species occur in the district. (*Ent. Gaz.* 16:8.)

Homoeosoma saxicola Vaughan. Ottershaw trap, 15.ix.56 (*teste* Whalley): no more seen despite careful watch (R.F.B.).

Eurhodope marmorea Haw. Gracious Pond, one at light 29.vii.54 (J.L.M.): taken not far from one of the few thickets of *Prunus spinosa* L., its foodplant, in the district.

Euzophera cinerosella Zell. Oatlands trap, one 15.vi.57 (J.L.M.).

Myelois ceratoniae Zell. Oatlands trap one 19.viii.58 (J.L.M.). A surprising capture, as this introduced species is usually an inhabitant of warehouses.

Cryptoblabes bistriga Haw. Lucas Green, two at light 6.vii.58, several 6.vi.58 and 26.vi.59, under oak trees (R.F.B.).

Crambus selasellus Hübn. Sheerwater, at light end vii.56 (S. Wakely *teste* Bradley);

Chobham Common, one 4.viii.58 (R.F.B.). No doubt overlooked because of its resemblance to *C. tristellus* F., but probably not common.

Diasemia ramburialis Dup. Two only: a scarce vagrant. Ottershaw trap, 16.ix. and 4.x.61 (R.F.B., *Ent. Rec.*, 74:1-9).

Pyrausta fuscalis Schiff. Ottershaw trap, one 21.vi.63 (R.F.B.). The foodplant, *Melampyrum pratense* L., is scarce.

B. Additional records of scarce species and of aberrations

PAPILIONES

PIERIDAE

Gonepteryx rhamni L. Horsell, a halved gynandromorph taken in the garden 10.viii.58 (G.S.H.).

NYPHALIDAE

Nymphalis antiopa L. 1900: Woking, one viii, in rather bad condition (Saunders, *E.M.M.*, 37:100). 1953: Blackwater, Camberley, 1.vii (*Ent.*, 87:62). 1959: Chobham, 18.viii.: possibly one of those released at Lullingstone, Kent, 24.vii. by L. H. Newman (*Ent.*, 95:175). These raise the total for the district to ten. Certainly immigrant.

LYCAENIDAE

Plebejus argus L. Worplesdon, a gynandromorph with left side normal, right side blued and smaller (E. E. Johnson, *Ent. Rec.*, 67:298). Chobham Common: in 1963, a year of abundance for the species, no less than nine inter-sex aberrations were taken (R.F.B., *Ent. Rec.*, 75:277); another in 1964 (C.de W.).

Lysandra coridon Poda. Staple Hill, Chobham Common, one 15.viii.57 (R.W.P.). Third record for the district; probably strays.

SPHINGES

SPHINGIDAE

Acherontia atropos L. Immigrant. 1956: Oatlands trap, 24.xi. 1958: Ottershaw trap, female 14.v. 1963: Ottershaw trap, female 17.ix.

Celerio galii Rott. Immigrant. Before 1875: Weybridge, 'in August, several years ago, two flying over such flowers as verbenas, geraniums, etc.' (O. Milne, *Ent.*, 8:271). 1961: Ottershaw trap, female 24.vii., which laid only infertile eggs. Four records for the district.

Herse convolvuli L. Immigrant. 1959: Horsell trap, 7.x. 1964: Hook Heath, in trap 30.viii. (A. G. M. Batten).

Deilephila porcellus L. Horsell Park, a few in trap each year 1959-63 (J.A.C.G.); Gracious Pond, one 1964 (C.de W.). A rather scarce resident.

BOMBYCES

NOTODONTIDAE

Drymonia trimacula Esp. Melanic forms becoming increasingly numerous: an extreme one is illustrated in *S.L.E.S.* 1960, plate I, fig. 8 (R.F.B.).

D. ruficornis Hufn. Woking, 1956, one ab. *albispinata* Lenz. (C.de W.).

THYATIRIDAE

Tethea ocularis L. Most of those taken now in the district are more or less melanic: an extreme form in Horsell trap 8.vi.63.

T. duplaris L. Also melanic: a totally black example (ab. *obscura* Tutt) in Ottershaw trap 19.viii.62.

LYMANTRIIDAE

Orgyia antiqua L. Still seldom seen, but 12 were assembled in a garden at Horsell Park, 31.viii.62 and 1.ix.62 (J.A.C.G.), and several more have been taken at light in Ottershaw trap.

Dasychira pudibunda L. The melanic ab. *concolor* Staud. continues to be rare. At Ottershaw trap none were taken 1959-63, and for the whole period since 1946 only six out of 570 were of this form.

Leuconia salicis L. Camberley, one larva on poplar outside the station, the moth emerged 7.viii. (E. E. Green, *Ent. Rec.*, 51:23); Ottershaw trap, two 3 and 4.viii.57, bringing the total for the district to six. Probably only vagrant here.

DREPANIDAE

Drepana falcataria L. Ottershaw trap, a male aberration with all wings suffused with blackish-brown, 9.v.60.

NOLIDAE

Nola cucullatella L. Ottershaw trap, one ab. *nigrofasciata* Cockayne (with the position of the black markings reversed) 23.vi.53, and another, worn, 5.vi.59.

HYLOPHILIDAE

Earias clorana L. Oatlands trap, 6.viii.58; Ottershaw trap, 4.vii.57. A relict marsh species.

ARCTIIDAE

Spilosoma urticae Esp. Horsell Park, one 1959 (J.A.C.G.). Resident in marshes, but rare.

S. lutea Hufn. Ottershaw trap, ab. *totinigra* Seitz (*Ent. Rec.*, 63:266).

Cychnia mendica Clerck. Horsell trap, 7.v.61, gynandromorph with left wings white, right wings brown (C.de W.): figured *S.L.E.S.* 1961, plate 2, fig. 8).

Eilema deplana Esp. Oatlands trap, 7.vi.56; Horsell trap, 3.vii.57. Four district records in all; probably only vagrant here.

AGROTIDES (NOCTUAE)

CARADRINIDAE

Apatele aceris L. Melanic forms have increased; about ten per cent now have forewings dark rather than light grey; an almost black ab. *infuscata* Haw. was taken in Ottershaw trap, 3.vii.61.

A. alni L. Ottershaw trap, worn female 4.vii.59; Horsell trap, 10.vi.64; Gracious Pond, one at light 30.v.64 (C.de W.). Though there are still only six district records, it must be regarded as resident.

A. rumicis L. The black ab. *salicis* Curt. is now about five per cent of the population and seems to be increasing.

Agrotis cinerea Hübn. (*denticulatus* Haw.) Oatlands trap, two 28.v.56, making three for the district: probably stragglers from the chalk.

Euxoa tritici L. Two forms, very distinct in appearance, size, time of emergence, and biotope occur in the district. A large brownish form appears at Ottershaw trap and in cultivated areas elsewhere in the second or third weeks of July and continues into early August. A much smaller insect with almost black ground colour but often suffused with greyish-white is locally common on the heaths

from about 20th August and lasts well into September. No differences can be detected in the genitalia, and so far attempts to rear either form from the egg have failed. Nonetheless, there seems to be a strong possibility that two species are present.

Polia nitens Haw. Ottershaw trap, 26.vi.59; Horsell trap, 18.vii.56. Doubtfully resident, certainly very scarce.

Hadena nana Hufn. The melanic ab. *latenai* Pierret in Ottershaw trap 20.vi.54.

H. conspersa Esp. Oatlands trap 11.vi.58; Horsell Park, one 25.v.60 (J.A.C.G.).

These raise the district total to five; may be resident at low density.

H. lepida Esp. Oatlands trap, 4.vi.58; Ottershaw trap, 28.v.56, 24.v.59, 13.vi.63;

Horsell trap, 11.vi.60, 5.vi.63; Horsell Park, 1 and 17.vi.63 (J.A.C.G.).

Heliophobus saponariae Esp. (*calcotrippae* View.) Ottershaw trap, 21.vi.56, six 6 to 22.vi.57; none since from there or in other traps. Possibly a resident, more probably establishing itself for a year or two only.

Eremobia ochroleuca Esp. Horsell Park, 12.viii.63 (J.A.C.G.). The fourth district record: probably strays from the chalk.

Apamea ophiogramma Esp. Ottershaw trap 1956, 1957, 1959, 1962, 1963—13 in all; Horsell trap, three in 1956, 1957; Horsell Park, three 1958, 1959, 1960; Lucas Green, one 13.vii.62. Resident in marshes.

Brachionycha sphinx Hufn. Ottershaw trap, 28.x.57, 18.xi.61; Horsell trap, 5.xi.56, 22.xi.61. Scarce generally.

Celaena leucostigma Hübn. Ottershaw trap, 2.ix.58, 15.viii.63; Horsell trap, 5 and 6.ix.62. Resident in marshes, but scarce.

Phalaena typica L. Ottershaw trap, 4 and 26.vii.59, 16.vii.63.

Coenobia rufa Haw. Horsell trap, four 1959. Elsewhere, very local but often abundant.

Oria musculosus Hübn. Oatlands trap, 7.viii.56; Hook Heath, in trap, 27.vii.56 (E.J.T.). Four district records, probably strays.

Leucania obsoleta Hübn. Ottershaw trap, 18.vi.57—the last seen in the district.

L. straminea Treits. Horsell trap, 17, 21 and 22.vii.64. Elsewhere, in reed-beds.

L. albipuncta F. Ottershaw trap, 6.ix.56; second record for the district. Vagrant.

Mythimna turca L. Oatlands trap, 2.vii.57; Ottershaw trap, 30.vi.57, 16.vii.59.

Resident, but very scarce.

Laphygma exigua Hübn. Immigrant. 1957: Oatlands trap, 6.xi. 1959: Ottershaw trap, 26.vi. 1962: Ottershaw trap, 6.v., two, 13 and 17.vii. 12 and 19.viii.; Horsell trap, 6 and 14.v., 15.viii., 3.ix., two; Horsell Park, 13.viii. 1963: Ottershaw trap, 23.vii.

Zenobia retusa L. Oatlands trap, 24.vii.57. Widespread, but scarce.

Cirrhia gilvago Esp. Oatlands trap, 9.ix.56; Horsell Park, 19.ix.63. Rare.

C. ocellaris Borkh. Oatlands trap, 24.ix.56; Ottershaw trap, 2.x.57. Probably still breeding in large poplars here, as outside the area at Byfleet.

Grapholitha ornitopus Hufn. Ottershaw trap, 27.iii.56; Horsell trap, 29.iii.56. Scarce.

Cucullia absinthii L. Ottershaw trap, 1956, 1957, 1959, and larvae several years on *Artemisia absinthium* L. in the garden; Horsell trap, 28.vii.63; Woking, larvae 5.ix.59 and later years on *A. vulgaris* L. Now well established in the district.

Anarta myrtilli L. Ottershaw trap, 5.viii.57. Abundant on the heaths by day.

Panemeria tenebrata Scop. Henley Gate, common 30.v.59 (R.F.B.). Very local.

Heliothis maritima Graslin. Ottershaw trap, 4.vi.59. Has become much scarcer in its headquarters on Chobham Common, probably because of extensive fires. Attempts to find larvae have failed.

H. peltigera Schiff. Immigrant. 1957: Oatlands trap, 3.viii.; Horsell trap, 5.iv. 1958: Ottershaw trap, 9 and 23.v. Ten district records in all.

PLUSIIDAE

Acontia luctuosa Esp. Oatlands trap, two 3.vii.57, one 15.vii.58. Nine district records in all; probably strays from the chalk.

Hapalotis venustula Hübn. Oatlands trap, 3.vii.56, two 2.vii.58; Ottershaw trap, 11.vi.59, two 21.vi. and one 27.vi.63. Probably now resident; it has extended its range recently in Surrey.

Plusia festucae L. Chertsey Mead, 25.vi.56; Gracious Pond, 30.viii.57. Scarce in marshes elsewhere.

P. iota L. Oatlands trap, 9.vii.57, 25.vi.58; Ottershaw trap, 13.vi.56, 3.vii.57, two 24.vi. and one 8.vii.59; Horsell trap 13 and 26.vii.56; Hook Heath, few 1956 and 1957 (E.J.T.). Apparently became commoner 1956 to 1959, but not seen since.

Abrostola triplasia L. (*trigemina* Werneberg). Ottershaw trap, 24 and 30.vii.56, 5.vii.58, 23.v. and 30.vii.61. Local and rare.

GEOMETRIDES

GEOMETRIDAE

Chlorissa viridata L. Lucas Green, at light 26.vi.59 (R.F.B.). Very local.

Sterrrha sylvestraria Hübn. Lucas Green, quite common from 1958 on, rare on other heaths.

Scopula immutata L. Horsell trap, 14.vii.64. Usually in marshes, rare.

S. marginepunctata Goeze (*conjugata* Borkh.). Oatlands trap, 26.v.56; Ottershaw trap, 17.vi.57. Three district records in all. Vagrant.

Cosymbia linearia Hübn. Horsell trap, 30.vi.62, 30.v.64. Very scarce.

Triphosa dubitata L. Ottershaw trap, 15.ix.56. Rare.

Calocalpe undulata L. Oatlands trap, 10.vi.56, a male with the central fascia and basal patch black (figured *S.L.E.S.* 1956, plate II, fig. 5; J.L.M.).

Philereme vetulata Schiff. Ottershaw trap, 7.vii.59; Horsell trap, 7.vii.57. Seven district records; presumably a very scarce resident.

P. transversata Hufn. Ottershaw trap, 16.vii.59, 20.vii.63. Almost equally rare; 11 district records.

Thera variata Schiff. Ottershaw trap, 25.x.60, 20.x.62; Horsell trap, 24.x.60, 29.ix.63, vi.64. Eight district records, but probably overlooked.

T. firmata Hübn. Ottershaw trap, 15.x.61; the second district record.

Xanthorhoe quadrifasciata Clerck. Ottershaw trap, two annually 1956-59; Horsell trap, two in 1957; Gracious Pond, two 29.vi.57 (R.W.P.). Wide-spread but scarce.

Colostygia didymata L. Oatlands trap, 1.vii.57; Horsell trap, 17.viii.57. Only four district records, but probably overlooked.

Euphyia cuculata Hufn. Oatlands trap, three 1956-58; Ottershaw trap, 8.vii.57; 1 and 2.vii.61; Horsell trap, 16.vii.59; Lucas Green, one at light 7.vii.58 (R.F.B.). Resident but scarce.

Rhodometa sacraria L. Immigrant. Chobham Common, female on heather 16.ix.56; Ottershaw trap, 29.viii.58, 25.viii.59, 18.ix.61.

Eulype hastata L. Henley Gate, Pirbright, one caught flying by day 30.v.59 (R.F.B.). Third record for the district; curiously rare.

Mesoleuca albicillata L. Ottershaw trap, 22.vi.56, 18.vi.57; Horsell trap, 23.vii.60; Horsell Park, 4.vii.57 (J.A.C.G.). Scarce.

- Melanthia procellata* F. Horsell Park, 6.vii.59 (J.A.C.G.). Second district record. Possibly resident, attached to *Clematis* in gardens.
- Nycterosia obstipata* F. Immigrant. 1956: Oatlands trap, 16.x.; Woking, 23.ix. (*Ent.*, 90:235). 1959: Ottershaw trap, 9 and 27.viii. 1961: Ottershaw trap, 10.vii., 2 and 3.ix., 15.x.; Horsell trap, two 1.ix.
- Horisme vitalbata* Hübn. Ottershaw, 5.vi.58, 16.vii.59, 10, 14 and 31.v.60, 22 and 24.viii.61; Horsell trap, 28.viii.64. Rare.
- H. tersata* Hübn. Oatlands trap, 30.vii.56; Ottershaw trap, 9.viii.56, 16.vii. and 8.viii.62. Rare.
- Eupithecia lariciata* Frey. Horsell trap, two 18 vi.59, one 22.vi.62.
- E. haworthiata* Doubl. Ottershaw trap, 13.vi.57, 26.vi. and 18.vii.59; Horsell, single examples 1958 and 1959.
- E. valerianata* Hübn. Ottershaw trap, 25.vi.56, 16.vi.58, 30.v. and 13.vi.59. Local in marshes.
- E. plumbeolata* Haw. Ottershaw trap, 25.vi.56 (*teste* D. S. Fletcher); Brookwood, several at light among *Melanopyrum* by the canal, 23.vi.57 (R.F.B.).
- E. fraxinata* Crewe. Ottershaw trap, several more annually from 1956; Pirbright, 29.vi.57.
- E. sobrinata* Hübn. Ottershaw trap, 1 and 6.vii.61 (*teste* D. S. Fletcher); Horsell trap, 25.vii.56, 2.ix.58.
- E. subnotata* Hübn. Ottershaw trap, 19.viii.56, 19.viii.60, 23.vii.63; New Haw Bridge, one by day 5.viii.56. Nowhere common.
- E. subumbrata* Schiff. Ottershaw trap, 20.vi.63; Horsell trap, 26.vi.60, 30.vi.61; Lucas Green, 6.vii.58. Widespread, but scarce.
- Anticollix sparsata* Treits. Ottershaw trap, 4.vii.57; Horsell trap, 25.vii.56—both some distance from the foodplant.
- Abraxas sylvata* Scop. Horsell trap, 18.vi.57; Fourth district record.
- A. grossulariata* L. Ottershaw trap, 28.vii.61; Horsell trap, 24.viii.62, 21.vii.64. Commoner on the fringes of the district.
- Ligdia adustata* Schiff. Horsell trap, 26.vi.59. Scattered and scarce.
- Perconia strigillaria* Hübn. Oatlands trap, 26.vi.56. Rare away from the heaths, like the next species.
- Dyscia fagaria* Thunb. Ottershaw trap, 21.vi.62, 19.vi.63.
- Gnophos obscurata* Schiff. Ottershaw trap, 3.ix.63; Hook Heath, at light 1956 (E.J.T.). Otherwise very locally common on the heaths.
- Selenia lunaria* Schiff. Ottershaw trap, singly 1958, 1959, 1962; Horsell trap, singly 1956, 1961, 1963 and 1964; Horsell Park, several in most years (J.A.C.G.). Still only taken at light.
- Cepphis advenaria* Hübn. Colony Gate, Blackdown, common by day among *Vaccinium*, 18.v.59 and in later years (R.F.B.). Previously recorded only from Chertsey in 1854.
- Biston betularia* L. The proportion of melanic specimens appears to be still rising slightly in the district, at any rate at Ottershaw. For the periods 1946–55 and 1956–63 complete counts at the trap gave for the black f. *carbonaria* Jordan 80 per cent and 81 per cent; for the intermediate f. *insularia* Th.-Meig. 6 per cent and 7 per cent; for the typical form 14 per cent and 12 per cent. These percentages contrast strikingly with those found in 1964 at Bramley, 12½ miles south and outside the district: 41.5 per cent, 13.5 per cent and 45.5 per cent.
- Hemerophila abruptaria* Thunb. Horsell trap, the melanic ab. *fusca* Tutt 26.iv.61; apparently the only district record of it.
- Ectropis crepuscularia* Hübn. Ottershaw trap, 10.v.60, 31.v.63; Horsell trap, 10.v.56. Scarce in the district.

E. extersaria Hübn. Oatlands trap, 18.vi.56; Ottershaw trap, 1957, 1959, 1963; Horsell trap, two 1956, two 1963, one 1964. Widespread, only locally numerous.
Bupalus piniaria L. An extreme melanic male at Lucas Green, 24.vi.64 (C.de W.); photographed at *S.L.E.S.* Annual Exhibition, 1964.

PSYCHES

ZYGAENIDAE

Zygaena trifolii Esp. Henley Gate, Pirbright, a strong colony in a marshy meadow, 14.vi.59 and later years (R.F.B.).
Procris statices L. Henley Gate, in the same meadow, 30.v.59, etc.
Aegeria tipuliformis Clerck. Horsell Park, one moth and many larval workings in blackcurrant (J.A.C.G.); Lucas Green, many workings in old currant bushes (R.F.B.).
A. spheciformis Schiff. Chobham Common, one moth caught settled on a birch stem, 18.vi.55 (*S.L.E.S.*, 1955:75); Lucas Green, many larvae in alder, 28.iv.56 and later years (R.F.B.).
Sphecia bembeciformis Hübn. Ottershaw Park, larvae 1960 and later; Brookwood, several larvae and pupae 1956 (R.F.B.).

COSSIDAE

Cossus cossus L. Oatlands trap, 28.v.56, 15.vi.57, 15.vii.58; Ottershaw trap, 13.vi.56, 8.vii.59, 18.vi.60. Nowhere common.

MICROPTERYGES

HEPIALIDAE

Hepialus hecta L. Horsell Park, occasional (three in 1958); once common in a marshy patch now built over (J.A.C.G.). Very local.

PYRALES

PYRALIDAE

Galleria mellonella L. Oatlands trap, 11.viii.57; Ottershaw trap, 18.viii. and 2.ix.58.
Crambus dumetellus Hübn. Ottershaw trap, 20.vi.46, 25.vi.50; Lucas Green, 14.vi.55. Previously recorded only from Woking heaths in 1911. Easily overlooked, but certainly not common.
C. contaminellus Hübn. Oatlands trap, 13 and 24.vii.57, 3.viii.58; Ottershaw trap, regularly, 40 in all.
C. falsellus Schiff. Ottershaw trap, 29.vii.61, 22.vii.63; Sheerwater 1956 (S.W.).
Schoenobius mucronellus Schiff. Ottershaw trap, 25.vi.59; Gracious Pond, 24.vi.59.
Dioryctria splendidella H.-S. Oatlands trap, 16 and 28.vi.56. Mr. P. Whalley tells me that the English specimens attributed to this species are not taxonomically identical with the Continental examples; but on the other hand, he can find no clear structural differences between the former and (British) *D. abietella* Schiff. The English *D. splendidella* are, however, mostly larger than *D. abietella* and of a very different colour, especially when fresh. Moreover, both in the district and elsewhere, they appear sporadically, usually in the company of migratory species, whereas *D. abietella* occurs regularly every year and can be bred from the cones of *Pinus sylvestris* L. collected on the heaths. They are therefore retained as distinct species in this list.
Acrobasis consociella Hübn. Chobham and Horsell Commons, larvae in spun oak leaves, 18.vi.55 and 24.vi.56 (*S.L.E.S.*, 1955:75, 1956:78).

- Hypochalcia ahenella* Schiff. Ottershaw trap, 20.vi.58, 20.vi.59, 18.vi.60. May be resident, though it is mainly a downland species.
- Cateremna terebrella* Germ. & Zinck. Oatlands trap, 15.vii.58; Ottershaw trap, 24 and 26.vi.59, 1.vii.61.
- Aglossa caprealis* Hübn. Oatlands trap, 31.vii.58. Second district record.
- Pyralis farinalis* L. Ottershaw trap, 18.viii.61, 23.vii.63.
- Synaphe angustalis* Schiff. Oatlands trap, 24.vi.56; Ottershaw trap, 12.vii.61.
- Scoparia basistrigalis* Knaggs. Oatlands trap, two 29.vi.56, 9.vii.57.
- S. cembrae* Haw. Ash Vale, 1945 (R.W.P.).
- Palpita unionalis* Hübn. 1956: Oatlands trap, female 11.x. 1960: Ottershaw trap, female 24.x.60. Twelve district records.
- Loxostege palealis* Schiff. Ottershaw trap, female 9.viii.56. Fourth district record.
- Pyrausta cespitalis* Schiff. Ottershaw trap, 28.vii.61. Only second district record, but probably overlooked.
- Trichoptilus paludum* Zell. Horsell Common, flying in numbers, 24.vi.56; Chobham Common, six larvae found 27.v.56 which produced moths about 25.vi.; moths of the second brood were numerous 16.viii.64.
- Amblyptilia punctidactyla* Haw. (*cosmodactyla* Hübn.) Oatlands trap, 1.vii.57.
- Stenoptilia bipunctidactyla* Scop. Ottershaw trap, a few annually from 1956.
- Marasmarcha lunaedactyla* Haw. Ottershaw trap, 28.vi.57, 26.vi.60 and 1.vii.61.

REVISED CENSUS OF SPECIES

Group	Recorded for N.W. Surrey (1)	Of which probably now resident or annually immigrant (2)	Probably now resident or annually immigrant in British Isles (3)	% Col. 2 of Col. 3 (4)
PAPILIONES	45	35	57	66.7
SPHINGES	15	9	10	90.0
BOMBYCES	73	67	92	72.8
AGROTIDES	228	206	313	65.8
GEOMETRIDES	210	193	286	67.5
PSYCHES, etc.	19	19	33	57.6
TOTAL MACROS	590	532	793	67.1
PYRALIDINA	108	99	192	51.6

NOTE: As compared with the census given in 1955, column 1 is increased by 22 species. Column 2 has been adjusted by adding a number of species for which there is now an adequate presumption of residence, and by deleting some others of which nothing has been seen since before 1950: a net gain of two macros and eight Pyralidina. Column 3 has also been increased by 12 to cover species whose residence in the British Isles has recently been demonstrated.

MELANISM IN NORTH-WEST SURREY

One has a strong impression that the incidence of melanism is high in the district and is increasing, both in the number of species affected and in the proportion of individuals which show it. But exact appraisal is difficult because, though extreme melanic forms are obvious enough, in many species there is merely a gradation of dark grey or dark brown scaling to which it is almost

impossible to apply any consistent standard of measurement of deviation from a typical non-melanic form. The differences show up clearly when one compares series of moths from this and other districts, but changes over the years within the district are much harder to prove. For the classical melanic species, *Biston betularia* L., exact counts have been made of the three forms from 1946 to 1963. These show the proportion of the two melanic forms, already very high at the beginning, have only slightly increased since. For other species, counts have been made in certain years only and the appraisal below represents a broad assessment of the average situation during the last ten years or so.

Species in which melanic forms are occasional only (less than one per cent of totals counted): *Mimas tiliae* L., *Pheosia gnoma* F., *Phalera bucephala* L., *Tethea duplaris* L. (extreme form), *Drepana falcataria* L., *Nola cucullatella* L., *Spilosoma lutea* Hufn., *Callimorpha jacobaeae* L., *Triphaena comes* Hübn., *Polia nebulosa* Hufn., *Apamea monoglypha* Hufn., *Crocallis elinguaris* L. (extreme form), *Apocheima hispidaria* F. (extreme form), *Hemerophila abruptaria* Thunb., *Cleora repandata* L. and *Bupalus piniaria* L.

Species with one per cent to ten per cent melanic: *Dasychira pudibunda* L., *Apatele aceris* L., *A. rumicis* L., *Ceramica pisi* L., *Bombycia viminalis* F., *Meristis trigrammica* Hufn., *Eupsilia transversa* Hufn., *Hydriomena furcata* Thunb., *H. coeruleata* F., *Lycia hirtaria* Clerck, *Boarmia roboraria* Schiff. and *Ectropis bistortata* Goetz.

Species with ten per cent to 50 per cent melanic: *Nonagria typhae* Thunb., *Thera obeliscata* Hübn., *Eupithecia abbreviata* Steph., *Eranis leucophaearia* Schiff. (both melanic forms combined), *Crocallis elinguaris* L. (dusky speckled form), *Phigalia pedaria* F., *Boarmia punctinalis* Scop. and *Crambus contaminellus* Hübn.

Species with 50 per cent to 90 per cent melanic: *Stauropus fagi* L., *Procus strigilis* Clerck, *P. latruncula* Schiff., *Apamea crenata* Hufn., *Gonodontis bidentata* Clerck (dark grey form), *Biston betularia* L., *Nephopteryx palumbella* F. and *Phycita spissicella* F.

Species with heavy gradation towards melanism: *Drymonia trimacula* Esp., *Tethea duplaris* L., *T. ocularis* L., *Apatele megacephala* F., *Agrotis segetum* Schiff., *A. clavis* Hufn., *Meganephria oxyacanthae* L., *Eranis marginaria* Borkh., *E. defoliaria* Clerck, *Apocheima hispidaria* F., *Biston strataria* Hufn. and *Cleora repandata* L.

Folly Hill,
Birtley Green,
Bramley, Guildford,
Surrey.
2nd December 1964

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NOTES ON THE CLASSIFICATION OF SOME GROUPS OF WEEVILS
(COL., CURCULIONOIDEA)

By M. G. MORRIS

Mr. A. A. Allen has recently referred to the classification of such genera as *Attelabus*, *Apoderus* and *Rhynchites* in his valuable paper on the British species of *Lasioryhynchites* Jekel (Allen, 1964). I think most coleopterists would regard the classification of the weevils by Kloet and Hincks (1945) as out of date, following the detailed work of Crowson (1953). As Mr. Allen says, there is no doubt that the removal of *Cimberis* from Rhynchitinae (of Kloet and Hincks) into a separate position is justified. This arrangement was adopted not only by Crowson (1953) and Ter-Minassian (1950) (*vide* Allen), but earlier by van Emden (1938), on the basis of larval morphology. Van Emden, to avoid the creation of a separate family for *Cimberis*, advocated its inclusion in Anthribidae (as a distinct subfamily), because the larva resembles those of Anthribidae more closely than those of Curculionidae *s. lat.* This course was also followed by Anderson (1947), as noted by Crowson.

When *Cimberis* is removed into a separate family, the question of the rank of *Attelabus* and *Apoderus* as subfamilies in Kloet and Hincks, to which Mr. Allen, with reason objects, is more open. Van Emden, who did not give family rank to Rhynchitinae, included Rhynchitini, Attelabini and Apoderini (and the non-British Auletini) in one subfamily. The advantage of having these tribes within Rhynchitinae is, presumably, to indicate that *Rhynchites s. lat.*, *Byctiscus* and *Deporaus* are more closely related to each other than to *Apoderus* and *Attelabus*, and that these last two genera are as distinct from each other as they are from the Rhynchitini. If, as tentatively suggested by Crowson, Apoderinae and Attelabinae are regarded as one subfamily within Attelabidae, the adoption of such tribes as Rhynchitini *s. str.*, Byctiscini and Deporaini does not enable this relationship to be shown, unless some taxon intermediate between tribe and subfamily is used, probably an undesirable step. This sort of problem is, of course, a common one in taxonomy.

Mr. Allen's observation that Hoffmann (1958) (not 1954) differs from Kloet and Hincks in using *Rhynchites s. str.*, *Caenorhinus* and *Lasioryhynchites* as subgenera rather than genera is true as far as it goes. What is not apparent from Mr. Allen's note is that Hoffmann follows Reitter (1916) in placing the British species in six subgenera, not three. The subgenera used by van Emden (for the smaller number of species of which the larvae were known) differ in some respects from Reitter's, although it should be pointed out that van Emden does not refer to subgenera in his text, but merely mentions them in his key. The table overleaf shows the generic/subgeneric assignment of the British species by these authors.

The proliferation of subgenera within *Rhynchites s. lat.* seems to be as undesirable as the raising of *Caenorhinus* and *Lasioryhynchites* to the status of genera. However, the study of the British species only is too insular a basis for the expression of a sound opinion on this point; perhaps a satisfactory arrangement will only come with a thorough revision of the family Attelabidae as a whole. It should be noted that Kloet and Hincks were, in general, extremely sparing in the use of subgenera in their classification of the 'Rhynchophora'. There is much to be said for this policy in dealing only with the small British fauna. In showing relationships within large genera on a world scale however, subgenera are essential.

Mr. Allen writes: 'with such an unwieldy assemblage as the Curculionidae

SPECIES	KLOET & HINCKS (1945) (GENERA)	HOFFMANN (1958) (SUBGENERA)	VAN EMDEN (1938) (SUBGENERA)
olivaceus Gyll.	Lasiorhynchites	Lasiorhynchites	—
sericeus Herbst	—	„	Lasiorrhynchites
cavifrons Gyll.	Lasiorhynchites	„	—
nanus Payk.	Caenorhinus	Pselaphorhynchites	—
tomentosus Gyll.	„	„	—
longiceps Thoms.	„	„	—
germanicus Herbst	„	Coenorrhinus	Coenorrhinus
aeneovirens Marsh.	„	„	—
interpunctatus Steph.	„	„	—
pauillus Germ.	„	„	Coenorrhinus
aequatus L.	„	„	—
caeruleus Deg.	Rhynchites	Involvulus	Haplorrhynchites
cupreus L.	„	Euvolvulus	Involvulus
curatus Scop.	„	Rhynchites <i>s. str.</i>	Rhynchites <i>s. str.</i>
bacchus L.	„	„	—

s. lat. the more marginal groups that can with reason be split off, the better'. Few coleopterists will disagree with this. As well as removing *Cinberis* and Rhynchitinae to separate families (Nemonychidae and Attelabidae respectively) Crowson (1953, 1956) has proposed the family Apionidae. This includes not only *Apion* and its close allies, but also Ithycerinae and Eurhynchinae and the non-orthocerous group Nanophyinae. In his study of the internal characters of the Curculionidae *s. lat.* Aslam (1961) doubted whether Apionidae should be retained as a family. His reasons for this opinion do not appear to arise entirely from his study of the internal anatomy of the group, indeed, he lists a number of features in which Apionidae differ from Curculionidae *s. str.* in this respect, but because 'it is difficult to separate this family from Curculionidae on the basis of external characters alone'. Many coleopterists may think that, on the whole, Aslam's work strengthens the case for separating Apionidae from Curculionidae, rather than weakens it. Unfortunately, Aslam did not study the internal anatomy of the interesting genus *Nanophyes*, nor that of any other genus of Apionidae, except *Apion*.

More recently Kissinger (1963) studied the proventriculus of representatives of 54 subfamilies of Curculionidae *s. lat.* He distinguished three types of proventriculus: Type I, proventriculus with nonsclerotised folds. Type II, proventriculus with setose sclerotised plates. Type III, proventriculus with sclerotised plates bearing tooth-like processes. Kissinger's Type I neatly separates those subfamilies forming the Attelabidae and Apionidae of Crowson (together with the non-British Belidae) from the rest of the Curculionidae *s. lat.* However, this tidy arrangement is not quite as satisfactory as it seems, since Kissinger notes that it is possible that a proventriculus is lacking in Attelabinae and Nanophyinae, as well as in some other subfamilies, a character which would cut across the groupings at present recognised. Kissinger was able to find a proventriculus, or a 'structure analogous to a proventriculus' in Apioninae, Apoderinae and Rhynchitinae, also in Eurhynchinae, although Aslam (1961) suggested that a proventriculus was absent in Attelabidae and Apionidae.

With the exception of three non-British subfamilies with a Type III proventriculus the whole of the rest of the Curculionidae *s. lat.* falls into Kissinger's Type II. Crowson (1953), in considering that section of Curculionidae *s. str.* in which the larvae have only two tergal folds in each abdominal segment, gave as one of its characters, the lack of a differentiated proventriculus. Kissinger's work however, suggests that a differentiated proventriculus does occur in the adults of this section, although he examined only two genera of the British representatives of this group, *Gymnaetron* (*sic*) and *Rhynchaenus*. Crowson mentioned that many of the characters of the weevils with larvae having only two tergal folds were shared by Apionidae, and Aslam also suggested that Rhynchaeninae were related to Apionidae, citing, among other characters, the similar specialised central nervous system. However, Aslam showed that a similar type of central nervous system is also found in genera not usually regarded as closely related to either Rhynchaeninae or Apionidae, i.e. *Coeliodes* and *Balanobius*.

The relative importance to be attached to the resemblances of Apionidae to Attelabidae on the one hand and to Rhynchaeninae, Mecininae and Stenopelminae (and possibly other groups of Curculionidae *s. str.*) on the other, may remain slightly controversial and a matter of opinion. Perhaps in dealing with such a vast group as the Curculionidae, sheer expediency might be allowed to tip the balance in favour of a separate family Apionidae even though, contrary to my own opinion, its characters are regarded as scarcely distinct enough for family rank.

The work of Crowson and other authors has clearly indicated the lines along which a modern classification of the Curculionoidea should develop. There are, inevitably, many points which have not been settled and a number of gaps to be filled in our knowledge of internal and other characters. The adoption of a modern classification by general coleopterists will lag behind its acceptance by the taxonomic specialist, but we should see to it that this time-lag is not too long. Some coleopterists still regard *Nanophyes* as 'nothing like *Apion*' basing their judgment almost entirely on the geniculate antennae and ignoring the conclusive evidence of the close relationship between these two genera, evidence which has been available for many years. The coleopterist interested in the general biology of the Curculionoidea will welcome the increasing use of larval and internal characters in classification. It is a welcome and necessary change from the extreme view, still occasionally put forward, that species are nothing more than assemblages of external morphological characters visible only in the adult insect.

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The Nature Conservancy,
Monks Wood Experimental Station.
30th December 1964

An Infestation of Periphyllus californiensis (Shinji) (Hem. Chaitophoridae) on Acer species—In early May 1964 the staff at Westonbirt Arboretum near Tetbury, Gloucestershire reported aphids to be damaging the new growth of ornamental maples. The maples are widely planted in big clumps in an area of 113 acres and also as glades, one of which is one hundred yards long. By 13th May the new growth was so heavily infested with aphid colonies that the stems were invisible and many specimens showed severe leaf distortion. A similar condition was found in Silk Wood about half a mile away. The aphids causing the damage were later identified as *Periphyllus californiensis* (Shinji). At this time a small proportion of the individuals had moulted into winged parthenogenetic females, but a greater proportion were still in the last nymphal instar showing prominent wing buds.

Of the maple species attacked, *Acer palmatum* Thunb, especially the varieties *dissectum* (Thunb.) Maxim., *ornatum* (Carr.) Andre, *atropurpureum* (Vank.) Schwer. and *heptalobum-ozakazuki* Thunb. had the heaviest infestations, although odd trees of the latter were clear. The above are all glabrous, and although *Acer nikoense* Maxim. was growing among them in the glade it remained clear of aphids probably on account of the very pubescent leaves. *Acer japonicum* Thunb. and some of its varieties being somewhat pubescent only showed slight infestations.—C. I. CARTER, Forestry Commission Research Station, Farnham, Surrey. December 1964.

Prionus coriarius (L.) (Col., Cerambycidae) at light in N.E. Essex—A living female *Prionus coriarius* (L.), our largest longhorn beetle, was brought to me for examination by Mr. Basil Harley. The insect was found by his wife when it arrived at a lighted window of his home at Great Horksley on the night of 14.viii.65. The species is recorded from the Colchester area by Fowler (1890, *Col. Brit. Is.*, 4:219), though the present writer is not aware of any recent records, or of any records of the species at light. It is almost certain any of our lepidopterists would have recorded the species, or brought it to the attention of a coleopterist had it turned up at their light. In this respect it would perhaps appear to resemble *Odontaeus armiger* (Scop.) (Col., Scarabaeidae), a rare species which occasionally appears at light in the home, but seldom, if at all, at the lepidopterist's light. Late July and August is the normal time for *P. coriarius*, when it may be taken by searching among the debris and loose top soil in the crevices at the base of trees in which the beetle is known to be feeding, and also along the sides of the exposed roots. Trees infested with this insect usually look sickly and in poor foliage. The example here recorded was released in the area where it was captured by Mr. Harley.—F. D. BUCK, 9, Elton Walk, Tiptree, Colchester, Essex, 16th August 1965.

NOTES ON THE DISTRIBUTION OF PHORIDAE (DIPTERA) IN BRITAIN

By L. PARMENTER, F.R.E.S.

The identification of the Phoridae, in particular the species of the genus *Megaselia*, is difficult. This has discouraged the capture of these flies. The general attitude of collectors is shown by such remarks as those of Dr. F. W. Edwards, who collected in Perthshire with Messrs. R. B. Benson, W. H. T. Tams and Dr. K. G. Blair in June 1932. In reporting on the Diptera taken, he said of the Phoridae: 'Although members of this family were abundant on all the hills, little attention was paid to them because of the time and care needed for their collection.'

In this country, Mr. C. N. Colyer has specialised in the family for many years and has kindly determined my captures of these small flies. They were taken in general collecting of Diptera. Many species of the family are found 'scuttling' over leaves of shrubs and the lower branches of trees, on their trunks, 'swarming' in the air close to shrubs and trees, and on carrion and fungi. Many were caught in flight by merely sweeping the air whilst walking through woodland.

Their distribution in Britain was given by Dr. J. H. Wood (1906-14) in a series of articles, with keys, based mainly on his collecting in Herefordshire. H. Schmitz (1938) published a detailed list for Ireland of 117 species after collecting there in 1937, also incorporating data from the National Museum, Dublin, and other published records. English county lists are few; e.g., Gloucester 23 (Audcent), Somerset 30 (Audcent), Northumberland and Durham 11 (Fordham), and Suffolk 35 (Aston).

My captures, and odd specimens taken by friends for me, are recorded below as a contribution to the knowledge of the distribution of the family in the various counties of this country. As major habitats in the localities have changed over the years, dates are given in case species have disappeared and the record is of historical interest. Flight periods of adults are summarised in months and shown in roman figures. Where no habitat is stated, the species was taken in general sweeping of vegetation or the air space about herbage.

Genera are listed in the order of the *Check List of British Insects*, 1945, of G. S. Kloet and W. D. Hincks but species are in alphabetical order for ease of reference.

Aneurina curvinervis (Becker), iv. NORFOLK, Scolt Head Island, 11.iv.1937, collected by M. Hose.

A. thoracia (Meigen), v-x. PEMBS., Dale, 4.viii.48, disturbed from heather clump; 5.viii.48, in Castle Beach wood. SUFFOLK, Cattawade, 29.vii.53. SURREY, Bookham Common, 10.x.48; Box Hill, 1.vi.41, on oak trunk; Limpsfield Common, 13.vi.38, on sycamore trunk; Mitcham Common, 10.vi.52, on sycamore trunk; Oxshott, 19.x.64. SUSSEX, Three Bridges, 6.v.49.

A. unispinosa (Zetterstedt), vi, x. SURREY, Bookham Common, 10.x.48, 12.vi.49, in oak wood; Limpsfield Common, 4.vi.39, in oak wood.

A. urbana (Meigen), iv-v. HERTS., Ivinghoe, 15.v.38. SURREY, Bookham Common, 13.iv.58, on bole of oak; Mitcham Common, 17-24.iv.49, males swarming, flying to and fro, individuals alighting from time to time on shaded trunks of poplar trees, up to four feet from the ground.

Chaetopleurophora erythronota (Strobl), vii-viii. CORNWALL, Lelant, 8.viii.41, a pair *in cop.* on wet rocks of sea cliff. SUFFOLK, Dodnash Wood, Bentley, 25.vii.53; Flatford, 20.vii.51, in shade of tree-lined lane.

- Triphleba collini* Schmitz, iii. ESSEX, Langdon Hills, 26.iii.46, running on bramble leaf in oak wood.
- T. distinguenda* (Strobl), v. SUSSEX, Three Bridges, 6.v.49.
- T. intermedia* (Malloch), iv. SURREY, Bookham, 11.iv.41.
- T. intempesta* (Schmitz), xii. SURREY, Bookham Common, 12.xii.48, in trench of a grass heath at edge of oak wood.
- T. lugubris* (Meigen), v. SURREY, Ranmore Common, 30.v.48, in oak wood.
- T. minuta* (Fabricius), ix-x. SURREY, Bookham Common, 5.x.47, many females on the fungus *Pholiota spectabilis* Fr. (det. E. M. Wakefield); Oxshott, 28.ix.47, many females on the same species of fungus (det. C. P. Castell).
- T. nudipalpis* (Becker), iv-ix. KENT, Blean Woods National Nature Reserve, 22.ix.64. MIDDLESEX, Cripplegate, City of London, 24.iv.48 and 26.vi.48, on bombed site.
- T. opaca* (Meigen), ii. SURREY, Mitcham Common, 15.ii.48, on surface of muddy ditch in the gravel pit area near Mitcham Junction station.
- T. papillata* (Wingate), iii-vii. ESSEX, Epping Forest, 7.v.49. NORTHUMBERLAND, Wooler, 4.iv.43. PERTHS., Glen Lyon, 14.vii.55. SURREY, Bookham Common, 11.iii.51, in oak wood; Limpsfield Common, 4.vi.39, in oak wood.
- Spiniphora bergenstammii* (Mik), v. HERTS., Stevenage, many of both sexes emerged 31.v.51 ex the Roman Snail *Helix pomatia* L. per J. F. Shillito. SURREY, Coulsdon, 19.v.54.
- Beckerina umbrimargo* (Becker), v. BUCKS., Wendover, 29.v.49, in shade of trees at side of stream. SURREY, Worms Heath, 21.v.39.
- Diploneura abbreviata* (von Roser), viii. DORSET, Osmington, 15.viii.48, in woodland.
- D. concinna* (Meigen), vii-ix. CAMBS., Chippenham Fen, 1.vii.51 and 27.ix.64. KENT, Blean Woods National Nature Reserve, 14.ix.64. SUFFOLK, East Bergholt, Great Martin Hill Wood, 27.vii.53.
- D. funebris* (Meigen), viii. CORNWALL, Hayle, 2.viii.49, on ivy of hedgerow.
- D. glabra* Schmitz, vi-viii. KENT, Brook, 22.viii.64. OXON., Oxford, July 1952, found in food taken by a Swift, *Apus apus* L., nesting in the University Museum tower. SURREY, Mitcham Common, 23.vi.56, on bramble leaf under a hawthorn; 5.viii.57, visiting the flower of Wild Parsnip, *Pastinaca sativa* L.
- D. nitidula* (Meigen), iv-x. BERKS., Windsor Forest, 3.vi.61. KENT, Eynsford, 15.viii.37. MIDDLESEX, Cripplegate, City of London, 19.viii.50, on bombed site. PEMB., Dale, 4.viii.48, in clump of heather. SUFFOLK, Dodnash Wood, Bentley, 18.vii.51 and 25.vii.53. SURREY, Bookham Common, 13.iv.47, visiting flowers of willow, *Salix atrocinerea* Brot., 12.x.47 and 10.x.48, at foot of oak; Coulsdon, 31.v.48, visiting flowers of Keck, *Anthriscus sylvestris* (L.) Hoffm.; Limpsfield Common, 7.vi.36 and 17.vi.38, in oak wood; Merstham, 30.ix.51, at foot of oak; Oxshott, 12.x.54; Thornton Heath, 8.vii.45, 25.vi.50 and 6.vi.64, in garden.
- D. pilosella* Schmitz, iv-ix. KENT, High Halstow, 24.viii.52, on concrete post by station; Blean Woods National Nature Reserve, 22.ix.64. OXON., Whitchurch, 6.viii.50. SUFFOLK, Westleton, 2.vi.52. SURREY, Headley, 16.vii.50; Selsdon, 20.iv.52, on trunk of beech; Thornton Heath, 25.vi.50, in garden.
- D. versicolor* (Schmitz), vii. KENT, Blean Woods National Nature Reserve, 23.vii.64.
- Phora aterrima* (Fabricius), iv-ix. CORNWALL, Hayle, Phillack. DORSET, Moreton Heath, Osmington. ESSEX, Benfleet. HANTS., Brockenhurst. HUNTS., Wood Walton Fen. KENT, Stone, Strood, Swanscombe, Upnor marshes. MIDDLESEX, Cripplegate (also taken by P. W. E. Currie and A. W. Jones). OXON., Oxford,

- Whitchurch. PEMBS., Dale. PERTHS., Glen Lyon, Rannoch Black Wood. SUFFOLK, Butley. SURREY, Beddington, Bookham Common, Coulsdon, Horsell Common, Kingston Hill, Limpsfield Common, Mitcham Common, Wisley. SUSSEX, Tilgate Forest. A widely distributed species that has been found to visit the flowers of Keck, *Anthriscus sylvestris* (L.) Hoffm., of *Torilis japonica* (Houtt.) D.C., of Sea Aster, *Aster tripolium* L. It is generally seen scuttling over the leaves of such trees and shrubs as hazel, hawthorn, ivy, willow, wayfaring-tree, oak, thistles, rhododendron. Males have been found swarming in the air close to trees such as willow, oak and hawthorn, rising to eight feet from the ground as they danced in the air. It has been found in the food of the swift nesting in the University Museum tower at Oxford.
- P. edentata* Schmitz, vi-ix. ESSEX, Benfleet 13.vi.64. KENT, Blean Woods National Nature Reserve, 14.ix.64. SURREY, Bookham Common, 26.vi.60; Riddlesdown, 13.vii.64. This is an addition to the *Check List of British Insects* of Kloet and Hincks.
- P. holosericea* Schmitz, vii. CAMBS., Chippenham Fen, 1.vii.51.
- P. tincta* Schmitz, v-vi. ESSEX, Benfleet, 13.vi.64. HANTS., Matley, New Forest, 19.vi.49. SURREY, Beddington sewage farm, 4.ix.64; Bookham Common, 28.vi.64. SUSSEX, Three Bridges, 6.v.49.
- Borophaga femorata* (Meigen), iv. SURREY, West End Common, Esher, 14.iv.52.
- B. incrassata* (Meigen), viii-ix. CORNWALL, Angarrack, 5.viii.49; Bodmin, 16.viii.36 and 20.viii.36, in hedgerow; Carbis Bay, 15.viii.35, on hazel leaves; Hayle, 24.viii.47 and 13.viii.49, on bramble leaves; Phillack, 9.viii.49, on ivy leaves. DORSET, Egepe, 1-16.viii.38, collected by A. M. Low; Moreton Heath, 19.viii.48. PEMBS., Dale, 9.viii.48. SURREY, Godstone, 6.ix.36.
- Conicera dauci* Meigen (*atra* Meigen), iii-xi. CORNWALL, Hayle, 4.ix.46, on ivy, 17-21.viii.47, visiting flowers of Hogweed, *Heracleum sphondylium* L. and of *Angelica sylvestris* L. HERTS., Broxbourne, 7.v.50. PEMBS., Dale, 1.viii.48, visiting flowers of *Heracleum sphondylium* L. and 10.viii.48, visiting flowers of Fennel, *Foeniculum vulgare* Mill. SUFFOLK, Dodnash Wood, Bentley, 18.vii.51; Flatford, 11.vii.51, visiting flowers of *Heracleum sphondylium* L. SURREY, Bookham Common, 27.iii.48, on oak trunk, 9.xi.47, in oak wood; Coulsdon, 28.ix.57.
- C. floricola* Schmitz, vi-ix. CAMBS., Wicken Fen, 18.vi.50. SURREY, Mitcham Common, 18.vii.48. SUSSEX, Tilgate Forest, 4.ix.49.
- C. minuscula* Schmitz, vii. KENT, Blean Woods National Nature Reserve, 23.vii.64. This is an addition to the *Check List of British Insects* of Kloet and Hincks.
- Plectanocnema nudipes* (Becker), iv. KENT, Blean Woods National Nature Reserve, 30.iv.64.
- Gymnophora arcuata* (Meigen), vi-vii. SUFFOLK, Flatford, 17.vii.51, in damp lane shaded by trees. SURREY, Bookham Common, 11.vi.39 and 11.vii.54; Headley, 16.vii.50; Limpsfield Common, 8.viii.37, on oak tree bole, 25.vi.39, on bracken.
- G. quartomollis* Schmitz, iii, vi-vii. HANTS., Matley, New Forest, 19.vi.49. SUFFOLK, Dodnash Wood, Bentley, 18.vii.51; Flatford, 20.vii.51. SURREY, Bookham Common, 16.vi.46, 12.vi.48, 11.vi.61; Limpsfield, 5.iii.39, female on dead rabbit.
- Pseudacteon formicarum* (Verrall), vi. SUSSEX, Robertsbridge, 30.vi.60, 'a female ovipositing on the backs of ants', collected by P. Roper.
- Megaselia* (s.gen. *Megaselia*) *albicaudata* (Wood), vii. INVERNESS, Aviemore, 4.vii.60.

- M. (M.) albidohalteris* (Felt), vi-x. KENT, All Hallows, 20.viii.50. SURREY, Bookham Common, 3.x.48, 12.vi.49, 10.vii.49.
- M. (M.) angusta* (Wood), iv, vii-ix. CORNWALL, Phillack, 7.viii.49, on ivy. INVERNESS, Loch an Eilein near Aviemore, 7.vii.60. KENT, Blean Woods National Nature Reserve, 22.ix.64. PERTHS., Glen Lyon, 14.vii.55. SURREY, Godstone, 25.vi.64.
- M. (M.) angustifrons* (Wood), v, ix. HUNTS., Wood Walton Fen, 5.ix.64. KENT, Blean Woods National Nature Reserve, 27.v.64.
- M. (M.) bovista* (Gimmerthal), viii, x. SURREY, Bookham Common, 10.x.48. SUSSEX, Robertsbridge, 11.viii.62, collected by P. Roper from a nest of the yellow ant *Lasius flavus* (F.).
- M. (M.) brevicostalis* (Wood), iv, vii-ix. CAMBS., Chippenham Fen, 27.ix.64. ESSEX, Wrabness, Stour wood, 19.vii.51. KENT, Brook, 22.viii.64. SUFFOLK, East Bergholt, Great Martin Hill Wood, 27.vii.53. SURREY, Box Hill, 22.iv.51; Ranmore Common, 29.vii.51; Woldingham, 13.vii.64.
- M. (M.) breviterga* (Lundbeck), v. SURREY, Oxshott, 30.v.64.
- M. (M.) coacta* (Lundbeck), vii. SURREY, Headley, 16.vii.50.
- M. (M.) discreta* (Wood), vii. KENT, Blean Woods National Nature Reserve, 23.vii.64.
- M. (M.) errata* (Wood), viii. CORNWALL, Phillack, 7.viii.49.
- M. (M.) flavicans* Schmitz, xi. SURREY, Bookham Common, 14.xi.48.
- M. (M.) frontalis* (Wood), vi. SURREY, Box Hill, 11.vi.52.
- M. (M.) fuscinervis* (Wood), vii. CAMBS., Chippenham Fen, 1.vii.51.
- M. (M.) giraudii* (Egger), iv-viii. CORNWALL, Hayle, 18.viii.47, visiting flowers of *Angelica sylvestris* L., 23.viii.47, on window. ESSEX, Benfleet, 11.vi.60. HERTS., Watford, 22.v.55. KENT, Blean Woods National Nature Reserve, 30.iv.64, 12.v.64, 4.vi.64; Swanscombe, 9.v.64. MIDDLESEX, Cripplegate, 18.vi.55. SUFFOLK, Flatford, 28.vii.53. SURREY, Bookham Common, 26.vi.60; Ranmore Common, 29.vii.51.
- M. (M.) gregaria* (Wood), vi. SURREY, Bookham Common, 12.vi.49.
- M. (M.) halterata* (Wood), viii-x. KENT, All Hallows, 20.viii.50. SURREY, Bookham Common, 10.x.48.
- M. (M.) hilaris* Schmitz, viii. KENT, Blean Woods National Nature Reserve, 25.viii.64. This is an addition to the *Check List of British Insects* of Kloet and Hincks.
- M. (M.) infraposita* (Wood), vii. SUFFOLK, Dodnash Wood, Bentley, 18.vii.51.
- M. (M.) longicostalis* (Wood), v-viii. CORNWALL, Hayle, 23.viii.47, on window. ESSEX, Wrabness, Stour Wood, 19.vii.51. KENT, Blean Woods National Nature Reserve, 14.vii.64. SURREY, Bookham Common, 10.v.64.
- M. (M.) longiseta* (Wood), vii. SUFFOLK, Dodnash Wood, Bentley, 25.vii.53.
- M. (M.) lutea* (Meigen), v-ix. INVERNESS, Loch an Eilein near Aviemore, 7.vii.60. KENT, Blean Woods National Nature Reserve, 23.vii.64, 25.viii.64, 14.ix.64. SURREY, Oxshott, 30.v.64.
- M. (M.) luteipes* Schmitz, xi. SURREY, Bookham Common, 10.xi.46. This is an addition to the *Check List of British Insects* of Kloet and Hincks.
- M. (M.) mallochi* (Wood), iv, vi. SURREY, Beddington sewage farm, 24.vi.62; Limpsfield Common, 18.iv.48, visiting the flowers of Wood-sorrel, *Oxalis acetosella* L.
- M. (M.) melanocephala* (von Roser), viii. CORNWALL, Hayle, 21.viii.47.
- M. (M.) mixta* (Schmitz), viii. KENT, Blean Woods National Nature Reserve, 20.viii.64.

- M. (M.) picta* (Lehmann), vi-vii. CAMBS., Chippenham Fen, 1.vii.51. SURREY, Limspsfield Common, 24.vi.64.
- M. (M.) pleurispinulosa* (Zetterstedt), vi, ix. KENT, Ashford, 24.vi.45, Blean Woods National Nature Reserve, 16.vi.64, 25.viii.64, 22.ix.64. SURREY, Bookham Common, 12.vi.60; Coulsdon, 27.ix.58; Limspsfield Common, 24.vi.64.
- M. (M.) propinqua* (Wood), viii. KENT, All Hallows, 20.viii.50.
- M. (M.) pseudogiraudii* (Schmitz), v. SURREY, Farthing Downs, Coulsdon, 10.v.46, in hedgerow, 23.v.59.
- M. (M.) pulicaria* (Fallén), iii-x. ESSEX, Ongar Park Wood, 1.v.49. HUNTS, Wood Walton Fen, 5.ix.64. SUFFOLK, Dodnash Wood, Bentley, 18.vii.51; Butley, 4.vi.52. SURREY, Ashtead Common, 19.x.64; Bookham Common, 13.iii.49, in grass tufts, 11.vi.61, at edge of pool in wood; Druids Grove, Mickleham, 7.v.61; Mickleham Downs, 7.x.56; Oxshott, 19.x.64; Woldingham, 13.vii.64.
- M. (M.) pygmaea* (Zetterstedt), vi-x. SURREY, Bookham Common, 3 and 10.x.48, 10.vii.49, 11.vi.50.
- M. (M.) pygmaeoides* (Lundbeck), vii. SUFFOLK, Flatford, 8.vii.51, visiting flowers of Hemlock, *Conium maculatum* L.
- M. (M.) ruficornis* (Meigen), vi-viii. CORNWALL, Hayle, 23.viii.47, on window. SUFFOLK, Dodnash Wood, Bentley, 25.vii.53. SURREY, Bookham Common, 12.vi.49; Mickleham, 17.vi.51, collected by P. W. E. Currie on the Roman snail *Helix pomatia* L.
- M. (M.) scutellariformis* (Schmitz), v-vi. KENT, Blean Woods National Nature Reserve, 27.v.64; Darenth Wood, 26.vi.64.
- M. (M.) sinuata* Schmitz, vii-xi. CAMBS., Chippenham Fen, 27.ix.64. PERTHS., Glen Lyon, 14.vii.55. SURREY, Bookham Common, 14.xi.48; Limspsfield Common, 24.vi.64; Riddlesdown, 13.vii.64.
- M. (M.) subtumida* (Wood), ix-x. CAMBS., Chippenham Fen, 27.ix.64. KENT, Blean Woods National Nature Reserve, 13.x.64.
- M. (M.) sulphuripes* (Meigen), iii. SURREY, 13.iii.49, in grass tufts.
- M. (M.) tarsalis* (Wood), viii. KENT, All Hallows, 20.viii.50.
- M. (M.) tenebricola* Schmitz, vii. INVERNESS, Loch an Eilein near Aviemore, 7.vii.60. SURREY, Woldingham, 13.vii.64.
- M. (M.) tumida* (Wood), v-ix. CAMBS., Chippenham Fen, 1.vii.51, 27.ix.64. KENT, Blean Woods National Nature Reserve, 16.vi.64, 13.x.64. SUFFOLK, Minsmere, 25.v.52. SURREY, Bookham Common, 1.ix.35, 9.xi.47, on bracken, 10.vii.49; Ranmore Common, 15.v.55.
- M. (M.) uliginosa* (Wood), x. SURREY, Oxshott, 19.x.64.
- M. (M.) verna* Schmitz, vii-x. KENT, Blean Woods National Nature Reserve, 22.ix.64, 13.x.64. SURREY, Bookham Common, 10.vii.49; Thursley Common, 31.vii.60.
- M. (M.) vernalis* (Wood), iii. SURREY, Bookham Common, 14.iii.43, on telegraph pole at edge of path through an oak wood.
- Megaselia* (s.gen. *Phiochaeta*) *aequalis* (Wood), vii-x. KENT, Brook, 22.viii.64. OXON., Oxford, July 1952 in food of young nestling swift at University Museum tower. SURREY, Bookham Common, 10.vii.49; Merstham, 30.ix.51, at base of tree; Oxshott, 19.x.64.
- M. (A.) alticolella* (Wood), vii. SUFFOLK, Flatford, 17.vii.51, in lane.
- M. (A.) basispinata* (Lundbeck), iv, vii, x. SURREY, Bookham Common, 3.x.48, 10.vii.49; Thornton Heath, 16.iv.49, on window.
- M. (A.) beckeri* (Wood), ix. CAMBS., Chippenham Fen, 27.ix.64.
- M. (A.) ciliata* (Zetterstedt), i-iv, vii-x. ANGUS, Edzell, 14.iii.48, collected by D. Leston. CORNWALL, Hayle, 21.viii.47. SOMERSET, Charterhouse, 24.vii.55;

- Failland, 23.vii.55. SURREY, Bookham Common, 10.x.48, 11.ix.49, 13.ii.49, on oak near remains of workings of hymenopteron, 14.ix.52, on bracken, 13.iii.60, running on powdered rotten beech log, 10.ix.61; Oxshott, 19.x.64. SUSSEX, Robertsbridge, 12.i.62, collected by P. Roper near a mouse nest in hollow tree, 1.iv.62, emerged from litter of mouse nest, P. Roper.
- M. (A.) coaequalis* Schmitz, iii, vii, x. SUFFOLK, Dodnash Wood, Bentley, 25.vii.53. SURREY, Oxshott, 19.x.64; Thornton Heath, 14.iii.60, in house running on screen of television set that was in use.
- M. (A.) conformis* (Wood) (not *confirmis* as in Kloet and Hincks' Check List), v. HERTS., Watford, 22.v.55.
- M. (A.) dahli* (Becker), viii. PEMBS., Dale, 4.viii.48.
- M. (A.) diversa* (Wood), vi-x. HUNTS., Wood Walton Fen, 5.ix.64. KENT, Blean Woods National Nature Reserve, 23.vii.64, 20.viii.64; Farningham, 19.vi.55. SOMERSET, Charterhouse, 24.vii.55. SUFFOLK, Tuddenham, 27.ix.64. SURREY, Mickleham, 17.x.54; Oxshott, 12.x.54, 19.x.64.
- M. (A.) fuscovariana* Schmitz, vi-vii. KENT, Blean Woods National Nature Reserve, 16.vi.64, 29.vi.64, 14.vii.64.
- M. (A.) hortensis* (Wood), vii. SUFFOLK, Flatford, 8.vii.51, on window.
- M. (A.) hyalipennis* (Wood), vii. PERTHS., Bridge of Balgie, Glen Lyon, 11.vii.55.
- M. (A.) latifrons* (Wood), vii. CAMBS., Chippenham Fen, 1.vii.51. ESSEX, Bradfield, 16.vii.51, in an area of *Scirpus*.
- M. (A.) lucifrons* (Schmitz), vii. INVERNESS, near Kinveachy, Aviemore, 9.vi.60.
- M. (A.) manicata* (Wood), iv. SURREY, Bookham Common, 13.iv.52.
- M. (A.) meconicera* (Speiser), iii-vii. DORSET, Swanage, 8.v.55, on window. KENT, Blean Woods National Nature Reserve, 23.vii.64. NORTHUMBERLAND, Wooler, 21.iii.43.
- M. (A.) meigeni* Becker, viii. SURREY, Horsley, 20.viii.39.
- M. (A.) pectoralis* (Wood), vi-x. CAMBS., Chippenham Fen, 27.ix.64. KENT, Blean Woods National Nature Reserve, 4.vi.64, 23.ix.64. PERTHS., Glen Lyon, 13.vii.55, at about 3,000 feet. SURREY, Mickleham, 17.x.54; Oxshott, 10.x.64, very numerous.
- M. (A.) pleuralis* (Wood), iv-x. CORNWALL, Hayle. ESSEX, Wrabness, Stour Wood. HANTS., Matley Bog, New Forest. HUNTS, Wood Walton Fen. KENT, Blean Woods National Nature Reserve, Farningham. MIDDLESEX, Harefield. PERTHS., Coshievile, Rannoch Black Wood. SUFFOLK, Butley, Chillesford, Dodnash Wood, Flatford. SURREY, Banstead Wood, Bookham Common, Godstone, Mickleham, Oxshott, Riddlesdown, Thornton Heath, West End Common, Esher. SUSSEX, Tilgate Forest. Widely distributed and occurring in a variety of habitats including an isolated elder bush on sandhills (towans) and visiting the flowers of Ivy, *Hedera helix* L.
- M. (A.) pollex* Schmitz, v. KENT, Blean Woods National Nature Reserve, 27.v.64. This is an addition to the *Check List of British Insects* of Kloet and Hincks. Mr. C. N. Colyer tells me that it was previously known from Portugal and Spain.
- M. (A.) projecta* (Becker), v-x. KENT, Blean Woods National Nature Reserve, 23.v.64, 29.vi.64, 23.vii.64, 20.viii.64. SUFFOLK, Butley, 1.vi.52; Dodnash Wood, Bentley, 18.vii.51. SURREY, Limpsfield, 24.vi.64; Mitcham Common, 7.vi.47, on leaves of sallow; Oxshott, 19.x.64.
- M. (A.) pumila* (Meigen), vi-x. INVERNESS, near Loch Ruthven, 11.vii.60, Loch Garten, 10.vii.60. KENT, Blean Woods National Nature Reserve, 14.vii.64, 20.viii.64; Darenth Wood, 26.vi.64. MORAY, Lochindorb, 9.vii.60. SURREY, Bookham Common, 11.vi.61; Oxshott, 24.vi.51, 12.x.54.

- M. (A.) ractica* (Schmitz), vii. INVERNESS, near Kinveachy, Aviemore, 9.vii.60. This is an addition to the *Check List of British Insects* of Kloet and Hincks.
- M. (A.) rufipes* (Meigen), iv-x. CORNWALL, Hayle, 6.x.39; Lelant, 6.x.39. HERTS, Ivinghoe, 15.v.38. KENT, Blean Woods National Nature Reserve, 4.vi.64. MIDDLESEX, St. Johns Wood, London, 10.ii.48, 11.vii.48, collected by D. Leston; Hendon, from leaves of *Rumex triangulivalvis* (Danser) Rech, collected by J. E. Lousley, I bred six females on 1.vii.39. A male *Pegomya bicolor* (Wied.) (Dipt., Muscidae) emerged on the same day from the leaf mine and from the midrib were bred five males of *Norellisoma spinimanum* (Fallén) (Dipt., Cordiluridae). NORTHUMBERLAND, Wooler, 4.v.43. OXON., Oxford, two found in meal of a swift, July 1952, nesting in the University Museum tower. SURREY, Limsfield Common, 21.vii.46, on bracken, 18.iv.48, visiting flowers of Wood Sorrel, *Oxalis acetosella* L.; Mitcham Common, 19.v.37, on hawthorn; Norbury Park, emerged on 18.viii.47 from a flowerhead of Red Campion, *Melandrium rubrum* (Weig.) Garcke, collected by Mr. M. Niblett on 19.vii.47; Selsdon Wood, bred on 25.vii.47 by Mr. M. Niblett from Goat's-beard, *Tragopogon pratensis* L., collected 17.vi.47; Thornton Heath, 24.vi.39, in garden.
- M. (A.) stichata* (Lundbeck), vi, x. SURREY, Bookham Common, 10.x.48, 11.vi.50.
- M. (A.) subpleuralis* (Wood), viii. KENT, Blean Woods National Nature Reserve, 25.viii.64.
- M. (A.) superciliata* (Wood), vi. SURREY, Limsfield Common, 24.vi.64.
- M. (A.) variana* Schmitz, v-ix. BERKS., Windsor Forest, 3.vi.61. CAMBS., Chippenham Fen, 27.ix.64. KENT, Blean Woods National Nature Reserve, 27.v.64, 4 and 29.vi.64, 23.vii.64, 20 and 25.viii.64. SUFFOLK, Butley, 1.vi.52; Dodnash Wood, Bentley, 25.vii.53. SURREY, Bookham Common, 10.vi.51, 12.vi.60.
- Plastophora emarginata* Wood, vi-vii. SURREY, Bookham Common, 11.vi.50; Box Hill, 30.vii.60. This species was removed from the genus *Megaselia* by Mr. C. N. Colyer in 1957.
- Phalacrotophora berolinensis* Schmitz, vi. HERTS., Watford, 16.vi.57, a swarm of both sexes on trunk of a larch.
- P. fasciata* (Fallén), vi-vii. HANTS., New Forest, Bolderwood, 20.vi.51 and Rhinefields, 21.vi.51, both collections by Mr. C. N. Colyer. SUFFOLK, Flatford, 8.vii.51 and 17.vii.51. SURREY, Wisley, bred August 1938 from pupae of *Anatis ocellata* L. (Col., Coccinellidae) by Mr. K. M. Guichard.

SUMMARY

1. A list is given of 111 species of Phoridae taken in Britain with some details of habitats.
2. The list mentions 23 counties. Species totals for these are: Angus 1, Berkshire 2, Buckinghamshire 1, Cambridgeshire 12, Cornwall 14, Dorset 4, Essex 11, Hampshire 5, Hertfordshire 7, Huntingdonshire 5, Inverness 7, Kent 40, Middlesex 6, Moray 1, Norfolk 1, Northumberland 3, Oxfordshire 5, Pembrokeshire 5, Perthshire 7, Somerset 2, Suffolk 25, Surrey 69, Sussex 9.
3. Six species are additional to the *Check List of British Insects* of G. S. Kloet and W. D. Hincks: *Phora edentata* Schmitz, *Conicera minuscula* Schmitz, *Megaselia hilaris* Schmitz, *M. luteipes* Schmitz, *M. pollex* Schmitz, *M. ractica* Schmitz.

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94, Fairlands Avenue,
Thornton Heath,
Surrey.
10th March 1965.

**ARGOLAMPOTES MICELLA SCHIFF. (LEP. GELECHIIDAE)
TAKEN IN BRITAIN**

By ALAN KENNARD

Among a small collection of micros which I passed to Mr. S. Wakely recently for determination was one specimen with which he was not familiar. He submitted it to Mr. J. D. Bradley of the Commonwealth Institute of Entomology, who determined it as *Argolamprotes micella* Schiff., a species hitherto unrecorded from the British Isles.

The insect was captured at mercury vapour light at Ide, Devon, on the outskirts of Exeter, on the night of 17.vii.63. The light was situated on a south-west facing slope overlooking the village on the edge of a residential area.

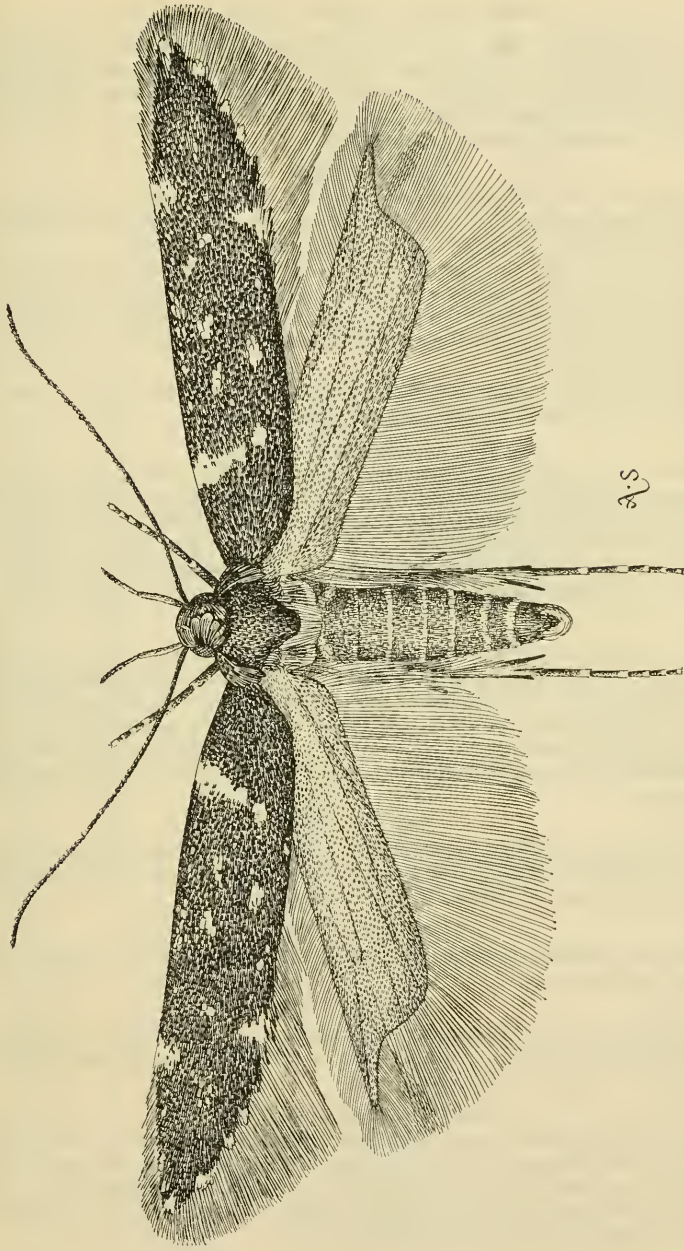
The species is apparently quite widespread on the continent. It feeds in May and June on *Rubus* spp., principally raspberry, and probably feeds on the pith.

In the vicinity of capture most gardens possess cultivated raspberry, but some 200 yards distant is a small orchard and open hedgerow where there is a greater concentration of *Rubus*, and the insect may be breeding here.

The moth measures about 13 mm across the forewings, which are dark brown with a strong brassy sheen and marked with scattered, conspicuous, silvery-white specks and spots as shown in the illustration; the cilia are dark grey and have no markings. The head, thorax and tegula are dark brown with a strong purple and violet iridescence. The labial palpi are very long and slender, smoothly scaled and a uniform pale yellow in colour. The hindwings and abdomen are dark grey.

I am indebted to Mr. Bradley for determining the insect and particularly to Mr. Wakely for his help in making this note possible. Mr. Arthur Smith has kindly depicted the moth.

Torns,
Ashburton,
Devon.
14th May 1965



Argolamprotes micella Schiff. × 14

TREASURER'S REPORT FOR 1964

I am pleased to be able to give a favourable report on the financial affairs of the Society, despite a considerable rise in the cost of producing the Proceedings and Transactions, which included an additional volume, the Natural History of the Garden of Buckingham Palace. It was considered, by your Council, that the cost of this important venture was justified.

BALANCE SHEET

During the year there has been no change in our Investments which stand at £3,373 (market value £2,764), and our total Assets, including Sundry Debtors, Stock of Christmas Cards and Cash at Bank, amount to £4,372.

On the other side, the sum of £652 is ear-marked for the Special Funds (Housing, Centenary, Library and Publication Funds). Subscriptions paid in advance were £57 and Sundry Creditors amounted to £999. In the last item were included unpaid rent and a large sum for the printing of the Proceedings and Transactions for 1963.

The General Fund amounted to £2,664, but this figure would be reduced to £2,234 if the depreciation of Investments is deducted.

INCOME AND EXPENDITURE ACCOUNT

The total subscriptions for the year amounted to £615 and, with interest on investments and bank interest, there was a total income on the General Account of £750. Expenditure on the General Account amounted to £382 and £370 was transferred to the Publication Fund. In the expenditure was an item of £38 for the cost of entertaining, at the rooms of the Linnean Society, distinguished visitors to the Entomological Congress, which in 1964, was held in London.

PUBLICATION FUND

This fund always makes great demands upon our income. This year, there was again a large increase in printing costs, the total, with postages added, amounting to £881. The income for the year from the sale of Proceedings, etc., interest on investments, profit on Christmas cards, and a very welcome anonymous gift of £50, amounted to £319. After including a grant of £370 from the General Fund, there was a credit balance of £134, as against £325 at the beginning of the year.

LIBRARY FUND

The balance in this fund has increased to £102, mainly because of a credit of £21 for a Life Membership. The Entrance fees, which are also credited to this fund, roughly balanced the cost of books purchased.

HOUSING FUND

This now stands at £408, an increase of £17 resulting from donations and interest on investments.

CENTENARY FUND

I would like to draw the attention of all members to this fund, which has been created to attract donations towards the cost of the Society's Centenary Year—1972. So far, £8 have been received.

CHRISTMAS CARDS ACCOUNT

This account shows a profit of £62, after valuing our stock of over 12,000 cards at £100. The printing of three cards and order forms and the purchase of envelopes cost £164. The profit was transferred to the Publication Fund.

Mr. J. L. Messenger and Mr. G. Stoughton-Harris were our honorary auditors, and our thanks are due to them for their services.

GENERAL INCOME AND EXPENDITURE ACCOUNT—Year ended 31st December 1964

	EXPENDITURE		INCOME	
	£	s.	£	s.
	d.	d.	d.	d.
Rent .. .. .	..	..	..	..
Insurance .. .. .	..	..	..	..
Secretarial Expenses .. .. .	..	..	..	..
Treasurer's Expenses .. .. .	..	..	..	..
Editorial Expenses .. .. .	..	..	..	..
Stationery .. .. .	..	..	..	..
Subscriptions .. .. .	..	..	..	..
Lectures, etc. .. .. .	..	..	..	..
Annual Dinner and Exhibition .. .. .	..	..	..	..
Conference Expenses .. .. .	..	..	..	..
Entomological Congress .. .. .	..	..	..	..
Bank Charges .. .. .	..	..	..	..
Miscellaneous .. .. .	..	..	..	..
Grant to Publication .. .. .	..	..	..	..
	145	0	615	12
	10	18	123	14
	50	15	10	9
	10	2	2	1
	5	19	2	7
	52	17	6	1
	13	15	0	0
	19	10	6	0
	12	11	9	0
	3	2	6	0
	38	8	6	0
	9	19	6	0
	9	2	0	0
	370	0	0	0
	<u>£752</u>	<u>2</u>	<u>£752</u>	<u>2</u>
		<u>10</u>		<u>10</u>

CHRISTMAS CARDS ACCOUNT

	EXPENDITURE		INCOME	
	£	s.	£	s.
	d.	d.	d.	d.
Stock at 1st January 1965 .. .. .	..	..	..	..
Blocks .. .. .	..	..	..	..
Printing and Envelopes .. .. .	..	..	..	..
Postages .. .. .	..	..	..	..
Profit transferred to Publication Fund .. .. .	..	..	..	..
	38	9	171	16
	8	3	7	0
	155	16	100	0
	6	15	0	0
	62	12	9	0
	<u>£271</u>	<u>16</u>	<u>£271</u>	<u>16</u>
		<u>7</u>		<u>7</u>

PROCEEDINGS

11th FEBRUARY 1965

The PRESIDENT in the Chair

EXHIBITS

Mr. S. A. WILLIAMS—*Conosomus bipunctatus* (Grav.) (Col., Staphylinidae) from a rotting tree stump on the banks of the Darent at Farningham, Kent, 7.ii.65. This insect was first recorded in Kent by J. J. Walker, from Chatham (Fowler, 1888, *Col. Brit. Is.*, 2 : 192). There appears to be no further record for the country. The species is very local and rare throughout Britain. The most recent record seems to be from Epping Forest.

Mr. C. G. ROCHE—Examples of female *Sceliphron spirifex* L. (Hym., Sphecidae). Two from Port Harcourt, Nigeria, on the creeks of the Niger delta and two from N.W. Sardinia. Attention was drawn to the two different types of county, one being tropical rain forest of the Ethiopian region and the other arid country in the Palearctic region. Dr. B. J. MacNulty gives some interesting biological notes on this species (1962, *Proc. S. Lond. ent. nat. Hist. Soc.*, 1961 : 118–133) in which the exhibited species is illustrated. The distribution of *S. spirifex* ranges from the Mediterranean basin and southern Europe to the Cape of Good Hope.

Mr. P. A. GODDARD—Photographs of the oecophorid moth *Pleurota bicostella* Clerck and the gelechiid moth *Anacamptis blattariella* Hübn. (*betulinella* Vari). The latter appears to be common among the birches on Harrow Weald Common, Middlesex.

Mr. H. LAST—*Philonthus parvus* Sharp (Col., Staphylinidae) which he exhibited 12.x.61 as *Philonthus felix* Tott. At that time it was thought to be new to science and was to have been published by the Rev. C. E. Tottenham. It was as well that he has delayed so long because about three months ago while identifying some Australian material specimens of *P. parvus*, a species named by Sharp from Japanese specimens in 1874, were discovered. This species appeared familiar and on comparison it was found that *P. felix* was in fact *P. parvus*; and is therefore a species new to the British list. It is very similar to *P. cephalotes* Grav., but the microsculpture of the head is more broken and the pronotum is without microsculpture altogether. The puncturation of the elytra is not so dense as in *P. cephalotes* but denser than in *P. pachycephalus* Nord. The size varies but generally it is slightly larger than either species. The unmistakable difference is in the arrangement of the pegs on the inner face of the paramere and to a lesser extent, the shape of the paramere. The species has now occurred in Kent, Cambridge, Sussex and Cheshire, often in numbers. It does not appear to have been recorded from Australia before.

COMMUNICATIONS

Dr. B. J. MACNULTY asked Mr. C. G. Roche if the habits of *Sceliphron spirifex* L. were the same in Sardinia as he had recorded in Nigeria; and Mr. ROCHE replied that he had only seen the two specimens shown and had therefore been unable to study its habits.

The meeting closed with a series of coloured slides shown by Dr. DE WORMS and Messrs. HAYNES, VALLINS, UFFEN, BRADFORD and B. R. BAKER. Miss BROOKE showed some black and white slides.

25th FEBRUARY 1965

The PRESIDENT in the Chair

EXHIBITS

Dr. C. G. M. DE WORMS—Two live melanic geometrid moths, *Erannis leucophaearia* Schiff. and *Phigalia pilosaria* Schiff. both taken at light at Woking, Surrey.

Mr. J. E. COOPER—(1) A skull of the Chinchilla, *Chinchilla laniger*, showing mal-occlusions, a condition of the teeth effected partly by the genetic make-up of the animal and partly by methods of feeding. Similar tooth problems occur even in the wild rodents, an example being overgrown incisors, a condition seen in the Grey and Red Squirrels, *Sciurus carolinensis* Gmelin and *S. vulgaris* L. Inability to feed and even death may result. (2) The completely wingless Sheep Ked, *Melophagus ovinus* (L.) (Dipt., Hippoboscidae) and the Swift Louse-fly, *Crataerina pallida* Lat. (Dipt., Hippoboscidae), a species with vestigial, non-functional wings.

Dr. H. B. D. KETTLEWELL—Two live female hybrids of the geometrid moths *Nyssia zonaria* Schiff. and *Lycia hirtaria* Clerck.

Mr. P. A. GODDARD—Photographs of *Batia lunaris* Haw. (Lep., Oecophoridae) taken on Stanmore Common, Middlesex, 2.viii.64; and *Epinotia paykulliana* F. (Lep., Tortricidae), the form with pale costal region, taken on Harrow Weald Common, Middlesex, 22.viii.64.

COMMUNICATIONS

In a reply to a question by Mr. R. F. HAYNES, Dr. KETTLEWELL replied that the moths exhibited paired readily. Mr. R. M. MERE asked why the moths should be melanic, and Dr. Kettlewell said that the chromosome numbers were different. The black chromosome in one of the species does not have a corresponding chromosome in the other, and thus it cannot be dominated; the moths are therefore all melanic.

Dr. B. J. MACNULTY read an article from the *Guardian* which gave an account of the bracken on Ilkley Moor, Yorkshire, dying off because of an unknown disease.

A talk was given by Dr. Kettlewell accompanied by a film on 'The Origins of Melanism in Lepidoptera'.

11th MARCH 1965

The PRESIDENT in the Chair

EXHIBITS

Dr. A. M. MASSEE—*Procas armillatus* (F.) (Col., Curculionidae), a species rarely taken by coleopterists. Its headquarters appear to be the headlands of arable fields at the foot of the South Downs behind Brighton, Sussex, occurring under stones in the spring and autumn. At one time it was known from Battersea Fields and also in a locality near Bristol, Gloucestershire; there is also a doubtful record from Norfolk, and it is now interesting to record the species at East Mallong, Kent. It was found in a similar habitat to that at Brighton, under a stone on the headland of an arable field in August.

Mr. T. R. EAGLES—The fungus *Daldinia concentrica* (Bolton ex Fr.) Ces & de Not., from Epping Lower Forest, Essex. This fungus is the food plant of several

beetles and, when growing on burnt gorse, of the microlepidopteron *Apomyelois neophanes* Durr. (Daldinia Knot-horn).

Mr. P. A. GODDARD—Photographs of *Caloptilia elongella* L. (Lep., Lithocolletidae) and the uniformly orange form of *Ypsolophus radiatellus* Don. (Lep., Plutellidae). Both moths were abundant in a small wooded area on a heath in Dorset in early September 1964. The great predominance there of the orange form of *Y. radiatellus* Don., together with the orange *C. elongella* L., suggested there might be some advantage in the orange coloration in that particular spot. A photograph of the one streaky example of *Y. radiatellus* found among the orange form was also shown.

Mr. R. W. J. UFFEN—A birthday card showing a moth larva in an apple.

Mr. E. S. BRADFORD—*Anthrenus verbasci* (L.) (Col., Dermestidae) discovered at the base of a chimney behind a gas fire, where apart from the usual dust and fluff there was a piece of fatty meat and two crusts of bread. These had obviously been dropped by birds from the chimney stack.

COMMUNICATIONS

The PRESIDENT announced that three books had been presented to the library by Mr. S. N. A. Jacobs. He also announced that the Treasurer, Mr. D. W. Thorpe-Young, had resigned the office, and he thanked him for his services and in filling the position when Mr. J. D. Henderson was unable to continue. The vacancy created will be filled by Mr. F. T. Vallins who was also thanked for offering his services.

Dr. B. J. MACNULTY read a letter from the British Trust for Ornithology concerning the current survey on the Wryneck. He asked members to let him have details of the Wryneck they had seen or heard, and he also asked for any evidence of a connection between the availability of ants and the distribution of the Wryneck.

Mr. A. E. GARDNER, commenting on the *Anthrenus verbasci* (L.) shown by Mr. Bradford, said they were known to live in nests in the lofts of houses, often entering the occupied part of the house through cracks in the ceiling. Mr. R. W. J. UFFEN said he had seen the species on flowers in the garden and that these beetles were probably living in pigeons' nests; he added that he had known one to chew through a six-inch pile of clothing in a drawer in search of food. Mr. S. M. DAVIES said that he had seen them in a bowl lampshade. D.D.T. and acetone, said Dr. A. M. MASSEE, are useful in keeping the numbers of the beetles down.

Mr. R. Tubbs asked members attending the Blean Wood field meeting not to take too many *Melitaea athalia* Rott. Previously many had been taken at Hadley Wood in Essex, and the species was now scarce there. Dr. MASSEE said he thought none at all should be taken.

Mr. D. LESTON gave a talk on the 'Origins of Insect Flight'.

25th MARCH 1965

The PRESIDENT in the Chair

EXHIBITS

Mr. P. A. GODDARD—Photographs, taken during the present month, of *Diurva fagella* F. (Lep., Oecophoridae) and *Acleris ferrugana* Schiff. (*fissurana* Pierce) (Lep., Tortricidae). The *D. fagella* F. were reared from larvae, the pupae being brought indoors in mid-February; there have been no signs yet of an emergence in the wild in the Harrow Weald and Stanmore areas of Middlesex.

COMMUNICATIONS

Mr. P. A. GODDARD said that he had not seen many *Depressaria* species and asked if any other member had noticed their paucity, he added that the numbers of macrolepidoptera appeared to be about normal. Mr. R. F. BRETHERTON remarked that he had taken some in traps and had seen some on windows. Mr. S. N. A. JACOBS said he had come across about four *Depressaria* only. He observed that their low numbers might be due to the destruction of many places in which Cow Parsley grows.

Dr. R. M. FOX gave a talk on 'Entomology in America'.

8th APRIL, 1965

The PRESIDENT in the Chair

EXHIBITS

Mr. M. P. CLIFTON—A young living gecko taken in Sicily, from beneath a fallen piece of prickly pear, on a hill above Messina.

Mr. P. A. GODDARD—Photographs of *Telphusa alburnella* Dup. (Lep., Gelechiidae) which is common on Stanmore Common, Middlesex, in August. Previously this species was known only from a few localities in the north of England.

Mr. T. R. EAGLES—Male catkins of *Salix* × *lanata* L. He drew attention to the size of the catkins and their lateness.

Dr. A. M. MASSEE—Five examples of *Badister anomalus* (Perris) (Col., Carabidae) from reed litter in March 1963 and March 1965, at the edge of the Military Canal at Pett Level, East Sussex. This insect was first recorded in England in July 1954, when Mr. Frewin found two specimens at Swyre, Dorset.

Dr. C. G. M. DE WORMS—A living example of *Dasycampa rubiginea* Schiff. (Lep., Noctuidae) taken in his light trap at Woking, Surrey.

COMMUNICATIONS

Mr. F. T. VALLINS read the Treasurer's Report for 1964 which had been postponed from the Annual General Meeting and moved its adoption. The motion was seconded by Mr. P. A. GODDARD and was carried unanimously.

Mr. P. A. GODDARD said that after the last meeting, when he had commented on the very small numbers of *Depressaria* and allied species, he had seen plenty of *Agonopterix applana* F. (Lep., Oecophoridae).

Dr. C. G. M. DE WORMS said that on a recent visit to the New Forest he had seen very many *Gonepteryx rhamni* L. (Lep., Pieridae). He added that the moths were coming to light in good numbers as well.

The meeting closed with a talk, illustrated by coloured slides, 'Collecting Lepidoptera in the Atlas Mountains, N. Africa, in July 1963', given by Mr. H. G. ALLCARD, which he followed with a short film on 'The Life History of *Charaxes jasius* L'.

22nd APRIL, 1965

The PRESIDENT in the Chair

EXHIBITS

Mr. P. A. GODDARD—(1) Photographs of eriocraniid moths taken during the last two weeks including *Eriocrania semipurpurella* Steph., and at least one other species as yet unidentified. (2) Photographs of the tineid moth *Monopis rusticella* Hübn., bred from a bird's nest this March.

Dr. A. M. MASSEE—The very local and uncommon weevil, *Ceuthorhynchus suturellus* Gyll., a species confined to Kent, where it has been recorded from Snodland (Walker and Champion), Hythe (Tylden) and Blarstead, near Maidstone (Gorham). All in the last century. It is therefore of interest to record its presence in a wood in east Kent, where it is associated with Cuckoo Flowers, *Cardamine pratensis* L. and the Large Bitter-cress, *C. amara* L. The adult weevil feeds on these plants in the latter part of April and early May.

Mr. T. R. EAGLES—Mosses collected in Wistmen's Wood, Dartmoor, Devon, 18.iv.65, by Dr. Patrick Roche: *Rhytidiadelphus loreus* (Hedw.) Warnst., *Plagiothecium undulatum* (Hedw.) B. & S. and *Hypnum cupressiforme* Hedw. var. *filiforme* Brid.

Mr. S. A. WILLIAMS—*Raymondronymus marqueti* (Aube) *forma typica* from the Royal Botanical Gardens, Kew, Surrey, 10.viii.64. This weevil, previously unrecorded from Britain, was taken in the open, walking on the surface of the soil. It is described by Hoffmann in *Faune de France* 2 : 779, as being found in Central Italy and the Garron district of S.W. France. The beetle is blind and lives in soil. Little is known of its life history and the larva is unknown. Thanks are due to Mr. R. T. Thompson for the determination.

Mr. A. E. GARDNER—The following Coleoptera: *Pterostichus macer* (Marsh.) and *Lionychus quadrillum* (Duft.) (Carabidae) from Nagden Marsh, N. Kent, 17.iv.65; and *Meligethes kunzei* Er. (Nididulidae), from flowers of *Cardamine pratensis* L., Blean, Kent, 18.iv.65.

COMMUNICATIONS

Mr. S. N. A. JACOBS said that the identification of one of the eriocranid moth photographs exhibited by Mr. Goddard, might be found in the paper by Mr. Heath (1958, *Proc. S. Lond. ent. nat. Hist. Soc.*, 1957 : 115–125). However, Mr. Goddard said he had consulted this work but had failed to obtain a determination. The PRESIDENT asked if there was any sexual dimorphism in these moths, and Mr. Goddard replied that several of the photographs showed moths pairing but these appeared to be similar in pattern.

13th MAY 1965

A Vice-President, Mr. J. A. C. GREENWOOD, in the Chair

The death was announced of Mr. F. J. Coulson.

EXHIBITS

Dr. B. J. MACNULTY—(1) *Pterostichus angustatus* (Dufts.) (Col., Carabidae) from Epping Forest, Essex; an addition to the list of Coleoptera from this area (Buck, 1955, *Ent. mon. Mag.*, 91 : 174–192). The species was first taken in England in 1916 by Sharp and Tomlin in Berkshire and has occurred at Westerham, Kent; Woking, Surrey and in Windsor Forest, Berkshire. (2) *Bembidion geniculatum* Heer (*redtenbacheri* K. Daniel), from Macclesfield, Cheshire. Attention was drawn to Dr. Joy's record (1926, *Ent. mon. Mag.*, 62 : 9) from the Sheffield area of Yorkshire, which led the exhibitor to speculate if the species was confined to the Peak District. Also shown for comparison was *B. tibiale* (Dufts.).

Dr. A. M. MASSEE—The common and widely distributed water-measurer, *Hydrometra stagnorum* (L.) (Hem., Hydrometridae) which had been recorded throughout the British Isles. The apterous form is the more usual, while microp-terous and brachypterous forms are sometimes present. During the field meeting at Higham Marshes, 2.v.65, a number of the exhibited macropterous forms were

found in a dyke near the Thames estuary. This form is very rare in the British Isles.

Mr. M. P. CLIFTON—Two living spiders. (1) A male *Dolomedes fimbriatus* (Clerck) taken on the Basingstoke Canal, Farnborough, Hants, on the field meeting, 24.iv.65. It is a wide-spread but uncommon spider, being confined to the edges of larger pieces of water. (2) A female *Philodromus histrio* (Lat.) taken on heather near Fleet Pond, Hampshire. This spider is also wide-spread, but rare. A batch of eggs laid by this arachnid during the previous week-end was also shown.

Mr. S. WAKELY—Some cocoons which he had been unable to identify, he asked if other members could help him. (See also p. 54).

Mr. T. R. EAGLES—The fungus *Polyporus brumalis* (Pers.) Fr., found at Farningham Wood, Kent during the field meeting, 9.v.65. It has the appearance of growing on the soil, but is generally attached to buried sticks or bark.

Mr. P. A. GODDARD—Photographs of *Eriocrania sparrmannella* Bosc. (Lep., Eriocraniidae), and of young larvae of *Pseudoips prasinana* L. (*bicolorana* Fuessl.) (Lep., Noctuidae) taken on the Ash Vale field meeting, 24.iv.65. The *P. prasinana* L. larvae were dark brown, very well camouflaged on the tips of oak twigs. As the oak buds burst, the larvae became green with red-brown markings, exactly matching the colour of the buds. The larvae are now entirely green and blend with the foliage.

Mr. C. G. ROCHE—An article from *The Times* of 11th May 1965 which commented on the odd names of our Lepidoptera.

COMMUNICATIONS

Mr. M. P. CLIFTON said that he had bred *Anthocharis cardamines* L. (Lep., Pieridae) in 1962 and a female butterfly had this year emerged from a chrysalis of that brood which had long been considered dead.

One of the insects in the British Museum (Nat. Hist.), said Mr. R. M. MERE, had come to life when being soaked off its card mount. He was unable to say to what Order the insect belonged.

Mr. A. SMITH reported that he had taken an example of an east Asian cerambycid beetle at a window on the first floor of the entomology block at the British Museum (Nat. Hist.) (see also page 54).

Having just returned from the Burren, Co. Clare, Mr. MERE said the weather had been very bad, but he had seen *Anthocharis cardamines* L. and *Pieris napi* L. (Lep., Pieridae) on the wing. He added that he took *Odontosia carmelita* Esp. (Lep., Notodontidae) which was a new record for Co. Cork; and *Lycia hirtaria* Clerck which, though common in England, proved to be a new record for Co. Clare.

Referring to Mr. Wakely's exhibit, Mr. S. N. A. JACOBS suggested that the cocoons might be the work of spiders, but Mr. A. SMITH thought they may have been made by coccids.

27th MAY 1965

The PRESIDENT in the Chair

EXHIBITS

The PRESIDENT—A male syrphid fly, *Brachyopa scutellaris* R.-D., taken on the Horsley field meeting, 15.v.65. He also exhibited one of the phaonine muscids which it closely resembles.

Mr. M. P. CLIFTON—Eggs of the sphingid moth, *Celerio livornica* Esp., from a female taken at Basingstoke, Hampshire, 21.v.65.

Mr. A. SMITH—(1) The cocoons shown by Mr. S. Wakely at the previous meeting (page 53). They had now been identified by the British Museum (Nat. Hist.) staff as the coccid, *Luzulaspis luzulae* Duf. (2) The cerambycid beetle *Chlorophorus annularis* (F.) which was reported at the previous meeting (page 53) being found on a window of the entomology block at the British Museum (Nat. Hist.). The distribution of this species is India and south-east Asia.

Dr. C. G. M. DE WORMS—A living example of the butterfly *Aporia crataegi* L., bred from a larva, taken by him at Ifran, Morocco.

Dr. B. J. MACNULTY—*Chlaenius vestitus* (Payk.) and *C. nigricornis* (F.) both from Canvey Island, Essex, 26.iv.64; these magnificent carabs are local and unfortunately seem to be only found singly.

Mr. P. A. GODDARD—Photographs of *Metriotes modestella* Dup. (Lep., Coleophoridae) and *Pancalia leuwenhoekella* L. (Lep., Heliodinidae), both taken on the Horsley field meeting, 15.v.65.

COMMUNICATIONS

Attention was drawn to an article in the *New Scientist* in which it was said that the entomologist himself was the greatest threat to rare species.

A Hoopoe, *Upupa epops* L., was reported by Miss W. M. A. BROOKE to have been seen near Alton, Hampshire.

Dr. C. G. M. DE WORMS gave a talk 'A Natural History Tour of South Africa', which he illustrated by coloured slides.

10th JUNE 1965

A Vice-President, Mr. C. G. ROCHE, in the Chair

EXHIBITS

Mr. P. A. GODDARD—Photographs of the gelechiid moths *Telphusa luculella* Hübn., taken on the Hook Common field meeting, 23.v.65, and *Xenolechia aethiops* Westw., taken on the Horsell Common field meeting, 25.v.65.

Dr. A. M. MASSEE—Several adults of the dermestid beetle, *Ctesias serra* (F.) found under the loose, dry bark, of deciduous trees. The larva of this beetle also occurs under the same circumstances and feeds on flies and other small insects caught in the webs of spiders. The 'woolly bear' larvae are typical of species in the family. Adults are very rarely found in the field, and most examples in collections have been reared from larvae. Those exhibited came from Moccas Deer Park, Herefordshire.

Dr. C. G. M. DE WORMS—Puss Moth larvae and an imago from Morocco. When at Azran in eastern Morocco this May a Puss moth was found at the window of the hotel which laid a number of eggs. Though Seitz (*Macrolepidoptera of the World, Palaearctica*, 2 : 288) considers the exhibited species a form of *Cerura vinula* L. under the name of *deloroiei* Gashet, there is every reason to accord it specific status. Unlike *D. vinula* L. it lays ova in batches and the larvae feed gregariously, often doing much damage to poplars. These larvae, now in their last instar, differ appreciably from those of *D. vinula* L. in that the saddle has no angle in it, while the imago is generally more smoky in ground colour with darker hindwings.

Mr. S. A. WILLIAMS—*Thalassophilus longicornis* (Sturm) (Col., Carabidae). A single example of this very local insect, taken on the banks of the river Lune near

Lancaster, 14.v.65. The species is recorded from a few northern counties and Derbyshire and Shropshire. It was first recorded from Broughton, Lancashire, about 20 miles from this latest capture.

Mr. A. S. WHEELER—*Saturnia pavonia* L. (Lep., Saturniidae). A mixed gynandromorph bred 14.v.65, with a typical pair for comparison.

Mr. A. E. GARDNER—The following Coleoptera taken at Moccas, Herefordshire, 6.vi.65: a series of *Nitidula rufipes* (L.) (Nitidulidae) from Fallow Deer bones, and a single example of *Malthodes crassicornis* (Macklin) (Cantharidae) swept from beneath old oaks.

COMMUNICATIONS

Acherontia atropos L. (Lep., Sphingidae), Mr. S. N. A. JACOBS reported, had been taken near Perth, and two *Celerio livornica* Esp. (Lep., Sphingidae) had been taken at Bristol, Gloucestershire, and another at Bournemouth, Hampshire.

A talk 'Agricultural Chemicals and Conservation' was given by Dr. B. N. K. DAVIS, illustrated by both coloured and black and white slides.

24th JUNE 1965

The PRESIDENT in the Chair

The deaths were announced of Mr. C. A. Woolacott and Mr. J. L. Henderson.

EXHIBITS

Mr. M. P. CLIFTON—A female *Celerio livornica* Esp. taken from amongst grass on a lawn at Basingstoke, Hampshire, 21.v.65; and several larvae from eggs obtained from this moth. In all about 250 eggs were laid, but about ten per cent were infertile. Since then losses have reduced the brood to about 150 larvae.

Mr. A. E. GARDNER—The following Coleoptera: *Ampedus (Elater) pomonae* Steph., from rotten alder, Chippenham Fen, Cambridgeshire, 16.v.65; *A. elongatulus* F., Ham Street, Kent, 12.vi.65; *Athous villosus* (Geoff.), bred from a pupa found in an old oak, Moccas, Herefordshire, 6.vi.65; and *Ctenicera (Corymbites) nigricornis* (Panz.), Ham Street, 12.vi.65 (Elateridae); *Phytoecia cylindrica* (L.) (Cerambycidae) Coombe Hill, Cheltenham, Gloucestershire, 7.vi.65; *Saprinus cuspidatus* (Ihs.) (Histeridae) near Mildenhall, W. Suffolk 13.vi.65.

Mr. P. A. GODDARD—Photographs of *Argyresthia retinella* Zell. (Lep., Yponomeutidae) and *Fumaria casta* Pall. (Lep., Psychidae) wingless female on larval case.

The PRESIDENT—A living example of the trypetid fly *Ditricha guttularis* (Meig.) taken in the Wye Valley, 19.vi.65.

COMMUNICATIONS

Dr. A. RYDON said that last week between Newmarket and Thetford he had nearly knocked down a Hoopoe, *Upupa epops* L., with his car.

The habits of the moths of the *Argyresthia* group, said Mr. P. A. GODDARD, he had found interesting. *Argyresthia nitidella* F., a common hawthorn species, he had seen swarming on oak. The birch feeder, *A. retinella* Zell., he had also found swarming on oak. He asked if any other members who noticed this kind of behaviour would let him have details. One of our Oxford members, the PRESIDENT said, was breeding these moths in an attempt to discover more about their life-histories.

Dr. RYDON commented on the method he used to record Nightingales, *Luscinia megarhyncha* Brehm, singing. In Africa they are quite quiet and only sing in the daytime, so they are difficult to record against background noises, but in England recording is easier because they react very strongly if a recording of their voice is played back to them. This was probably the male asserting his territorial authority. Mr. T. G. HOWARTH asked if the Nightingales in England reacted to recordings made in Africa. To which Dr. RYDON replied that he had not tried this, but he added that he had got a Nightingale to come within five feet of him.

Referring to Mr. Clifton's exhibit, Mr. R. F. HAYNES asked what foodplant he was feeding his *C. livornica* Esp. on, and Mr. CLIFTON replied he had been using dock.

FIELD MEETINGS, 1965

HIGHAM MARSHES, KENT—2nd May, 1965

Leader: Dr. A. M. MASSEE

A party of 17, composed of members of this Society and the Kent Field Club, attended. The day was fine, but not too warm, and proved ideal for field work. The dykes near the Thames estuary were worked during the morning, but later in the day members moved towards the centre of the marshes.

Tea was taken at the Chequers Inn, Lower Higham. Mr. Last, the well-known shepherd of Higham Marshes, joined us during the afternoon and remained for tea.

Collecting was carried out with great enthusiasm, no less than 108 species of insects were recorded, as follows: Coleoptera: *Notiophilus substriatus* Waterh., *Dyschirius lüdersi* Wagner, *Badister bipustulatus* (F.), *Anthracus consputus* (Dufts.), *Chlaenius vestitus* (Payk.), *Harpalus rufipes* (Deg.), *Stomis pumicatus* (Panz.), *Pterostichus macer* (Marsh.), *P. longicollis* (Dufts.), *P. strenuus* (Panz.), *Amara familiaris* (Dufts.), *A. plebeja* (Gyll.), *A. montivaga* (Sturm), *Bembidion iricolor* Bedel, *B. lunulatum* (Fourc.), *B. fumigatum* (Dufts.), *B. clarki* Dawson, *B. minimum* (F.), *B. varium* (Ol.), *B. normannum* Dej., *B. assimile* Gyll., *B. articulatum* (Panz.), *B. genei* Küst. s.sp. *illigeri* Netolitzky, *Agonum marginatum* (L.), *Leistus ferrugineus* (L.), *Microlestes maurus* (Sturm), *Metabletus truncatellus* (L.), *Brachinus crepitans* (L.), *Haliphus lineatocollis* (Marsh.), *H. immaculatus* Gerh., *Noterus capricornis* (Herbst), *N. clavicornis* (Deg.), *Hyphydrus ovatus* (L.), *Hydroporus pictus* (F.), *H. palustris* (L.), *Gyrinus natator* (L.), *Enochrus ochropterus* (Marsh.), *E. testaceus* (F.), *E. melanocephalus* (Ol.), *E. quadripunctatus* (Herbst), *Laccobius minutus* (L.), *L. biguttatus* Gerh., *Cymbiodyta marginella* (F.), *Hydrochus elongatus* (Schall.), *Hydrobius fuscipes* (L.), *Anacaena limbata* (F.), *Helophorus aquaticus* (L.), *Ochthebius marinus* (Payk.), *O. bicolor* Germ., *Cercyon atomarius* (F.), *C. analis* (Payk.), *C. haemorrhoidalis* (F.), *C. melanocephalus* (L.), *Xantholinus fracticornis* (Müll.), *Lathrobium multipunctatum* (Grav.), *Sunius propinquus* (Bris.), *Oxytelus laqueatus* (Marsh.), *Platystethus nitens* (Sahlb.), *Conosomus testaceus* (F.), *C. lividus* (Er.), *Tachyporus nitidulus* (F.), *T. chrysomelinus* (L.), *T. hypnorum* (F.), *Stenus boops* Ljungh, *S. juno* (Payk.), *Brachygluta helferi* (S.-G.), *Leiodes oblonga* Er., *Hister neglectus* (Germ.), *H. unicolor* L., *Lathridius bifasciatus* Reitt., *Monotoma brevicollis* Aubé, *Anthicus constrictus* Curt., *A. antherinus* (L.), *Dryops striatellus* Fairm. & Bris., *Heterocerus fenestratus* (Thunb.), *Onthophagus vacca* (L.), *Aphodius fossor* (L.), *A.*

granarius (L.), *A. pusillus* (Herbst), *A. ater* (Deg.) and *Tanyssphyrus lemnae* (Payk.).

Odonata: *Ichnura elegans* (V. d. Lind.).

Hemiptera-Heteroptera: *Tingis cardui* (L.), *Piesma quadratum* (Fieb.) one developed, *Orius laevigatus* (Fieb.) (*niger* Wolff), *Saldula palustris* (Dougl. & Scott), *Hebrus pusillus* (Fall.), *Hydrometra stagnorum* (L.) several developed, *Microvelia pygmaea* (Dufts.), *M. reticulata* (Burmeister) one developed, *Gerris thoracicus* Schummel, *G. lacustris* (L.), *G. odontogaster* (Zett.), *Nepa cinerea* L., *Ilyocoris cimicoides* (L.), *Notonecta viridis* Delcourt, *Plea atomaria* (Pallas), *Cymatia coleoprata* (F.), *Corixa punctata* (Ill.), *Hesperocorixa linnei* (Fieb.), *Sigara dorsalis* (Leach), *S. falleni* (Fieb.), *S. distincta* (Fieb.) and *S. concinna* (Fieb.).

HORSLEY, SURREY—15th May 1965

Leader: Mr. R. W. J. UFFEN

Only a small party of members availed themselves of this superb spring day for this meeting. *Metriotes modestella* Dup., a moth with a very short emergence period, was found sitting on the flowers of *Stellaria holostea* L. at the edges of the wood south-west of Horsley station. The larvae later feed on the seeds of this stitchwort. A man sat in statuesque pose on a dead tree trunk in a clearing, reading a newspaper, whilst we collected larvae of *Eana incanana* Steph. from the flowers of the bluebells growing about his feet.

As we walked towards the Sheep Leas it became really hot, so lunch was taken in the shade of the trees behind the church. May blossom was already fully out here.

Hamearis lucina L. and *Pyrgus malvae* L. were on the wing and *Pancalia leuwenhoekella* L. and *Glyphipterix cramerella* F. were beginning to make their appearance. Larvae of *Pempelia* sp. were numerous in webs in the soil about thyme on some ant hills. Few insects could be disturbed from the fields that until recently were cultivated.

On the steep slope leading down into the lane to East Horsley, a few shoots of *Chamaenerion angustifolium* (L.) Scop. were found to contain larvae of *Mompha conturbatella* Hübn.; they have a characteristically shrivelled, but fresh appearance, as though attacked by frog-hoppers (Cercopidae). Burdock (*Arctium* sp.), in the neighbouring woods, was as peppered as ever with holes made by the larvae of *Pterophorus galactodactylus* Schiff. The larvae gather on the youngest leaves at the centre of the plant. The attack may at once be distinguished by the woolly edges to the holes, where the larvae have avoided eating the felted hairs beneath the leaf. This year, no parasites were reared from a dozen larvae.

The membracid, *Centrotus cornutus* (L.) was one of the many insects that posed for its picture to be taken by the close-up photographers in the party.

HOOK COMMON, HANTS.—23rd May 1965

Leader: Mr. J. EAGLES

Eight attended. It was overcast at times but no rain fell. In the morning Hook Common was worked. It is characterised by large quantities of *Genista anglica* L. on which *Apion genistae* Kirby, larvae of *Coleophora genistae* Staint. and *Stomopteryx albipalpella* H.-S. were found; *Serratula tinctoria* L., mined by a few

Coleophora peripennella Zell. (*alcyonipennella* auct.); and *Stachys officinalis* L. In other parts *Succisa pratensis* Moench. abounds, and in a boggy area *Gentiana pneumonanthe* L. grows, with *Pedicularis sylvatica* L. and *Achillea ptarmica* L. nearby.

On the birch bushes were many larvae including *Lasiocampa quercus* L., *Trichiura crataegi* L., *Achlya flavicornis* L., *Gometra papilionaria* L. and *Salebria betulae* Deg. There were also imagines such as *Cosymbia albipunctata* Hufn. and *Telphusa luculella* Hübn. Many beetles were taken and it was pleasing to see again *Clytus arietus* (L.) and *Anaglyptus mysticus* (L.).

After lunch the party drove to Odiham for a visit to the Basingstoke Canal. The large growth of the fungus *Polyporus squamosus* Fr. which was admired the year before was still flourishing. Donaciid beetles, mostly *Plateumaris sericea* (L.), were present although not so abundantly as a year ago. The plants growing in the canal were very beautiful. One stretch was white with the flowers of *Ranunculus aquatilis* L. At other places *Potamogeton natans* L. was dominant with its spikes of flowers protruding from the water. There were also *Hippuris vulgaris* L., *Hottonia palustris* L. and *Menyanthes trifoliata* L. On *Glyceria maxima* (Hartm.) Holmb. the commonest flies were *Odontomyia tigrina* (F.) and *Cheilosia albitarsis* Meig.

At the end of the day some of the party explored a field near the cricket ground and found the Adder's Tongue Fern, *Ophioglossum vulgatum* L.

HORSELL COMMON, SURREY—29th May 1965

Leader: Mr. J. A. C. GREENWOOD

The weather was unpleasantly cold and windy, but a party of nine members were grateful that, although there were only momentary gleams of sun, there was no rain.

The area to the Ottershaw side of the sandpits was worked before lunch. Larvae of *Buckleria* (*Trichoptilus*) *paludum* Zell. were found on sundew. Beating and searching birch, oak and willow produced numerous larvae, including *Archiearis* (*Brephos*) *parthenias* L., *Achlya flavicornis* L., *Euproctis similis* Fuessl. and the usual spring geometrids. From pine trees very small larvae of *Panolis flammea* Schiff. and one larva of *Ellopia fasciaria* L. (*prosapiaria* L.) were beaten.

Imagines included *Macrothylacia rubi* L., males in flight; *Anarta myrtilli* L.; a male *Dyscia fagaria* Thunb. at rest on a bare patch of damp earth; and a single example of *Xenolechia aethiops* Westw. in a recently burnt area.

Butterflies were few but several *Pararge megeria* L. and *P. aegeria* L. were disturbed, and one *Callophrys rubi* L. was found at rest on oak.

Microlepidoptera were fairly plentiful, but nothing of unusual interest was reported beyond the *X. aethiops* Westw. already mentioned.

After lunch the party moved to the Gracious Pond area of Chobham Common where one larva of *Quercusia* (*Thecla*) *quercus* L. was found on a telegraph pole. No more were seen in spite of beating the nearby oaks.

CASSIOBURY PARK & WHIPPENDELL WOOD—26th June 1965

Leader: Mr. P. A. GODDARD

Nine members of the combined South London and Amateur Entomologist's societies met at Watford station, and started by working the water meadows between the Grand Union Canal and the river Gade. From the beginning the

absence of most butterflies was very noticeable, in spite of the sunshine; this was thought to be caused partly by the rather cool wind, and the cool weather during the preceding week. *Ochlodes venata* Br. & Grey and *Coenonympha pamphilus* L. were seen in small numbers. Moths disturbed from the undergrowth included *Nymphula stagnata* Don., *Hypena proboscidalis* L., *Amathes c-nigrum* L., *Spilosoma lubricipeda* and worn examples of *Xanthorrhoe montanata* Schiff. *Olethreutes lacunana* Schiff. was unexpectedly scarce, but *Anthophila fabriciana* L. was so abundant as to make collecting microlepidoptera somewhat difficult. Larvae discovered by the younger members included *Aglais urticae* L. and, on *Epilobium hirsutum* L., *Clepsis costana* F.

After the water meadows the party transferred their attention to the edge of the golf course. *Nemotois degeerella* L. was in evidence in the more wooded parts, and *Tortrix viridana* L., *Hedya nubiferana* Haw., *Crambus pratellus* L., *Agriphila culmella* L. and *Euphyia bilineata* L. were seen. The bugs *Heterogaster urticae* (F.) and *Leptopterna dolabrata* (L.) were also reported.

After lunch the party moved to Whippendell Wood, where the following Lepidoptera were noted: *Polyommatus icarus* Rott., *Ectypa glyphica* L., *Noctua pronuba* L., *Apotomis turbidana* Hübn., *Argyresthia retinella* Zell. and *Epinotia tenerana* Schiff.

The leader stumbled upon a colony of *Lathronympha strigana* F. on *Hypericum pulchrum* L., and found many larvae in spun shoots of this plant. Unfortunately most were parasitised.

Spiders recorded by Mr. D. Stimpson included *Pirata piraticus* (Clerck), *Pisaura mirabilis* (Clerck), *Tibellus oblongus* (Walck), *Arctosa perita* (Latr.) and *Araneus cucurbitinus* (Clerck).

KNOWLE PARK, KENT—4th July 1965

Leader: Dr. A. M. MASSEE

Fourteen naturalists representing the London Natural History Society, The Kent Field Club and The South London Entomological Society met at the Fawke Common entrance to the park at 11 a.m.

The day was fine with the exception of a brief shower during the lunch break. The party consisted mainly of coleopterists and hemipterists who spent the day examining fallen trees and beating oak and beech. The two dipterists in the party left the main body and collected around the ponds where flies were more plentiful.

During the day many interesting species were noted, from which the following list was compiled:

HEMIPTERA-HETEROPTERA: *Aradus depressus* (F.), *Tingis cardui* (L.), *Temnostethus gracilis* Haw., *T. pusillus* (H.-S.), *Xylocoris cursitans* (Fall.), *Loricula elegantula* (Bärens.), *L. pselaphiformis* Curt., *Phylus melanocephalus* (L.), *P. palliceps* Fieb., *Psallus perrisi* Muls. & Rey, *P. variabilis* (Fall.), *P. quercus* (Kirsch.), *P. varians* (H.-S.), *Orthotyplus tenellus* (Fall.), *Phytocoris dimidiatus* Kirsch., *P. reuteri* Saund., *P. ulmi* (L.), *Saldula orthochila* (Fieb.).

COLEOPTERA: *Carabus problematicus* Herbst. s.sp. *gallicus* Gehin, *Abax parallelepipedus* (Pill. & Mitt.), *Agathidium* sp., *Anisotoma humeralis* (F.), *Conosomus bipunctatus* (Grav.), *Euplectus* sp. with *Myrmica scabrinidis* Nylander (Hym., Formicidae), *Malthinus frontalis* (Marsh.), *Athous villosus* (Geoff.), *A. hirtus* (Herbst), *Synchita separanda* Reitt., *Bitoma crenata* (F.), *Cerylon fagi*

Bris., *Ptilinus pectinicornis* (L.), *Xylophila populnea* (Panz.), *Vincenzellus viridipennis* (Lat.), *Phloiotrya rufipes* (Gyll.), *Aphodius zenkeri* Germ., *Psylliodes affinis* (Payk.), *Rhagium mordax* (Deg.), *Leiopus nebulosus* (L.), *Rhynchaenus quercus* (L.), *R. fagi* (L.), *Taphrorychus bicolor* (Herbst), *Platypus cylindrus* (F.).

LEPIDOPTERA: *Aglais urticae* L., *Scoparia ambigualis* Treits., *Hada nana* Hufn., *Euphyia bilineata* L., *Hypena proboscidalis* L., *Crambus pratellus* L., *C. hortuellus* Hübn., *Olethreutes lacunana* Schiff., *Tinea semifulvella* Haw., *Colostygia pectinataria* Knock., *Argyresthia glaucinella* Zell., *Fumaria casta* Pall. female, *Sterrhia aversata* L., *Anthophila fabriciana* (L.), *Hepialus hecta* L., *Gypsonoma sociana* Haw., *Prays curtisellus* Don.

Two species of fungus were noted, *Russula lutea* (Huds. ex Fr.) S. F. Gray and *Grifola sulphurea* Fr.

The introduced plant from New Zealand, *Epilobium nerterioides* A. Cunn. was also brought to the attention of the party by Mrs. K. C. Side.

Delayed emergence from pupa in Lepidoptera—During the season of 1962 I was breeding *Anthocharis cardamines* L. (Pieridae) and one of the pupae failed to hatch. Assuming it to be dead I placed it in my collection. In May this year a female emerged. Since it was unable to find a suitable foothold on the side of the drawer it was slightly damaged, but the wings were still limp when found and it soon recovered when placed in a box with rough sides.—M. CLIFTON, Farnborough, Hants, 5th June 1965.

Celerio livornica Esp. (Lep., Sphingidae) in Hants.—On 21.v.65 my niece found a female *Celerio livornica* Esp. in the grass on a lawn at Basingstoke. During the following week this moth laid approximately 250 eggs, most of which appear to be fertile.—M. CLIFTON, Farnborough, Hants, 5th June 1965.

Pterostichus angustatus Duft. and *Bembidion geniculatum* Heer (*redtenbacheri* K. Daniel) (Col., Carabidae)—Dr. MacNulty's exhibit at the meeting of 13th May 1965 (page 52) is of more than a little interest. *Pterostichus angustatus* Duft., the present writer has taken in Ongar Park Wood, only a mile or so away in a direct line from the northern end of Epping Forest. This species is usually associated with burnt ground, and the Ongar Park Wood specimens were taken where tree fellers had burnt the trimmings and chippings when a stand of Scots Pine had been cleared. The beetle occurred regularly during 1947 and 1948 in the months of May, July and August. In view of the proximity of the two localities it is not surprising to find the species recorded from the forest, but it would be of interest to know the circumstances of the Epping Forest capture. On Ockham Common, Surrey, the present writer also found the species, and again among burnt pine, though when Mr. C. N. Hawkins went for it a week or so later he was unable to find it. Normally the species is transitory, remaining in a situation only so long as the burnt conditions are suitable; but this does raise the query, as with all these species associated with burnt conditions, where do they

get to between times? In addition to the counties Dr. MacNulty mentioned with his exhibit the following are also given by Moore (1957, *Ent. Gaz.*, 8 : 178): Dorset, Sussex, Kent, Notts, Cheshire, Lancashire and Yorkshire.

The *Bembidion geniculatum* Heer record is of more importance, and would appear to be a new county record (Moore, 1957 *loc. cit.*, 8 : 174). Dr. Moore records the counties Durham and Cumberland, and the eastern and western highlands of Scotland, besides Yorkshire which Dr. MacNulty mentions. The species thus has a much greater distribution than the Peak District, but seems to favour the higher altitudes.—F. D. BUCK, 9, Elton Walk, Tiptree, Colchester, Essex, 12th July 1965.

Diptera in the vicinity of Buckingham Palace—Professor O. W. Richards' list (1964, *Proc. S. Lond. ent. nat. Hist. Soc.*, 1963 : 94-7) has tempted me to record that Sir Christopher Andrewes, F.R.S., caught *Helophilus parallelus* Harris (*trivittatus* (F.)) in the garden of Buckingham Palace when attending a garden party. My nearest capture to the garden was of a male *Solva marginata* (Meig.) just outside the walls on a passing omnibus. Perhaps it had come from the garden, but more likely, could have travelled in the bus from the suburbs.

In nearby Hyde Park and Kensington Gardens there must exist quite an interesting fauna which could stray into the palace garden. Mr. R. W. J. Uffen mentioned in his paper 'Some Flies (Diptera) Breeding in Wounds on Elm Trees in Hyde Park' (1963, *Lond. Nat.* 42 : 25) the following species: *Mycetobia pallipes* Meig., *Brachyopa insensilis* Collin, *Aulacigaster leucopeza* (Meig.) and *Phaonia cincta* (Zett.). Mr. C. L. Collenette recorded (1939, *Lond. Nat.*, 1938 : 49): *Episyrphus* (*Syrphus*) *guttatus* (Fallén), *Gnophomyia lugubris* (Zett.) and *Chironomus supplicans* Meig., the latter species as common in 1938. In mid-April 1942, I found *Syrphidis* (*Syrphus*) *ribesii* (L.), *Metasyrphus* (*Syrphus*) *luniger* (Meig.), *Tubifera* (*Eristalis*) *pertinax* (Scop.), *Platycheirus albimanus* (F.), *Melanostoma scalare* (F.), *Dasyphora cyanella* (Meig.), *Calliphora erythrocephala* (Meig.) and *Scopeuma* (*Scatophaga*) *stercorarium* (L.) present. These are of widespread distribution and likely to be regular visitors to the palace garden. In July 1947 I also found *Chloromyia formosa* (Scop.), *Dolichopus unguulatus* (L.) and *Xyphosia miliaria* (Schränk.).—L. PARMENTER, 94, Fairlands Avenue, Thornton Heath, Surrey, 12th March 1965.

Insect Conservation: an appeal by the Royal Entomological Society of London—Since the publication of the appeal made by the Honorary Secretary of the Committee for the Protection of British Insects (1951, *Proc. R. ent. Soc. Lond.* (C) 16 : 23-24), that committee has been reconstituted as the Conservation Committee of the Royal Entomological Society of London. The original committee was instituted in 1925 as a result of many complaints in the entomological journals of that time about the activities of unscrupulous collectors: certain species were being threatened with extinction. Since its institution the Committee has met with considerable success, and some of those insects most threatened in 1925 are now considered to be much more firmly established.

Modern agricultural practices, the widespread use of insecticides and herbicides, urbanisation, the present heavy forestry programme, and sometimes the well-intended activities of local authorities, may threaten the existence of rare or local species through the alteration or destruction of their habitats. The Conservation Committee has taken an active part in minimising the risks that have arisen from such causes, and has been careful to co-ordinate its activities with those of other organisations interested in nature conservation, particularly the Nature Conservancy. With the co-operation of entomologists it is hoped to do even more in the future to preserve the natural conditions essential to the existence of particular insects.

These activities should be sufficient to safeguard rare or local species of the less popular orders, but some species of Lepidoptera are threatened with extinction at the hands of thoughtless collectors. It is with regret that the Committee has to record that reports are still sometimes received that collectors using methods of mass collection on local species; such methods may well cause populations of such species to be reduced below the survival level. Collectors are again earnestly requested to use the utmost restraint in taking any of the species listed below in any of their stages, particularly when adverse factors have reduced their numbers. The indiscriminate capture of large numbers of these species may not only endanger their existence but also render more difficult any negotiations taking place with a view to preserving them and their habitats.

Papilio machaon L. (Swallow Tail), *Melitaea cinxia* (L.) (Glanville Fritillary), *Mellicta athalia* (Rott.) (Heath Fritillary), *Maculinea arion* (L.) (Large Blue), *Lysandra bellargus* (Rott.) (Adonis Blue), *Strymonidia pruni* (L.) (Black Hair-streak), *Catocala fraxini* (L.) (Clifden Nonpareil), *Minucia lunaris* (Denis & Schiff.) (Lunar Double Stripe), *Colobochyla salicalis* (Denis & Schiff.) (Lesser Belle), *Coscinia cribraria* (L.) (Speckled Footman), *Aplasta ononaria* (Fuess.) (Rest Harrow), *Thalera fimbrialis* (Scop.) (Sussex Emerald), *Scopula immorata* (L.) (Lewes Wave), *S. nigropunctata* (Hufn.) (Sub-angled Wave), *Eustroma reticulata* (Denis & Schiff.) (Netted Carpet), *Epione paraellaria* (Denis & Schiff.) (*vespertina* L. sensu F.) (Dark Bordered Beauty), *Zygaena viciae* (Denis & Schiff.) (New Forest Burnet), *Bembecia chrysidiformis* (Esp.) (Fiery Clearwing) and *Eucnemidophorus rhodactylus* (Denis & Schiff.) (Rosy Plume).

In 1962 the Nature Conservancy, at the instigation of the Committee and the Devon and Cornwall Naturalists' Trusts, undertook the financing of an investigation into the status of *Maculinea arion* (the Large Blue), which has been declining in numbers for some years and is now at a very low ebb, with a view to taking the necessary conservation measures. This investigation, which took place during 1963 and 1964, has proved that the fears of the Committee were only too well founded. In 1963 some 80 specimens were seen and marked in the now very restricted locality for this species. During 1964, in spite of better weather, very few more specimens were seen, and the individual sites within the general locality had been reduced still further. In these circumstances it is imperative that collectors abstain from taking any specimens of this butterfly until its numbers have increased considerably; this species, which is evidently on the verge of extinction in England, will otherwise be lost.

The Committee would be glad to receive any practical suggestions from entomologists. In particular it would urge them to notify the Committee at the earliest possible moment of any observed threat to a rare or local species or its habitat, so that protective measures may be taken before it is too late.—T. R. E. SOUTHWOOD, *Chairman, Conservation Committee*, 41, Queens Gate, London, S.W.7, May 1965.

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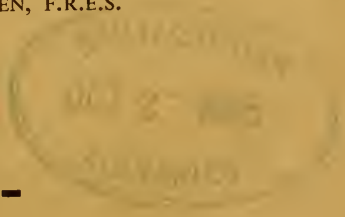
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VARIATION IN *EPIRRHOE ALTERNATA* MÜLLER (SOCIATA BORKH.) WITH SPECIAL REFERENCE TO AB. *LACTEATA* LARSEN, AND ITS GENETICS

By G. M. HAGGETT, F.R.E.S.

SUMMARY

This paper describes a variable strain of *Epirrhoe alternata* Müller reared through three generations; an account is given of the genetics of ab. *lacteata* Larsen and other varietal* forms bred from this strain are discussed. A review is made of variation within the species.

INTRODUCTION

E. alternata is a common Palaearctic geometrid moth that has a wide tolerance of habitat. A number of varieties and geographical races have been described but the species is usually constant in appearance despite its complex pattern. A female example of ab. *lacteata* Larsen was caught at Arundel, Sussex on 2.viii.64 and three generations were inbred in quick succession, until January 1965 with part of the third brood lying over until May. Extensive variation was revealed in F₂ and F₃ generations in addition to ab. *lacteata*. The strain is being continued in the Genetics Laboratory at Oxford and at Arundel.

PART I. DESCRIPTION OF TYPICAL *ALTERNATA* AND ITS VARIETIES

DESCRIPTION OF TYPICAL *ALTERNATA* MÜLLER

Müller's original description of *alternata* (1764) reads as follows 'Phal. Geometra alternata seticornis, alis dentatis: fasciis albis nigricantibusque alternis: striga marginali duplici undulata.' In order the better to understand the complex variation of the insect and to clarify the descriptions of forms made during the two centuries since Müller, I give below a comprehensive description of the typical *alternata*.

The familiar pattern and coloration of *E. alternata* are due to a combination of delicate grey-brown shadings and transverse, sinuous lines that alternate with bands of cream-white; on the forewings the characteristic median transverse band is composed of two elements, an inner blue-grey one contained within a dark brown-grey one, the two being widest apart on the anterior side; both elements are bounded by scalloped, fine, black lines and the outer band carries a heavy black dot where it crosses the veins numbered 1-4 and again, but less clearly on the outer areole.

The fringes are speckled with dark grey at each of the vein endings, and the fringes are etched internally by a fine, crisp, black line that is broken at each of the veins. Internal to this line there is a broad submarginal band of soft blue-grey admixed with brown towards the apex where the darker mottling is streaked across with delicate blue-white. The submarginal band is fairly evenly divided by a scalloped, fine, clear, white line that is continuous from the costa to vein 1.

* The term variety is used throughout this paper to indicate the insects appearing in the breeding experiments at a low frequency.

Immediately preceding the inner edge of the submarginal band there is an exceedingly fine and weak wavy white line. The space between the submarginal band and the median, is cream or bone-white with an ochreous tinge and it is evenly divided throughout its length by a scalloped, dark grey line that is weakest between veins 1 and 4. The discal dot is contained within the inner constituent of the median band. The anterior edge of the band is margined in white, there follows a very narrow, dark grey line, another white, then a broader grey band composed of rounded blotches between the veins, a whitish fine line again and then the basal patch which, like the median band, is composed of two units, a blue-grey inner patch that contains a black central dot, and a black-brown outer band.

The shape of the median transverse band is normally very constant, and is rather broader at the costa and extended distally on vein 4 to an acute angle, the band being irregularly concave above and below that point. The inner edge is fairly uniform and arcs gently away from the thorax.

The hindwings lack obvious banding and instead present a more uniform series of wiggly lines: the fringe is again speckled in black at the vein endings and it carries also the fine, black, terminal line. The submarginal band is pale grey, with blue and brown admixture especially on the upper half. There is a whitish streak radially between veins 3 and 4. The band carries the same fine, white, scalloped lines as the forewing. The white band that follows is broader than on the forewing but is similarly divided by a scalloped, dark grey line. The rest of the wing is dusted with ash-grey scales and carries three wavy, dark grey lines beyond the discal dot, the posterior of which is marked with a black dot on veins 1-3.

The head and thorax are mottled dark grey and brown, the abdomen is ash-grey with pairs of fine, black dots increasing in intensity towards the thorax.

Synonyms: These names are synonyms and have no other significance: *alchemillata* Schiff., *sociata* Borkh., *subtristata* Haw., *contristata* Don. and *aparnata* Hübn.

These are racial forms, and all are quite distinctive: *obscurata* South, *islandica* Prout, *dynata* Prout, *dubiosata* Alph. and *xenos* Bryk.

The following list of forms and aberrations is based upon an original list compiled for me by Mr. A. L. Goodson, and augmented by Mr. D. S. Fletcher who also examined with me those type specimens; figures and original descriptions that are available at the British Museum (Nat. Hist.). Forms marked * were reared in the Arundel strain and numbers are given where relevant.

*LACTEATA LARSEN (1948), figured.

I am indebted to Dr. Hoffmeyer for this translation of Larsen's original description: 'Of this curious aberration I have caught one completely fresh specimen, female, near Fabory (Funen) 16.vi.38. All that is left of the markings of the species is a narrow dark grey central band. The ground colour is bright cream, so I have given the beautiful insect the name *lacteata* (milk-coloured). The base of the wings, and especially the hind wings, darker, and all wings a bit grey-yellow along the border. Underside totally greyish-white, especially from the base to the centre then paler without other markings except the four central dots: darker grey again along the border.'

In this aberration the dark pigments of typical *alternata* are redistributed so that the submarginal band is paler, the fine, dark line that normally divides the posterior white band is totally absent and that band is much broader. The median band is composed of only the inner element which is expanded at the expense of

the outer and scattered grey scales in the region of the areole and vein axils are all that may remain of the outer element. The grey lines and band that lie in typical *alternata* between the basal area and the transverse band are also largely absent. On the hind wing of the variety there is no trace of the three separate grey lines of typical *alternata*, instead the pattern is a uniform grey and the basal area is contracted; the white band that in typical *alternata* separates the basal area from the submarginal is in the variety greatly extended and is totally devoid of any dividing line; the submarginal band is weak and much reduced. All wings on the underside lack the clear, fine lines of typical *alternata* and present instead a simple pattern of a submarginal band that is broken by white between veins 3 and 4, then a broad white band and finally a uniform, dusky ochreous-grey patch containing the conspicuous median dots.

The aberration is itself remarkably variable but it is important to discriminate between its extremes on the one hand and on the other those varieties that result from a combination of *lacteata* with quite separate genetic entities, *i.e.*, round-winged, scale defective and diminished markings. Variation within *lacteata* is concerned with exaggeration, contraction, intensification or fragmentation of the median band and with clarity of outer margins and hind wing basal area. At one end of the range (fig. 11) the insect is predominately white with the merest trace of a submarginal band, greatly reduced basal area and very narrowed, constricted, median band; at the other end (fig. 9) the submarginal band is heavily pigmented with dark blue-grey and the median is thickened and the colour deepened to velvety black, and there is shading between it and the darkened basal area. The colour of the median band can be ashy-grey but is always darker than the submarginal (unlike the scale defectives). Fragmentation of the band produces forms like *degenerata* Haworth (fig. 12). The ground colour may be clouded pinkish or ochreous and is rarely clear chalk-white, usually it is milky.

So far in this breeding programme a total of 194 female and 85 male *lacteata* have been reared.

EFFUSA MÜLLER (1930), figured.

'The white postmedian band very broad, the boundary between it and the median band ill-defined.'

The illustration shows that this could be a development of *lacteata* or a combination of *lacteata* with another gene that separately controls the median band. The form looks very like *Euphyia luctuata* Schiff. A conspicuous feature is the sharply concave contour of the posterior edge of the median band. Prout (1934) was quite wrong in thinking this form to be only a modification of *pseudorivata* Wagner.

*ALBINATA ROMANISZYN (1925).

'All the wings normal but very pale pattern. The moth looks as though damaged or as if without scales. 10.viii.24 on willow trunk. Libyca Krolewska.'

A note appended to this description by the Editor says the form is very pale yellow.

This fully describes some examples of the scale defective *alternata* and *lacteata* insects reared in these experiments (fig. 21).

DIVISA OSTHELDER (1929).

'The median band completely divided by a paler stripe from costa to margin.' There is no figure and the description could be fitted to brightly marked

heterozygote males of *lacteata* (fig. 6), but the type of *divisa* is said to be female, which would make it a quite different genetic entity.

TENUIFASCIATA SCHIMA (1927).

'The median band much narrowed (1-1.5 mm), but not actually interrupted.'

Prout (1914, in Seitz, *Pal. Geometridae*, 4 : 258) originally thought this and *degenerata* Haw. to be the same, but he later (1934) accepted *tenuifasciata* for specimens in which the median band, although constricted, was not broken; both forms have in common a broad pale surround to the median band and darker outer margin.

DEGENERATA HAWORTH (1809).

(*kurzi* Hirschke (1910)).

'The median band broadly interrupted with white. The median band is reduced to an island surrounding the discal dot, and the rest of the median area is dull white and the outer margin is heavily suffused.'

*PSEUDORIVATA WAGNER (1923), figured.

'Much paler with an appearance of *Euphyia unangulata* Haw. and *Epirrhoe galiata* Schiff. to *E. rivata* Hübn. Clouding of the white transverse band absent, as is its dark dividing line. On the other hand the bold, white band of *rivata* is lacking. The hind wings paler towards the base.'

The moth is illustrated and the figure can be seen to be no more than a brightly marked, typical *alternata* with median band narrowed and sharply defined. Two paratypes in the British Museum (Nat. Hist.) collection confirm this, while the fact that Wagner reared a second generation 'almost entirely' of this form further indicates that this cannot be the heterozygote of *lacteata*.

One female reared in F₃.

OBSCURA LEMPKE (1949).

'The white postmedian narrow, and over its whole length divided by a black line, the base of the hind wing darker.'

This seems scarcely separable from the range of typical *alternata*.

MELANOTICA HÖRHAMMER (1952).

'All wings unicolorous brownish-black.'

CONFUSA COCKAYNE (1953), figured.

'The median band of the fore wing is narrow; the border is dark and suffused internally, fading away gradually into the white ground colour shortly before reaching the postmedian line; there are none of the normal reticulations and the dark line just external to and parallel with the postmedian line is absent. On the hind wing the basal part is dark as far out as the postmedian line and the marginal area is similar to that of the fore wing. The aberration has a dark smoky suffused appearance.'

PSEUDOTRISTATA HEYDEMANN (1936), figured.

'Smaller than typical *alternata*, markings normal but deep black-grey, without the brown and grey-blue hues, bearing superficial resemblance to *E. tristata*.'

Possibly racial.

EULAMPA KAUTZ (1922).

'Light grey, with violet reflections, the median band very broad, not darker, the white markings very narrow, but distinct. Seewalchen (Attersee), one only.'

Mr. Fletcher has been good enough to obtain from Herr Reisser of Vienna the following information. The type of *eulampa* is believed to have been destroyed during the war along with other macrolepidoptera of Kautz's collections, but the descriptions made by Kautz are understood to be very accurate. No figure was made.

CINGULATA TENGSTRÖM (1875).

'The abdomen black, the hind wing also somewhat darkened.'

A specimen figured (1948, *Flora og Fauna*, 54 : 59) is attributed to this form. Neither this figure nor the original description suggest an insect that is very different from typical *alternata*.

The descriptions that follow are of other phenotypes, that were encountered in the inbreeding of the Arundel strain; I do not propose to name them, but illustrations are given on Plate I.

1. HETEROZYGOTE MALE OF LACTEATA LARSEN (figs. 4-8).

This is quite distinct from both *lacteata* and typical *alternata*. The submarginal band is smooth olive-grey and still has the fine, sinuous, white line running through it, but this is exceedingly weak or interrupted; the white band external to the median is dulled yellowish and its dividing dark line is almost or quite absent; the median band itself contains both elements of typical *alternata* but is much darkened (fig. 4). The grey shading between the median and the basal area is suffused olive. On the hind wing the most obvious feature is the presence of two (not three as in typical *alternata*) grey lines within the basal half. The rest of the wing is shaded like the fore wing.

Variation of the heterozygote is concerned mostly with the shape and intensity of the median band, which can appear much coarsened, with the individual components sharply defined (fig. 6). The shape of the median band can be contracted (but still with both elements present) and straightened (fig. 8). The submarginal band may vary from dull violaceous grey-olive to greenish-buff. 236 specimens reared.

SCALE DEFECTIVE AND ROUND-WINGED MOTHS.

Amongst the F₂ and F₃ progeny there appeared two variations, one with smaller, rounded wings and straightened median band, the other with the scales reduced. Both are variable and both can be graded into a cline-like series but only a few moths of the extremes of each form were reared.

2. ROUND-WING (figs. 16, 20, 29-32).

This is clearly not a dwarf, for the body is of normal size; the wings are truncated so that the angular wing shape of typical *alternata* is replaced by a wing

that has the apex and outer margin much rounded. The reduction of wing area is associated with contraction and straightening of the median band and suffusion of other transverse markings. The form has occurred in both sexes and in each phase of *lacteata* but not in male *alternata*. For numbers reared see Table VI (page 74).

3. SCALE DEFECTIVE (includes AB. ALBINATA ROMANISZYN) (figs. 14, 19, 21-24, 25-28).

There is every transition of scale loss from local absence from the area of the median band (figs. 14, 24) to almost complete denudation when a ghost-like insect results (fig. 22). The thorax may be bald and in extreme cases the abdomen also, when it appears orange or pink. When viewed under high magnification the scales that are present are seen to be properly developed and in no way different in shape or size from those of typical *alternata*, it is simply their absence that is remarkable. Although all wings can show the condition, some specimens have only the fore wings affected. The wing fringes are always fully developed. The aberration is full-sized. Scale deficiency appears to be associated in F_2 generation especially with the 'effusa-like' form (figs. 25, 26), but whereas the 'effusa-like' moths are nearly always scale defective, other forms may or may not show the scale-loss condition. Scale loss can combine with each phenotype of the *lacteata* forms, and with the typical *alternata*, and occur in both sexes. For numbers of moths reared see Table VI (page 74).

4. 'EFFUSA-LIKE'

These have both elements of the fore wing median band fused together and sharply scalloped as in *Euphyia unangulata* Haw., the distal white band broad and mostly lacking the fine dividing line of *alternata*, the overall appearance being smooth and greasy. The illustration of *effusa* Müller shows a much broader expanse of white distally to the median band, it is only the curious shape of this band that is common to both forms.

Eighteen moths reared in F_2 distributed eleven *alternata* (figs. 25 & 26), four heterozygous *lacteata* (figs. 27 & 28), three female *lacteata* (recognizable only by the angled median band), also two heterozygotes in F_3 .

5. 'TENUFASCIATA-LIKE'

These have the fore wing median band much reduced in width but not so extreme as *temifasciata* Schima and without its contrasted dark outer margin. These moths simply have the median narrowed and straightened and all other markings are normal. In *lacteata* females there is a tendency for the band to break up at the centre. The brood figures quoted by Prout (1934) indicate a high frequency (65 per cent) of *temifasciata* bred from a wild-caught female of the form whereas in these experiments very few examples have been reared; these comprise two male *alternata* in F_2 (figs. 35 & 36), five heterozygous *lacteata* in F_2 (fig. 8), eight male *lacteata* in F_3 (fig. 16) and two female *lacteata* in F_2 (fig. 20).

6. 'PSEUDOTRISTATA-LIKE'

These have those parts of the wing normally dark brown intensified to black and presenting a chequered appearance, full-sized, indeed quite large moths, some associated with scale deficiency. Three reared in F_2 (fig. 34), two in F_3 , all females.

7. DIMINISHED MARKINGS

This form is quite distinct from *tenuifasciata* and *degenerata* because the median band is not simply interrupted or narrowed, instead it undergoes progressive reduction until the only markings to remain on the four wings are the black discal dots. The extreme condition is reached in *lacteata* and then the ground colour becomes a unicolourous pale buff and may even show an orange tint. This is in marked contrast with female *lacteata* *tenuifasciata*-like moths (fig. 20) which retain a clear white ground colour. The fringes remain chequered. The majority of examples reared have been round-winged. The form has appeared in female *alternata* with round-wing (fig. 29), in male homozygous *lacteata* with round-wing, and in female *lacteata* both with and without (figs. 17 & 18) round-wing. Some of the round-wing heterozygous *lacteata* males (fig. 30) may belong here.

PART II. GENETICS OF AB. LACTEATA LARSEN

(A) OBSERVED RESULTS

F₁ The wild-caught female laid 82 eggs and 80 moths were reared, of which 36 were males. All the males were heterozygotes and all the females typical *alternata*. The moths were considerably larger than normal and some females displayed olive mottling and brightness of pattern not usually associated with the species.

F₂ Two pairings were made in P₂ and the progeny emerged as shown in Table 1. The F₁ generation comprising male varieties different from the parent female and from typical *alternata* immediately suggested sex-linked inheritance, with the reasonable assumption that the wild-caught female had paired with a typical *alternata* male. This belief was then tested against F₂ results from known pairings. The numbers of the two phenotypes of each sex were compared against forecasted results for each of the two batches and the results found to be statistically acceptable.*

TABLE I
SUMMARY OF F₂

Batch	MALE		FEMALE		Total moths	Eggs hatched
	Typical <i>alternata</i>	Hetero- zygote	Typical <i>alternata</i>	<i>lacteata</i>		
F ₂ /A	55	75	56	75	261	298
F ₂ /B	36	52	46	38	172	204
Totals	91	127	102	113	433	502

* chi² values are: F₂/A 5.84; F₂/B 3.81²

F₃ The following P₃ pairings were set up:

TABLE II
P₃ PAIRINGS

Batch	PARENTS		Total eggs hatched
	Male	Female	
P ₃ /1	hetero B	<i>lacteata</i> B	nil
P ₃ /2	hetero B	scale defective <i>alternata</i> B	nil
P ₃ /3	hetero A	<i>lacteata</i> A	30
P ₃ /4	hetero A	<i>lacteata</i> A	158
P ₃ /5	hetero A	<i>lacteata</i> A	224
P ₃ /6	hetero A	<i>lacteata</i> A	nil
P ₃ /7	hetero B	<i>lacteata</i> B	127
P ₃ /8	scale defective <i>alternata</i> A	scale defective <i>alternata</i> B	nil
P ₃ /9	scale defective <i>alternata</i> B	scale defective <i>alternata</i> B	nil
P ₃ /10	scale defective hetero A	<i>lacteata</i> A	nil
P ₃ /11	scale defective hetero B	<i>lacteata</i> B	nil

Only four batches proved viable. The progeny that emerged without diapause were comprised as below:

TABLE III
F₃ EMERGENCES JANUARY 1965

Batch	Male hetero <i>lacteata</i>	Male homo <i>lacteata</i>	Female <i>alternata</i>	Female <i>lacteata</i>	Total
P ₃ /3	1	3	4	1	9
P ₃ /4	18	21	15	19	73
P ₃ /5	25	17	21	31	94
P ₃ /7	7	9	19	10	45

All moths of batch P₃/3 emerged immediately; the moths of other batches that passed diapause emerged in May and were distributed as follows:

TABLE IV
F₃ EMERGENCES MAY 1965

<i>Batch</i>	<i>Male hetero lacteata</i>	<i>Male homo lacteata</i>	<i>Female alternata</i>	<i>Female lacteata</i>	<i>Total</i>
P ₃ /4	2	5	nil	3	10
P ₃ /5	18	27	14	17	76
P ₃ /7	2	3	7	nil	12

and the whole of F₃ can be analysed thus:

TABLE V
SUMMARY OF F₃

<i>Batch</i>	<i>Male hetero lacteata</i>	<i>Male homo lacteata</i>	<i>Female alternata</i>	<i>Female lacteata</i>	<i>Eggs hatched</i>	<i>Total pupae</i>	<i>Total moths</i>
P ₃ /3	1	3	4	1	30	12	9
P ₃ /4	20	26	15	22	158	118	83
P ₃ /5	43	44	35	48	224	201	170
P ₃ /7	9	12	26	10	127	71	57
Totals	73	85	80	81	539	402	319

The P₃ pairings had been set up with the calculated intention of producing the homozygote male *lacteata* and again the results of those batches that were large enough to score were compared against forecasted values; batches P₃/4 and P₃/5 were found to be statistically acceptable (see footnote) but P₃/7 showed a significant deviation outside the limits of chance* due to an excess of typical female *alternata*. The combined values of all three batches fell within the expected range.

* chi² values: P₃/4 3.700; P₃/5 2.094; P₃/7 13.245.

Pairings were set up from the January emergences, but no fertile eggs were obtained from five pairs of male homozygous *lacteata* × female *lacteata* although pairings between male heterozygous *lacteata* × female *lacteata* gave fertile eggs, as did the back-cross male heterozygous *lacteata* × female *alternata*. From these pairings Kettlewell reared *lacteata* moths which he also tried to breed true but he failed to obtain fertile eggs from observed pairings.

A variety of pairings were made amongst the May emergences at Arundel with a view to obtaining the pure *lacteata* strain and to test the viability of the homozygous *lacteata* male. It was found that not only did homozygous female *lacteata* × female *alternata* yield fertile eggs but so also did the pure cross and many progeny were reared.

The pedigrees can now be expressed diagrammatically, employing the conventional gene symbols.

LL	typical <i>alternata</i> male
ll	homozygous <i>lacteata</i> male
Ll	heterozygous <i>lacteata</i> male
L	typical <i>alternata</i> female
l	<i>lacteata</i> female
XX	male sex chromosomes
Xy	female sex chromosome

wild-caught <i>lacteata</i> female	\times	F_1 assumed wild <i>alternata</i> male	P_2	
Xy		XX		
l		LL		
XX	Xy	Xy	XX	F_1
Ll	L	L	Ll	

all males heterozygous *lacteata*
all females *alternata*

	F_2			
typical <i>alternata</i> female	\times	heterozygous <i>lacteata</i> male	P_2	
Xy		XX		
L		Ll		
XX	Xy	Xy	XX	F_2
Ll	L	l	LL	

Half males heterozygous *lacteata*
Half males homozygous *alternata*
Half females *lacteata*
Half females *alternata*

F ₃				
<i>lacteata</i> female	×	heterozygous <i>lacteata</i> male		P ₃
XY l		XX ll		
XX ll	XY L	XY l	XX ll	F ₃
half males heterozygous <i>lacteata</i> half males homozygous <i>lacteata</i> half females <i>alternata</i> half females <i>lacteata</i>				

(B) DISCUSSION

There are three noteworthy features amongst the data recorded from this strain. First the extent of variation associated with the *lacteata* gene, second the diversity of other variation that is apparently under quite separate genetic control but which can combine with *lacteata*, and third that of all the curious forms reared in these experiments only *lacteata* has an obvious pattern of inheritance; all other varieties have occurred at too low a frequency to fall into known segregation patterns yet even the rarest are much too frequent to be accepted as mutations.

At the outset we may guess that the presence of the *lacteata* gene may serve to release, in minor genes of the normal complement, expressions that are usually inhibited; the *lacteata* gene may not only control redistribution of the wing pigment but it may also allow variation in the way the redistribution may take. Such variation when combined with round-wing, scale defective and diminished markings will be given the widest scope for expression, and this variation is astonishingly rich, especially when compared with the frequency of wild varieties.

Within *lacteata* it is the shape and intensity of the median band that display the most variation but the principal action of the gene itself is to localise those pigments which in *alternata* are distributed over the different parts of the wing; the pigment of the dark lines and bands of *alternata* becomes concentrated into the median, basal and outer areas. The fact that this redistribution may appear in so many subtle grades suggests that the major gene is qualified by polygenes that control the precise expression. This minor variation, which is called continuous variation, is brought about by the interaction of several pairs of alleles to produce different expressions of one character. Here it is necessary to recognise the two factors that produce *lacteata*, and to distinguish between them and the other genes which can combine with them and which are controlled in the same manner although they are of separate identity.

(C) OCCURRENCE IN NATURE OF LACTEATA

The genetic mechanism that controls *lacteata* is seen to be quite simple, but Dr. Kettlewell tells me that this condition—where the heterozygote of a sex-linked gene is a clearly identifiable phenotype—is extremely uncommon in the animal world, and there is no recorded instance in Lepidoptera.

The aberration *lacteata* must be of excessively rare occurrence in a species that is both plentiful and widely distributed. Indeed the aberration was unknown until 1938 and remained undescribed until ten years later. If *effusa* Müller is

of the same genetic origin then the Vienna specimen described in 1930 would increase to two the total of specimens encountered over the long history of Lepidoptera collecting. And if, as seems possible, the type of *albinata* Romaniszyn is heterozygous *lacteata* then this Polish example described in 1925 would bring the total to only three.

The distribution of the *lacteata* gene therefore may extend from Britain and Denmark to Austria and Poland.

Because the gene is linked to the X chromosome its presence in the heterogametic sex, the female, means that the occurrence of *lacteata* in any population would be readily revealed, and the form is so striking that no collector would easily overlook it. The reason for so few records can lie only in the fact that *lacteata* must be so rare that its frequency is scarcely above mutation rate. That P_1 pairings should be fertile and the gene breed true is astonishing.

PART III. GENETICS OF OTHER PRINCIPAL ABERRATIONS REARED

Table VI shows the distribution of round-wing and scale defective moths in each of the F_2 and F_3 broods; neither form appeared in F_1 .

TABLE VI

F_2	MALE		FEMALE		Total
	<i>Typical alternata</i>	<i>Hetero lacteata</i>	<i>Typical alternata</i>	<i>lacteata</i>	
round-wing	—	—	—	1	1
scale defectives	16	13	15	17	61
all moths reared	91	127	102	113	433

F_3	MALE		FEMALE		Total
	<i>Hetero lacteata</i>	<i>Homo lacteata</i>	<i>Typical alternata</i>	<i>lacteata</i>	
round-wing	9	15	10	4	38
scale defectives	5	52	5	23	85
all moths	73	85	80	81	319

Note: scale defective typical *alternata* include 'effusa-like' moths.

In both broods the numbers of each form reared are significantly different from the values to be expected from normal Mendelian inheritance. No scale

defectives were reared from that part of F_3 that passed diapause and it is possible that accelerated development may be associated. Attempts to pair defective moths were unsuccessful. Round-wing moths emerged in both parts of F_3 but there was only one clearly identifiable example in F_2 .

Both round-wing and scale defective moths display clinal variation and although the extreme condition is obvious there is such a gentle transition from typical *alternata* to the first recognisable varieties that scoring is difficult and sometimes impossible with the live insect. In the case of round-wing the condition is easier to recognise in the male no matter in which genotype of *lacteata* it occurs because the shape of the median band becomes altered, the band becoming narrowed toward the hind margin. In both male and female *lacteata* the round-wing condition is accompanied by marked contraction of the hind wing basal area.

But round-wing is complicated by another character and this is diminishing of the median band. It appears to be mainly a male condition and has occurred more often in *lacteata* both heterozygous and homozygous; but in its extreme condition more females have been reared than males. Again all manner of reduction can be traced and recognition of intermediates is doubtful. It would be attractive to believe that round-wing and tenuifasciata-like were one and the same or linked but the occurrence of examples such as those figured in Pl. 1 figs. 8, 35 and 36 argue against this. The *lacteata* moths in which all markings have been suppressed except the discal dots are sometimes round-winged, when they could be regarded as the double extreme condition, but they may be as normally shaped as the F_2 example (Pl. 1, fig. 17).

The evidence of three generations can be summarised. The characters of round-wing, diminished markings and scale defect appear to be quite separate from each other and from *lacteata*; they can each be graded into a clinal series, the extremes of which have occurred at a very low frequency. The most likely mode of inheritance is that they, like the variation within *lacteata*, result from the cumulative effect of several genes (continuous variation) but that the extreme condition of each is weak and cannot reproduce. These polygenes can affect typical *alternata* but they appear to operate more favourably in the environment of *lacteata* and to reach their maximum expression in the presence of the *lacteata* gene.

ACKNOWLEDGEMENTS

The success of these experiments is due largely to my mother who took complete charge of the livestock, and to my father who regularly collected large quantities of *Galium palustre* L. from a distant meadow. Mr. Goodson of the Tring Museum and Mr. Fletcher of the British Museum (Nat. Hist.) have given me valuable help with infra-specific names and references. I am fortunate to have had liaison with Dr. Kettlewell of Oxford on genetical matters. To Mr. Jeffers of the Forest Research Station, Farnham, I am especially grateful for statistical analysis of brood figures. The excellent plate is the work of Siviter Smith and Company, Ltd., and I am pleased to record my thanks to Mr. P. Siviter Smith for his personal interest and direction of the work.

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KEY TO PLATE I

Epirrhoe alternata Müller, natural size

Figures

- 1 & 2 typical *alternata* female F₁
 3 typical *alternata* male F₂
 4-7 heterozygous *lacteata* males F₂
 8 heterozygous *lacteata* male (tenuifasciata-like) F₂
 9-12 *lacteata* females F₂
 13 & 15 homozygous *lacteata* males F₃
 14 homozygous *lacteata* male scale defective F₃
 16 homozygous *lacteata* male (tenuifasciata-like) F₃
 17 *lacteata* female diminished markings F₃
 18 *lacteata* female diminished markings F₃
 19 *lacteata* female scale defective F₂
 20 *lacteata* female (tenuifasciata-like) F₃
 21 heterozygous *lacteata* male scale defective F₃
 22 homozygous *lacteata* male scale defective F₃
 23 *lacteata* female scale defective F₃
 24 *lacteata* female scale defective F₂
 25 *alternata* variety male scale defective (effusa-like) F₂
 26 *alternata* variety female scale defective (effusa-like) F₂
 27 & 28 heterozygous *lacteata* males scale defective (effusa-like) F₂
 29 *alternata* female round-wing F₃
 30 heterozygous *lacteata* male round-wing F₃
 31 homozygous *lacteata* male round-wing F₃
 32 *lacteata* female round-wing F₂
 33 *alternata* variety female F₂
 34 *alternata* variety female (pseudotristata-like) F₂
 35 & 36 *alternata* variety males (tenuifasciata-like) F₂



Epirrhoe alternata Müller

A NOTE ON THE DISTRIBUTION OF THE ORANGE TIP BUTTERFLY *ANTHOCHARIS CARDAMINES* L., IN N.E. SCOTLAND

By GUY D. MORISON

Ford (1945) considered that the Orange Tip arrived in Britain during the third Pleistocene Interglacial Stage, but as the Donau Glacial Stage, apparently represented in Britain by the Red Crag marine beds, has recently been shown to have preceded the other four recognised glacial stages (Holmes 1965), it may be necessary to alter Ford's name for the stage. On the scanty evidence of his day Meyrick (1928) gave the insect's British distribution as 'Britain to the Caledonian Canal'. Smith (1949) reviewed its recorded distribution in Scotland which he mapped on a slightly modified Watsonian Vice-county System, including for the north-east Vice-counties No. 91, 93 (North Aberdeen), 94, 95 and the west corner of 96. In response to Smith's appeal for more information on distribution, Raeburn (1949) mentioned seeing it in Aberdeenshire, and Richter (1950) gave his records from which he surmised its general distribution in Morayshire. Commander Harper (1953 and 1954) records six males seen in May 1953 between Boat of Garten, Aviemore and Kingussie, Inverness-shire (V.C. 96). Scattered in various entomological journals are a few other records which are not mentioned here as they fall between recorded distribution. Since 1949 there seems to have been no detailed survey published of its Scottish distribution.

Both privately and as an economic entomologist I have had the good fortune during the past 40 years of being able to look for insects in the counties of Kincardine, Aberdeen and Inverness, and all those north of them, including many of the western and northern islands. My observations on the Orange Tip were made casually and I did not catch the insects. From long observation of the males it seemed that each male confined its flight to a rather restricted area, though it flew rapidly, particularly when aided by the wind. Almost certainly I saw more than the single female mentioned below, but specimens are not recorded which I might have confused with those of *Pieris napi* L. that occurred in many of the places listed.

The following records are arranged in the Watsonian Vice-counties:

- Vice-county 91, Kincardineshire. One male by Feughside Inn, Strachan, 17.v.64; one male Banchory, 13.vi.65.
- Vice-county 92, South Aberdeen. One male Tornaveen, 16.vi.42; one female and one male Kemnay 1.vi.47; one male Whitehouse 8.v.55 and one male 29.v.65; one male Birse 26.v.57; one male just emerged from pupa on cultivated *Arabis*, Tarland 24.v.61; one male visiting flowers of *Cardamine pratensis* L. and one male visiting flowers of *Stellaria holostea* L., Birse 2.vi.63; one male Kincardine o'Neil 14.v.65.
- Vice-county 94, Banffshire. One male Dufftown 25.v.46.
- Vice-county 95, Morayshire. One male Grantown-on-Spey 24.v.46; one male Forres 10.v.47.
- Vice-county 96, Easternness. One male Glen Feshie, and two males Nethybridge 25.v.59; one male Kincaig 25.v.64; one male Newtonmore 26.v.64.

The Orange Tip is adapted to living and breeding in rather sheltered places with lush vegetation including some of the larval food-plants. Such places occur scattered over the lowlands fringing the coasts and rivers of the north-east, but they are much more widely separated in the north and north-west. From the

terrain and climate it seems to me that the butterfly should have established itself beyond its recorded distribution in Nairnshire (part of Easternness) to Beaully, Inverness-shire, to Easter Ross and to Golspie in Sutherlandshire. However, recorders of insects are few in May and early June in those regions.

According to its recorded distribution the butterfly reaches its north-west European boundary in Scotland many miles from the north and some miles from the north-west coasts. The geology and climate of the region are summarised by Fraser Darling and Morton Boyd (1964) with emphasis on the diversity of climate and the differences in weather between closely approximated localities.

About ten species of Cruciferae have been recorded, chiefly from England, as larval food-plants. They are lowland plants absent from the plant communities of the Highlands with the rare exception of *Cardamine pratensis* L. (McVean & Ratcliffe 1962), but as some are cultivated ornamentals they may occur sparingly in a few Highland gardens.

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4, Granville Place,
 Aberdeen,
 Scotland.
 15th October 1965.

Larval habit of Anthonomus pedicularius (L.) (Col., Curculionidae).—Towards the end of May I was called to see 'two insects hopping about' on a shelf below a vase containing sprays of hawthorn. The 'insects' proved to be flower-buds which at intervals made jerking movements recalling those made by the well-known jumping bean. I kept these and in July there emerged from each bud a small weevil which Mr. F. D. Buck identified as *Anthonomus pedicularius* (L.), a very common beetle to be freely beaten from hawthorn blossom; in fact so common that probably few coleopterists have even bothered to enquire into its life-history. The spasmodic movements are no doubt a useful device to enable the larva to reach a suitable place to pupate without losing the protection afforded by the enclosing bud. The larva of the sawfly *Heterarthrus aceris* (MacLachlan) enclosed in its disc of sycamore leaf, acts in a similar manner. It would be interesting to know what becomes of these beetles between their emergence in July and their appearance on hawthorn blossom the following spring. Is there a second brood of over-wintering larvae feeding perhaps in the hawthorn fruits?—
 W. H. SPREADBURY, 3, Sherwood Road, Seaford, Sussex, 2nd August 1965.

PROCEEDINGS

8th JULY 1965

A Vice-President, Mr. J. A. C. GREENWOOD, in the Chair

EXHIBITS

Mr. P. A. GODDARD—Photographs of *Metzneria metzneriella* Staint. (Lep., Gelechiidae), taken around *Centaurea* on the railway embankment in Stanmore, Middx., and *Schiffermuelleria tripuncta* Hw. (Lep., Oecophoridae), taken in a hedgerow at Harrow, Middx. The latter moth is very local in its distribution.

COMMUNICATIONS

A paper was read by Prof. H. E. Hinton on 'Sex attractant glands in Lepidoptera', which he illustrated with slides.

22nd JULY 1965

The PRESIDENT in the Chair

EXHIBITS

The PRESIDENT—An example of the fly *Pegohylemyia nudithorax* Ringl. (Dipt. Muscidae) and a living larva of *Cupido minimus* Fuessl. (Lep., Lycaenidae).

Mr. E. S. BRADFORD—A living male *Lucanus cervus* (L.) (Col. Lucanidae) taken in London.

Mr. M. G. MYALL—An aberrant example of *Agrotis exclamationis* L. (Lep., Noctuidae) with markings on the fore wings confluent. The exhibitor thought it might be the aberration *plaga* Steph., and asked if any member could confirm the identification. The specimen is of particular interest as considerable variation has been noted in this species this year. Several have been seen with the heart and dart joined, but nothing as extreme as that exhibited. Other examples have had very faint markings.

Mr. P. A. GODDARD—Photographs of *Argyresthia glaucinella* Zell. (Lep., Yponomeutidae), which is plentiful on some oak trunks in the Harrow area of Middlesex in late June to early July. Also *Telphusa alburnella* Dup. (Lep., Gelechiidae) which is very common on Stanmore Common, Middx., although previously known only from the north of England and Scotland. As the latter species has just been taken in Oxfordshire too, it would appear that the species is increasing its range into southern England. Members were asked to look out for it as this was its emergence period.

COMMUNICATIONS

In reply to a question by Mr. R. F. HAYNES, Mr. M. G. MYALL said that the *Agrotis exclamationis* L. was taken at mercury vapour light.

Mr. S. N. A. JACOBS agreed that the moth shown by Mr. Myall was *Agrotis exclamationis* L. ab. *plaga* Steph.

12th AUGUST 1965

The PRESIDENT in the Chair

EXHIBITS

The PRESIDENT—Part of the plant *Lathyrus japonicus* Willd., from Shingle Street, Suffolk. The plant had both flowers and seed-pods on it. He also exhibited a children's book on Lepidoptera.

Dr. A. M. MASSEE—The plant bug *Loricula pselaphiformis* Curt. (Microphytidae). In this family the males are always fully winged and the females wingless. All stages are found on the trunks of deciduous trees that support epiphytic plants, mosses and the unicellular green alga of the genus *Pleurococcus*, in which the minute eggs are laid. The immature and adult stages are partially predaceous, feeding also on the minute insects which inhabit such conditions. Adults occur mainly in June and July; the males sometimes resting on the stems of grasses adjacent to the trees where the females occur. One species in this family, *Myrmedobia bedwelli* China, is the only endemic plant bug found in the British Isles. It was recorded from the Lizard, Cornwall.

Mr. S. A. WILLIAMS—*Bembidion virens* Gyll. (Col., Carabidae) taken at Loch Maree, Ross and Cromarty, Scotland, 11.viii.65.

Mr. P. A. GODDARD—Photographs of (1) *Narycia marginipunctella* Steph. (Lep., Psychidae), larva and imago. The larva lives in a portable case made in two distinct layers, the inner being roughly triangular in cross section and exposed posteriorly. (2) The common gelechiid moth *Telphusa vulgella* Hübn., taken in the Harrow and Stanmore area of Middx.

COMMUNICATIONS

The northern species of gelechiid moth, *Telphusa alburnella* Dup., was reported by Mr. P. A. GODDARD, to have been found at Park Wood, Hillingdon, Middx. This is in addition to his Stanmore Common record.

A talk was given by Dr. D. Povolny of Brno, Czechoslovakia, on his recent trip to Afghanistan, illustrated by coloured transparencies.

26th AUGUST 1965

The PRESIDENT in the Chair

EXHIBITS

Mr. M. CLIFTON—An example of the very rare cerambycid beetle *Strangalia aurulenta* (F.) taken on the Arundel Park field meeting, 8.viii.65, where it was found flying in one of the beech woods.

Mr. T. R. EAGLES—(1) Plants of *Poterium sanguisorba* L. galled by the mite *Eriophyes sanguisorbae* Nal (*Phytoptus sanguisorbae* Can.). He drew attention to the pubescence caused by the mites. (2) The yellowish moss *Camptothecium lutescens* Hedw.) Brid. Both from chalk grassland near Burham, Kent.

Mr. B. GOATER—(1) A small selection of British Bryophytes to illustrate his talk. (2) Larvae of *Apatele leporina* L. at the end of the fourth instar, *ab ovis* from a female taken in a trap at Bushey, Herts. (3) Three rare grasses from the

rubbish tip at Colney Street, Herts.; *Lolium temulentum* L., *Digitaria sanguinalis* (L.) Scop. and *Echinochloa crus-galli* (L.) Beauv.

COMMUNICATIONS

A talk was given by Mr. B. Goater on 'An introduction to the study of Mosses and Liverworts', which he illustrated with coloured slides.

9th SEPTEMBER 1965

The PRESIDENT in the Chair

EXHIBITS

Dr. A. M. MASSEE—*Cassida hemisphaerica* Herbst (Col., Chrysomelidae) which is widespread throughout southern England and Wales, but is never a common species, and is usually taken singly. It is associated with Bladder Campion, *Silene vulgaris* (Moench.) Garcke (*cucubalus* Wibel) and probably other low plants, and can be found by grubbing around the roots of the plants. It is rarely taken sweeping, and is more common in the West Country than elsewhere.

Dr. C. G. M. DE WORMS—Two male examples of the Giant Wood Wasp, *Sirex gigas* (L.) (Hym., Siricidae), the largest of the British Sawflies, from Clifden, Co. Galway. These were extracted from borings in pine logs which were infested with the species. According to Mr. Benson, the males are much more difficult to obtain as adults than the female. Borings were also shown with a pupa in situ and a male adult cutting its way out. He also exhibited a dried specimen of St. Dabeoc's Heath, *Daboecia cantabrica* (Huds.) C. Koch. He also showed a fibre ball from Connemara which he explained was made by the action of the waves even though it looked like the nest of a mouse. (See also *Proc. S. Lond. ent. nat. Hist. Soc.*, 1955 : 8.)

Mr. A. E. GARDNER—(1) Living examples of *Hydrophilus piceus* (L.) and *Hydrochara caraboides* (L.) (Col., Hydrophilidae), from the north Somerset peat area, 13.viii.65. (2) A series of *Dermestes undulatus* Brahm (Col., Dermestidae) taken in carcasses, Dungeness, Kent, 5.ix.64.

Mr. P. A. GODDARD—(1) A photograph of *Cynaeda dentalis* Schiff. (Lep., Pyralidae), taken in mid-August at Portland, Dorset. This moth looks like a bunch of grass seed-heads when at rest. (2) Photographs of *Oegoconia quadri-puncta* Haw. (Gelechiidae), which emerged from a bunch of *Ononis repens* L. collected from Portland in mid-August, showing the normal form. He also showed the common form in London, with reduced yellow fasciae.

Mr. S. A. WILLIAMS—Two local beetles taken on the Formby sand dunes, Lancs., 15.v.65: *Phytosus balticus* Kraatz (Staphylinidae) taken just above the high water mark in a carrion trap; and *Orthocerus clavicornis* (L.) (Colydiidae) taken at the roots of Marram Grass, *Ammophila arenaria* (L.) Link.

COMMUNICATIONS

Mr. S. N. A. JACONS said that he had seen the balls of fibre, similar to the one exhibited by Dr. de Worms, on the mediterranean coast; and Mr. T. R. EAGLES added that he had received some a few years ago from Majorca.

Dr. A. M. MASSEE reported that the Upleas Marshes had been in danger of being converted into a yachting marina and the sponsors were being supported by the local Rural District Council. Dr. Massee was one of the 90 objectors to the scheme. He said that the result of the enquiry had just been announced, and

the plans had been rejected. The PRESIDENT thanked Dr. Massee for all the work he does for conservation.

Mr. T. R. EAGLES asked if the tortoise beetle shown by Dr. Massee would feed on Sea Campion, *Selene maritima* With., which many botanists thought to be the same species as Bladder Campion. He added that there was a close relative, Nottingham Catchfly, *S. mutans* L., in the area where the beetles were caught. Mr. S. WAKELY said that a number of years ago he had found a *Cassida* larva on Sea Campion.

Euplagia quadripunctaria L. (Lep., Arctiidae) was reported by Mr. P. A. GODDARD to have been seen by him on Hemp Agrimony, *Eupatorium cannabinum* L. while at Portland this year. The only migrant Lepidoptera which he saw were some *Plusia gamma* L. (Noctuidae), *Vanessa cardui* L. (Nymphalidae) and a couple of *Nomophila noctuella* Schiff. (Pyrilidae). Mr. R. F. HAYNES asked if *E. quadripunctaria* L. could be changing its range, and Mr. Goddard replied that he did not know, nor did he know if those he saw were of British or Continental origin.

The PRESIDENT reported that a few years ago he had taken an example of *Tenthredo omissa* (Förster) (Hym., Tenthredinidae) along the Thames at Chiswick, Middx., adding that it is normally confined to East Anglia. During the previous week-end he had found another on Littleworth Common, Berks., on umbelliferous flowers. He asked for members to keep a lookout for it as it appears to be much more common than was thought.

A photograph of the plan of the Dungeness Power Station had been seen by Mr. T. G. HOWARTH, and he asked if the second stage of the building would be within the fence already erected. Dr. MASSEE reported that the second stage of the building would be within the fence, but a third stage is already drawn up. He said that a greater threat to the area at present was the gravel producers in the area, as they were trying to get permission to dig up the shingle.

The meeting ended with coloured slides shown by Mr. M. W. F. TWEEDIE, Mr. C. O. HAMMOND, Mr. and Mrs. T. G. HOWARTH and the PRESIDENT.

23rd SEPTEMBER 1965

The PRESIDENT in the Chair

EXHIBITS

Mr. T. N. D. PEET—The following Lepidoptera: the pupal case of *Nonagria sparganii* Esp. (Noctuidae) from Upstreet, Kent, September 1965; *Rheumaptera undulata* L. (Geometridae) taken at mercury vapour light in Norfolk, 2.vii.65; a male and a female *Mesotype virgata* Hufn. (Geometridae) taken by day in Suffolk, 30.vii.65; an underside example of *Anathes glareosa* Esp. s.sp. *edda* Staud., with the left fore wing marked with yellow paint to illustrate the marking technique used by Dr. Kettlewell on the Shetland expeditions, 1959–1962.

Mr. P. A. GODDARD—Photographs of *Aristotelia ericinella* Dup. (Lep., Gelechiidae), found commonly on heaths in Dorset in late August; and *Ancylis apicella* Schiff. (Tortricidae), a very local species taken on the heath near Wareham, Dorset, in the same period.

Dr. A. M. MASSEE—The mirid plant bug, *Miridius quadrivirgatus* (Costa), a very local Kent insect, being recorded only from Cliffe, Deal, Dover, Isle of Sheppey, Ham Street, Shoreham downs and Swalecliffe. This insect is usually

found within ten miles of the coast, the exception being Shoreham which is situated on the north downs. The species has been recorded from nine English counties and from Glamorgan and Pembrokeshire, but it has not been found in Scotland or Ireland. *Miridius* feeds on various species of grasses, and matures in August.

Dr. B. J. MACNULTY on behalf of Mr. MORRISON—(1) A normal and a black form of *Tribolium confusum* Duv. (Col., Tenebrionidae) bred from a laboratory culture started from a few specimens obtained in stored products. (2) A number of Hemiptera-Heteroptera, Pentatomidae, or near relatives, which he had taken over the past two seasons: *Elasmucha grisea* (L.), common on birch at Tuddenham, Suff., May 1965; *Sehirus dubius* (Scop.), Holmbury St. Mary, Surrey, September 1964; *Aelia acuminata* (L.), Tuddenham, June to September 1964 and 1965; *Eysarcoris fabricii* Kirkaldy, Brook, Kent, 22.viii.64; *Palomena prasina* (L.), Oxwich, Glam., 1.x.64; *Piezodorus lituratus* (F.), Oxshott, Surrey 1965 and Dungeness, Kent, August 1964; *Pentatoma rufipes* (L.), Oxshott, June 1964; *Troilus luridus* (F.), Oxwich, and Burrey Port, Carm.; *Rhacognathus punctatus* (L.), Oxshott, June 1965; *Gonocerus acutangulus* (Goeze), Box Hill, Surrey, 19.ix.65; *Enoplops scapha* (F.), near Castle Martin, Pemb., 29.ix.64; *Coriomeris denticulatus* (Scop) Little Baddow, Essex, 8.xi.64; and *Rhopalus subrufus* (Gmelin), Brook, Kent, June 1964

COMMUNICATIONS

Mr. T. R. EAGLES read an extract from the Society's Proceedings for 1955 which recorded his exhibit of one of the fibre balls from Majorca, similar to those exhibited by Dr. de Worms at the last meeting.

The PRESIDENT reported that the shingle beach at Dungeness was formed during a period of violent storms in the Middle Ages, and the fauna and flora at present on them must have colonised it since then. He then reported that the Council had made Mr. M. Niblett an Honorary Member of the Society.

Mr. S. A. WILLIAMS reported that there was a proposal to make a new London Airport on either the Isle of Sheppey, on the Cliffe marshes in Kent or at Stanstead, Essex. Dr. MASSEE said he would contact the planning authorities at Maidstone and enquire about it.

The meeting concluded with a talk by Dr. A. M. MASSEE on the 'Hemiptera-Heteroptera of the British Isles', which he illustrated with coloured transparencies.

Odontaeus armiger (Scop.) (Col., Scarabaeidae) and *Chlaenius vestitus* (Payk.) and *C. nigricornis* (F.), some comments.—In a recent note (*antea* p. 34) Mr. Buck refers to *Odontaeus armiger* (Scop.) as 'a rare species which occasionally appears at light in the home, but seldom, if at all, at the lepidopterist's light.' I have taken three examples of this beetle in my garden, in 1957, 1962 and 1963, all in a mercury vapour light trap (vide *Ent. Gaz.*, 9 : 101, 13 : 177, 14 : 162).

Dr. MacNulty (*antea* p. 54) notes that *Chlaenius vestitus* (Payk.) and *C. nigricornis* (F.) 'are local and unfortunately seem to be only found singly'. I found the former species, however, in some numbers under stones beside the river Usk in Breconshire in 1964.—Sir ERIC ANSORGE, Timbers, Welders Lane, Chalfont St. Peter, Bucks., 6th October 1965.

A SIMPLE LIGHT TRAP FOR AQUATIC INSECTS

By C. I. CARTER and A. PARAMONOV

Various types of traps have been described for the collection of insects emerging from the water (Mundie 1956, Morgan et al, 1963) but it appears that no literature has been published concerning underwater light traps as Peterson (1949) does not mention them. A simple apparatus was made to see if aquatic insects could be lured to light and trapped under water. Although the trap was tested only twice, it proved very effective in collecting certain insects.

The apparatus consisted of a cylinder nine inches in diameter and two feet long made from perforated zinc sheet, a removable muslin cover being fastened over one end with a piece of cord. The other end had a non-return entrance funnel made from the corner of a polythene bag, the apex having been cut in two directions to give four triangular flaps, thus forming a simple valve. A simple pocket torch functioned as the light source utilising a 0.25 W, 2.5 V bulb and a 1.5 V dry cell battery. The torch was switched on and placed in a glass jar with a good-fitting screw lid, the jar being suspended in wire loops with the torchlight beam passing through the funnel entrance. (See figure.)

The trap, prepared at dusk, was immersed into a pond using a long pole later secured at the water's edge. The following morning the trap was emptied and the catch sorted. As an experimental control, the trap was immersed the next night at the same place but without the torchlight. This procedure was repeated in a large water tank in a garden which contained only a few insects. The results are shown below:

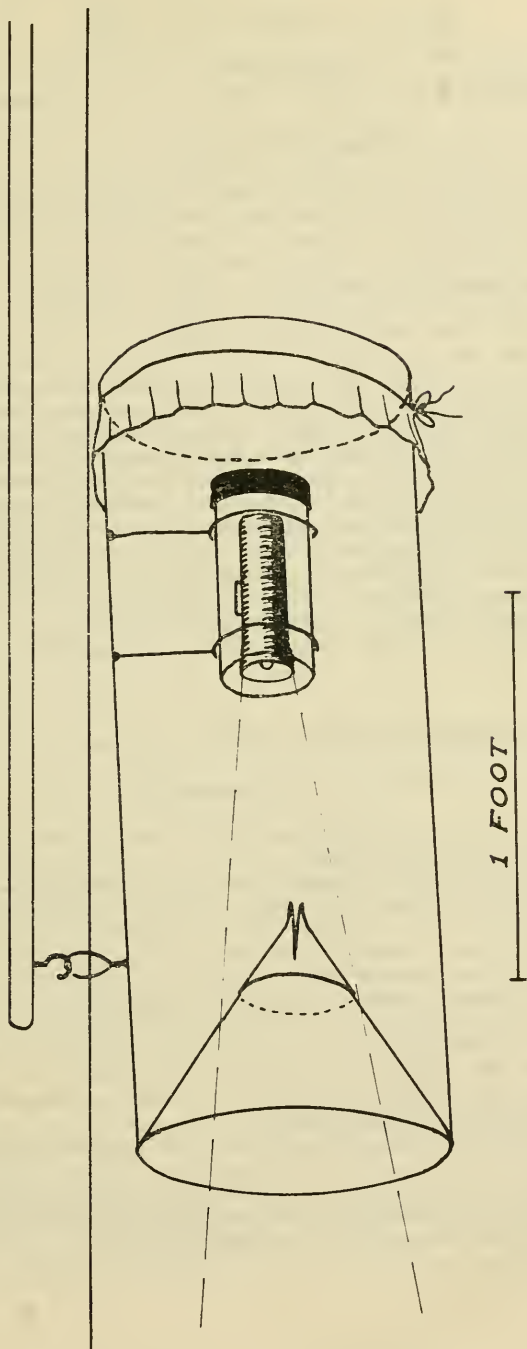
	SMALL POND	LARGE WATER TANK
TRAP WITH LIGHT	22.00-09.00 hrs., 3-4.vi.62 198 Corixidae (Hem.)	23.00-09.00 hrs., 12-13.vi.62 3 Corixidae (Hem.) 5 Dytiscidae (Col.)
TRAP WITHOUT LIGHT	22.00-09.00 hrs., 4-5.vi.62 5 Corixidae (Hem.)	23.00-09.00 hrs., 11-12.vi.62 1 Corixidae (Hem.) 1 Dytiscidae (Col.)

(Times quoted are B.S.T.)

In these trial runs the apparatus was especially effective in obtaining large numbers of Corixidae. It is possible that other aquatic insects can be trapped in this way.

REFERENCES

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- Mundie, J. H., 1956. Emergence traps for aquatic insects. *Mitt. Int. Ver. Limnol.*, 7 : 1-13.
- Peterson, A., 1949. *A Manual of entomological equipment and methods*. Michigan. The Ridgeway, Alton, Hants. 10th August 1965.



Light trap for collecting aquatic insects

FIELD MEETINGS, 1965

FARNBOROUGH and FLEET POND, HANTS—24th April, 1965

Leader: Mr. M. CLIFTON

During the morning the weather was cloudy but bright, and led to an afternoon of cloud broken by sunny periods. Seven members and one visitor attended the meeting which started on a stretch of the Basingstoke canal alongside the airfield at Farnborough. This produced large quantities of the more common insects, amongst which were several larvae, later found to be those of the moth *Pseudoips prasinina* L., the Scarce Silver-lines. Under loose oak bark two members of the party found several specimens of the scolytid beetle *Dryocoetes villosus* (F.). The only other capture of note was that of a male *Dolomedes fimbriatus* (Clerck), a water-loving spider. In the afternoon the party moved to the edge of the Fleet pond, a few miles away. The ground cover here is mainly heather, with a large stand of *Phragmites* at the water's edge. The heather produced another spider, the rare species *Philodromus histrio* (Lat.); but the rest of the material obtained there was common. In the *Phragmites* were several interesting insects and spiders; all confined to the reed bed and all common where they occurred. Several examples of the uncommon weevil, *Thryogenes nereis* (Payk.), were found by breaking the bases of last year's reeds apart. While searching for these, several examples of the spiders *Clubiona phragmitis* Koch and *Aranus cornutus* Clerck were taken. Most of the party collected something of interest, even if one member collected only a little sunburn.

The meeting ended at the leader's house, where tea was provided.

FARNINGHAM WOOD, KENT—9th May 1965

Leader: Mr. J. M. CHALMERS-HUNT

Eleven members attended this meeting which was held in sunny and rather warm conditions, with no wind or rain.

The following Lepidoptera were among those noted: *Anthocharis cardamines* L., a male on the wing; *Celastrina argiolus* L., imbibing mud; *Oidematothorus tephrodactylus* Hübn. larvae on *Solidago virgaurea* L. (Golden Rod); *Hysterosia maculosana* Haw., a single example on the wing; *Pammene argyrana* Hübn., one on an oak trunk; *Eana incanana* Steph., many larvae in flowers of *Endymion non-scriptus* (L.) Garck (Bluebell); *Caryocolum fraternellum* Dougl., a larva on *Lonicera periclymenum* (Honeysuckle). A close search of the Broom (*Sarothamnus scoparius* L. (Wimmer)) failed to reveal the cases of *Coleophora saturatella* Staint., although this species had previously been noted here by Mr. R. W. J. Uffen, who was present at this meeting. The search, however, produced numerous cocoons of *Leucoptera spartifoliella* Hübn.

Mr. P. Goddard observed a few specimens of the hemipteron, *Anthocoris nemorum* (L.).

Mr. T. R. Eagles reported large areas of *Convallaria majalis* L. (Lily-of-the-valley), adding that the plants flower freely here. He was also pleased to find a good example of the fungus, *Polyporus brumalis* (Pers.) Fr.

The Hemiptera-Heteroptera reported by Mr. N. Wilding were: *Palomena prasina* (L.), *Sehirus bicolor* (L.), *Heterogaster urticae* (F.) and *Stenodema laevigatum* (L.).

In the later afternoon some of the party went down to the river Darent, for the purpose of visiting the lake, which it appears was formerly a gravel pit. Examination of a clump of the fungus *Coprinus atramentarius* (Bull.) Fr. produced a species of *Paederus*.

SCRATCH WOOD, MIDDLESEX—5th June 1965

Leader: Mr. B. GOATER

Nine members assembled at Stirling Corner for this meeting, which took place in warm, rather overcast weather, broken in the late evening by a heavy storm.

The first part of the morning was devoted to the bank beside the A.1, and work proceeded against a background of incessant traffic noise. Nevertheless, this bank proved to be about the most productive locality of the day. One of its features was the abundance of *Lathyrus nissolia* L. (Grass Vetchling). A specimen of *Commophila aeneana* Hübn. was found at rest among grasses and shoots of *Senecio erucifolius* L., and larval cases of *Coleophora hemerobiella* Scop. were plentiful here and elsewhere on apple, hawthorn and cherry.

The *raison d'être* of the meeting had been to search for larvae of *Eucnemidophorus rhodactylus* Schiff., one specimen of which was taken at light in 1964, but diligent searching of the rose bushes was not successful. Several plants of *Rosa tomentosa* Sm. were seen among the more abundant *R. canina* L. Both species were just coming into flower.

In the afternoon the party worked rough grassland, some of it marshy, on the golf course; and oaks were beaten for larvae, the most notable being two *Quercusia quercus* L. Those of *Platyptilia pallidactyla* Haw. were plentiful on Sneezewort, and of *Amelia paleana* Hübn. on a variety of herbs. Three male specimens of *Epichnopteryx pulla* Esp. were caught.

Afterwards Mr. and Mrs. T. G. Howarth entertained the party to tea, and to this was added the enjoyment of being shown round their rich and beautiful garden. The lepidopterists were invited to look over the contents of the mercury vapour light trap, and some of them departed with a good harvest from this source.

BLEAN WOODS, KENT—13th June 1965

Leader: Mr. J. M. CHALMERS-HUNT

Although rain was forecast, a dry, warm and windless day was enjoyed by the eight members who worked the Nature Conservancy area of Church Wood.

Among the Lepidoptera noted were: *Argynnis euphrosyne* L., *Lithina chlorosata* Scop., *Oidematomorphus tephradactylus* Hübn., many larvae of *Acrobasis consociella* Hübn., on oak and *Bactra lanceolana* Hübn.

The leader had the great fortune to take a larva in the terminal shoot of *Frangula alnus* Mill. (Alder Buckthorn), from which he reared *Sorhagenia janiszewskae* Riedl. This is the first record, so far as is known, for Kent. The

species has previously been confused with *S. rhamniiella* Zell. (Bradley, *Ent. Gaz.*, 14 : 41-44).

The following Coleoptera were noted by Mr. E. G. Philp, of which the best find was one example of *Triplax lacordairii* Crotch.: *Clivinia fossor* (L.), *Bembidion genei* Kuster s.sp. *illigeri* Netol., *Abax parallelepipedus* (Pill. & Mitt.), *Stenus rogeri* Kraatz, *Lordithon lunulatus* (L.), *Cantharis pellucida* F., *Malachius bipustulatus* (L.), *Anthocomus fasciatus* (L.), *Alosterna tabacicola* (Deg.), *Clytus arietis* (L.), *Pogonochaerus hispidulus* (Pill. & Mitt.), *Zeugophora subspinosa* (F.), *Z. flavicollis* (Marsh.), *Clytra quadripunctata* (L.) and *Chaetocnema concinna* (Marsh.).

WYE VALLEY, MONMOUTHSHIRE—19th and 20th June 1965

Leader: Mr. R. M. MERE

The rendezvous was the Royal George Hotel, Tintern, Monmouthshire. Some 15 members and friends attended the meeting. Lepidoptera were the main interest, but some Diptera were collected. No details of the latter are available at the time of writing.

Several members met informally on the Friday evening, 18th June, and ran mercury vapour lights from portable generators in the woods above Tintern. A few *Eupitheca egenaria* H.-S. were seen, but little else of interest. The weather on this and the following night was rather chilly for the time of year.

The meeting proper started on Saturday afternoon, when the weather was generally sunny, and the woods behind Tintern were worked. These are mainly oak, beech and conifer, in contrast to the woods worked at night. The latter were more varied, with oak, wych elm, small leaved lime, birch, yew, beech, etc. In a ride in a plantation of young pines *Epirrhoe tristata* L. was flying in some numbers, and *Eupitheca plumbeolata* Haw. was also seen. In another area *Cochylidia ruplicola* Curt. was netted, larvae of *Acrocercops brongiardiella* F. were found on oak, and a single larva of *Apamea scolopacina* Esp. was seen. *Bomolocha crassalis* F. and *Cepphis advenaria* Hübn. were noted. Larvae of *Coleophora sylvaticella* J.H.W. appeared in August on seed heads of *Luzula sylvatica* (Huds.) Gaud., these seed heads were collected on this meeting in the hope of rearing *C. sylvaticella* J.H.W.

That evening the party split, some collecting with mercury vapour lights in the woods on the Gloucestershire side of the river Wye, while the majority collected in the woods above Tintern on the Monmouthshire side of the river. The former were the more fortunate, recording several *Drepana harpagula* Esp., as well as further *Eupithecia egenaria* H.-S., neither of which were seen in the Monmouthshire woods on this occasion. Some 70 species of macrolepidoptera were recorded that evening, including *Discoloxia blomeri* Curt., *Abraxas sylvata* Scop., *Stauropus fagi* L., *Atolmis rubricollis* L., and *Ectropis consonaria* Hübn. ab. *waiensis* Richardson.

Most members had to leave early on Sunday, those remaining went their own ways collecting.

Several members stayed at the Crown Inn, Whitebrook, where traps were plugged into the mains on Friday and Saturday nights. Over 100 species of macrolepidoptera were recorded here in the two nights, including *Arctia villica* L. and *Selenia lunaris* Schiff., neither of which were seen elsewhere.

All members were delighted with the wonderful country and scenery, and several expressed a wish for a further meeting to be held in the area.

STORRINGTON, SUSSEX—18th July 1965

Leader: Mr. D. A. ODD

Eleven members of the Society including the President, Mr. R. W. J. Uffen, enjoyed a fine day in this part of unspoiled downland. A large variety of Lepidoptera were seen including numbers of freshly emerged *Aphantopus hyperanthus* L. Other Lepidoptera recorded were: *Maniola jurtina* L., *Coenonympha pamphilus* L., *Ochlodes venata* Br. & Grey, *Plusia gamma* L., *Euphyia bilineata* L., *Sterrhia dimidiata* Hufn., *Agriphila culmella* L., *A. inquinatella* Schiff., *Agapeta hamana* L., *A. zoegana* L., *Lathronympha strigana* F., *Scoparia ambigualis* Treits S. *dubitalis* Hübn., *Pyrausta purpuralis* L., *Pseudoargyrotoza conwayana* F., *Notocelia uddmanniana* L., *Heyda nubiferana* Haw., *Epiblemma costipunctana* Haw., *Horisme tersata* Schiff.

Over 60 species of wild flowers were observed including the rare *Campanula rapunculus* L. (Rampion) and *Gentianella campestris* (L.) Börner (Field Gentian).

During the day a male and a female Common Lizard, *Lacerta vivipara* Jacquin were noted; and a Linnet's nest containing a single egg was found in a low hawthorn bush.

After the meeting the party was entertained to tea by Mrs. Odd at Dingley Dell.

ARUNDEL, SUSSEX—8th August 1965

Leader: Mr. M. CLIFTON

Seven members came to this meeting, collecting over a part of the primeval beech forest in Arundel Park. The weather was clear and sunny at first, but became more and more cloudy as the day went on, producing full cover at about 5 p.m., when the meeting broke up.

Many rare and local beetles were taken, which included *Saprosites mendax* Blackb., *Strangalia aurulenta* F., *Epitrix atropae* Foud., *Diplocoelus fagi* Guér-Mén., *Cerylon fagi* Bris., *Dryophilus pusillus* (Gyll.), *Prionychus fairmairei* Reiche, *Longitarsus quadriguttatus* (Pont.), together with the immaculate form, *L. anchusae* (Payk.), *Anisandrus saxeseni* (Ratz.), *Taphrotychus bicolor* (Herbst) and *Lordithon lunulatus* (L.), together with many common species.

Only four species of heteropterous bugs were found, all common species. Butterflies and moths were also very poorly represented, and again only common species.

Many fine growths of the plant *Atropa bella-donna* L. (Deadly Nightshade) were found, together with *Cynoglossum officinale* L. (Hound's Tongue), which is so common in the area. Two interesting fungi were noted, *Boletus satanus* Lenz. and a species thought to be *Polyporus ovinus* Fr. ex Schaeffer which is not known from this country. Unfortunately the specimen was delayed in the post when sent to the leader for a final identification at the British Museum (Nat. Hist.), and was badly decomposed when received.

All in all, a very interesting meeting.

COLNEY STREET, HERTS.—21st August 1965

Leader: Mr. E. S. BRADFORD

It had been raining, and was still raining, when the only two members who met at the station moved off to the gravel pits. The rain did clear for a time, but in the afternoon there was another deluge and everything was very wet. Nevertheless, the meeting proved most interesting botanically, and the following Bryophytes were noted: *Acrocladium cuspidatum* (Hedw.) Linbd., *Atrichum undulatum* (Hedw.) P. Beauv. c.fr., *Aulaconnium palustre* (Hedw.) Schwaegr., *Barbula convoluta* Hedw., *B. unguiculata* Hedw., *Brachythecium rivulare* (Bruch.) B. & S., *B. rutabulum* (Hedw.) B. & S., *Bryum argenteum* Hedw. c.fr., *B. bicolor* Dicks. c.fr. and c.gemmae, *B. bimum* Brid. c.fr., *Ceratodon purpureus* (Hedw.) Brid. c.fr. and male, *Dicranella heteromalla* (Hedw.) Schf. c.fr., *Fissidens bryoides* Hedw., *Fumaria hygrometrica* Hedw. c.fr., *Leptodictyum riparium* (Hedw.) Warnst. c.fr., *Philonotis fontana* (Hedw.) Brid. *Pohlia delicatula* (Hedw.) Grout male and female, *P. nutans* (Hedw.) Linbd. c.fr., *Polytrichum commune* Hedw., *P. formosum* Hedw. c.fr., *P. juniperinum* Hedw., *P. piliferum* Hedw., *Pottia truncata* (Hedw.) Fürnr. c.fr., *Pseudoscleropodium purum* (Hedw.) Fleisch., *Sphagnum fimbriatum* Wils., *S. palustre* L., *S. plumulosum* Roll., *S. squarrosum* Pers. ex Crome, *Tortula muralis* Hedw. c.fr., *Cephaloziella* sp. and is indeterminate without perianths, *Lophocolea bidentata* (L.) Dum., *L. heterophylla* (Schrad.) Dum. *Marchantia polymorpha* L., abundantly fertile, *Riccardia pinguis* (L.) Gray, *Riccia fluitans* L., *Riccocarpus natans* (L.) Corda.

There were several interesting flowering plants, the most noteworthy being: *Artemisia absinthium* L., *Linaria purpurea* (L.) Mill., *Hydrocharis morsus-ranae* L., believed extinct in Herts., and last seen near Harefield circa 1940, *Valerianella rimosa* Bast. and a Brassica with very long siliquae which awaits determination at the British Museum (Nat. Hist.). It is not native to this country.

Lepidoptera taken or seen included *Pararge megera* L., *Callimorpha jacobaeae* L., *Nonagra typhae* Thunb., *Coenobia rufa* Haw., *Ortholitha chenopodiata* L., *Chiasmia clathrata* L., *Udea lutealis* Hübn., *Platyptilia gonodactyla* Schiff., *Pterophorus pentadactylus* L., *Ancylys badiana* Schiff. (*lundana* F.), *Epinotia nisella* Clerck, *Agonopteryx applana* F.

ASHTREAD, SURREY—29th August 1965

Leader: Mr. R. W. J. UFFEN

A chilly breeze and a heavy dew combined to keep insects inactive and deeply hidden in the herbage for much of the day, so that sweeping proved most unproductive. Beating for larvae was also rather unsuccessful. One tortoise beetle, *Cassida sanguinolenta* Mull. and many *Crepidodera ferruginea* (Scop.) were swept. Only three examples of the handsome trypetid fly *Ictericia westermanni* (Meig.) could be disturbed.

The ten species of butterflies seen included *Thymelicus lineola* Ochs., the Essex Skipper. Among the more unusual finds were cases of a *Coleophora* sp. on the seeds of *Trifolium pratense* L., Red Clover, and many larvae of *Simaethis pariana* Clerck skeletonising the leaves of a young apple tree beneath fine silk webs, rather like those of *Swammerdamia* spp. These larvae were mostly on the upper side of the leaf, and the damage showed strong reticulation patterns from the remaining network of veinlets. Recent webs were much contaminated with frass. The larvae are light yellow-green, dark spotted, like those of *Anthophila fabriciana* L.

The following Coleoptera were shaken from wet rushes and damp grass: *Notiophilus palustris* Duft., *Bradycellus verbasci* (Duft.), *Pterostichus minor* Gyll., *Bembidion obtusum* Serv., *Philonthus splendens* (F.), *P. longicornis* Steph., *P. intermedius* Lac., *Stenus bimaculatus* Gyll., *S. rogeri* Kraatz, *S. flavipes* Steph., *S. brunipes* Steph., *Agriotes pallidulus* (Ill.), *Cryptophagus cellaris* (Scop.), *Omius mollinus* Boh.

The centipede, *Lithobius forficatus* L., and the spider *Pachygnatha clercki* Sund., were also reported.

DUNGENESE, KENT—5th September 1965

Leader: Dr. A. M. MASSEE

This was another of our joint meetings with the Kent Field Club and 15 members attended. After a very wet morning the weather improved in the afternoon and a number of interesting insects and plants were noted.

HEMIPTERA-HETEROPTERA: *Aelia acuminata* (L.), *Chorosoma schillingii* (Schummel), *Dictyonota fuliginosa* Costa, *Acalypta parvula* (Fall.), *Enpicoris vagabundus* (L.), *Stygnocoris fuliginus* (Geoff.), *S. pedestris* (Fall.), *Trapezouotus arenarius* (L.), *Plinthisus brevipennis* (Lat.), *Coranus subapterus* (Deg.).

COLEOPTERA: *Amara aenea* (Deg.), *Dromius linearis* (Ol.), *D. notatus* Steph., *D. vectensis* Rye, *D. melanocephalus* Dej., *Aleochara curtula* (Goeze), *Staphylinus ater* (Grav.), *Sciodrepa watsoni* (Spence), *Sericoderus lateralis* (Gyll.), *Rhyzobius litura* (F.), and the aberration *maura* L., *Meligethes planiusculus* (Heer), *Omosita colon* (L.), *Micrambe villosus* (Heer), *Dermestes undulatus* Brahm, *Trixagus obtusus* (Westw.), *Laria dulcamarae* Scop., *Necrobia violacea* (L.), *Xyletinus longitarsis* Jahnsson, *Cassida hemisphaerica* Herbst, *Otiorrhynchus sulcatus* (F.), *O. desertus* Rosen. ab. *muscorum* Bris., *Smicronyx coecus* Reiche, *S. jungermanniae* (Reiche), *Apion immune* Kirby, *A. striatum* Kirby and *Phytononius suspiciosus* (Herbst).

LEPIDOPTERA: Larvae of *Calophasia lunula* Hufn., on *Linaria vulgaris* Mill., and one larva of *Eupithecia linariata* Schiff. was noted on the same host; *Aspitates ochrearia* Rossi and a moth thought to be *Mirificarma muliella* Zell. on broom; larvae of *Ethnia terminella* Fletcher and *E. bipunctella* F. were found on *Echium vulgare* L. (Vipers Bugloss), the former in a silken tube among the seeds and the latter at rest on the plants.

Plants of interest included: *Salix repens* L. s.sp. *argentea* (Sm.) G. & A. Camus, a beautiful willow with its silvery pubescent leaves; *Galeopsis angustifolia* Ehrh. ex Hoff.; *Silene nutans* L., a likely host of the tortoise beetle *Cassida hemisphaerica* Hübn.; one plant of *Echium vulgare* L. was seen to be galled by the eriophyd mite, *Eriophyes echii* (Cottee), and constitutes a new county record for the mite, which has been recorded only once previously in the British Isles.

A fine specimen of the fungus *Argrocybe praecox* (Pres. ex Fr.) was also noted.

SEASALTER, KENT—19th September 1965

Leader: Mr. K. C. SIDE

This was a joint meeting of the South London and the Kent Field Club. Twelve members met at Faversham Station and then drove to the Old Sportsman Inn at Seasalter. The weather was fine and warm throughout the day.

The morning was spent in working various habitats on both sides of the sea

wall. The most productive were the thick stands of *Scirpus maritimus* L., and *Phragmites communis* Trin. The local mirid bug, *Stenodema trispinosum* (Reuter), was taken by sweeping the reeds, but nymphs greatly outnumbered the adults.

Lunch was eaten on the cockle-shell beach which encloses the Nagden saltings; the afternoon was spent in this area.

The lygaeid bug, *Taphropeltus contractus* (H.-S.), was common at the roots of *Glaucium flavum* Crantz. and a single example of its congener *T. hamulatus* (Thoms.) was also taken. Amongst the many species of beetles collected on the beach and saltings the most noteworthy were: *Trechus fulvus* Dej., *Anthicus floralis* (L.), *A. quisquilius* Thoms., *A. instabilis* Schmidt, *A. angustatus* Curt., *Apion conflens* Kirby and *Baris scolopacea* Germ.

The lepidopterists in the party reported seeing several *Agdistis bennetii* Curt. and a single *Bucculatrix maritima* Staint. Larvae of *Eucosma heringiana* Jäckh. were found in spinnings among the flowers and buds of *Aster tripolium* L., and larval cases of *Coleophora artemisiella* Scott were seen on the seed-heads of *Artemisia maritima* L.

Dipterous larvae were frequent mining leaves of *Suaeda maritima* L. (Dum.). These have yet to be reared, but probably represent a species previously unrecognised in Britain.

OXSHOTT, SURREY—16th October 1965

Leader: Mr. P. C. HOLLAND

About 24 people belonging to the South London Entomological and the London Natural History Societies attended and of these about 20 took tea at the restaurant near the railway station. The day was all that could be desired, sunny and warm.

Perhaps the feature of the day was the many species of bolet. All were plentiful except *Boletus edulis* Bulliard ex Fr., which had almost all been gathered by our continental friends. The spot where *Russula sanguinea* (Bull. ex St. Amans) Fr. used to grow had become overgrown and only one poor example could be found.

The following list of species noted is made up of identifications, mainly in the field, by the leader, Mrs. Gillian Craw, Messrs. T. R. Eagles and H. G. Tunstall besides other members of the party.

MYXOMYCETES identified by the leader, the nomenclature follows S. W. Martin (1949, *North American Flora*, Vol. I, part 1). *Comatricha nigra* (Pers.) Schroeter, *Fuligo septica* (L.) Weber, *Leocarpus fragilis* (Dickson) Rost., *Stemonitis fusca* Roth.

ASCOMYCETES named according to R. W. G. Dennis (1960, *British Cup Fungi*). *Aleuria aurantia* (Fr.) Fuckel (*Peziza aurantia* Pers. ex Fr.), *Claviceps purpurea* (Fr.) Tulasne, *Coryne sarcoides* (Jacq. ex Fr.) Tulasne, *Daldinia concentrica* (Bolton ex Fr.) Ces. et de Not., *Peziza badia* Pers. ex Mérat, *Ustulina deusta* (Fr.) Petrak, *Xylophaera hypoxylon* (L.) Dumortier (*Xylaria hypoxylon* (L.) Grev.).

HETEROBASIDIOMYCETES—TREMELLALES named mostly according to D. A. Reid and P. K. C. Austwick (1963, An annotated list of the less common Scottish Basidiomycetes (exclusive of Rusts and Smuts), *Scot. Nat.*). *Auricularia mesenterica* Dick. ex Fr., *Calocera viscosa* (Pers. ex Fr.) Fr., *Dacrymyces deliquescens* (Bull.) Duby, *Tremella mesenterica* Retz. ex Fr.

HOMOBASIDIOMYCETES—APHYLLOPHORALES, nomenclature follows the authority as used for Tramellales. *Bjerkandera adusta* (Willd. ex Fr.) Karsten (*Polyporus adustus* (Willd.) Fr., *Clavaria argillacea* Pers. ex Fr., *Clavinulopsis helvola* Pers.

ex Fr. (*Clavaria inaequalis* Müll.), *Coltrichia perennis* (Fr.) Murril (*Polyporus perennis* (L.) Fr.), *Coriolus versicolor* (L. ex Fr.) Quélet (*Polystichus versicolor* (L.) ex Fr.) (*Trametes versicolor* (L. ex Fr.) Pilât, *Daedalea quiercina* Fr., *Fistulina hepatica* (Huds.) Fr., *Fomitopsis amosa* (Fr.) (*Fomes annosus* (Fr.) Cooke), *Merulius tremellosus* (Schrader) Fr., *Phaeolus schweinitzii* (Fr.) Patouillard (*Polyporus schweinitzii* Fr.) *Phlebia radiata* Fr. (*Phlebia merismoides* Fr.), *Piptoporus betulinus* (Bull. ex Fr.) Karsten (*Polyporus betulinus* (Bull.) Fr.), *Polyporus cuticularis* (Bull.) Fr., *Polyporus stipticus* (Pers.) Fr., *Polystictus abietinus* (Dickson) Fr., *Sparrasis crispa* (Fr. ex Wulf.) Fr., *Stereum hirsutum* (Willd.) Pers., *Stereum purpureum* Pers., *Thelephora terrestris* (Erhart) Fr., *Trametes rubescens* (Alb. et Schweinitz) Fr.

HOMOBASIDIOMYCETES—AGARICALES, nomenclature follows Dennis, Orton & Hora (1960, *New Check List of Agarics and Boleti*). *Agrocybe semiorbicularis* (Bull. ex St. Amans) Fayod, *Amanita citrina* (Schaef.) S. F. Gray, *A. excelsa* (Fr.) Kummer, *A. fulva* (Schaef.) Secretan, *A. muscaria* (L. ex Fr.) Hooker, *A. rubescens* ((Pers.) Fr.) S. F. Gray, *Armillaria mellea* (Vahl ex Fr.) Kummer, *Boletus badius* Fr., *B. bovinus* L. ex Fr., *B. edulis* Bull. ex Fr., *B. elegans* Schum. ex Fr., *B. holopus* Rost. apud Sturm., *B. pinicola* Venturi, *B. scaber* Bull. ex Fr., *B. subtomentosus* L. ex Fr., *B. testaceosaber* Secretan, *B. variegatus* Sowerby ex Fr., *Cantharellula expallens* (Pers. ex Fr.) Orton, *Clitocybe clavipes* (Pers. ex Fr.) Kummer, *C. ditopus* (Fr. ex Fr.) Gillet, *V. langei* Singer ex Hora, *Collybia butyracea* (Bull. ex Fr.) Kummer, *C. maculata* (Alb. et Schweinitz ex Fr.) Kummer *Coprinus comatus* (Müll. ex Fr.) S. F. Gray, *C. plicatilis* (Curt. ex Fr.) Fr., *Cortinarius anomalus* (Fr. ex Fr.) Fr., *C. flexipes* (Pers. ex Fr.) Fr., *C. semi-sanguineus* (Fr.) Gillet, *Cystoderma amianthinum* ((Scop.) Fr.) Fayod, *Gallerina mutabilis* (Schaef. ex Fr.) Orton, *Gomphidius roseus* (Fr.) Karsten, *G. rutilus* (Schaef. ex Fr.) Lund., *Gymnopilus penetrans* (Fr. ex Fr.) Murrill, *Hebeloma crustuliniforme* (Bull. ex Fr.) Quélet, *Hygrophorus turundus* (Fr. ex Fr.) Fr., *H. hypothejus* (Fr. ex Fr.) Fr., *Hypholoma fasciculare* (Huds. ex Fr.) Kummer, *Inocybe fastigiata* (Schaef. ex Fr.) Quélet, *Laccaria amethystea* (Bull. ex Mérat) Murrill, *L. laccata* (Scop. ex Fr.) Cooke, *Lacrymaria vetulina* (Pers. ex Fr.) Konrad et Maulanc, *Lactarius hepaticus* Plowright apud Boudier, *L. mitissimus* (Fr.) Fr., *L. pubescens* (Fr. ex Krombholz) Fr., *L. pyrogalus* (Bull. ex Fr.) Fr., *L. quietus* (Fr.) Fr., *L. rufus* (Scop. ex Fr.) Fr., *L. subdulcis* (Pers. ex Fr.) S. F. Gray, *L. torminosus* (Schaef. ex Fr.) S. F. Gray, *L. turpis* (Wein.) Fr., *L. vietus* (Fr.) Fr., *Lepiota cristata* (Fr.) Kummer, *Merasmium androsaceus* (L. ex Fr.) Fr., *Melanoleuca melaleuca* (Pers. ex Fr.) Murrill, *Mycena epipterygia* (Scop. ex Fr.) S. F. Gray, *M. galericulata* (Scop. ex Fr.) S. F. Gray, *Paxillus involutus* (Batsch ex Fr.) Fr., *Pleurotus ostreatus* (Jacq. ex Fr.) Kummer, *Russula atropurpurea* (Krombholz) Britzelmayr, *R. betularum* Hora, *R. emetica* (Schaef. ex Fr.) S. F. Gray, *R. fellea* (Fr.) Fr., *R. fragilis* (Pers. ex Fr.) Fr., *R. nigricans* (Bull. ex Mérat) Fr., *R. ochroleuca* (Pers. ex Secretan) Fr., *R. sanguinea* (Bull. ex St. Amans) Fr., *R. sardonica* Fr., *Tricholoma argyraceum* (Bull. ex St. Amans) Gillet, *T. fulvum* (DC ex Fr.) Saccardo, *T. portentosum* (Fr. Quélet, *T. terreum* (Schaef. ex Fr.) Kummer, *T. ustale* (Fr. ex Fr.) Kummer, *Tricholomopsis rutilans* (Schaef. ex Fr.) Singer.

HOMOBASIDIOMYCETES—GASTEROMYCETES named according to Moser (1955, *Kleine Kryptogamenflora von Deutschland, Oesterreich und der Schweiz*). *Lycoperdon perlatum* Pers., *Scleroderma aurantium* Vaillant ex Pers.

For names not included in the works above cited, recourse has been made to Michael & Hennig (1960, *Handbuch für Pilzfreunde*, vol. 2, Nichtblätterpilze), and to Rea (1922, *British Basidiomycetae*).

FREDERICK JOHN COULSON

1878-1965

Mr. F. J. Coulson first became attracted to entomology at the age of 15, first by Lepidoptera, and subsequently by Coleoptera, though he never lost his interest in the former. Like most coleopterists of his day he also studied Hemiptera, including the more difficult Homoptera. It is perhaps less well-known that his attentions were also caught by Diptera and other orders. All natural history subjects held an interest for him, but it was as a very competent coleopterist that most of us will remember him.

It was with the G.P.O. Engineering Department, clerical section, that he spent his working life, entering this section of the Civil Service by way of competitive examination, eventually retiring after 46 years in this important branch of public service.

In the field Coulson was indefatigable and he could walk the feet off many a younger man to get to particular spots where he knew the collecting was likely to be good. His field work was excellent and his experience wide. The young entomologist found him always willing to help in the determination of insects, introduction to the correct literature, guidance in field work and in setting and mounting techniques. A valuable man on field meetings where more of his time was spent in encouraging the tyro than in collecting for himself. The present writer has cause to be very grateful indeed to him, and his great friend the late Mr. S. R. Ashby, who between them guided the writer during that critical period when he doubted his ability to master the subject.

It was in 1909 that he joined our Society and became an enthusiastic South London member, regularly attending both indoor and field meetings, serving on the Council and contributing to our Proceedings and Transactions. He was our President in 1937, and he succeeded Mr. Ashby as curator in 1945, an office he filled with a diligence that was characteristic of the man. The collections were always in order, always available, and he was always there to advise and help the enquirer. He relinquished this office in 1954 enriching our collections during his ten years of office with much of his own material. The Council appointed him an Honorary Member in 1960, a distinction he richly deserved.

During the 1930s he spent much time and derived considerable pleasure determining the insect remains in the pellets of the Little Owl for Miss Hibbert-Ware of Girton for a book she was writing on the bird.

Following a major operation at the age of 80 he was, much to his disappointment, unable to attend the indoor meetings or join the field meetings which had given him so much pleasure. He died at the age of 87 on 6th May 1965.

His collection of Lepidoptera, Hemiptera and Hymenoptera he left to the Society together with his library and notebooks. The well-used and carefully annotated copy of Joy indicates how carefully he recorded the changes in our beetle fauna, and in itself is of no small value to our book shelves. His collection of Coleoptera he left to Mr. A. E. Gardner, his successor as our Curator.

Though he was unable to attend our meetings in the last seven years or so his demise is a sad loss to us. Many will remember him best in the field; trilby hat squarely on his head, an old bag slung from his shoulder, pockets bulging with tubes and boxes, his pipe clenched firmly between his teeth as he swung his sweeping bag across Bookham Common with an efficient rhythm that lasted throughout the day.

F. D. BUCK.

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The South London Entomological
and Natural History Society

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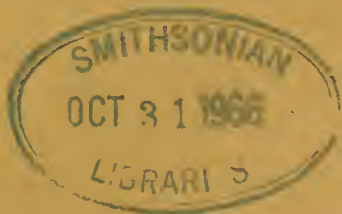
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97-



MEETINGS OF THE SOCIETY

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AN INTRODUCTION TO THE STUDY OF MOSESSES AND LIVERWORTS

By B. GOATER, B.Sc.
(Read 26th August 1965)

The Bryophyta are a somewhat neglected Phylum of small green plants—few of them exceed 10cm in length—but, given certain basic equipment with which to study them, you will find them a particularly fascinating group. Moreover, they tend to be at their best at entomologically dull times of year, from autumn till spring.

Being small, they are easy objects to gather and store; the usual custom is to place gatherings in envelopes of folded newspaper upon which the essential data can be written in the field, to dry them thoroughly on reaching home and then to transfer them to a more permanent labelled envelope which can be filed away in a card index cabinet (Fig. 1). My own envelopes are folded to fit comfortably into a shoe box, and while I dare not actively encourage my wife in the purchase of more pairs of shoes, when she does so, I know I shall have that much extra room for my bryophytes. When the time comes to study them in more detail, a small fragment is thoroughly wetted and placed under a microscope, when it will have recovered completely to reveal all its fine structure. This brings me to the major snag in bryologizing—a good microscope is essential, for though many of our 650 mosses and 300 or so liverworts can be named in the field, using a $\times 15$ hand lens, many have to be examined under high power, and all gatherings should be checked microscopically.

The majority of plants have a life cycle comprising two alternating generations—one haploid, reproducing sexually by means of gametes, and one diploid, reproducing asexually by spores (Fig. 2). In some the two generations

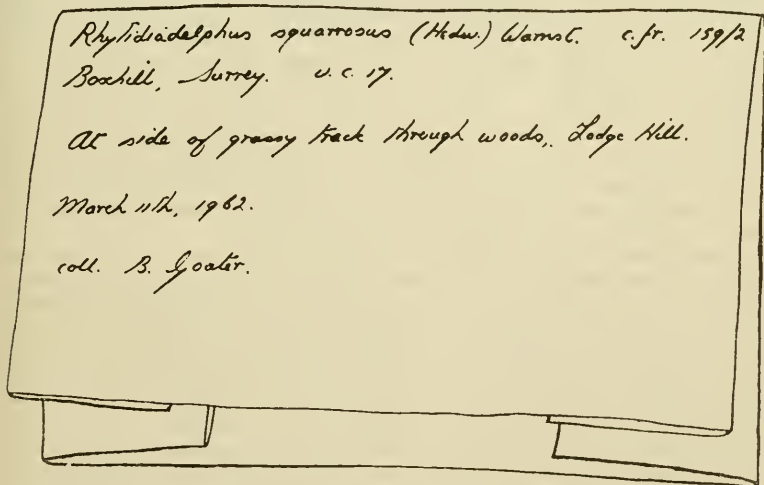


Fig. 1. Bryophyte packet

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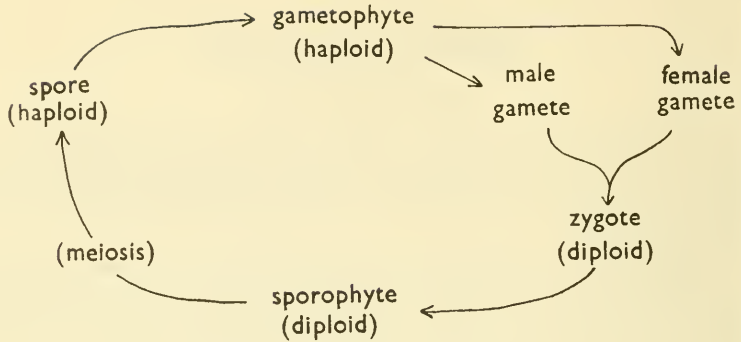


Fig. 2. Alternation of Generations.

are morphologically alike and differ only in cytology and in the kind of reproductive organs they have; in others the generations are dissimilar and either the gametophyte or the sporophyte may be the larger and more conspicuous. In the flowering plants and ferns it is the diploid sporophyte which is the green plant and the other generation is inconspicuous. In the bryophytes, however, it is the haploid generation which is the green plant, and the sporophyte, when formed, consists of a capsule held aloft on a slender stalk, and is parasitic, or partly so, upon the gametophyte. This fact is an important one for the student to bear in mind and I shall have more to say about it later.

Many bryophytes are not known to produce a sporophyte or do so very rarely, and all have great powers of regeneration from small fragments of gametophyte tissue. Most readers have seen, though they may not have recognized, the flat cushions of *Campylopus piriformis* (Schultz) Brid. on the Surrey heaths, with many detached leaves scattered over the tops of the cushions. These get dispersed and readily give rise to new plants. Other species have more elaborate methods of vegetative reproduction by means of gemmae, which may be produced in special receptacles on the leaves, in the leaf axils, on the rhizoids, or on special branches. *Aulacomnium androgynum* (Hedw.) Schwaegr., *Tetraphis pellucida* Hedw., *Ulota phyllantha* Brid. and *Marchantia polymorpha* Linn., the last a large thallose liverwort, are good examples. (Fig. 3). Several investigators have shown that minute pieces of almost any part of bryophytes can be induced to grow into complete plants. It has even proved possible to produce diploid gametophytes by stimulating the growth of fragments of seta.

Sexual reproduction in bryophytes involves the production of flagellated male gametes which require a film of water in which to swim to the female gamete. This does not necessarily mean that these plants are restricted to wet habitats since dew or rain will suffice, and some seem to get away without sexual reproduction at all; but it is true to say that they are more abundant in more humid climates. There is another reason for this; they seldom have any proper water-conducting tissue, so they can only attain large size where water is abundant. Conversely, rupestral mosses are either minute or have a cushion- or mat-forming habit, such growth forms absorbing water like a sponge. They frequently show other devices for restricting water loss in drier habitats. Many present a very different appearance in the wet and dry states owing to a different posture

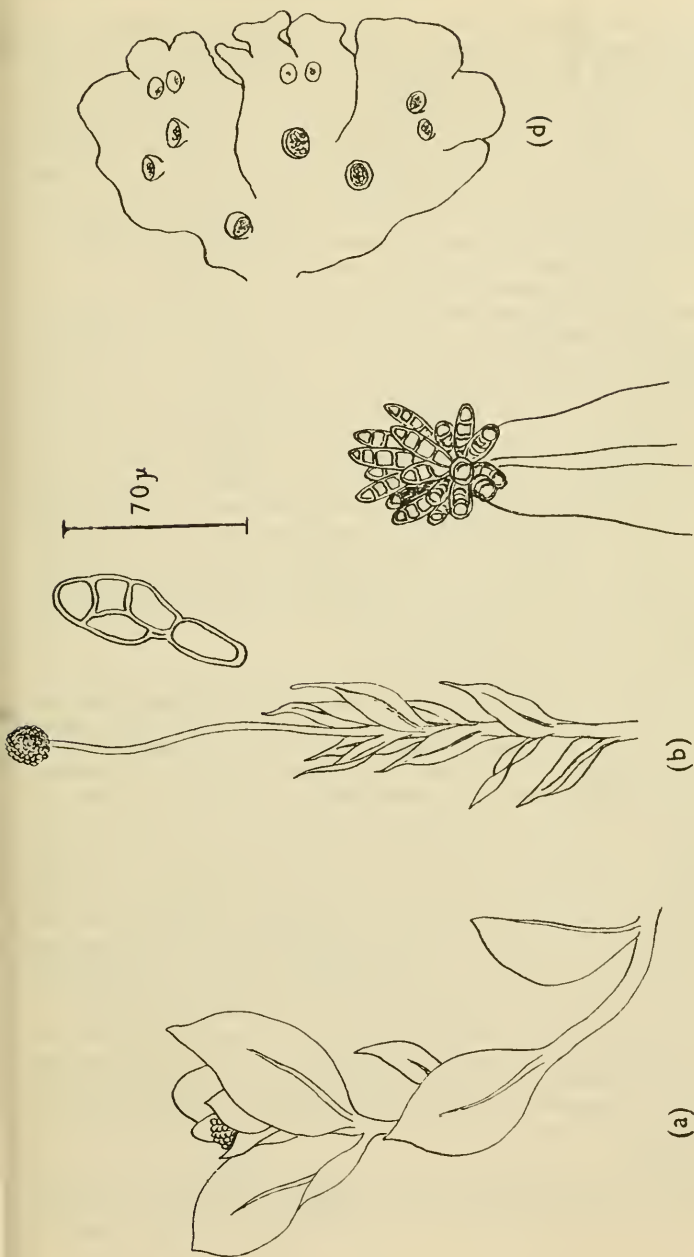


Fig. 3. Gemmae. (a) gemma 'flower' of *Tetraphis pellucida*. (b) gemmiferous shoot of *Aulacomnium androgynum*, and enlarged gemma. (c) part of thallus of *Marchantia polymorpha*, with gemma cups. (d)

of the leaves. This incidentally can cause a lot of confusion to beginners trying to recognize bryophytes in the field; they have to learn each plant twice, as it were. Thus the long, narrow, wavy leaves of *Tortella tortuosa* (Hedw.) Limpr. spread out from the stem in the moist condition, but are greatly curled and contorted when the moss is dry. One of the most common features is the possession of hyaline hair points on the leaf tips, which give the cushions of *Grimmia pulvinata* (Hedw.) Sm. and the mats of *Tortula muralis* Hedw. on walls a hoary appearance. Mosses are also very resistant to drying and many will recover after long periods of desiccation. Liverworts are much less happy in dry places—one notable exception is the species of *Frullania* which form reddish patches on the bark of trees, but even these prefer dampness in the atmosphere.

So far I have talked about bryophytes without attempting to distinguish between mosses and liverworts. While in practice it is usually not difficult to decide, one reaches one's conclusions by observing a sum of characters rather than looking for any single feature. Indeed it is said that the only absolute criterion for separating the two groups is the fact that liverwort rhizoids are unicellular and those of mosses are uniseriate filaments. Rhizoids are hair-like organs of attachment to the substratum and are analogous to the roots of higher plants. In practice, though, there are more accessible characters to go upon. Some of these are provided by the gametophyte. All thallose bryophytes are liverworts; nearly all bryophytes whose leaves are lobed or subdivided are also liverworts (Fig. 4); nearly all leafy liverworts have their leaves arranged in two ranks with or without a third rank of minute leaves on the under side (Fig. 5); most mosses have their leaves arranged spirally on the stem and those which are distichous can be recognized as mosses by other considerations. All bryophytes with nerved leaves and all those with very elongated leaf cells (10 to 15 times as long as broad) are mosses (Fig. 6).

In the sporophyte of liverworts, the seta which bears the capsule aloft is soft and fleshy and only elongates when the capsule has ripened. When young, the sporophyte is usually enclosed by a tubular 'perianth' of gametophyte tissue. In mosses, the seta is tough and wiry and elongates during the early growth of the sporophyte, long before the capsule has developed, and there is no perianth. Liverwort capsules split when ripe by means of four valves and the spores are discharged all at once, often with the aid of hygroscopic elaters (Fig. 7); in mosses, the mouth of the capsule is covered at first by a lid, and, when this is shed, the orifice is guarded by a peristome which opens and closes with changes in atmospheric humidity—a much more elaborate arrangement. I should add that a few small mosses lack a peristome, and this may be an important character for distinguishing them from closely related species. In cleistocarpous mosses there is not even a definite lid, and the capsule splits irregularly on discharge of the spores. However, most of these exceptional species are inconspicuous and the beginner is usually fairly experienced by the time he encounters them.

There are three small groups which do not rest easily among either liverworts or mosses: the large genus of bog mosses, *Sphagnum*, known to you all, and the rupestral genus *Andreaea*, are usually put with the mosses even though they have peculiar and unique structural features; likewise the thalloid *Anthoceros* is placed with the liverworts, though there is perhaps an even stronger argument for separating this.

Though most of the formal characters for naming bryophytes are microscopic, some macroscopic features provide valuable assistance; the habit of the plant

[continued on page 10

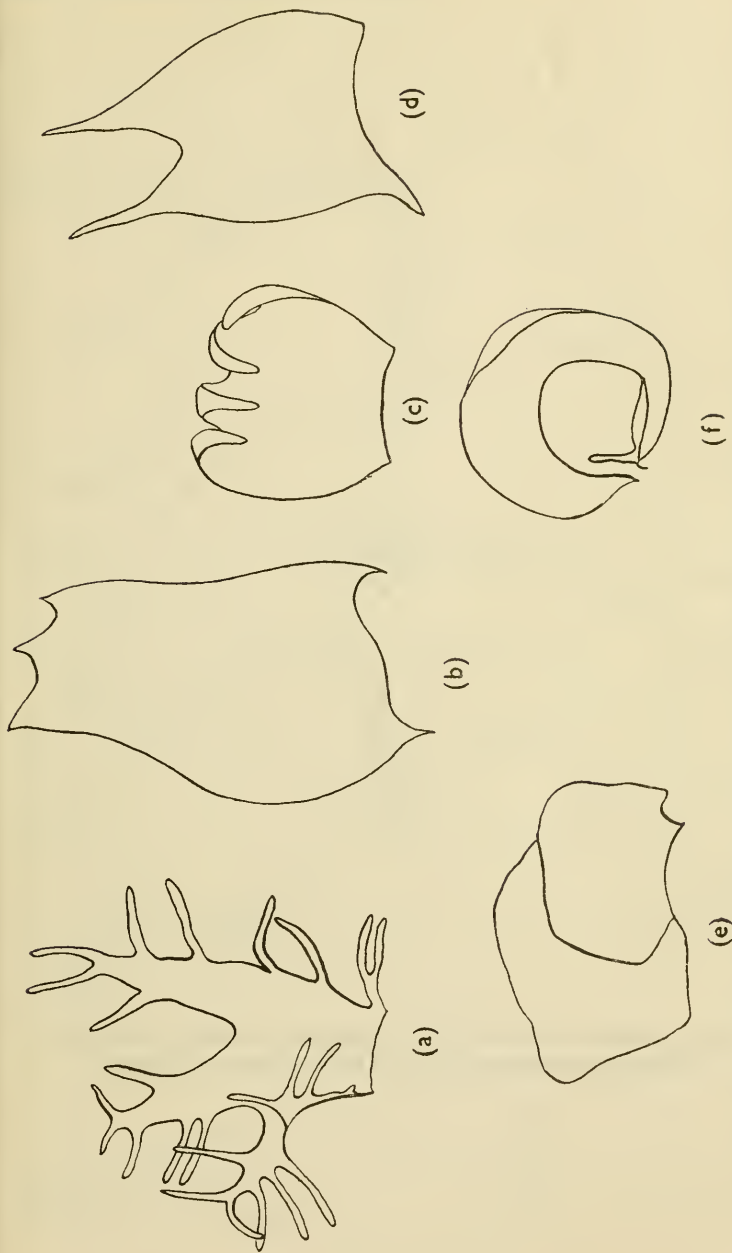


Fig. 4. Liverwort leaves, (a) *Ptilidium ciliare*, (b) *Bazzania trilobata*, (c) *Lepidozia reptans*, (d) *Lophocolea cuspidata*, (e) *Scapania undulata*, (f) *Frullania dilatata*.

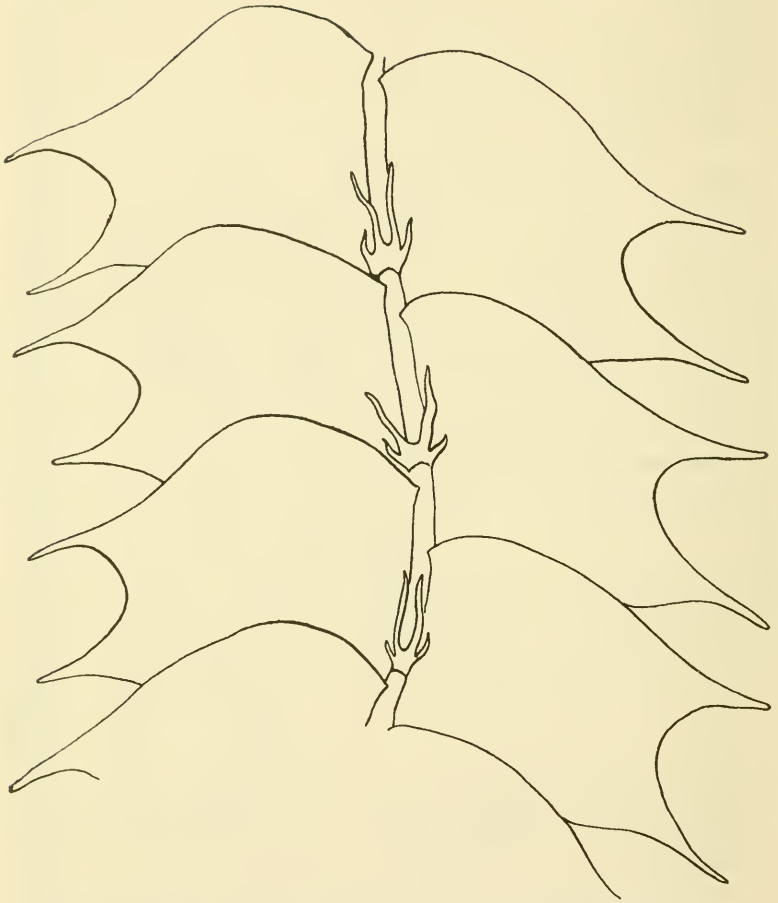
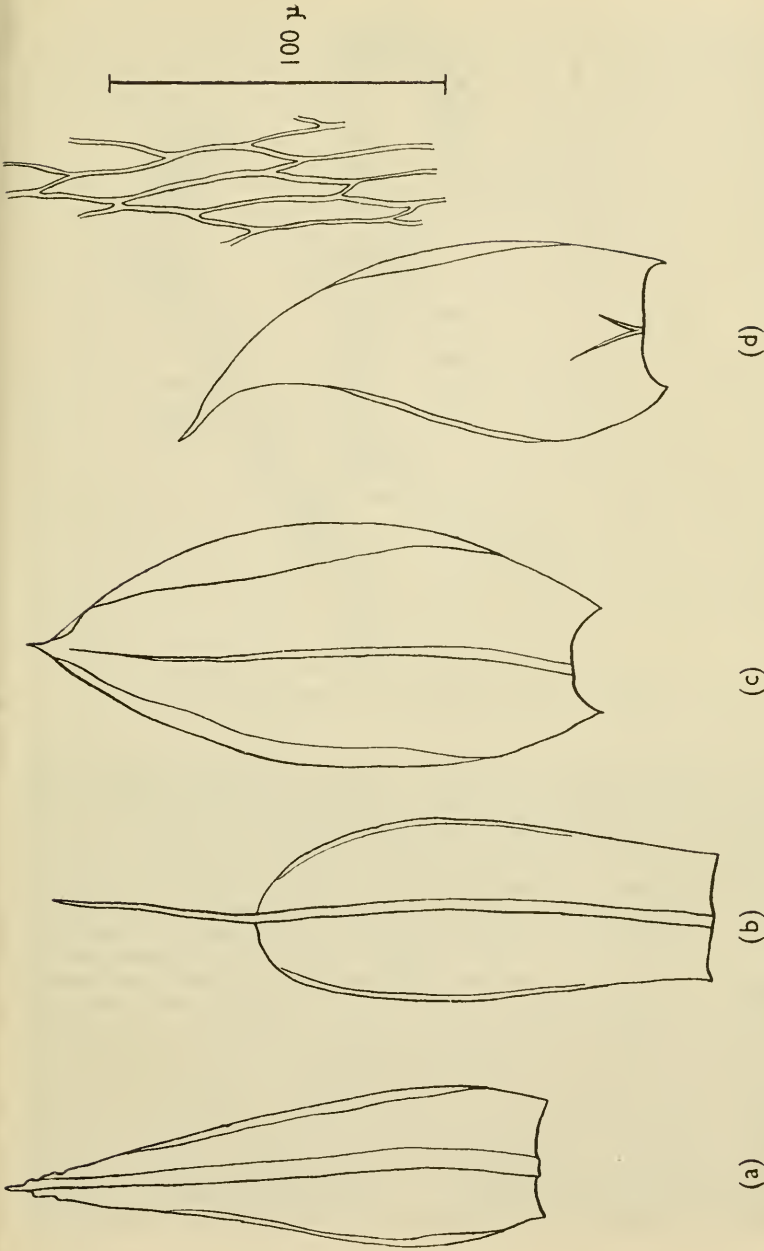


Fig. 5. Underside of part of shoot of *Lophocolea cuspidata* showing two-ranked leaf arrangement with third rank of minute underleaves.



(a) *Ceratodon purpureus*, (b) *Tortula muralis*, (c) *Funaria hygrometrica*,
(d) *Hypnum cupressiforme*, leaf and cells from region of mid-leaf.

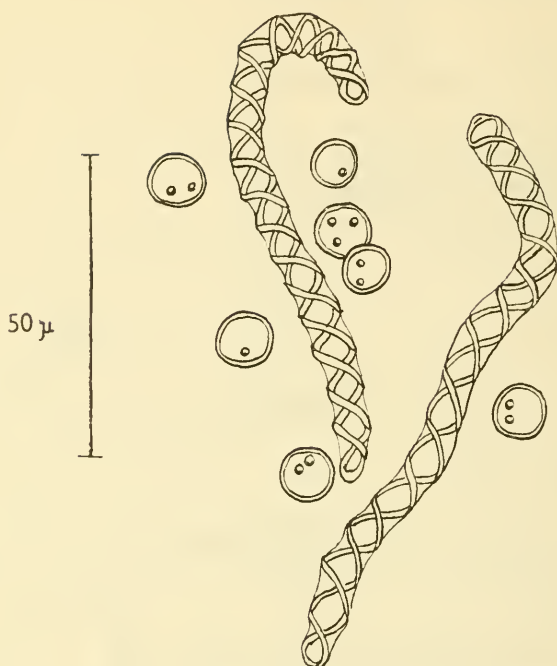


Fig. 7. *Lophocolea heterophylla*, spores and elaters.

both wet and dry, its colour and so on. Size is not to be relied upon. The most commonly used microscopic characters are leaf shape, and the shape and size of leaf cells. These are easily observed when a few leaves from near the middle of the stem are carefully removed from soaked material and mounted on a slide. It is useful to have a calibrated graticule inserted in the eyepiece of the microscope to facilitate measurement of cell size. In a few critical cases one has to cut thin sections of leaf or stem. The technique is not so difficult as one might expect; a few shoots held down on a slide in a puddle of water and minced with a sharp razor will nearly always provide a few good sections amongst a mass of useless bits. Sometimes important characters are to be found in the capsule (when it is produced); in the genus *Bryum*, for instance, species often defy determination unless ripe capsules are present, and this can be very frustrating.

There are a few taxa which present especial difficulty for the student, and I am going to mention two, the *Bryum erythrocarpum* complex and the *Plagiothecium denticulatum/silvaticum* complex. The first is a group of small, soil-inhabiting mosses which produce coloured gemmae on their rhizoids. They are distinguished chiefly by small differences in colour, shape, cell size and surface texture of these gemmae. You may consider it significant that several different 'species' may be found in the same field, or mixed in the same tuft. The *Plagiothecia* are woodland mosses and are distinguished by their leaf shape, cell size

and especially by the shape of the decurrent leaf bases. Now anyone who subscribes to a theory of evolution will expect to find taxa in the act of undergoing speciation, whose differences are slight—one could mention herring gulls, certain land snails, Galapagos tortoises and spotted orchids—but these organisms are diploid and the phenotypes of the individuals and hence the character of the whole populations, are determined by the interaction of two sets of chromosomes, one maternal and one paternal. Moreover, one expects to find some degree of isolation between different populations below the species level. In these bryophytes, the gametophytes are haploid and so there can be no heterozygotes, and differences such as I have cited could be due to difference in single genes. I have said already that they often grow together. I am very much a beginner myself, but it seems to me that much more knowledge of their genetics and breeding behaviour is required before one dare designate species on such small criteria.

Finally, a word about the distribution and ecology of British bryophytes, especially those which you may expect to find near London. Those who argue about the origins of the Lepidoptera, *Xanthorhoe biriviata* Borkh. or *Hydraecia hucherardi* Mab. in Britain may like to ponder the case of *Tortula stanfordensis* Steere, discovered in 1958 near the Lizard and known elsewhere only from the campus of Stanford University in California. It is evidently spreading in Cornwall, a fact which points to fairly recent introduction. It has been suggested that the moss came in with two Pecan Nut trees believed to have come from California, and planted in Gulval in 1927, or with Californian bulbs. A more lighthearted theory is that it arrived on the boots of one of Stanford's professors who visited the Lizard peninsula! The case of *Platygyrium repens* B., S. & G., found on trees in a wood in Berkshire, is more obscure, though *Aongstroemia longipes* (Somersf.) B., S. & G., found last year (1964) below a dam near Killin, Perthshire, probably came on Swedish equipment used in building the dam.

Like lichens, bryophytes are very intolerant of atmospheric pollution, and very few species can be expected in the heart of London. Two which are common, however, are *Bryum argenteum* Hedw. and *Tortula muralis* Hedw.; the former is abundant in cracks in pavements and similar habitats, the latter on walls. On waste ground where there is plenty of old ash, *Ceratodon purpureus* (Hedw.) Brid. and the textbook moss, *Funaria hygrometrica* Hedw., are likely to be found. If your home is on London Clay, you may be troubled with straggling patches of *Brachythecium rutabulum* (Hedw.) B. & S. in your lawn, and as one gets out into the suburbs the number of species one is likely to encounter gradually increases. At Elstree, in Herts., we have recorded just over 50 species in a school grounds. Several of these are abundant on the clay soil, and we have recorded no fewer than 18 species from the sandstone parapet of an old bridge; seven of these are small mosses of the genus *Barbula*.

Calcareous habitats are good for bryophytes and one can obtain a very sound introduction to the group by paying a visit to Boxhill, where close on 100 species can be encountered in a day's hunting. The following are just a few of the more noteworthy: *Thannium alopecurum* (Hedw.) B. & S. forms loose balls on the floor of chalky woodlands and is also found attached to the soil and to tree roots, and *Ctenidium molluscum* (Hedw.) Mitt. occurs on the open downland where the ground is broken, in golden green patches. Its branches bear many small tightly curled leaves. Several robust species occur on sheltered, north-facing escarpments, particularly under scrub: *Rhytidadelphus triquetrus* (Hedw.) Warnst., *R. squarrosus* (Hedw.) Warnst. and *Neckera crispa* Hedw. are beautiful objects, and all may be seen here. The trunks of trees carry quite an abundant

flora which includes *Isoetecium myosuroides* Brid., patches of which have been likened to the astrakhan collar of a millionaire's coat. Possibly the most interesting microflora occurs on detached lumps of chalk on the steep wooded banks above the river Mole—an association of the minute mosses *Seligeria paucifolia* (Dicks.) Carruth., *Fissidens minutulus* Sull. var. *tenuifolius* (Boulay) Norkett and the recently discovered *Tortella inflexa* (Bruch) Broth. Other distinct communities occur on banks, on rotting logs, walls, and in and beside the river Mole.

After visiting Boxhill, the budding bryologist can do no better than to make an excursion to Oxshott, where the heathland and bog will yield fewer species, but several new ones. Here, in the drier parts, *Polytrichum juniperinum* Hedw., *P. piliferum* Hedw., *Pleurozium schreberi* (Brid.) Mitt. and *Hypnum cupressiforme* Hedw. var. *ericetorum* B. & S. are sure to be found. In wetter places, *Sphagnum* spp. are evident, and it is worth searching among their robust shoots for the trailing strands of several small liverworts. *Polytrichum commune* Hedw. and *Aulacomnium palustre* (Hedw.) Schwaegr. are other characteristic species.

Another interesting area which is in reach is the stretch of sandstone rock outcrops in east Sussex where an extraordinary number of small liverworts occur. Rocks I have seen near East Grinstead, in a valley overgrown with rhododendrons, are carpeted with a patchwork of these plants, each its own shade of green, red or brown.

On the north side of London, south Herts. is noted for three small *Dicranum* spp. which occur in some of the oak woods known also for the elusive moth, *Dicycla oo* L., but in general there are fewer suitable habitats for interesting species than in Surrey and Sussex.

Wherever one lives, however, one is constantly coming across new finds, and often these turn out to be new vice-county records. At this moment, the British Bryological Society is engaged on the production of an Atlas of British Bryophytes on the same lines as that monumental volume on vascular plants by the Botanical Society of the British Isles, and in connection with this, there is a great deal of work to be done recording 10km squares. The amateur can do much that is valuable by growing bryophytes in culture—I have already hinted at the plasticity of some species and the need for genetic study, and problems in these fields can only be elucidated in the laboratory or greenhouse. I have also tried to show that many bryophytes demand very precise ecological conditions, judging by the habitats where they normally grow, and study in culture will help us to understand the reasons for this. One is then led on to a consideration of bryophyte physiology, a topic in which unsolved problems abound. In short, the bryophytes are plants with a great aesthetic appeal to the naturalist, and at the same time a challenging group for detailed study.

In concluding, I wish to say how grateful I am to Mr. J. H. G. Peterken, President-elect of the British Bryological Society, and to Mr. M. W. F. Tweedie, for their valuable help.

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22, Reddings Avenue,
Bushey, Herts.
30th January 1966.

An unusual case of bee sting. An interesting case of multiple stings by a swarm of bees, *Apis mellifera* L. (Hym., Apidae), was encountered during July 1965.

On 5th July, three male Springer Spaniels, one five years old and the other two each one year old, were stung by a swarm of Caucasian bees. Forty-eight hours later the owner noticed that all three dogs were stiff, particularly in the hindlegs; each also had a slight temperature. The next day the oldest dog was worse with a temperature of 103°F (normal 101.5°F), dull eyes and loose skin. The other two were less stiff and their temperature was normal. A veterinary surgeon was called and within a week only the oldest dog still showed faint signs of stiffness.

The case is of interest in that bee stings are, traditionally, supposed to relieve arthritis, rather than cause it. Barker, S. A. (1964, *Bee World*, 3: 125) has shown this to be related to the enzyme hyaluronidase in bee venom breaking down the crystals of hyaluronic acid which accumulate in arthritic joints, though the mechanism is not fully understood. In this case however, there is no doubt that arthritis-like symptoms followed the bee stings and it would be interesting to hear if other entomologists have ever encountered such a phenomenon. It should be mentioned that the owner of the dogs, who also suffered from a large number of stings, showed no arthritic symptoms.—J. E. COOPER, Quantocks, New Wokingham Road, Crowthorne, Berks., 13th December 1965.

KENTISH GLORY MOTH, *ENDROMIS VERSICOLORA* L.
(LEP., BOMBYCIDAE), IN ABERDEENSHIRE

By GUY D. MORISON.

Having found a fertilized female Kentish Glory moth in perfect condition on 1.v.55 at Logie Coldstone on *Calluna* I took her to my garden in Aberdeen where she was caged to oviposit on leafy twigs of *Betula pubescens* s.sp. *pubescens* Ehrh. (classification of Clapham, Tutin & Warburg, 1962). The variations in temperature and relative humidity in the cage were probably quite close to those she would have experienced in the open at Logie Coldstone. She had almost certainly laid some eggs before capture, but before dying on 20.v.55 she laid 64 fertile eggs on the birch twigs. She laid a batch of 12 eggs on 3rd May and the rest in batches at intervals till just before her death. Ten of the first batch of eggs hatched on 31st May and the other two by 2nd June. The eggs were whitish, somewhat translucent when newly laid and then turned yellow and finally purplish-brown in colour within 2 to 3 days. Their speed of darkening seemed correlated with the intensity of light to which they were subjected. The late A. E. Tonge (1932) illustrated and described fairly mature eggs and Mr. H. E. Webb (1955) described the method of oviposition and the eggs as canary yellow turning red.

After hatching from the eggs the caterpillars fed on the leaves of *B. p. pubescens* and *B. pendula* Roth. On 22.vi.55 I liberated 18 caterpillars 12–18 mm long on the two species of birch near where I found their mother. There was mortality of unknown cause amongst some of the caterpillars when about three-quarters grown. The remaining caterpillars were presented to fellow entomologists.

On 2.v.62 I saw a fertilized female on birch at Birse.

The species may not be as numerous in the N.E. counties of Scotland as it was during 1920–35, owing to the changing climate and the variations in weather, some of which were discussed in 1964 at the symposium on the Biological Significance of Climate Changes in Britain (Johnson & Smith, 1965). In *The Entomologist* and in our Proceedings various lepidopterists have written on the small numbers of species and specimens of Lepidoptera to be found during the last few years. Both these reductions seem attributable to the weather. I have found in certain species of Lepidoptera, and in greater detail over a number of years with various species of Thysanoptera, a considerable reduction in numbers of specimens and this reduction seems directly correlated with the weather during the breeding period—lack of sun, long persistence of stratus cloud often with mist, not exceptional volume of rain or particularly strong winds or intense cold for the year.

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4 Granville Place,
Aberdeen,
Scotland.
19th January, 1966.

NATURAL HISTORY of the GARDEN of BUCKINGHAM PALACE
Further Records and Observations, 1964-5. Lepidoptera.

By J. D. BRADLEY and R. M. MERE

Trapping and occasional daytime visits searching for larvae etc. continued in 1964 after the Addendum was written (Bradley & Mere 1964, p. 73) and throughout most of 1965.

Two additional species were recorded in 1964:

**Eupsilia transversa* Hufn. (The Satellite)

Platyptilia acanthodactyla Hübn., 25. ix.64, flying by day in greenhouse, probably introduced with nursery plants.

Although the Addendum stated that 41 additional species were taken in 1964 up to September 15th, only 40 were listed. The species omitted in error was:

**Lithosia complana* L. (Scarce Footman)

The following 22 additional species were recorded in 1965. They bring the total number of species of Lepidoptera so far listed from the garden to 367. There are still a few specimens the identity of which requires checking, but these are not expected to produce any additional species.

**Apamea infesta* Ochs. (Large Nutmeg)

**Leucania comma* L. (Shoulder-striped Wainscot)

**Conistra vaccinii* L. (Chestnut)

**Xanthorhoe montanata* Schiff. (Silver-ground Carpet)

Philereme vetulata Schiff. (Brown Scallop)

Triphosia dubitata L. (Tissue)

Erannis marginaria Esp. (Dotted Border), one female bred from larva on elm.

**Chiasma clathrata* L. (Latticed Heath)

Hepialus humuli L. (Ghost Swift)

Salebria fusca Haw.

Loxostege verticalis L.

Laspeyresia succedana Schiff. (556. *L. ulicetana* Haw.)

Pammene aurantiana Staud.

Hedya nubiferana Haw. (484. *Argyroploce variegana* Hübn.)

H. ochroleucana Fröl. (485. *A. ochroleucana* Fröl.)

Sophronia semicostella Hübn.

Argyresthia albistria Haw.

Lithocolletis harrisella L. (1042. *L. cramerella* F.)

L. klemannella F.

Caloptilia alchimiella Scop. (1115. *Gracillaria alchimiella* Scop.)

Coleophora peribenanderi Toll (1016. *C. therinella* sensu Ford)

Bucculatrix ulmella Zell.

Single specimens only were noted of all these except *S. fusca* and *B. ulmella*: several of the former and two of the latter species being taken in the mercury vapour light trap.

Of the larger insects, *P. vetulata* was unexpected being a buckthorn (*Rhamnus*) feeder. *T. dubitata* is also a buckthorn feeder but has the alternative foodplant

*Those species of macrolepidoptera marked with an asterisk appear not to have been previously recorded from Inner London. *P. vetulata* was, it seems, last recorded from Inner London in 1831.

of Bird Cherry (*Prunus padus*). If *T. dubitata* breeds locally it is most likely on *Prunus*, several species of which, including *P. padus*, are found in the garden. It is of interest that within a few days of the garden record, a further specimen of *T. dubitata* was taken by R. M. M. about a mile from the garden in a room in Bush House, Aldwych.

By far the most interesting record of the year was the capture of a fresh male *P. aurantiana* at mercury vapour light on 11.viii.65. This species was unknown in the British Isles until about ten years ago when it was recorded from Southern England (Wakely, 1956; and Bradley & Gardiner, 1958). It now appears to have become established and to be spreading in the south; it has been noted, among other places in the Scilly Isles, near Oxford, and in Kent and Surrey. Moths have been reared from larvae feeding in seeds of Norway Maple (*Acer platanoides*) gathered in Surrey.

The division of the species recorded from the garden on the same basis as that previously used is as follows:

Rhopalocera 5 (5); Sphingidae 3 (3); Bombycidae (including Notodontidae, Arctiidae, etc.) 14 (13); Noctuidae 87 (75); Geometridae 50 (36); Pyralidae and Pterophoridae 39 (33); Tortricidae 63 (53); Tineidae 101 (81); Zygaenidae, Hepialidae and Cossidae 5 (3). The figures in brackets are the respective totals to the end of 1963 (Bradley & Mere 1964 p. 58).

Of the larger numbered groups listed above, the Noctuidae are proportionately the best represented being approximately 22 per cent of the 400 species of this group recorded from the British Isles. In contrast the Tineidae (*sensu lato*) are the most poorly represented, there being about 840 British species known. This is as might be expected. A large proportion of the Noctuidae are polyphagous on low growing plants and shrubs or feed on common British trees that are found in the garden and its environs; they are strong fliers, fly by night, and come readily to mercury vapour light. By comparison, again generalising, the Tineidae are more plant specific, more often being monophagous, and are comparatively weak flyers, generally flying at dusk and dawn, and with few exceptions not coming readily to mercury vapour light.

During 1965 the mercury vapour light trap was run regularly and frequently from early spring until the end of November, again under the supervision of Mr. F. C. Nutbeam, and in the same sites described in the Introduction (Bradley & Mere 1964). The intensive sampling of crepuscular and nocturnal flying species was thus maintained. The overall results of 1965 were similar to those of previous years, the most interesting aspect being the continued high proportion of species new to the list. If the same pattern is repeated in 1966 we can expect further species will be added. Although we have now seen *Oegoconia quadripuncta* Haw., *Amathes c-nigrum* L. (Setaceous Hebrew Character) and *Conistra vaccinii* L. (The Chestnut), there are several other species which we feel are bound eventually to be found, see page 57. *loc. cit.* Furthermore, there is every reason to expect that additional species will continue to find their way into the garden either through accidental introductions or as a result of migration or general movement.

The number of Lepidoptera, both in actual number of specimens and species, trapped in 1965 was on most nights much lower than in previous years, due undoubtedly to the unfavourable weather which affected Lepidoptera throughout the country. Considering the poor season it seems remarkable that as many as 22 species should have been added to the list; especially when many of the species recorded in previous years did not reappear at all. Only a few species such as

Noctua pronuba L. (Large Yellow Underwing), *Acroclita naevana* Hübn. and *Telphusa fugivittella* Zell. maintained their high numbers.

In the early spring a careful watch was kept for the eriocraniid *Mnemonica unimaculella* Zett., one example of which was taken on 20.iv.63, but none was seen. Nor was any further example of *Monochroa hornigi* Staud. found, and the solitary specimen taken in the garden on 17.vi.63 remains the only known British example of the species.

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Carabus violaceus L. ab. *sollicitans* Hartert (Col., Carabidae), an addition to the fauna of Buckingham Palace garden. Whilst working for Lepidoptera in the garden of Buckingham Palace, 15.vii.65, Mr. R. M. Mere took a large ground beetle which he sent to me for examination. This proved to be *Carabus violaceus* L. ab. *sollicitans* Hartert, a species not previously recorded from the Palace garden (1964, *Proc. S. Lond. ent. nat. Hist. Soc.*, 1963:87-92).—F. D. BUCK, 9, Elton Walk, Tiptree, Colchester, Essex, 15th December 1965.

PRESIDENT'S ADDRESS

I shall begin my remarks on the past year, ladies and gentlemen, by reminding you of the part played in the affairs of the Society over the years by those members who have died during my year of office. I am pleased to say that I appear to have had a rejuvenating influence on our older members, because there are only three deaths to report this year.

F. J. Coulson joined the Society in 1909, was elected President in 1937 and became an Honorary member in 1960. I met him towards the end of his long term of office as Curator (1945-54), peeping between the mountains of cabinets in our tiny basement store in Burlington House. I shall always remember him as the first entomologist I met who pushed away his glasses to see a specimen more clearly. As Curator, he was a constant source of help and encouragement to younger members bewildered by the insect legion. In the field, he proved to be one of a fine band of naturalists whose knowledge was not only wide, but deep. Between two or three of them there seemed to be no living thing that one picked up that they were not able to recognize and discourse upon. These men all seemed to be the product of a particular period: all were over 55 when I joined the Society. In this day of specialization, there are few replacements for these people.

Council's report details the fine bequest of collections that the Society has received from Mr. Coulson. I should like to remind you that we also have his notebooks, which will be found well worth consulting.

J. L. Henderson joined us in 1924 and will be remembered by most of you as our Treasurer. He ably filled this post from 1945 to 1962. All of us who served on Council during that period found that he saved many hours of Council's

time by his exact knowledge of our financial position at all times and his sense of priorities in spending your subscriptions. You will now be able to see that he formed a fine collection of Coleoptera, particularly water beetles, for he left this, with the cabinets, to the Society. He became an Honorary member in 1963.

Mr. A. Woollacott was one of our few members in Derbyshire. He was a lepidopterist, joined us in 1962 and died after a long period of ill-health.

Each year at your Annual General Meeting, ladies and gentlemen, you hear such comprehensive accounts of the year's events from those Officers who really run your Society, that your President needs to add very little. From my own experience, I can tell you that many things that your Council would view with grave disquiet are but the normal standard of administration in many amateurs' societies. I think that the Society may feel justly proud that so many able men have, over the years, considered it worthy of so much of their time and labour.

I should like to thank Council, and particularly our Officers, for their support during the past year. It has been a busy one for them all. Our Secretary has had to turn his attention to many new problems. Our Treasurer has taken up his post at a most awkward time when our costs are in a state of flux. Our Curator puts in long hours during meetings and at other times to great effect on our behalf, as I am sure you must all have appreciated in looking at the growing proportion of our collections that have been rearranged in Hill units. Our Editor continues his task with undiminished vigour when many men, similarly rusticated, would have lost their enthusiasm. As the Society grows, an increasing number of assistants quietly give of their free time to help our smooth running.

It is a source of some disappointment to me that in many respects we have stood still during the past year. I hope that you will let me get away with calling it a year of consolidation; of waiting to see the effect of moving to new rooms and making new arrangements for publishing our Proceedings. If you are disappointed at the current rate of appearance of our publication, I can assure you that it is no fault of Mr. Buck's. It results from our having to wait until our increased subscription becomes fully effective and compensates for the much steeper than anticipated rate of increase in the cost of printing. I earnestly commend you to support your journal by contributing to its pages.

My immediate predecessor, Mr. Roche, set in motion an examination of our organization. Several committees are now at work looking at ways of extending our activities, particularly with a view to attracting at least another 100 members. This is a more limited objective than Mr. Mere aimed at with his presidential appeal that each of us should enlist another member, but it will substantially strengthen our financial position. The only way to avoid persistent inflation of our subscription rate is to expand our membership. Council will do its best to make the Society attractive to new members, but we have repeatedly found that members who stay with us for many years result from maintained personal contact with other members.

As you all know, presidents of this Society are sometimes elected not in recognition of their distinction as great naturalists in their own right, but because we wish to benefit from their sound business sense they cannot give sufficient time to take on executive office and because we look forward to their stimulating chairmanship of our ordinary meetings. I can tell you that several such men have in the past declined to take the chair and others have been embarrassed by their office because of one tradition that has grown up. The President has always been expected to provide some entertainment to recompense the members

for attending a dull, annual business meeting. This much is excusable. The rub is that it now seems to be regarded by presidents as essential that they should belatedly prove their entomological credentials by presenting some profound paper (often unsuitable for reading) for publication in the Proceedings. On more than one occasion it has been apparent to me that there was a very good reason for keeping the title of a presidential address secret until it was too late for the audience to depart without appearing disrespectful. This tradition, ladies and gentlemen, does us a disservice and I do not intend to follow it. I shall therefore conclude my Presidential part in this meeting at this point.

I should like to thank you all for giving me the honour of serving the South London, first on Council and now as President. I hope that I shall be able to continue putting something into it in return for the great pleasure that it gives me.

I am very happy that you have chosen Mr. Greenwood to follow me as your President, for in him I know that you have a competent administrator who will do his utmost to see that the Society moves ahead once more. If I can be as useful a member of his Council as he has been of mine, I shall be well pleased. I now have great pleasure in calling upon Mr. Greenwood to take up his Office.

R. W. J. UFFEN

COUNCIL'S REPORT FOR 1965

The Society has come to the end of the first year in our new rooms, a pleasant and happy time due in no small measure to the warm welcome received from the officers and staff of the Alpine Club.

Our membership has risen slightly in spite of Council being forced to strike off a number of members who were several years in arrears with their subscriptions and who persistently neglected to answer letters. This was not unexpected and was indeed foreshadowed in previous Reports. There are unfortunately still a number of members who, despite reminders, have not adjusted their Bankers' Orders and have paid only at the old subscription rate. This is unfair to the rest of the Society and we urge them to hasten to put matters right.

The membership of the Society at 31st December was 5 Honorary, 3 Special Life, 17 Life, 247 Ordinary, 260 Country and 55 Junior Members. During the year 15 members were struck off for non-payment of dues. New members have offset the inevitable number of resignations. Increasing the annual subscriptions undoubtedly led to the loss of some members but our financial position shows clearly that this action could not have been delayed any longer.

The Annual Dinner was this year held at Flemings Hotel, Half Moon Street, as the Grosvenor was unable to accommodate us due to a rebuilding and re-decorating scheme, and an excellent dinner was enjoyed by some 78 members and guests. Generally the members approved of the change and it has been agreed to hold the 1966 dinner at Flemings Hotel.

Despite the cold and wet season, members produced a most interesting and important series of exhibits on the occasion of the Annual Exhibition which was held at the rooms of the Royal Society on Saturday, 30th October. About 270 members and friends attended, and we thank Mr. T. G. Howarth for arranging for outstanding exhibits to be photographed, Mr. D. Carter for undertaking the photography, Mr. D. Stimpson and his team for doing so much to make the exhibition a success, and the Royal Society and the Geological Society for the use of their rooms.

This year the Society produced a Christmas card depicting badgers in the snow, for which we have to thank Mr. C. Threadgall. Mr. W. G. Tremewan once again organized the production and sale of cards and the profit made a welcome addition to the Society's funds.

The varied programme of field meetings was arranged by Mr. R. W. J. Uffen. The Society is gradually spreading its field meetings further from London to serve more of our Country Members. Offers to lead meetings in other parts of the country are particularly welcomed. Co-operation with local societies short of entomological contacts is also being fostered.

A very enjoyable programme of 14 indoor meetings was drawn up by Mr. Howarth and included several unscheduled lectures by visiting scientists. We congratulate him on the success of the programme.

This year the Society commenced issuing the Proceedings in Parts so that notes should be up to date and papers receive more rapid publication. This has necessitated not only the publication of the 1964 Proceedings but also those for 1965 in Parts. Two of the four parts planned have so far appeared. The 1964 Proceedings was deliberately restricted to reports of meetings and recent By-law amendments, and consisted of vii plus 54 pages. Part I of the 1965 Proceedings consisting of 30 pages was published in May and contained Council's report for 1964, the President's Address of January 1965, two other papers, and notes. Part II was published in September consisting of 32 pages containing the Treasurer's report, Meeting Reports, two original papers and numerous notes including one which recorded a species of Gelechiidae new to the British Isles.

We congratulate and thank our editor Mr. F. D. Buck for the smooth, rapid and successful transition from one form of publication to another.

We must remind our members that the success of our new publication requires a steady stream of notes and papers.

A new list containing members' addresses was also published during the year and we are grateful to Mr. F. T. Vallins for typing the original.

Members may not be aware that Mr. D. W. Thorpe-Young, who resigned from the treasurership last January, suffered a serious illness during the summer, but we are pleased he is now fully recovered, his friends were very glad to see him at the Dinner and the Exhibition. This office has been ably filled by Mr. Vallins.

Council are glad to have elected Mr. M. Niblett, one of our oldest members, an Honorary Member. We regret that Mr. Niblett is no longer well enough to attend meetings.

For many years your Council have found it increasingly difficult to carry out the Society's business in the short time available before Ordinary meetings. Accordingly early in 1965 it was decided that Council Meetings should be held on the first Thursday in every month except August. The time so freed is enabling the Officers and Council to get to know the general membership and is allowing members to contact and discuss matters with officers more easily.

The Curator reports that the Society has been fortunate in receiving two major bequests. That from the late Mr. F. J. Coulson comprised Hemiptera, Lepidoptera, Hymenoptera, Mollusca, his note books (mainly relating to Lepidoptera), a very complete card index of Hemiptera and technical books; the collection of Hemiptera is not only extensive, but contains many rare and local species of special value to the Society. The Hemiptera-Heteroptera have been checked by Dr. A. M. Masee and are now being incorporated in the Society's collection. We are indebted to Dr. Masee for fulfilling this onerous task so promptly. The Hemiptera-Homoptera, equally extensive, are housed in store

boxes which are readily available for study prior to the future amalgamation in our main collection. The Lepidoptera are housed in two cabinets and work has commenced incorporating specimens in the Society's collection.

The Henderson bequest comprises his fine collection of British Coleoptera housed in five Hill Units (the Staphylinidae in store boxes), and a small collection of Hemiptera-Heteroptera. Beautifully mounted, the collection is of great value, especially the Hydradephaga in which Mr. Henderson specialized. It is intended to keep this collection intact and work has commenced in transferring the Staphylinidae to a Hill unit. We are grateful to Mrs Dicker for also presenting to the Society her father's monocular and binocular microscopes, his card index of Ashted, Surrey, Coleoptera, diary and several valuable books.

Although this influx of material has slowed the original programme, work has continued on the Joy collection of Coleoptera, larvae of Lepidoptera and the amalgamation of the collections of British Macrolepidoptera. This latter task is nearing completion and it is hoped to commence work on the Microlepidoptera when the new check list is published.

The thanks of the Society are due to the following members for notable accessions: Mr. R. M. Craske (Lepidoptera), Mr. J. M. Chalmers-Hunt (Hymenoptera), Mr. A. E. Gardner (Coleoptera), Mr. C. Mackechnie Jarvis (Odonata), Dr. A. M. Massee (Coleoptera and Hemiptera-Heteroptera), Dr. B. J. MacNulty (Coleoptera), Mr. R. M. Mere (Lepidoptera), and Mr. B. R. S. Morrison (Coleoptera).

During the year two Hill units have been purchased to accommodate the larvae of Lepidoptera, and our thanks are due to Dr. MacNulty for replacing the table loaned by the Alpine Club. Thanks are due also to Miss C. M. Wagner for presenting three coloured pictures of insects which are being framed.

With work on the Macrolepidoptera nearly completed a number of duplicate specimens are available. Members interested should submit lists of desiderata to the Curator. Available specimens will be put on one side for collection as it is impossible to forward these by post.

As usual Mr. L. Christie has rendered valuable help as assistant curator.

The Hon. Lanternist reports that the 35mm transparency collection has been built up over the last several years and consists mainly of slides on British insects. The collection is due mainly to the generous donations of just a few enthusiastic insect photographers, members of this Society, the main contributions coming from Mr. J. E. Knight, Mr. R. W. J. Uffen and Mr. M. W. F. Tweedie. Some donations have also been made by Mr. J. D. Bradley.

Though the standard of the slides in the Society's collection is very high, the range of subject matter is unfortunately limited. The collection of slides consists of:

General views of collecting areas	3	slides
Plants	8	"
Hymenoptera	8	"
Coleoptera	1	slide
Orthoptera	3	slides
Odonata	1	slide
Diptera	8	slides
Lepidoptera—Butterfly larvae	5	"
" —Adult butterflies	5	"
" —Adult micro-moths	46	"
" —Adult macro-moths	14	"
" —Macro-moth larvae	140	"

It is therefore seen that the bulk of the slides are on Lepidoptera, out of a total of 242 slides, no less than 210 deal with this group. The Society also possesses a large collection of $2\frac{1}{2} \times 2\frac{1}{2}$ transparencies, but these are of relatively little use because of their size. If the collection is to be of any real value to the Society, it will need to contain a far greater variety than it does and thus be a benefit to all members. This can only be achieved if members of the Society are willing to donate their duplicate slides, or other slides to the Society's collection.

A complete list of the Society's slide collection can be obtained by contacting the Lanternist.

Council accepted with regret Miss Wagner's resignation from the office of Librarian as she no longer works in London. Mr. S. A. Williams succeeds her.

He reports once again the Society has benefited by bequests and gifts. Many useful books were left to the library by Mr. F. J. Coulson and Mr. J. L. Henderson, including both volumes of Joy's *British Beetles*. This scarce work is much used by members and this duplicate set is very welcome. It has been suggested that it be kept permanently in the library for use on meeting nights.

Two further publications of the Royal Entomological Society have been purchased; *A Check List of the Hemiptera and small orders*, and a further part in the *Handbooks for the Identification of British Insects* concerned with the Hemiptera, Cicadomorphs, by W. J. Le Quesne.

We continue to receive the usual journals. Additions have been made to our growing collection of Separates. As the result of an exchange agreement we now receive the excellent publications of the Institut Royal des Sciences Naturelles de Belgique.

The following books were kindly presented by members Clegg, J., 1964, *The Freshwater Life of the British Isles* presented by S. N. A. Jacobs; Heslop, I. R. P., *Notes and views of the Purple Emperor*, two copies presented by T. R. Eagles and S. N. A. Jacobs; Ragge, D. R., *Grasshoppers, Crickets and Cockroaches of the British Isles*, presented by S. N. A. Jacobs; Oldroyd, H., 1965, *The Natural History of Flies*, presented by S. N. A. Jacobs; Fritz-Martin Engel, *Creatures of the Earth's Crust*, presented by S. N. A. Jacobs.

PROCEEDINGS

14th OCTOBER 1965

The PRESIDENT in the Chair

EXHIBITS

Mr. T. R. EAGLES—The fungus *Cortinarius albo-violaceus* (Pers.) Fr. from White Webbs Wood, Enfield, Middx. He drew attention to the bulbous stem and the white coating. He said that the various species of *Cortinarius* seemed to be unusually plentiful this year.

Mr. P. A. GODDARD—Photographs of the very local moth *Gelechia nigra* Haw. (Lep., Gelechiidae), which sits on aspen trunks on Stanmore Common, Middx., in July; this species is easily mistaken for *Anacampsis* species, which occupy the

same habitat at the same time. Also photographs of *Agdistis bennetii* Curt. (Lep., Pterophoridae), taken on Nagden Marsh, Kent, on the recent field meeting.

Dr. A. M. MASSEE—An example of the local and rare colydiid beetle, *Syrichta humeralis* (F.) swept on a ride in Chippenham Fen, Cambs, 18.viii.65. Recently a second species, *S. separanda* Reitt. has been added to the British list, thus all the old records are suspect until they have been checked. The present authentic records of *S. humeralis* (F.) are as follows: London, Surrey, Berks, Essex, Sussex, Norfolk, Hunts, Staffs., Salop, Cheshire, Lancs., and Yorks. To this must now be added Cambridgeshire.

Mr. S. A. WILLIAMS—*Hypophloeus linearis* F. (Col., Tenebrionidae) from Delamere Forest, Cheshire, 8.v.65. The beetle was found in a large colony of *Pityogenes bidentatus* (Herbst) (Col., Scolytidae) upon which it is believed to be predacious. The beetle is rarely recorded and this is no doubt a new county record. Joy (1932, *Brit Beetles* 1:314) gives the size of the insects as 2 mm, but all six examples taken were 3 mm in length.

Mr. D. STIMPSON—Showed the living young, and a large female in spirit of a spider of the genus *Dolomedes*, as yet unidentified. It was taken by Mr B. Leonard at San Giorgio, on his recent collecting trip to Sardinia.

COMMUNICATIONS

The Librarian announced that Mr. S. N. A. Jacobs had presented a copy of *Pond Life* by J. Clegg to the library, and Mr. T. R. EAGLES had presented a copy of *Notes and Views of the Purple Emperor* by I. R. P. Heslop and others.

Mr. R. F. BRETHERTON reported that he had taken *Gelechia nigra* Haw. (Lep., Gelechiidae) on Chobham Common, Surrey.

On a recent trip to Sardinia, said Mr. C. G. ROCHE, he took a large female mutilid which had stridulated. All subsequent examples which he found did the same, the stridulation being very high-pitched. He asked if any member had seen any record of this, and if anyone knew how the sound was produced.

An example of *Acherontia atropos* L. (Lep., Sphingidae) was reported by Mr. M. P. CLIFTON to have been taken by a friend in Pembrokeshire.

Mr. D. STIMPSON quoted a newspaper cutting reporting the occurrence of a 'rare Spanish beetle' in a carton of yoghurt. As far as he knew the beetle was as yet unidentified.

A talk was given by Mr. W. H. T. TAMS on 'The Seychelles', which he illustrated with coloured transparencies.

11th NOVEMBER 1965

The PRESIDENT in the Chair

EXHIBITS

Mr. P. A. GODDARD—Photographs of *Nemapogon cloacella* Haw. (Lep., Tineidae), which is much confused with allied species, it is normally fairly easily distinguished by the large dark markings, which stand out clearly against the indistinctly mottled ground colour, and the longitudinal streak terminating the median costal bar. He also showed photographs of *Tubuliferola flavifrontella* Hübn. (Lep., Oecophoridae), one of which was ovipositing in a fence near Stanmore Common, Middx.; the other lacks the sclerotised extensile ostium characteristic of the species. It is not clear however, if this represents a real aberration or is the result of accidental damage in mounting the genitalia.

Dr. A. M. MASSEE—The curculionid beetle *Miarus campanulae* L. taken from the seed capsules of Harebells growing on the North Downs at Brook, Kent, during the first week in November. He said they appeared to be hibernating in the seed heads.

COMMUNICATIONS

A member quoted a report from *The Observer* of an interview given by Mr. L. H. Newman giving details of the capture of Black-veined Whites, *Aporia crataegi* L., (Lep., Pieridae) in north Kent.

Mr. R. F. BRETHERTON reported that he had seven *Plusia gamma* L. (Lep., Noctuidae) and one *Palpita unionalis* Hübn. (Lep., Pyralidae) in his light trap the previous night, adding that it was late for both species, and suggesting that it might be a new migration.

There was a note in the papers a few days previously, said Mr. S. WAKELY, about the stopping of engineering works at some gravel pits in Nottinghamshire because of a rare beetle in them. He asked if any member knew which species, but several said the only name quoted was *Dytiscus*.

Miss W. M. A. Brooke reported that on a recent field trip, the Alton Natural History Society had discovered the second recorded locality for the fungus *Fomes fomentarius* (L.) Fr. in England. Mr. T. R. EAGLES said that he was present when the first locality, Knowle Park, was found. The species is common in Scotland.

A talk was given by Mr. D. E. Kimmins on 'Wild Life Photography' which he illustrated with coloured slides.

25th NOVEMBER 1965

The PRESIDENT in the Chair

EXHIBITS

Dr. A. M. MASSEE—Examples of the small clavicorn beetle *Atomaria lewisi* Reitter, which was first discovered in this country in 1938. The species can be recognized readily from all others in the genus by its pale yellow colour and its long outstanding pubescence. All other species have short recumbent pubescence. He added that it was widespread, but probably overlooked by collectors because of its small size.

Mr. A. E. GARDINER—A pair of *Aromia moschata* (L.) (Col., Cerambycidae) and a pair of *Strangalia quadrifasciata* (L.) (Col., Cerambycidae) all found on one umbelliferous plant at Shapwick, N. Somerset, 13.viii.65. Also a short series of *Rhopalodontus perforatus* (Gyll.) (Col., Ciidae) bred from fungus from Rannoch, Perthshire, found by Dr. A. M. Massee during August 1965.

COMMUNICATIONS

Mr. T. R. EAGLES read two notes. The first referred to the occurrence of the larva *Infurcitinea argentimaculella* Staint. (Lep., Tineidae) on the lichen *Lepraria incana* (L.) Ach., found on a sandstone boulder at Folkestone, Kent, by Mr. E. S. Bradford, and recorded by Brightman (1965, *Lichenologist*, 3:154). In this note Mr. Brightman draws attention to how little is known about arthropods which feed on lichens. His second note was an extract from our Proceedings for 1960, referring to the field meeting at Knowle Park, Kent (p. 97). This was the occasion of the discovery of the fungus *Fomes fomentarius* (L.) Fr. in England.

Dr. A. M. MASSEE reported that the Hampshire County Council were clearing and changing the banks of Fleet Pond, but he had received a letter that morning telling him that the Nature Reserve at the pond had now been extended to cover the part of entomological interest. Previously the Reserve covered only the pond itself.

Mr. S. N. A. JACOBS reported that in the last week of October and the first week of November he had removed five batches of flies' eggs from the jets of his gas lighter. He wondered whether the methane gas now used was attracting them. He added that they were now being bred so the species involved could be identified later.

The meeting closed with series of coloured slides shown by Mr. M. W. F. TWEEDIE, Dr. C. G. M. de WORMS, Mr. M. P. CLIFTON and Mr. N. B. POTTER.

9th DECEMBER 1965

The PRESIDENT in the Chair

EXHIBITS

Dr. A. M. MASSEE—The fourth British specimen of the lygaeid bug *Xanthochilus quadratus* (F.). It was taken in a crack in the cliffs at Slapton Ley, Devon, 23.viii.53. This bug was first recorded in Britain in Llandudno Wells by E. Saunders in 1892. The second specimen was found by H. A. Saunders at Swanage in 1910, and the third by E. C. Bedwell at Tor Cross, near Slapton Ley, in 1920.

Sir ERIC ANSORGE—Four examples of *Psylliodes weberi* Lohse, identified by Mr. A. A. Allen, and taken in Flintshire this June. The species is very close to *P. napi* Koch, with which it has no doubt been confused in collections. *P. weberi* is commoner than *P. napi* in Germany where it was first discovered, and may prove to be common here.

Mr. P. A. GODDARD—Photographs of (1) *Aspilapteryx tringipennella* Zell. (Lep., Lithocolletidae), one of the several disturbed from *Ononis repens* L. in disused quarries on the northern part of Portland, Dorset, in late August this year. (2) *Lobesia littoralis* Westw. (Lep., Olethreutidae) found flying plentifully on Portland Bill, for a short period in mid-afternoon, 27.vii.65. This species is said to feed on *Armeria maritima* (Mill.) Willd. (Sea Pink), and although at one time considered restricted to coastal areas, it is now well established far inland, feeding on garden pinks. The exhibitor took an example at light in Harrow Weald, Middx., 11.vi.65.

Mr. T. R. EAGLES—The spiny leaves and stem of the shrub *Solanum sodomaeum* L., from Majorca. The frost had cut down the plants and so they would probably not grow in the open here.

Mr. A. E. GARDNER—The following species of Coleoptera: *Bolitobius cingulatus* Mann. (Staphylinidae) taken in sedge refuse at Chippenham Fen, Cambs., 17.x.65. Also *Phytosus nigriventris* (Chev.) and *P. balticus* Kraatz (Staphylinidae), and *Aceritis punctum* (Aube) (Histeridae) taken under decaying seaweed at Braunton Burrows, N. Devon, 18.viii.65.

Mr. D. STIMPSON—The spider, *Physocyclus simoni* Berland, taken in a bath. This arachnid is imported with French wine casks and is usually found in wine cellars. The bath in which this example was found is in a flat above a wine shop.

COMMUNICATIONS

The secretary read the list of officers and Ordinary Members of Council put forward for the coming year.

The meeting ended with a talk by Dr. B. J. MACNULTY on a 'A miscellany of West African plants', which he illustrated with coloured slides.

13th JANUARY 1966

The PRESIDENT in the Chair

EXHIBITS

Dr. A. M. MASSEE—(1) The very remarkable aquatic hemipteron *Aphelocheirus aestivalis* (F.) f. *montandoni* Horvath (Aphelocheiridae), captured in a tributary of the Great Stour on Boxing Day. This record is important as it is the first Kent record, and it has now been found in all the Home Counties with the exception of Essex. This bug requires very specialized conditions, and it invariably occurs at a bend in the river where the water flows swiftly and the bed is of a gravelly nature. The insect usually remains at the bottom of the river amongst sparse vegetation. It is predacious, and is capable of inflicting a severe wound with its proboscis if handled carelessly. (2) *Rhipiphorus subdipterus* Bosc (Col., Rhipiphoridae), he read the following note. 'On his return from a collecting trip in Sardinia, Mr. B. W. Leonard presented me with a pinned insect of very unusual appearance, and after much deliberation it was decided it belonged to the Order Coleoptera. After further study it was found that the beetle belonged to the obscure family Rhipiphoridae, and Mr. Colin Johnson, Manchester Museum, diagnosed the species as a female *Rhipiphorus subdipterus* Bosc. The species is predacious, the larva preying upon the immature stages of wasps and cockroaches. The distribution is confined to the Mediterranean region, Spain and South Africa.'

Mr. P. A. GODDARD—Photographs of *Pulicaria (Recurvaria) ?piceaella* Kearfott (Lep., Gelechiidae), taken at light, Harrow Weald, 20.vii.65. This specimen is conspecific with the only other known British specimen, taken by Mr. W. E. Minnion at Pinner, Middx., in June 1952; but there is some doubt as to whether the first specimen is really *P. piceaella* Kearfott, although it is at least congeneric with it. As Mr. Minnion's specimen was thought to be *Parachronistis albiceps* Zell. until material at the British Museum (Nat. Hist.) was examined, it appears that collectors should check their series of *P. albiceps* Zell. for *P. piceaella* Kearfott.

Mr. S. A. WILLIAMS—Four species of Coleoptera (Staphylinidae) from moles' nests at Higham, Kent, 6.i.66: *Quedius* (s. gen. *Microcaurus*) *nigrocaeruleus* Fauv., *Q.* (s. gen. *Ediquus*) *longicornis* Kraatz, *Heterothrops niger* Kraatz and *Oxypoda spectabilis* Märk.

Dr. B. J. MACNULTY—(1) Two examples of *Niptus hololeucus* Fald. (Col., Ptinidae) found in a chemistry laboratory at Manchester College of Science and Technology, 8.xi.65. Fowler, W. W. (1890, *Col. Brit. Is.*, 4:182) says that it is found in old houses and in seeds, it used to be somewhat of a rarity and confined to towns but has now gradually spread and established itself even in the remotest country villages. Dr. MacNulty asked if there was any information on the present range of the species. (2) Examples of *Patrobis atrorufus* (Stroem) (*excavatus* Payk.) (Col., Carabidae) from New Buxton, 7.xi.65. This species is reputed to be common on high ground in northern England, the Midlands and the lowlands of Scotland, but absent from southern England. (3) *Pytho depressus* (L.) (Col., Pythidae) bred during October from larvae taken at Nethy Bridge, Inv., in August.

COMMUNICATIONS

The PRESIDENT announced that the Council had appointed Dr. A. M. Masee an Honorary Member of the Society.

Mr. S. N. A. JACOBS reported that he had seen an example of a *Depressaria* sp. on a lighted window on New Year's Eve. Commenting on Dr. MacNulty's exhibit Mr. Jacobs said that at Millwall Docks in East London when he was there during the 1940's *Niptus hololeucus* Fald. could be found in the waste grain. He also noticed *Trigonogenius globulus* Solier (Col., Ptinidae) in grain dust alongside a conveyor belt in the same docks.

Coloured slides were shown by Dr. B. J. MACNULTY, Mr. C. O. HAMMOND, Dr. C. G. M. DE WORMS, Mr. R. F. HAYNES and Mr. P. A. GODDARD.

REPORT OF THE ANNUAL EXHIBITION

30th October 1965

Probably due to a year less productive in interesting insects than usual both the number and size of the exhibits were down this year. Instead of exceeding 100 exhibits only 86 were recorded, and as a result less than the usual amount of table space was occupied. There were, however, many exhibits of considerable interest. Dr. C. G. M. DE WORMS and Mr. AUSTIN RICHARDSON each produced the extensive and well arranged exhibit of Lepidoptera that has become as much a part of our Annual Exhibition as the venue.

The Tring exhibit from the Rothschild-Cockayne-Kettlewell collection shown by Mr. A. L. GOODSON contained the expected array of rare and interesting aberrations of lepidopterous species. Perhaps not quite so extensive as in recent years, but still containing 47 different items including a mixed gynandromorph of *Anthocharis cardamines* L. which had been donated by Dr. H. B. Williams, a somatic mosaic *Colias croceus* Fourc. which showed streaks of the aberration *helice* Hübn., and a striking un-named aberration of *Luperina testacea* Schiff. which had been donated by Mr. R. Eley. An example of *Notodonta ziczac* L. (Pl. 2, fig. 1) taken at Tring in July 1965, was an outstanding un-named melanic aberration.

Mr. R. TUBBS showed the results of some of his bred material in two separate series: (1) *Argynnis paphia* L. ab. *valesina* Esp. which he bred during 1965 from a female ab. *valesina* taken in the New Forest, Hants, the previous year. The F₁ generation consisted of 26 males, 18 normal females and 24 ab. *valesina*. (2) Two separate F₁ generations from a female *Aphantopus hyperantus* L. taken in the New Forest. Both broods showed many additional small spots.

The zyaenid moths of Mr. W. G. TREMEWAN were, as in previous years, worthy of special attention. He showed a short series of *Zygaena purpuralis* Brunnich. s.sp. *caledonensis* Reiss from Argyll. A series of *Z. viciae* Denis & Schiff., also from Argyll, together with cocoons of this species which were first discovered in this part of Scotland by Best (1963, *Ent. Gaz.*, 14:149). The population there represents a new subspecies, differing from the nominate subspecies from Vienna, Austria, and the subspecies *anglica* Reiss from the New Forest, Hants (Tremewan, 1965, *Ent. Gaz.*, 16:122). There was also a series of *Z. trifolii* Esp. s.sp. *palustrella* Verity from Cotswold Park, Glos. This subspecies of *Z. trifolii* is normally confined to the chalk downs of southern England, but in Gloucestershire it occurs on limestone. Also exhibited were an orange example, two reddish-brown and two yellow examples of *Z. trifolii* s.sp. *palustrella*, all from the North Downs, Surrey.

A male *Zanclognatha tarsicrinalis* Knoch from Suffolk, 11.vii.65, a species new to the British Isles, was shown by Mr. E. C. PELHAM-CLINTON together with *Z. nemoralis* F. and *Z. tarsipennalis* Treits. for comparison. Mr. Pelham-Clinton also showed a trichopteron new to the British Isles, a male *Nemotaulius punctatolineatus* (Retz.), taken in a light trap at Aviemore, Inv., 2.vii.65.

Included in Mr. S. COXEY'S exhibit of the interesting Lepidoptera taken during the year was an extreme melanic aberration of *Arctia caja* L., shown on behalf of Mr. W. A. WATSON, which was bred from a feral larva taken at St. Annes-on-Sea, Lancs.

Rural melanics in five different species from Inverness-shire and Argyllshire formed the basis of Comdr. G. W. HARPER'S exhibit; these included an extraordinary *Biston betularia* L. with melanic body and forewings and white hindwings, a rare melanic form of *Xylena vetusta* Hübn. (Pl. 2, fig. 2), and a unique *Orthosia gothica* L. ab. *gothicina* H.-S. (Pl. 1, fig. 2). He also showed a male *Acherontia atropos* L. taken at Laggan, Inv., 2.vi.65.

Among the material shown by Mr. P. N. CROW was a series of *Aporophylla australis* Boisd. s.sp. *pascua* Humph. & Westwood, bred from Kent specimens showing melanic forms and typical forms (Pl. 2, figs. 7, 8, 9 & 10).

Another melanic which attracted attention was shown by Mr. B. R. BAKER. This was an example of *Jaspidia pygarga* Hufn. taken at rest in Pamber Forest, Hants, 7.vi.65 (Pl. 2, fig. 6).

A *Celerio livornica* Esp. female from Basingstoke, Hants, 21.v.65, was shown by Mr. M. CLIFTON and Mr. M. SHAFFER. Ova was obtained, but from 260 eggs only 12 reached adult stage. A second example was shown by Mr. T. W. HARMAN which he took on *Rhododendron* blossom in S. Wales, 30.v.65.

Another *Acherontia atropos* L. figured in the exhibit produced by Mr. S. A. KNILL-JONES. This came to mercury vapour light at Freshwater, I.o.W. He also showed a somatic mosaic *Omphaloscelis lunosa* Haw. with the left forewing assuming a light ochreous colour except for a dark grey streak on the upper area of the wing; the right forewing was dark grey in colour (Pl. 2, fig. 4).

Celerio livornica Esp. from a mercury vapour light trap in Minstead, Hants, 4.vi.65, was shown by Mr. L. W. SIGGS, who also included in his exhibit *Herse convolvuli* L. from the same trap, 26.ix.65. In addition to these hawk moths, Mr. Siggs had a series of *Biston betularia* L. which included the forms *typica*, *insularia* Th.-Meig. and *carbonaria* Jordan. The whole series indicated the difficulty of separating these forms. He also showed, from his Minstead trap, some nice forms of *Drymonia dodonea* Schiff., taken 2.vi.65, which included an example with the outer two-thirds of the forewing white (Pl. 1, fig. 5), *Rivula sericealis* Scop., dusky brown in ground colour, taken 13.ix.65 (Pl. 1, fig. 10), and *Ochropleura plecta* L., with the orbicular stigma club-shaped, taken 23.v.65 (Pl. 1, fig. 3).

Mr. D. J. L. AGASSIZ showed a selection of the more interesting Lepidoptera he had taken during 1964-5 in the Oxford area; these included the following species not previously recorded in the area: *Eurois occulta* L. and *Enargia paleacea* Esp., 15.viii.64; *Eilema deplana* Esp., 7.viii.65; *Eremobia ochroleuca* Schiff., 30.viii.65; *Oria musculosa* Hübn., 4 to 8.viii.65; and *Hysterosia sodaliana* Haw., 20.vi.65.

An exhibit of more than usual interest was placed by Mr. B. O. C. GARDINER and Dr. W. A. L. DAVID. This consisted of living larvae feeding on a semi-synthetic diet in the form of a jelly of casein, sugar, wheat germ, powdered cellulose, dried leaf powder, salts, vitamins, preservatives and agar. Full details

have been published (1965, *Nature*, 207:882-883). The species concerned were *Pieris brassicae* L., *Arctia caja* L., *Mamestra brassicae* L., *Philosamia vicina* Boisd. and *Panaxia dominula* L.

Dr. H. B. D. KETTLEWELL and Mr. C. J. CADBURY showed (1) *Lasiocampa quercus* L. s.sp. *callunae* Palmer (Pl. 1, fig. 11). A double recessive from a female *olivacea* Tutt from north Scotland and a male *feminicolorata* Cockayne from Ilkley Moor, Yorks. (F₂ generation). (2) *Panaxia dominula* L., a mutant form previously unknown, which occurred in a wild artificial colony of *bimacula* Cockayne x *bimacula* Cockayne. A wild female caught in 1965 was extreme. see Pl. 1, fig. 8. Genetically this mutant form has been shown to be homozygous for *bimaculata* Cockayne. Also some extreme forms of *bimaculata* Cockayne with black and red or black and yellow (ab. *lutea* Staud.) hind wings. (3) *Lycia hirtaria* Clerck, a new melanic form, male, from Steeple Barton, Oxford., 1965. (4) Hybrid *Lycia hirtaria* Clerck ab. *nigra* Cockayne (a recessive) x *Nyssia zonaria* Schiff. s.sp. *atlantica* Harrison, F₁ generation, showing melanic female hybrids and dark male hybrids. (5) Extreme *Biston strataria* Hufn, light and dark from Oxfordshire, 1965.

In the exhibit by Mr. G. S. E. Cross was part of a brood of *Pieris rapae* L., showing banding in the forewings which was confined to the underside in the male. These were bred in 1952 from a female taken in his garden at Finchley, Middx. There were also 18 examples of the yellow form of *Arctia caja* L. bred in 1957 from a female discovered in his cages in 1955.

Another exhibit of breeding results was that by Mr. F. V. L. JARVIS, who has once more spent many patient hours on his favourite butterfly, *Aricia agestis* Schiff. and its allies. This year the results of two experiments were shown. (1) A cross pairing between a male *A. agestis* from Winchester and a female of the *artaxerxes* F. form from Hawick, Scotland. It would seem from this work, and that of Mr. O. Hoegh Guedberg, that it is more realistic to consider, *artaxerxes* as a form rather than a subspecies. The observation made in this experiment is that 'artaxerxes' is a single gene recessive. Mr. Guedberg's total of 178 in the F₂ generation included 45 imagines that were reared in 16 hours light (which is the photoperiod for southern *A. agestis*). In this group were 11 *artaxerxes* which indicate that the 'artaxerxes' gene is not linked with the genes controlling voltinism. Had there been a linkage these white-spotted forms could not have appeared in this short light period. (2) A reciprocal cross pairing using a male *artaxerxes* reared from ova laid by a female near Aberdeen, 24.vii.64, and a female *A. agestis* from cross-bred Leatherhead, Surrey and Winchester, Sussex stock. The results of this work show there is indication of genetic unbalance which could be a lethal specific barrier between *A. agestis* and *artaxerxes*. It is proposed to publish the work involved in these two experiments at a later date.

Ireland had attracted several of our exhibitors during the year, and interesting exhibits were placed by Messrs. R. M. A. P. and J. H. P. RIDGE, M. W. F. TWEEDIE, J. V. BANNER and M. J. LEECH.

Extreme abnormal wing shape was the subject of Mr. R. L. E. FORD's exhibit; in which he showed the nymphalids *Vanessa atalanta* L. and *V. c-album* L.

Epirrhoe alternata Müll. has been absorbing much of Mr. G. M. HAGGETT's time during his enquiries into the genetics. He showed selected progeny of five generations of the aberration *lacteata* Larssen, reared from a female of the same aberration caught at Arundel, Sussex, 2.viii.64. This aberration is linked to the X chromosome and has three distinct phenotypes: heterozygous male (XIX1),

homozygous male (X1X1), and female (X1). There is no dominance. Each phenotype is subject to extensive variation controlled by the interaction of polygenes. The principle variants are: redistribution of pigment; reduction of pigment; round-wing; and scale defective. See *Proc. S. Lond. ent. nat. Hist. Soc.*, 1965 (3):63-76.

A mixed gynandromorph of *Saturnia pavonia* L. was shown by Mr. A. S. WHEELER, bred 14.v.65. Major A. E. COLLIER had a gynandromorph *Lysandra coridon* Poda amongst his Lepidoptera, and Mr. M. J. LEECH a bred *Apeira syringaria* L. with the right side female and the left side male.

Although the poor summer resulted in a reduced number of exhibits of macrolepidoptera the micros shown were well up to the usual standard. The rarer migrant species were represented by *Uresiphita polygonalis* Schiff., of which two examples from the Isle of Wight were shown by Mr. S. A. KNILL-JONES, and another from Portland Bill, Dorset, by Mr. A. T. BROMBY.

A new British species, *Argolamprotes micella* Schiff. from Ide, Devon, 17.vii.63, was exhibited by Mr. H. A. KENNARD (see *Proc. S. Lond. ent. nat. Hist. Soc.*, 1965 (2):42). Mr. Kennard also showed an uncommon tortricid, *Exartema aurofasciana* Haw. from Torrington, Devon, 14.vii.63.

Mr. D. J. L. AGASSIZ's exhibit, already mentioned, included series of two species taken well outside their previously recorded range, *Panneme aurantiana* Staud. from Oxford, and *Telphusa alburnella* Dup. from Boar's Hill, Berks.

Mr. J. M. CHALMERS-HUNT showed a number of very local species among which the following were outstanding: *Coleophora tricolor* Wals., Norfolk, 12.vii.64; *Lithocolletis sylvella* s. sp. *joannisi* Le Marchand, bred from *Acer platanoides* L., Orpington, Kent (see *Ent. Rec.*, 77 (11):247-8); *Grapholita caecana* Schläg., five examples from Kent; *Panneme trauntiana* Schiff., Kent; *Eucosma pupillana* Clerck, Kent; and a fine series of *Coleophora chalcogramma* Zell., bred from *Cerastium arvense* L., Kent.

Included in the exhibit of Mr. R. FAIRCLOUGH were *Nephteryx albicilla* H.-S., Wye Valley, 12.vi.64, of which but two other British examples are known; *Coleophora conspicuella* Zell., a bred series from Benfleet, Essex; *Teichobia filicivora* Meyr., Pentawan, Cornwall, 7.vi.65; and *Iwaruna vinella* Bankes, bred from Ditchling, Sussex.

Mr. H. N. MICHAELIS showed *Cacoecimorpha pronubana* Hübn. from Glen Conway, Denbigh, 14.x.63, probably a new Welsh record; another interesting record in this exhibit was of *Nemapogon granella* L. from Caenarvonshire, bred from *Polyporus*.

A remarkable female aberration of *Coenonympha pamphilus* L., set as an upperside, was shown by Mr. D. H. WALKER, which he obtained during August 1965 on Alderney in the Channel Islands. This example had very large eye-spots on the forewings, each with a distinct pupil (Pl. 1, fig. 1).

An aberration of *Euphyia luctuata* Schiff., bred from a wild larva taken near Lewes, Sussex, during 1965, was a noteworthy insect in the exhibit of Mr. R. C. DYSON (Pl. 1, fig. 4).

A male aberration of *Asphalia diluta* Schiff. was exhibited by Mr. G. BOTWRIGHT, taken at mercury vapour light at Steyning, Sussex, 18.ix.65 (Pl. 1, fig. 6). He also showed an aberration of *Biston betularia* L., also taken at mercury vapour light, in the New Forest, Hants, 2.vii.62 (Pl. 1, fig. 7).

Mr. A. J. WIGHTMAN showed a series of *Cryphia muralis* Forst. s.sp. *westropi* Cockayne & Williams, from County Cork, Ireland, in which was included a pair of the jet black form, ab. *nigra* Huggins (Pl. 1, fig. 9).

An unusual form of *Apamea infesta* Ochs. from Chiddingfold, Surrey, was shown by Mr. R. M. MERE (Pl. 2, fig. 3).

Mr. J. A. SUMMERS exhibited an unusual male *Drymonia ruficornis* Hufn., taken at mercury vapour light at Bromley, Kent, 11.v.65 (Pl. 2, fig. 5).

Mr. S. WAKELY had as usual worked hard to put in a large number of interesting species among which the following were especially notable: *Caloptilia falconipennella* Hübn., bred, Surrey; *Eucosma heringiana* Jäckh., bred from *Aster tripolium* L., Nagden marshes, Faversham, Kent; *Grapholita caecana* Schläg., St. Margaret's Bay, Kent; *Lobesia euphorbiana* Freyer, bred, Folkestone, Kent; and a bred series from Surrey and Sussex respectively of the recently recognised species of *Sorhagenia*, *S. lophyrella* Dougl. and *S. janiszewskae* Reidl.

A portable mercury vapour light trap, designed by Mr. J. Heath of the Nature Conservancy Merlewood Research Station, was shown by Mr. C. J. GOODALL. Details may be found in the *Ent. Rec.*, 77:236-8.

The usual collection of fungi was shown by Mr. T. R. EAGLES and Mr. F. T. VALLINS. These were from Epping Forest, Essex, and included examples of *Ganoderma lucidum* Fr. and *Cantharellus tubaeformis* Fr.

Photographic work is playing an increasing part in our exhibition. Mr. P. A. GODDARD put on an extensive display of microlepidoptera subjects. Mr. A. D. BLAXILL showed a series of 12 coloured slides of the various stages of *Apatura iris* L., and Mr. G. E. HYDE exhibited six coloured photographs of Lepidoptera. Amongst other things in his exhibit Mr. J. BOORMAN had photographs of a limacodid moth larva with poisonous spines and abdominal 'suckers'. Mr. L. S. WHICHER showed a series of botanical subjects including some in colour.

Dr. A. M. MASSEE showed examples of the bug *Lasiosomus enervis* (H.-S.), one of the rarest species in the genus. It occurred abundantly in a plantation of young conifers in Orlestone Wood, Kent, in the autumn of 1965. It feeds on the seeds of grasses and other plants, and hibernates as an adult. He also showed again *Monosynamma nigrifulva* (Zett.) which he showed last year.

Melanism in Coleoptera is far less often noticed than in Lepidoptera, and is always worthy of attention, particularly in a species like *Nebria brevicollis* F. Sir ERIC ANSORGE showed a series of three examples of this species with the antennae and other appendages black instead of reddish. These beetles were taken near Flint, Flintshire, 6.ix.65. This form has apparently not been previously recorded. Dr. Lindroth has examined the insects and writes 'The coloration of the appendages is certainly striking—I have never seen anything similar—but all other characters, including microsculpture and male genitalia, are those of *brevicollis* Fab. Therefore I can say with confidence that the specimens constitute a melanic form of that species. It would be of considerable interest to find out if it is the question of an entire uniform population with respect to colour, in which case it must be thought to have a hereditary background. Otherwise, according to my experience, most melanic forms of insects so common in north-western Europe (including Iceland) are likely to be modifications caused by high humidity.' The fact that three exhibited beetles were found in a restricted area, and none of the usual form were found appears to support Dr. Lindroth's first suggestion.

Dr. M. G. MORRIS showed specimens of *Ceuthorhynchus unguicularis* Thoms. (*curvirostris* Schultz), a species of weevil (Col., Curculionidae) not previously recorded from the British Isles. The species was obtained from *Arabis hirsutus* (L.) Scop. (Hairy Rock-cress) in the Burren of Clare, Ireland, 10.vi.65; an

example of the same species was taken in the Suffolk Breckland in 1962 but was not recognized until recently. *C. unguicularis* has a wide distribution in western Europe, but the Irish record extends the known range of the species considerably further west. This species is placed in the subgenus *Ceuthorhynchus* s.s. and might be confused with *C. turbatus* Schultz, *C. parvulus* Bris., *C. constrictus* (Marsh.) or possibly *C. cochleariae* (Gyll.) among its British allies. From all except the last it may be distinguished by the much more elongate antennal club, and the prothorax which is not constricted just behind the apex. From *C. cochleariae* it may be separated by the dentate claws, and the scales on the elytra, which are broader and do not form a patch near the scutellum.

The striking black form of *Cetonia aurata* L., the aberration *nigra* Gaut., was shown by Mr. C. MACKECHNIE JARVIS, together with a typical example for comparison. This beetle was taken on the island of St. Mary, Scilly Isles, the black form being found nowhere else in the British Isles, but it does occur on several of the islands in the Scillonian archipelago, from which it was first recorded in 1834. This form also occurs in Corsica, but as far as is known, from no other continental locality. Mr. MacKechnie Jarvis also showed *Stenichnus barnevillei* Reit. (*poweri* Fowler) another Scillonian beetle, discovered by Dr. N. H. Joy in a bird's nest on the Isle of Annet, from which the exhibited example was obtained. Also from the Isle of Annet was *Sinius (Astenus) lyonessius* Joy. This beetle is not found elsewhere in the British Isles. A selection of original drawings by the late Rev. A. Matthews which were formerly in the possession of Dr. Philip B. Mason were also included in Mr. MacKechnie Jarvis's exhibit.

The Japanese beetle, *Popillia japonica* Newman (Col., Scarabaeidae) was shown by Mr. A. E. GARDNER, taken from spring wheat from the U.S.A. in the Royal Victoria Dock, London, July 1946 (ex F. J. Coulson coll.). In the Far East this beetle is a wide-spread pest. It was introduced into the U.S.A. in 1916 in the larval stage with nursery stock from Japan. Since then it spread annually and in 1962 occupied 100,000 square miles, with a large area under Federal quarantine. In 1940 it established itself locally in southern Canada—in Quebec and Ontario. Beetles have been found in aircraft landing in Britain from the U.S.A. during periods of intense beetle activity near the U.S. airfields in June and July. Both the adult and larvae are plant pests; the adult feeding on foliage, flowers and fruits, and the larvae on roots. The adults have a host range of at least 250 different deciduous trees, shrubs and herbaceous plants; some of the more favoured plants being strawberry, raspberry, apple, cherry, plum, maize, clover, rose, dahlia, zinnia, hollyhock, elm, horse chestnut, lime, willow and lombardy poplar. The larvae are a pest in nursery stock, especially root stocks and seedling trees, including conifers. Normally the life cycle takes one year, but in the north of the insect's range two years are required. The Ministry of Agriculture, Fisheries and Food have published an Advisory Leaflet, No. 449.

Among the Coleoptera in the exhibit of Mr. S. A. WILLIAMS was a nice series of *Bembidion virens* Gyll., from Loch Maree, Ross & Cromarty, together with colour photographs of the locality. He also showed some interesting Staphylinidae (Col.) taken during the year which included *Staphylinus pedator* Grav., from a chalk pit at Dartford, Kent, 1.vii.65; *S. erythropterus* L., Loch Maree, 11.vi.65; *Quedius ventralis* (Aragona) from Knole Park, Kent, 20.x.65; *Q. laevigatus* (Gyll.), Glen Affric, Inv., 27.vii.65; *Philonthus puella* Nord., at the summit of the Cairngorms, Inv., 4,000 ft, 15.vii.65; *Stenus geniculatus* Grav. Kincaig, Inv., 17.vii.65; and *Micropeplus tessera* L., Ham Street, Kent, 20.vi.65.

The following members and their friends contributed to the success of the exhibition with their exhibits: Mr. D. J. L. Agassiz, Lepidoptera; Sir Eric Ansorge, Lepidoptera and Coleoptera; Mr. B. R. Baker, Lepidoptera; Dr. J. V. Banner, Lepidoptera; Dr. N. L. Birkett, Lepidoptera; Mr. A. D. Blaxill, Lepidoptera (slides); Mr. E. L. Bolton, Lepidoptera; Mr. P. T. Boorman, Lepidoptera and photographs; Mr. G. Botwright, Lepidoptera; Mr. R. F. Bretherton, Lepidoptera; Mr. A. T. Bromby, Lepidoptera; Mr. F. C. Brown, Cartoons. Mr. B. S. Burns, Lepidoptera; Mr. J. M. Chalmers-Hunt, Lepidoptera; Mr. H. E. Chipperfield, Lepidoptera; Mr. M. P. Clifton, Lepidoptera; Major A. E. Collier, Lepidoptera; Mr. S. Coxey, Lepidoptera; Mr. G. S. E. Cross, Lepidoptera; Mr. P. N. Crow, Lepidoptera; Mr. R. C. Dyson, Lepidoptera; Mr. T. R. Eagles, Fungi; Mr. R. Fairclough, Lepidoptera; Mr. R. L. E. Ford, Lepidoptera; Mrs. M. J. Frohawk, paintings by the late F. W. Frohawk, Mr. A. E. Gardner, Coleoptera; Mr. B. O. C. Gardiner, lepidopterous larvae and semi-synthetic food; Mr. P. A. Goddard, Lepidoptera (photographs); Mr. J. C. Goodall, lightweight mercury vapour traps; Mr. A. L. Goodson, Lepidoptera; Mr. G. M. Haggett, Lepidoptera; Mr. E. J. Hare, Lepidoptera; Mr. T. W. Harman, Lepidoptera; Comdr. G. W. Harper, Lepidoptera; Mr. L. G. Huggins, Lepidoptera; Mr. T. J. G. Harmer, Lepidoptera; Mr. T. J. Honeybourne, Lepidoptera; Mr. T. G. Howarth, Lepidoptera and lepidopterous larvae; Mr. G. E. Hyde, Lepidoptera (photographs); Mr. S. N. A. Jacobs, Lepidoptera; Capt. R. A. Jackson, Lepidoptera; Mr. C. MacKechnie Jarvis, Coleoptera and drawings; Mr. F. V. L. Jarvis, Lepidoptera; Maj.-Gen. Sir George Johnson, Lepidoptera; Mr. A. H. Kennard, Lepidoptera; Dr. H. B. D. Kettlewell, Lepidoptera; Mr. S. A. Knill-Jones, Lepidoptera; Mr. H. J. Leech, Lepidoptera; Maj.-Gen. C. G. Lipscombe, Lepidoptera; Mr. G. H. Mansell, Lepidoptera; Dr. A. M. Massee, Hemiptera; Mr. R. M. Mere, Lepidoptera; Mr. J. L. Messenger, Lepidoptera; Mr. H. N. Michaelis, Lepidoptera; Dr. M. G. Morris, Coleoptera; Mr. E. C. Pelham-Clinton, Lepidoptera and Trichoptera; Mr. N. B. Potter, Lepidoptera; Mr. F. S. Reeves, Lepidoptera; Mr. Austin Richardson, Lepidoptera; Dr. R. M. A. P. Ridge, Lepidoptera; Mr. J. H. P. Ridge, Lepidoptera; Mr. T. S. Robertson, Lepidoptera; Mr. A. D. A. Russwurm, Lepidoptera; Mr. L. W. Siggs, Lepidoptera; Mr. J. Summers, Lepidoptera; Mr. W. H. Spreadbury, Fungi and Lichens; Mr. D. W. Thorpe-Young, Lepidoptera and philatelic entomology; Mr. D. A. Trembath, Lepidoptera; Mr. W. G. Tremewan, Lepidoptera; Mr. R. S. Tubbs, Lepidoptera; Mr. M. W. F. Tweedie, Lepidoptera; Mr. H. G. Tunstall, Fungi and Lichens, Mr. F. T. Vallins, Lepidoptera and Fungi, Mr. S. Wakely, Lepidoptera; Mr. R. W. Watson, Lepidoptera; Mr. A. S. Wheeler, Lepidoptera; Mr. L. S. Whicher, botanical photographs; Mr. A. J. Wightman, Lepidoptera; Mr. R. S. Wilkinson, a mercury vapour light trap; Mr. S. A. Williams, Coleoptera; Dr. C. G. M. de Worms, Lepidoptera; Mr. D. L. Young, Lepidoptera.

ANNUAL EXHIBITION, 30th October 1965

1. *Coenonympha pamphilus* L., Mr. D. H. Walker; 2. *Orthosia gothica* L. ab. *gothicina* H.-S., Comdr. G. W. Harper; 3. *Ochropleura plecta* L., Mr. L. W. Siggs; 4. *Euphyia luctuata* Schiff., Mr. R. C. Dyson; 5. *Drymonia dodonea* Schiff., Mr. L. W. Siggs; 6. *Asphalia diluta* Schiff., Mr. G. Botwright; 7. *Biston betularia* L. Mr. G. Botwright; 8. *Panaxia dominula* L., a mutant form, Dr. H. B. D. Kettlewell and Mr. C. J. Cadbury; 9. *Cryphia muralis* Forst. s.sp. *westropi* Cockayne & Williams ab. *nigra* Huggins, Mr. A. J. Wightman; 10. *Rivula sericealis* Scop., Mr. L. W. Siggs; 11. *Lasiocampa quercus* L. s.sp. *callunae* Palmer, a double recessive, Dr. H. B. D. Kettlewell & Mr. C. J. Cadbury.

FIELD MEETINGS, 1965

BANSTEAD, SURREY—10th October 1965

Leader: Mr. A. E. GARDNER

Seven members met at Banstead station and proceeded by cars to Banstead Woods in the Chipstead Valley. The party consisted mainly of coleopterists who spent a typical autumn day working heaps of vegetable debris in the wood and heaps of straw in a downland field. These habitats provided many interesting species contrasting with the lack of species found under bark and in decaying beeches.

The following Coleoptera were taken: *Leistus ferrugineus* (L.), *Notiophilus biguttatus* (F.), *Amara bifrons* (Gyll.), *Agonum muelleri* (Herbst), *A. dorsale* (Pont.), *Megasternum obscurum* (Marsh), *Clambus pubescens* Redt., *Siagonium quadricorne* Kirby, *Micropelus fulvus* Er., *Megarthus depressus* (Payk.), *M. denticollis* (Beck), *Phloeonomus punctipennis* Thom., *Olophrum piceum* (Gyll.), *Stenus clavicornis* (Scop.), *S. brunnipes* Steph., *S. canaliculatus* Gyll., *Gyrophynus punctulatus* (Goeze), *Quedius cruentatus*, *Q. cinctus* (Payk.), *Q. fumatus* (Steph.), *Lordithon thoracicus* (F.), *Autalia impressa* (Ol.), *Onthophilus striatus* (Forst), *Abraeus globulus* (Hoff.), *Omosita discoidea* (F.), *Rhizophagus bipustulatus* (F.), *Monotoma bicolor* Villa, *Atomaria lewisi* Reit., *Ephistemus globulus* (Payk.), *Lathridius nodifer* Westw., *L. bergrothi* Reit., *L. bifasciatus* Reit., *Enicmus transversus* (Ol.), *Bitoma crenata* (F.), *Cis boleti* (Scop.), *Phyllotreta nigripes* (F.), *Longitarsus luridus* (Scop.), and *Trypodendron domesticum* (F.).

Dr. A. M. Masee reported the following Hemiptera-Heteroptera: *Xylocorus galactinus* (Fieb.), *X. cursitans* (Fall.), *Drymus sylvaticus* (F.), *Anthocoris gallarumulmi* (Deg.), *Nabis rugosus* (L.), and *Taphropeltus contractus* (H.-S.).

Lepidoptera were scarce, but the following larvae were noted: *Strophedra weirana* Dougl. between spun leaves of beech, *Ancyliis mitterbacheriana* Schiff. in spun oak leaves, and *Coleophora onosmella* Brahm, small larvae on *Vipers Bugloss*.

Several members reported that a portion of the field had been dug over and that *Teucrium botrys* L., was flourishing. This was particularly pleasing as it was thought that the plant had died out.

An unusual time of emergence of Geometra papilionaria L. (Lep., Geometridae).—A perfect specimen of this moth was sent to me for identification. It was taken flying at Bow near Crediton, Devon., on 10th December 1965—A. E. GARDNER, 29, Glenfield Road, Banstead, Surrey. 14th February, 1966.

Diurnal flight in Dytiscus (Col., Dytiscidae). Recently 2.ii.66, a female *Dytiscus marginalis* L. was brought to me having flown indoors through an open door at 4 p.m. here at Tiptree, Essex. Though *Dytiscus* spp. are regular visitors to light, and the smaller Dytiscidae are sometimes taken in flight on warm spring days, I can recall no records of daytime flight in *Dytiscus*. The beginning of February is early for any Coleoptera to be on the wing and is particularly remarkable for *Dytiscus*.—F. D. BUCK, 9, Elton Walk, Tiptree, Colchester, Essex, 4th February 1966





ANNUAL EXHIBITION, 30th October 1965

1. *Notodonta ziczac* L., melanic, Mr. A. L. Goodson; 2. *Xylena vetusta* Hübn., melanic, Comdr. G. W. Harper; 3. *Apamea infesta* Ochs., Mr. R. M. Mere; 4. *Omphaloscelis lunosa* Haw., somatic mosaic, Mr. S. A. Knill-Jones; 5. *Drymonia ruficornis* Hufn., Mr. J. Summers; 6. *Jaspidia pygarga* Hufn., melanic, Mr. B. R. Baker; 7, 8, 9 & 10. *Aporophyla australis* Boisd. s.sp. *pascua* Humph. & Westwood, Mr. P. N. Crow (fig. 7 melanic female, fig. 8 melanic male, fig. 9 normal female, fig. 10 normal male).

JOHN LOFTUS HENDERSON

1884-1965

The only son of John Henderson and Mary Loftus, John Loftus Henderson was educated at Streatham College which he left as Head Boy when he joined his father and uncle at Waterlows. In 1903 he joined the London Scottish Regiment, but in 1910 he emigrated to Canada with friends and settled in Saskatoon in Saskatchewan where he worked in the timber trade.

When war broke out in 1914 he joined the Canadian Army and returned to England with the 1st Canadian Expeditionary Force. A serious attack of pleurisy prevented him embarking for France, and as a result of this illness he remained in England for the duration, serving as Company Quartermaster Sergeant at various training camps.

On 17th April 1915 he married Minnie Arnold whom he had known for several years when he lived at Streatham. Their only child, Betty, was born on 1st March 1918.

He joined the importing side of the timber industry when he was demobilised at the end of the war, and remained in this business until 1932 when he opened a dry cleaning business of his own. This was closed in 1940 because of the combined difficulties of restriction of materials and an acute shortage of staff. By this time, however, Henderson was back in the forces having re-joined the London Scottish in 1939, and for the next four years was on defence duty and troop training at Fort George in Scotland.

After leaving the army he joined a firm of City accountants with whom he remained until he retired. He contracted pneumonia and died some months later on 13th June 1965, surviving his wife by only eight months.

As a small child he used to help his father with his collection of Lepidoptera and in his late teens began his own collection of Coleoptera, becoming a very competent worker both systematically and in the field. He developed a special interest in the Hydradephaga and was among the most knowledgeable British coleopterists on the water beetles. He did not publish extensively, but most of his published work was of more than a little importance, included additions to the British list, notably *Ceuthorhynchus turbatus* Schultz and *Chaetocnema aerosa* Letzner, the former being in many collections unrecognized.

He joined the South London in 1924, and in 1945 he was elected our Treasurer; an office he filled with quiet distinction, guiding our finances safely through the extremely difficult inflationary post-war period. This office he held until 1963 when he relinquished the responsibility after a serious illness. The value of this 16 years' service cannot be too highly commended. Those who served on Council with him remember his careful and surprisingly accurate assessment of the Society's probable income for the coming year, enabling Council to plan expenditure in such a way that he could report a satisfactory financial year at the A.G.M. Nor will they forget the careful way he husbanded our reserves of accumulated revenue, making Council fight hard for projected disbursements so that a very good case was made before final agreement was reached on the expenditure. In 1949 he was elected Vice-President, but, despite enthusiastic pressure from the Council, he declined the office of President. The Council recognized his services to the Society in 1963 by electing him an Honorary member.

Henderson was also a keen tennis player; an interest he retained throughout

his life, playing his last game against his 18-year-old grand-daughter at the age of 78.

Cabinet making was his only other hobby. In this he showed a skill probably derived from his knowledge of timbers gained in his earlier business life. However he lost interest in this in later years.

This is a sad loss, not only to our Society, but to entomology generally; but he led a full life, unselfishly spent.

F. D. BUCK

Chrysolina sanguinolenta (L.) (*marginalis* Duft.) (Col., Chrysomelidae) in N.E. Essex. Recently, 15.ix.65, my daughter brought to me some examples of *Chrysolina sanguinolenta* (L.) which she had found on *Linaria vulgaris* Mill. (Toadflax) on her way home from school. On being shown the spot where she had taken them, I found a small growth of about a dozen plants among some mixed vegetation on a small bank in a lane on the edge of the built-up area of Tiptree. On these plants the beetles occurred in some numbers, about twenty or so examples being plainly visible without further searching, their blue and red coloration standing out clearly against the natural background.

Though Fowler (1890, *Col. Brit. Is.*, 4 : 303) records the species as local and not uncommon in the London area, it would appear in recent years to be very restricted indeed. The present writer has not taken it in the London area in over twenty-five years' collecting in the countryside around the capital.

It was a coincidence that only the previous Sunday, 12.ix.65, I was examining a strong colony of *Linaria vulgaris* Mill. on Tiptree Heath, on the edge of the village, about a mile or so from the spot where the *C. sanguinolenta* (L.) were taken, without finding a trace of this species. The only Coleoptera the plants produced were *Gymnetron antirrhini* (Payk.) (Curculionidae) in plenty and two examples of *Meligethes corvinus* Er. (Nuttidulidae).—F. D. BUCK, 9, Elton Walk, Tiptree, Essex, 17th September 1965.

Odontaeus armiger (Scop.) (Col., Scarabaeidae) at light.—Mr. Buck (*antea* p. 34) in a note on *Prionus coriarius* (L.) commented on the occurrence of *Odontaeus armiger* (Scop.) at mercury vapour light. This species has occurred at the writer's mercury vapour light operated at Medmenham, Bucks., regularly since 1962, during which time almost a dozen have been seen. The light has been in operation only since 1961 so this does not imply a sudden appearance of the insect. Most of the specimens have been noted in June but the beetle has been seen as late as early August, females predominating; the species seems to appear soon after dark.—T. W. HARMAN, 3, Lodge Farm Cottages, Medmenham, Near Marlow, Bucks., 9th October 1965.

A correction to the Proceedings and Transactions 1964

In reporting the Annual Exhibition an error has occurred in the table showing the characters identifying the tortoise species of the genus *Testudo*. Mr. F. C. Brown points out that the last character at the foot of the table should read 'Rear carapace plates flanged' not 'hinged' as printed.—*Editor*.

The Society's Publications

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MEETINGS OF THE SOCIETY

are held regularly at the Society's Rooms, and include the well-known ANNUAL EXHIBITION, which takes place in October in the Libraries of The Royal Society and of the Geological Society of London at Burlington House, Piccadilly, by kind permission of those two Societies. Frequent Field Meetings are held at weekends in the Summer. Visitors are welcome at all meetings. The current Programme Card can be had on application to the Secretary.

THE GENUS *ARICIA* (LEP., RHOPALOCERA) IN BRITAIN

By F. V. L. JARVIS, B.SC., F.R.E.S.

During the course of breeding experiments with British *Aricia agestis* Schiff., it has become increasingly apparent that morphological and genetic differences between the bivoltine race of southern England and the univoltines of the north (including f. *artaxerxes* F. from Scotland) represented more than the accepted racial grouping of double and single brooded forms. In view of the visual similarities between the north British *Aricia* population and *A. allous* Hübn. from Scandinavia I was able, with the generous co-operation of Mr. O. Høegh-Guldberg, to pair British with Scandinavian *Aricia*, and at the same time effect cross-pairings between southern and northern British stocks. The results of these experiments, together with previous work, set the scope for this paper which is to define the distinction between the bivoltine *A. agestis* in the southern half of England and the univoltines from northern Britain. The results were striking enough to indicate that the original stock in northern Britain, including f. *artaxerxes*, was indeed *A. allous* and not *A. agestis*.

I have expressed the opinion in earlier papers that the univoltine race of *agestis* in northern Britain had probably arisen by the elimination of the bivoltine fraction during a cooler phase of the late Pleistocene, following a warmer interstadial which had allowed the bivoltine to spread into Scotland. This view was suggested by the discovery of univoltine forms at Royston, Herts., and by the dates of field emergence at Royston, in north Wales and on the Lincolnshire coast, but it now seems that the undoubted presence of a strong 'allous' element in the north renders this theory untenable in its entirety. The results of pairing between southern and northern British forms have shown genetic results which are more extreme than should be expected between contiguous races of the same species. At the same time univoltine forms of *agestis* have been shown to exist in the northern fringe of the southern distribution so that it is highly possible that some northward coastal spread of this form along the east coast has introduced the 'agestis' element into the Durham littoral where their presence is indicated by occasional red shaded larvae and imagines with the full complement of orange marginal lunules. Going further back into the Pleistocene, the separation of *agestis* and *allous* must have arisen by segregation into bivoltine and univoltines, but this period is probably too remote to have caused the present British distribution.

DISTRIBUTION

Aricia agestis and *A. allous* are members of a species complex which is distributed throughout the Palaearctic region; *agestis* is bivoltine and potentially trivoltine, *allous* is univoltine. On the Continent *agestis* is found in lowland areas in western and central Europe. *Aricia allous* occurs in upland regions above 1,000 m in the Alps. It is absent in France and Germany, but its s.sp. *inhonora* Jach. is found in Poland and central and southern Russia. The more typical *allous* reappears at low-level sites in Scandinavia as far north as the Arctic Circle, with a recently described s.sp. *vandalica* (Høegh-Guldberg) in Jutland on the north coastal fringe of Denmark.

SCOPE OF THE PRESENT WORK

To define the British position the following stocks were raised:

- | | |
|-----------------------|-------------------------------|
| (1) <i>Bivoltines</i> | (a) from Winchester, Hants. |
| | (b) from Leatherhead, Surrey. |

(2) *Univoltines*

- (a) from Warton, Lancs.
- (b) from the Durham coast and inland in Durham.
- (c) from Hawick and Stonehaven, Scotland (f. *artaxerxes*).
- (d) from Oslo, Norway (*A. allous*).
- (e) from Jutland, Denmark (*A. allous* s.sp. *vandalica*)

Each of the stock is described under the following headings:

- (1) Larval colour, proportion and photoperiodism.
- (2) Pupal characters and proportion.
- (3) Imaginal characters.

The following cross-pairings were successfully obtained (in the case of British stocks the name of the locality has been used with the prefix 'biv' for bivoltine or 'univ' for univoltine, as the case may be):

- (a) univ. Warton male \times biv. Winchester female.
- (b) biv. Winchester male \times univ. Warton female.
- (c) biv. Winchester male \times *vandalica* female.
- (d) univ. Durham male \times *vandalica* female.
- (e) Norwegian *allous* male \times univ. Durham female.
- (f) biv. Leatherhead male \times biv. Winchester female, and the reciprocal.
- (g) biv. Winchester male \times univ. Hawick *artaxerxes* female.
- (h) univ. Stonehaven *artaxerxes* male \times biv. southern female (cross: Winchester \times Leatherhead).

The results of each cross-pairing are discussed and finally an examination was made of male genitalia.

Two definitions are best made at this stage.

(1) *Photoperiodism*

The number of hours of light in each 24 which will prevent the larva from entering diapause, counting from half an hour before sunrise to half an hour after sunset. In the rearing experiments, unless otherwise stated, larvae were raised in continuous light as near as possible to 21°C (70°F).

(2) *Pupal Ratio*

This is an important figure which can be classed as morphological for assessing relative proportions of pupae in the various stocks. All available pupae were measured. It was found that consistent values were obtained in each group. The pupa is laid on its ventral surface on a cloth surface to prevent turning and two measurements are made with fine dividers.

- (a) The total length.
- (b) The width at the junction of thorax and abdomen.

The pupal ratio is $a \div b$. Sex does not affect this linear ratio.

A similar ratio was used to determine the relative slenderness of the adult larvae. When placed side by side the adult larvae of *allous* from Norway and Jutland, and north British univoltines are noticeably more elongated than the larvae of bivoltines from southern England. Following this observation through, it was found that elongated larvae produce slender pupae and imagines with a long abdomen. The method is to allow the larva to settle on a sheet of paper which it will do when fully fed. Three measurements are made with a millimetre scale held just clear of the body setae.

Length = L.

Width of segment VI = W.

Height from paper to dorsum at segment VI = H.

The ratio of slenderness = $L \div W + H$.

Although not as accurate as the pupal ratio, ratios measured from considerable numbers of larvae give reasonably consistent values for each group as the following examples indicate:

	Larva	1	2	3	4	5	
Southern univoltines	L	9.0	8.2	9.5	10.0	9.5	mm.
	W	4.1	3.7	3.9	4.0	3.8	mm.
	H	4.0	2.8	3.5	4.0	3.5	mm.
Ratio of slenderness	$\frac{L}{W+H}$	1.11	1.30	1.29	1.25	1.30	Average 1.25
<i>A. artaxerxes</i> (Stonehaven)	L	11.2	9.8	11.9	11.9		mm.
	W	3.6	3.6	3.9	3.9		mm.
	H	3.6	2.2	3.6	3.6		mm.
Ratio of slenderness		1.55	1.73	1.59	1.59		Average 1.61
<i>A. allous</i> (Norway)	L	10.0					mm.
	W	3.0					mm.
	H	3.2					mm.
Ratio of slenderness		1.61					

All the above measurements in millimetres

The figure of 1.61 for *allous* was averaged from six larvae whose ratios were: 1.54, 1.57, 1.60, 1.61, 1.64 and 1.66.

The larva of bivoltine *agestis* is compact and elliptical in outline, whilst *allous* is widest between the 4th and 6th segments, with slight tapering and flattening of the posterior segments, Durham and *artaxerxes* larvae are elliptical but as slender as the larvae of *allous*. The *vandalica* larvae have the same ratio (1.60) as *allous* from Norway with very slight tapering after segment VI.

Each of the groups under discussion will be described as 1st and 5th instar larvae, as pupae and as imagines. The 1st instar shows an important distinction between bivoltine *agestis* and all the other groups. At maturity in the 5th instar, the coloured shading (if present) above and below the sub-spiracular ridge is fully developed. I would emphasize that this coloration is genetic and not an ephemeral appearance affected by such factors as temperature, food plant, crowding and suspension of diapause. I am fully satisfied that none of these influences have any effect on colour or pattern at any stage. The only effective environmental condition is a period of low temperature (2-3°C above freezing point) immediately following pupation. This will cause alterations in imaginal pattern, but in the rearing and cross-pairing to be described later no temperatures of this order were used.

For ease of comparison the groups are described under the headings of each character.

LARVA

BIVOLTINES FROM THE SOUTHERN PORTION OF ENGLAND (*ARICIA AGESTIS*)

- Instar I. Greyish-green with a pattern of blackish tubercles on the dorsum and sides of the body. The tubercles bear curved setae which are dark grey on the dorsum and grey elsewhere. Darker dorsal line.
- Instar V. Pea green on upper surface, paler below the legs; purple-brown dorsal line. The pink sub-spiracular ridge is broadly shaded above and below with purple-crimson. Segments III to X are patterned with oblique light and dark green chevrons. Covering the body is a close pattern of pale brown tubercles bearing transparent grey setae. In many larvae there is an admixture of blackish setae on segment I and on the dorsum (Pl. V, fig. 1). Slenderness ratio: 1.25.
Photoperiod: 16 to 16.5 hours.

UNIVOLTINES FROM NORTHERN BRITAIN, NORWAY AND JUTLAND

Warton

- Instar I. Pale green with brown tubercles; colourless setae; faintly darker dorsal line.
- Instar V. Dull yellow-green with indistinct chevrons; dorsal line varying from medium to dark brown; tubercles white; setae colourless; white sub-spiracular ridge with no shading in about 12 per cent of the larvae reared. In the remainder the shading was narrow, in tones of umber brown, deepest in colour on the dorsal boundary of the ridge; a few larvae showed pale pink shading above the ridge and no shading on the lower border.
Slenderness ratio: 1.50.
Photoperiod: 18 hours.

Durham

- Instar I. Very pale green, sometimes tinged with grey; light brown tubercles; colourless setae; faint dorsal line.
- Instar V. Variable in relation to ridge shading. Ground colour bright yellow-green with well-defined chevrons; tubercles white; setae colourless. Dorsal line medium to dark brown. The sub-spiracular ridge is white. The shading is interesting; in many larvae there is no shading (Pl. V, fig. 2); others show pinkish-brown shading, whilst a common shading is dull purple. In no case was the line of colour as broad or as brilliant as in the bivoltines. I have had 100 per cent unshaded larvae in some broods and 100 per cent purple in others, whilst some broods contain all three colours.
Slenderness ratio: 1.40 to 1.55.
Photoperiod: 18 to 18.3 hours (the purple shaded larvae show the lower value).

A. artaxerxes

- Instar I. Very pale green, light brown tubercles; colourless setae; faint dorsal line. Larvae from northern Scotland are deeper in colour and are more greyish than those from southern Scotland.
- Instar V. Yellow-green with well-defined chevrons; tubercles white; setae colourless; medium to dark brown dorsal line. The sub-spiracular ridge is

white or faintly buff, with either no shading or a variable brownish outline above and below the ridge. In some larvae from the south of Scotland the shading is reddish or pinkish-brown, but from a considerable number examined none were found with the purple colour of some Durham specimens.

Slenderness ratio: 1.55 to 1.61.

Photoperiod: 18.5 hours in southern Scotland to 20 hours in Sutherland.

A. allous (Norway)

Instar I. Pale grey-green with slightly darker dorsal line; tubercles pale brown; setae colourless.

Instar V. Deep yellow-green with well-defined chevrons and dark brown dorsal line; tubercles white; setae colourless; white unshaded sub-spiracular ridge.

Slenderness ratio: 1.61.

Photoperiod: 20 hours.

A. allous s.sp. vandalica (Jutland)

Instar I. Very pale green with faint dorsal line; tubercles very pale brown; setae colourless.

Instar V. Deep yellow-green with well-defined chevrons and medium brown dorsal line; tubercles white; setae colourless; sub-spiracular ridge white, usually unshaded but in a few larvae there is a narrow reddish shading above the ridge (Pl. V, fig. 3).

Slenderness ratio: 1.60.

Photoperiod: 19.5 hours.

PUPA

BIVOLTINES FROM SOUTHERN ENGLAND

Thoracic region and wing sheaths dull olive or brownish-green; abdomen light yellow-brown with dark brown dorsal line; wide, rose coloured sub-spiracular band intersected by a paler line. As the pupa matures the colourings become duller. The anterior margin of the eye is heavily shaded with black (up to $\frac{1}{2}$ diameter). (Pl. V, fig. 4).

Pupal ratio: 2.88 to 2.95 (average 2.91).

UNIVOLTINES FROM NORTHERN BRITAIN, NORWAY AND JUTLAND

Warton

Thorax and wing sheaths pale olive-green with a yellowish tinge; abdomen greyish-buff with brown dorsal line; sub-spiracular band pale buff with a few dull crimson flecks in some specimens; black eye shading varies from $\frac{1}{5}$ to $\frac{1}{3}$ of diameter.

Pupal ratio: 3.05.

Durham

Thorax and wing sheaths light bluish or yellow-green; abdomen pale buff with brown dorsal line; subspiracular band whitish flecked with purple in the darker larvae. Narrow black border to eye (less than $\frac{1}{5}$ diameter). (Pl. V, fig. 5).

Pupal ratio: 3.16 to 3.24.

A. allous (Norway)

Thorax and wing sheaths pale lime green; abdomen dull buff with brown dorsal line; faintly paler subspiracular band. Narrow black border to eye (less than $\frac{1}{5}$ diameter).

Pupal ratio: 3.16.

A. allous s.sp. vandalica

Identical in colouring to the pupa of Norwegian *allous* but with faint reddish shading above the sub-spiracular band in the pupae from red shaded larvae. Narrow black border to eye (less than $\frac{1}{5}$ diameter).

Pupal ratio 3.10.

DISCUSSION ON LARVAL AND PUPAL STAGES

From the foregoing descriptions it is clear that both larvae and pupae of the southern bivoltines showed marked differences in colour and proportions from the whole of the univoltine groups examined. Furthermore in the univoltines there is considerable homogeneity. The unshaded coloration appears in both British and Scandinavian forms; the brown or reddish shaded larvae seem to be peculiar to Britain as a major colour type but there are indications of this in Jutland. Larval ratios in the range 1.40 to 1.61 and pupae 3.05 to 3.25 are distinctly above the corresponding figures for the bivoltines (1.25 and 2.91).

IMAGINES

BIVOLTINES FROM SOUTHERN ENGLAND (pl. IV, rows 1 & 2).

Male. Upper surface deep umber-brown with black discoidal spot on forewings; 4-6 orange marginal lunules diminishing in size towards apex of wing; the apical two spots are sometimes absent. There are 5 lunules on the hindwings; the anterior spot may be reduced to a trace.

Undersurface light grey-brown, more brown on hindwings; black pupils of discoidal (forewing) and discal spots well formed.

Female. Upper surface lighter and more red-brown than male; discoidal spot occasionally edged with a few white scales. Six large marginal lunules on forewings; 5-6 on hindwings. Undersurface light brown with tinge of grey on forewings; black pupils prominent.

BRITISH UNIVOLTINES (COMPRISING RACES FROM DURHAM, LANCS, WESTMORLAND AND SCOTLAND (ARTAXERXES) (Pl. IV, rows 3 to 6)

Upper surface. Compared with the bivoltines, the ground colour is deep chocolate-brown, approaching black in some fresh specimens. Occasionally females are slightly less deep in tone than males. In both sexes the marginal lunules are less in size and numbers than in the bivoltines.

Male lunulation. Forewings nil to 3 (small); occasional traces of a 4th towards the apex. Hindwings 3 to 5 (small); very rarely the lunules are all absent.

Female lunulation. Forewings normally 4 or 5; a few specimens show a trace of a 6th apical. The number can be less than 4; very rarely all lunules are absent. Hindwings usually 5 small lunules, but the number may be reduced, particularly in *artaxerxes* from northern Scotland.

The black discoidal spot on the forewings is generally smaller than in the bivoltines and frequently outlined with white (ab. *albannulata* Harr.). In

artaxerxes this spot is completely white; occasionally there is a small white discoidal spot on the hindwings (Pl. IV, rows 5 & 6).

Undersurface greyish-brown on forewings; more brown on hindwings, generally darker in tone than in bivoltines. On the Durham coast decidedly brown undersides are a feature of both sexes. The black pupils are relatively small with frequent obsolescence of one or more spots.

In *artaxerxes* the discoidal spots are completely white, but the discal spots usually possess minute pupillations in the sub-marginals.

A. ALLOUS (NORWAY) (Pl. III, rows 1 & 2)

Male. Upper surface chocolate-brown; the black discoidal spot on the forewing is sometimes partially margined with white scales. The orange marginal lunules are usually absent or reduced to traces of 2 or 3 spots. The hindwing lunules are much reduced in size and range from traces of 5 to 3 or less.

Under surface light greyish-brown (more brown on hindwings). On the forewings the discoidal and discal pupillation is well-developed, but on the hindwings the pupillation is small and often obsolescent.

Female. Upper surface similar in colour to males. Forewing lunules small and usually reduced to traces of 4 or less. Hindwing lunules small and normally 5 in number. Under surface similar in pattern to males but more brown in colour.

A. ALLOUS S.SP. VANDALICA (JUTLAND) (Pl. III, rows 3 & 4)

This is the largest insect in the groups examined, with a wing span of 29–32mm, only equalled by some specimens from the Durham coast.

Male. Upper surface chocolate-brown with a small forewing black discoidal spot and prominent white costa. The orange lunulation is reduced to 1 or 2 small spots on the forewings, but complete loss of all lunules can occur. On the hindwings there are 4 or 5 rather small lunules.

Undersurface light grey on forewings and pale sand colour on hindwings, with black pupillation reduced in size. The orange marginal lunulation is reduced in extent together with the black marginal spots. The area of reduction is filled with white scales which give a characteristically beautiful effect to this underside.

Female. Upper surface as male, except that the orange lunulation on the forewings is increased to 3 or 4.

Undersurface light brown with traces of grey on forewings. As in the males there is a reduction in size of pupillation combined with a white marginal infusion.

DISCUSSION ON IMAGINES

(a) The bivoltines are readily separated from the univoltine group by the greater degree of orange lunulation on the upper surface of both sexes.

(b) The ground colour of the bivoltines is more reddish with a distinction between the sexes, females are lighter than the males and warmer in tone. The males usually show a diffuse area of slightly thinner scaling on the disc of the forewings against which the nervules stand out darkly.

In all the univoltines the forewing colour is a colder chocolate-brown, approaching black in many specimens from Durham and northern Scotland, and in *A. allous* from Norway. There is practically no difference in tone between the sexes.

- (c) Pupillation of the underside spots is heavier in the bivoltines.
 (d) The British and Scandinavian univoltines possess a strong group resemblance in colour and lunulation, but there is a small distinction, apart from the unique f. *artaxerxes*, in that there is a tendency in northern England and southern Scotland for slightly more orange lunulation than is found in Scandinavia. On the other hand many Durham and Westmorland insects are indistinguishable from Norwegian specimens.

It is not easy to appreciate the distinction from descriptions or a few specimens, but when series of all the forms are compared together the bivoltines stand out clearly.

Bringing all three stages, larva, pupa and imago, together there now appears to be a good case for establishing a distinction between the univoltines and the bivoltines which could be more than sub-specific. Furthermore the univoltines of northern Britain appear to be closely related to the univoltines of Scandinavia.

CROSS PAIRINGS

(a) *Univoltine Warton male* × *bivoltine Winchester female August 1962*

(b) *Bivoltine Winchester male* × *univoltine Warton female August 1962*

F₁ GENERATION

For these pairings two stocks of *Aricia* were raised.

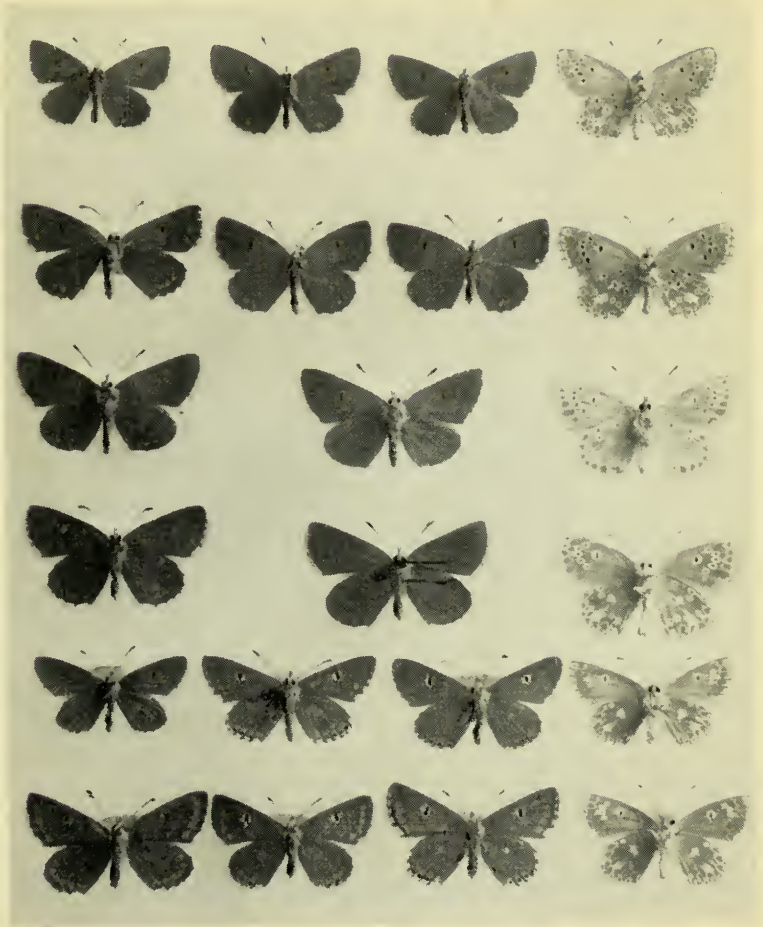
- (1) From females taken at Winchester on 6th June which were raised in normal daylight.
- (2) From females sent me from Warton Crag by Rev. J. H. Vine Hall, about 100 imagines were reared in continuous light.

Cross pairings (a) and (b) were successful at the end of August; about 120 eggs being used in each case. Larvae were reared in continuous light except for 20 from each pairing which were subjected to 16 hours of light in each 24 hours. A further 20 from (a) and (b) were placed outdoors as soon as they were hatched on *Chaemacistus* to form a diapause control. All the control group entered diapause at the end of October.

In the first instar both groups were identical, with dark brown or blackish tubercles and pale grey setae. In this respect they resembled the Winchester larvae, those from Warton possessed medium brown tubercles and colourless setae. In subsequent growth behaviour and imaginal facies the two groups (a) and (b) showed significant differences which are shown below.

F₁ (a) *Warton male* × *Winchester female*

CHARACTER	DETAILS
Larval Colour	80 larvae. Instar I resembled Winchester. Instar V 87% resembled Winchester. 13% resembled Warton (refer to earlier description).
Pupae	Mainly resembled Winchester in colour. Eye shading $\frac{1}{4}$ diameter of eye. Pupal ratio 2.94.



Line—Reading horizontally

- 1 *Aricia allous* males, south Norway.
- 2 *Aricia allous* females, south Norway.
- 3 *Aricia allous* s.sp. *vandalica* males, from Jutland.
- 4 *Aricia allous* s.sp. *vandalica* females, from Jutland.
- 5 F₂ generation from F₁ (b) Winchester/Warton cross males (F₂/×2).
- 6 F₂ generation from F₁ (b) Winchester/Warton cross females (F₂/×2).



Line—Reading horizontally

- 1 Bivoltine southern English *Aricia agestis* males.
- 2 Bivoltine southern English *Aricia agestis* females.
- 3 Univoltine Durham coastal *Aricia* males.
- 4 Univoltine Durham coastal *Aricia* females
- 5 *artaxerxes* males; Nos. 1, 2 & 4. Stonehaven, No. 3 Sutherland.
- 6 *artaxerxes* females; No. 1 Hawick, Nos. 2 & 3 Stonehaven, No. 4 Sutherland.

CHARACTER	DETAILS
Diapause behaviour	(i) In 16 hours light, 75% (15 out of 20) entered diapause in instar III. (ii) In continuous light 5% entered diapause (mortality 44%).
Imaginal Characters	24 males, 8 females. All conformed to Warton characters (see under British univoltines), except that the forewing discoidal spots were larger. The ground colour was dark brown; orange lunules were deep in tone. The undersides were decidedly grey in tone. Wing span: males 30mm, females 28mm.
Emergence sequence	Proterandrous, but unusually long period between male and female emergence peaks (10 days). The marked deficiency of females could be abnormal. Average growth periods: males 53 days, females 63 days.
<i>F₁ (b) Winchester male × Warton female</i>	
Larval colour	80 larvae. Instar I resembled Winchester. Instar V all resembled Winchester.
Pupae	Closely resembled Winchester. Eye shading $\frac{1}{8}$ diameter of eye. Pupal ratio 2.90.
Diapause behaviour	(i) In 16 hours light, 25% entered diapause. (ii) In continuous light. No larva entered diapause. Mortality rate 6%.
Imaginal characters	27 males, 39 females. All conformed to Winchester characters. The ground colour was rather dark brown in the males, but somewhat lighter in the females. The orange lunules were paler than in <i>F₁ (a)</i> . The undersides were more grey than in the parents, but not so grey as in <i>F₁ (a)</i> . Wing span: males 28mm, females 28mm. It is interesting to note that females were the same size in <i>F₁ (a)</i> and <i>F₁ (b)</i> but the males in <i>F₁ (a)</i> were noticeably larger.
Emergence sequence	Definitely proterogynous, with female peak preceding the male peak by 4 days. Average growth periods: males 56 days, females 52 days. The accelerated female development in this group is noteworthy (52 days against 63 days in <i>F₁ (a)</i>). Both groups were raised in the same environment.

Observation on F₁ (a) and F₁ (b)

There may be a linkage between regional pattern characters and larval photo-period. After the early stages, these experiments suggest a pattern dominance carried by the male parent. Response to the light period of 16 hours (photo-period for Winchester) and the development rate of females also seem to be influenced by the male parent. For example, the Warton male crossed with the Winchester female causes high diapause entry in the 16-hour group and also retards female growth.

F₂ GENERATION

On 21st October 1962 two males from F₁ (a) were put into a pairing cage with two females from F₁ (b). By 29th October about 70 eggs were obtained. Hatching began on 7th November. The eggs had been laid on *Chaemacistus*, but after the first moult *Geranium rotundifolium* L. was used as the food plant. Continuous light was used, temperatures maintained as near as possible to 18°C (65°F). On 25th November 45 larvae were selected (10 in Instar I; 32 in Instar II; 3 in Instar III), the remainder being placed outdoors on *Chaemacistus*. By 2nd December most of the larvae were in Instar IV; several in Instar V, and a few in Instars II and III. This pairing is recorded as F₂ × 1.

From 8th December, owing to cold weather I could only maintain, even in a warm room, 14–16°C (55–60°F) but by 21st December 20 pupae had been formed and all the remaining larvae were in Instar V. Eighty-two per cent of the larvae showed the red/purple sub-spiracular shading of the southern bivoltines; the majority of the remaining 18 per cent were shaded with deep brown as in the original Warton larvae. There were a few borderline cases.

After Christmas 1962 and throughout January and February 1963, England endured the coldest winter in the south since 1740 and in the ten days from 16th to 26th January day maxima at Bognor remained below 0°C (32°F) with severe night frosts. At times the room temperature fell to 8–10°C (45–50°F) but emergencies occurred in that period. Some of the imaginal patterns were remarkable owing no doubt to the effect of low temperature at the critical phase of pupation.

From the original 45 larvae I obtained 29 pupae. Apart from the pattern alteration due to cooling, most of the imagines showed a mixture of bivoltine and univoltine pattern and colouring, but a few were either pure Winchester or pure Warton in appearance.

F₂ × 2

On 25th October a cage was set up with four males and three females from F₁(b) to give an F₂ within one group. Forty-five larvae were selected for rearing in continuous light in the same conditions as for F₂ × 1. Although hatching about the same time as F₂ × 1, growth was slower and on 25th November most of the larvae were still in Instar I, with a few in Instar II and one in Instar III. By 21st December there were only four pupae in F₂ × 2, but 20 in F₂ × 1. I finally obtained 16 pupae, six of which died. On 6th January five larvae were still in Instar V; three of these died and the pupae of the other three were among the other fatalities. Mortality was high in this brood. It is perhaps noteworthy that in the F₁ crosses, the combination Winchester male × Warton female was the more vigorous, although exhibiting proterogyny. In the F₂ there was more mortality in the group crossed within itself (F₂ × 2), than in the F₂ crossing between F₁(a) and F₁(b).

Adult larvae in $F_2 \times 2$ showed the southern s.sp. colouring except for a small percentage with dark brown shading.

The imagines were extreme in pattern with a high degree of obsolescence and pronounced *albiannulata* effects, but there was one large female which was a splendid example of the Winchester pattern and colour (Pl. III, rows 5 & 6).

A third attempted cross pairing between males and a female from $F_1(a)$ was a failure; no pairing was observed and no eggs laid.

I tried to get an F_3 crossing from $F_2 \times 1$ at the end of January but the weather conditions were the worst imaginable for this type of experiment. By thawing the ice from the window and using hot water bottles to warm the cage, in the few hours of sunshine available the butterflies would fly a little and feed from the plastic flowers moistened with honey and water. No pairing was observed but when the female died on 15th February I found 12 eggs on the *Chaemacistus*. None of these hatched.

The opinion I formed from the results of these cross pairings was that several genes were probably involved in larval and imaginal pattern; there was blending and some separation; that there was no apparent linkage between larval and imaginal pattern genes. There was clearly an imbalance showing in proterogynous results and in the differing patterns of $F_1(a)$ and $F_1(b)$. I feel that the distinction between the southern bivoltines and the northern univoltines used in these experiments is at least sub-specific and may border on specific.*

(c) *Bivoltine Winchester male* \times *univoltine A. allous s.sp. vandalica*

F_1 GENERATION

From a male raised from Winchester stock and a female *vandalica* reared in continuous light from ova sent me on 3rd July 1963 by Mr. Høegh-Guldberg, a pairing was obtained on 16th August. The first hatching took place on 18th August, and pupation began on 26th September, the larvae being raised in continuous light, and 93 pupae were formed; all emerged between 14th and 25th October.

Proterogyny was present; from 14th to 18th October only females emerged, from 18th to 21st October the emergence of both sexes was equal, and from 21st to 25th October there was a preponderance of males.

Larvae

Instar I: pale green with deep brown tubercles; setae colourless except on segment 1, 11 and 12, where they are deep grey. In these respects they closely resembled the larvae of bivoltine *agestis*.

Instar V: at maturity the ground colour was more yellow than in *agestis*; brown dorsal line and well-defined lateral chevrons; sub-spiracular ridge white shaded above and below with purplish-brown or dull reddish-purple. Only one larva had an unshaded ridge, and another was shaded with light brown. Body tubercles were white or pale brown; setae were colourless with no intermingling of deep grey setae as in *agestis*.

Analysis of these results indicate more resemblance to *agestis* than to *vandalica*, particularly in Instar I, but there is not 100 per cent *agestis* dominance. The larvae were more slender than in *agestis*. As an approximate assessment I would have said that the visible comparison was 75 per cent *agestis* and 25 per cent *vandalica*.

* This was my opinion written early in 1963, before I had conducted the Scandinavian cross pairings. I would now throw the emphasis on a specific difference.

Pupae

Thorax and wing sheaths dull lime green or grey-green; abdomen pale buff with reddish shading in spiracular region; dark dorsal line; black anterior border to eye not more than $\frac{1}{2}$ diameter.

Pupal ratio: 3.04.

Assessment: *agestis* 60 per cent, *vandalica* 40 per cent.

Imagines

Males: upper side very similar in lunulation to *agestis*, but undersides paler with tendency to the reduced pupillation of *vandalica*.

Females: variable upperside lunulation. Only two showed the full *agestis* pattern; generally the degree of lunulation was about half way between that of the parents. Undersides were light grey-brown with reduced pupillation.

This first cross has demonstrated a blending of genetic elements with no marked dominance. The 'agestis' influence was noticeable in the young larva but this was steadily reduced as development proceeded to an approximate 50:50 ratio in the imagines. Proterogyny indicates a genetic imbalance approaching the specific.

F₂ GENERATION

From F₁ parents a pairing took place on 17th October giving eggs which hatched from 27th October onwards. Again continuous light was used, except for a portion kept in 16 hours light for diapause examination. From 80 eggs in the continuous-light group 38 pupae were formed; 17 males and 4 females emerged. There was obviously a high mortality. Emergence took place between 26th December and 15th January. Winter conditions probably aggravated mortality, but in comparison with pure strains in the same conditions the rate was excessive and attributable to weakness in the F₂ generation.

Larvae

A difference was apparent in Instar I. About half were pale green with light brown tubercles and colourless setae, tinged with brown on segment 1.

Thirty per cent were pale yellow-green with faintly brown tubercles and all setae colourless (resembling *vandalica*).

Twenty per cent were light greyish-green with dark brown or blackish tubercles; setae colourless but tipped with black on segment 1 (resemblance to bivoltine *agestis*).

At maturity 90 per cent of the larvae were shaded with deep red or purple in the spiracular region; ground colour varied from yellow-green to pea green; a few larvae in the group possessed the compact proportions of *agestis*, but the majority were as slender as *vandalica*.

The remaining ten per cent varied somewhat in tones of yellow-green, but either showed no shading in the spiracular region or merely traces of pink. It would appear that the genes for larval colouring and shape have partially separated in the F₂, giving forms resembling both parents, with the majority in the 'mixed' category. There is also the curious phenomenon that in Instar I there was more resemblance to *vandalica* than in Instar V; a form of reversing dominance.

Small number of red shaded larvae and others with no shading were segregated. Many of the pupae died, but from the 'red' group a typical female *agestis* emerged and from a large all-green slender larva a male *vandalica* appeared. The remaining

imagines were mixed in facies. This experiment produced no evidence to link larval and imaginal pattern characters.

Pupae

Mostly resembled *agestis* in colour; olive green thorax and wing sheaths; buff abdomen with red spiracular shading; deep brown dorsal line and wide black anterior margin to eye. Pupal ratio varied from 2.90 to 3.12, the two pupae with the highest ratio resembled *vandalica* and produced males resembling that form.

Imagines (17 males, 4 females)

Males. Three showed the upperside lunulation of *agestis*, five possessed the much reduced lunulation of *vandalica*, nine were intermediate between the two parent forms.

Undersides varied from light to dark grey-brown with reduced black pupillation. Forewing shapes mostly approximated to the more pointed wing of *agestis*.

Females. One resembled *agestis*, three were mixed. However in the 16-hour light group (not counted in the above total) a female which developed without diapause was a typical *vandalica*, but its larva and pupa conformed to *agestis* in colour and proportions.

DISCUSSION

The appearance of mixed forms at all stages is an indication that there is probably no linkage between the alleles controlling such elements as larval colour, larval proportions, imaginal lunulation on the upper surface and underside pupillation, apart from the genes concerning photoperiodism. Pupal colour and shape are linked to the corresponding larval elements. There is also varying dominance at progressive stages of development. Once the alleles are separated in the gametes, recombination of the several elements can take place in a number of ways, so that it would be a comparative rarity to obtain an individual which was 100 per cent *agestis* or 100 per cent *vandalica* in all its stages. It is clear from the results that one gene alone does not carry all the characters that could be defined as either *agestis* or *vandalica*. Were this so there would be a segregation in the F_2 approaching the 1:2:1 ratio, but all the experimental evidence contradicts this view. The results of the cross pairing are similar to the Winchester/Warton crosses. Proterogyny occurred when the male parent was bivoltine (Winchester) in each case. There was the same blending and partial dominance of certain characters with a small proportion of imagines carrying the parental facies. Once again it seems that the differences between the parental forms are wider than sub-specific.

The following cross pairings which were not taken beyond the F_1 generation are between univoltines from northern England and *A. allous* from Jutland and Norway.

(d) *Univoltine Durham Coast male* \times *A. allous s.sp. vandalica female*

From a pairing late in September 1963, 48 eggs were obtained which produced imagines in late November and December (16 males, 15 females).

The emergences were normally proterandrous.

Larvae

Instar I: pale green with medium brown tubercles; setae colourless except for a few dark grey ones on segment 1.

Instar V: slender; yellow-green with well-marked chevrons and medium brown dorsal line; sub-spiracular ridge white; unshaded in 35 per cent of the larvae; the remainder were shaded, ranging from a trace to well-defined dull brown border to the ridge; tubercles white and setae colourless. (The larvae of the Durham stock were shaded with red-brown in the spiracular region.)

Pupae

Thorax and wing sheaths lime green; abdomen yellowish-buff, with paler spiracular band shaded with small red flecks in the darker forms. Thin black margin to eye.

Pupal ratio 3·10.

Imagines

It was difficult to assess any marked distinctions. On the basis of the upperside lunulation the imagines varied on either side of a mean value for the degree of lunulation of the parents; the Durham male being somewhat more lunulated than a typical *vandalica* male.

The upperside ground colour also varied between the blackish-brown of Durham and the more chocolate shade of *vandalica*. The white costa of *vandalica* was present in some specimens. Undersides were intermediate between the parents.

(e) *Norwegian A. allous male* × *Durham female*
(Same Durham stock as in previous cross (f)).

From a pairing on 25th September 1963, 55 eggs produced 24 males and 9 females in late November and December; normally proterandrous.

Larvae

Instar I: pale green; medium brown tubercles; setae colourless with isolated grey setae on segment 1.

Instar V: slender; medium yellow-green with distinct chevrons and medium brown dorsal line. Sub-spiracular ridge white, unshaded in 91 per cent, but in the remainder faintly margined with greyish-brown; tubercles white; setae colourless.

Pupae

Similar in colour and proportions to the previous cross.

Pupal ratio: 3·10.

Imagines

Again a similar oscillation in colour and lunulation between the facies of the parents. The ground colour of Durham is darker than *allous*, but Durham showed more orange lunulation. Thus in both sexes there appeared:

Black-brown + reduced lunulation (i.e., Durham + *allous*)

Chocolate + increased lunulation (i.e., *allous* + Durham).

DISCUSSION

Summarizing these two pairings, (d) and (e), there is no evidence of genetic imbalance, except possibly the small number of females emerging in the *allous* × Durham cross. The second pairing could be regarded as the reciprocal of the first, but there was no sign of the proterogyny displayed as when a bivoltine

agestis was crossed with a *vandalica* female. Blending of parental characters takes place in larval and pupal stages but in the imagines there is a tendency rather to oscillate on either side of a mean. It is possible that ground colour and marginal lunulation of the upper surface may not be linked. The absence of any irregularities in these pairings lends colour to the view that the British and Scandinavian univoltines are closely related.

(f) *Cross pairing between bivoltine agestis from two southern English stations.*

On 4th August 1964, a pairing was obtained between a male from Leatherhead, Surrey, and a female from Winchester, Hants. The reciprocal pairing between male Winchester and female Leatherhead took place on the same day. Sixty eggs were retained from each female. Growth proceeded normally, but after 15th August light was increased to 18 hours daily to avoid diapause. One hundred per cent emergence occurred at the end of September with approximately equal sex ratio in each brood. Parents and F_1 generation were typical at all stages.

The final cross pairing in this series had been an objective for several years, but it was not until 1964 that the technical difficulties of timing and stock raising were overcome. These were the crosses between bivoltine southern *agestis* and f. *artaxerxes*. I have already described the results of a wild pairing between a typical male and *artaxerxes* female taken on the Durham coast by T. W. Jefferson where it was shown that *artaxerxes* was a single gene recessive, but in this instance both parents were univoltine. It was therefore highly desirable to cross a bivoltine with *artaxerxes*, both to check the genetic nature of *artaxerxes* and to observe whether we would obtain proterogynous behaviour and segregation as in the two crosses already described between bivoltine and univoltine.

(g) *Cross pairing between bivoltine Winchester male and artaxerxes female from Hawick (S. Scotland)*

The female *artaxerxes* was reared from a solitary egg found by Mr. Jefferson on 6th July 1964 on a day of continuous driving rain. This larva, reared in continuous light was unshaded in the spiracular area. Emergence took place on 27th August. Pairing with the Winchester male was obtained on 22nd September. Seventy-five eggs were used for the F_1 by myself, and a number sent to Mr. Høegh-Guldberg in Denmark, who reared his own F_1 , and obtained a separate F_2 . I am deeply indebted to Mr. Høegh-Guldberg for the wholehearted support he gave me in rearing these broods and for the thorough analysis of the results which have confirmed my own observations and given him the subject matter for his own publication.

Apart from the 75 eggs reared in continuous light a further 20 were used for the 16-hour light periods.

Larvae

Instar I: light grey-green; tubercles pale grey, ringed with blackish; setae colourless except on segment 1 where they were grey. In this instar the larvae showed resemblance to the Winchester parent.

Instar V: pea green with well-marked chevrons; dorsal line varied from medium to dark brown. The sub-spiracular ridge was white with shading varying from brownish-pink to deep crimson (not so deeply coloured as in *agestis*). The shape resembled *agestis*.

Pupae

Wing sheaths and thorax pale greyish-green; abdomen buff with dark brown dorsal line and purplish shading in the spiracular region. Black border of eye $\frac{1}{6}$ to $\frac{1}{4}$ of diameter.

Pupal ratio: 2.86.

Emergence between 21st and 31st October with proterogyny, female peak preceding male peak by two days. Average growth period at 20°C (68°F); 45 days. Total: 35 males, 32 females.

Imagines

Males. Upperside blackish-brown with two to four small orange lunules on forewings; three to four reduced lunules on hindwings; small black discoidal spot with a few white scales in 60 per cent of the specimens. Undersides deep grey-brown (more brown on hindwings) with well-formed black pupils.

Females. Upperside slightly paler and more red-brown than the males; full complement of marginal lunules, reduced in size in some individuals. Black forewing discoidal spot ringed with white scales (f. *albiannulata*). Small whitish discoidal on hindwings in three specimens (f. *garretti* Carter & Harrison). Undersides brown with well-formed pupils.

Reviewing briefly the above data it could be said that the appearance at all stages was a mixture of *agestis* and *allous* characters with the absence of *artaxerxes* pattern.

F₂ GENERATION

Two pairings were obtained from the F₁ with larvae hatching from 7th November. The two broods, totalling 81 were reared together in continuous light.

It is interesting to note the food selection exhibited by these two females as the original *artaxerxes* female laid exclusively on *Chaemacistus* although offered *Geranium sanguineum* L. Sprigs of *Chaemacistus* and *G. sanguineum* together with flowers moistened with 10 per cent sugar solution were set in a gauze cage four inches from a 100 W bulb and a Philips S5 blue tube, at 25°C (77°F). No daylight was used. The test was run for three hours.

Result	Front of leaf	Back of leaf	Total
Eggs on <i>Chaemacistus</i>	39	10	49
Eggs on <i>G. sanguineum</i>	10	14	24

Larvae

Instar I: pale green or grey-green; tubercles varying between medium brown and blackish; setae colourless but grey on segment 1 in darkest larvae.

Instar V: pea green with well-developed chevrons and medium to dark brown dorsal line. The sub-spiracular ridge was white with shading ranging from red-brown to the deep purple-crimson of *agestis*. I recorded no unshaded larvae, but Mr. Høegh Guldberg, who reared 178 from his own pairings, from my original stock, did obtain a few with no shading.

Pupae

Variable; thorax and wing sheaths in shades of olive-green; abdomen buff with variable red spiracular shading; medium to dark brown dorsal line. The

dark eye margin between $\frac{1}{5}$ and $\frac{1}{2}$ diameter of eye, the heaviest margin being in the darkest pupae.

Pupal ratio between 2.92 and 3.10; average 3.00.

The emergences were protracted, from 23rd December to 8th February 1965; 41 males and 23 females, normally proterandrous.

Included in this total were eight *artaxerxes* males and six females, giving a percentage total of 23.0.

Mr. Høegh Guldberg, from 178 emergences obtained 41 *artaxerxes* with a percentage of 23.1.

He also reared 45 larvae in 16 hours of light daily, and from this emergence obtained 11 *artaxerxes* (24.7 per cent). From these figures it can be seen that *artaxerxes* is a single gene recessive as the experimental percentages are very close to the theoretical 25 per cent required by 1:2:1 ratio. Furthermore from its appearance in the 16 hours light group, which would carry the photoperiod genes for the bivoltine *agestis*, the *artaxerxes* gene does not appear to be linked with the voltinism genes.

Imagines (Variable in both sexes.)

Males. Uppersides varied from the red-brown of *agestis* to blackish-brown. The orange lunules on the forewings ranged from nil to the four typical of *agestis*, the least lunulation being in the darkest individuals. There were two to four lunulations on the hindwings. The black forewing discoidal spot was associated with white scales in some specimens. Where *artaxerxes* spotting was present it appeared in both light and dark males.

Undersides were grey-brown with varying black pupillation, apart from the *artaxerxes* fraction.

Females. Red-brown to dark brown; forewing lunules from three to five, hindwing four to five; many *albimaculata*; *artaxerxes* spotting in light and dark forms; undersides brown with pupillation as in males.

Apart from the re-formed *artaxerxes* a few specimens of both sexes showed the facies of bivoltine *agestis*. Four males and one female were indistinguishable on both surfaces from *A. allous* from southern Norway.

The results from this cross pairing are in line with the conclusions formed from the Winchester/Warton and the Winchester/*vandalica* pairings, both in regard to genetics, imbalance and the separation of colour and pattern genes, with varying dominance at all stages.

(h) *Cross pairing between artaxerxes male and southern female*

On 26th July 1964, Dr. C. W. N. Holmes took a female *artaxerxes* at Stonehaven, near Aberdeen; from this parent we obtained 54 larvae which were raised in continuous light. At maturity 25 larvae were unshaded in the spiracular zone; the remainder were shaded with reddish or pinkish-brown. The shape was slender but not so flattened in the final segments as in Norwegian *allous*. Prior to pupation the larvae turned bright yellow-green; another resemblance to *allous*.

Pupae

Light lime green on thorax and wing sheaths; abdomen dull buff; medium brown dorsal line; traces of pale spiracular band with faint brown shading in some larvae; very narrow dark anterior margin to the eye.

Pupal ratio: 3:20.

Emergence between 19th September and 12th October. Thirty-five males and 19 females.

Imagines

Blackish-brown with the usual *artaxerxes* spotting, but the upperside orange marginal lunulation is reduced in comparison with *artaxerxes* from Hawick.

A peculiarity of the undersides is the full brown colour and the regular appearance of small elongated black pupils in the forewing sub-marginal discal spots.

Four males from this stock were put in a cage with two cross-bred females from southern *agestis* (Leatherhead \times Winchester). It was thought better to use a virile first cross instead of a second generation pure bred from one locality in order to introduce as much energy as possible into this cross between the two British extremes. A pairing occurred on 1st October and 70 eggs were laid which began to hatch on 11th October.

Larvae

Instar I: Grey-green with brown or blackish tubercles; setae pale grey but blackish on segments 1 and 12. There was a close resemblance to *agestis*. The larvae were darker than those in the Winchester/Hawick pairing.

Instar V: deep yellow-green with well-marked chevrons and dark dorsal line; sub-spiracular ridge white with shading ranging from light brown-pink to deep red. These larvae were somewhat slender. There was a heavy mortality (33) in the last two instars.

Pupae

Wing sheaths pale green; thorax pale yellow-olive; abdomen buff with traces of red flecking; medium brown dorsal line. Black margin to eye not more than $\frac{1}{5}$ diameter; further mortality at this stage.

Pupal ratio: 3:15.

Emergence between 27th December and 10th January 1965; 28 females and no males.

Four of the last pupae to colour died before emergence. On dissection they were all males. As near as could be ascertained the ground colour was similar to that of the female, but forewing lunulation was reduced to two in two pupae and three in the two others. Some white scales surrounded the forewing discoidal spot on the upper surface. The undersides were grey-brown on the forewings and brown on the hindwings. The thoracic hairs were orange-brown shaded with blue-grey.

With an emergence of 28 females the mortality must have principally affected the males. Average growth period at 20°C was 86 days, nearly double that of the Winchester/Hawick cross at similar temperature.

Imagines

Females. Chocolate brown; four orange lunules on forewings, with traces of a fifth (apical) in some specimens; five small lunules on hindwings. Forewing black discoidal spot ringed with white in all specimens. The undersides were a deep coffee brown with a tendency to obsolence in the black pupilled discal spot. These females were above average size and exceeded in wing span that of both parents.

DISCUSSION

The long development period and male mortality indicate considerable genetic imbalance which is probably specific. With no males it was impossible to obtain an F_2 . In the early stages the *agestis* element was prominent but this effect receded towards maturity.

SUMMARY

- (1) The larva, pupa and imago of the southern English bivoltines (*A. agestis*) are distinct in the following characters from both north British and Scandinavian univoltines (*A. allous*).
 - (i) Larval colour, proportions and photoperiodism.
 - (ii) Pupal colour and proportions.
 - (iii) Imaginal facies and voltinism.
- (2) The British univoltines show close resemblance to *A. allous* in the same groups (i), (ii) and (iii).
- (3) In cross pairing, bivoltine (*agestis*) males when crossed with univoltine females exhibit proterogyny in the three successful crossings:
 - (i) Winchester male \times Warton female, cross pairing (b).
 - (ii) Winchester male \times *vandalica* female, cross pairing (c).
 - (iii) Winchester male \times *artaxerxes* female (Hawick), cross pairing (g).

In each case there was the same phenomenon of decreasing male dominance as development proceeded. In each F_2 partial segregation into forms resembling the original parents was noted.

When the following reciprocal crossings were obtained:

Warton male \times Winchester female, cross pairing (a)

Stonehaven *artaxerxes* male \times southern *agestis* female cross pairing (h) mortality particularly affected one sex, development was delayed and imagines were large.

Other effects of genetic imbalance have been given in the descriptions of the crossings.

- (4) Bivoltines crossed normally with bivoltines.
- (5) British univoltines crossed normally with Scandinavian *allous*, showing a partial blend of characters.
- (6) As a similar reaction is obtained when British bivoltines are crossed with either British univoltines or univoltine Scandinavian *allous*, it seems logical to consider that the British and Scandinavian univoltines are closely related and specifically distinct from bivoltine *A. agestis*. If we take into account the undoubted *allous* facies (larval, pupal and imaginal) in northern Britain, in my opinion there is no doubt that the north British *Aricia* population (including *artaxerxes*) is essentially *A. allous*, with some infiltration of *agestis* characters in its southernmost limits, notably the Durham littoral.

MALE GENITALIA

Between the genitalia of *A. allous* and *A. agestis* there is so little distinction in the gross structure that it is impossible to draw a dividing line between the two species. It is only in the minutiae that some difference may possibly be found. In his exhaustive study of the group *allous*, *agestis* and *montensis* in central and southern Europe, H. Beuret (1960) has discussed several apparent variables. Working from a considerable number of preparations Beuret has analysed in detail the following structures: valves and processes, uncus, sub-uncus, the basal

tegumen, and length and proportions of the aedeagus. The position is still somewhat indecisive, as in many instances individual variation and method of preparing specimens tend to mask the small real differences between the species.

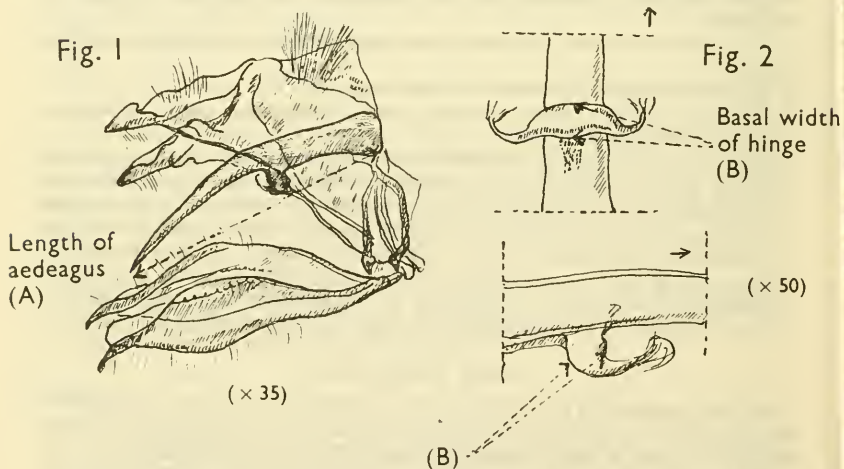
Mr. Hoegh-Guldberg and I made a number of genitalia preparations of *Aricia* in Britain and Scandinavia, going over the ground again and looking for fresh evidence that might prove to be more conclusive in establishing differences between *allous* and *agestis*. Between us we made 80 preparations and did indeed find one structure that seemed promising. A considerably greater number of preparations would be needed to prove the point, but for what the indication is worth the figures are tabulated for 45 specimens.

The structure concerned is the trigger-like process on the ventral surface of the aedeagus in its proximal position. This small projection is hinged by two curved arms to Mennard's membrane lying above the sub-uncus. Functionally it is the pivot for movement of the aedeagus during copulation.

If a straight line measurement from the base to the tip of the aedeagus is divided by the basal thickness of the 'hinge' a ratio expressing the relative slenderness of the hinge is obtained—the higher the ratio, the more slender the hinge (figs. 1 and 2). It was found that bivoltine *agestis* exhibited the higher ratio, whilst the univoltines showed lower figures. The ratio for Stonehaven *artaxerxes*, Durham coastal and *vandalica* were approximately similar.

Readings in the table are in centimetres from an eyepiece scale; to obtain the actual measurements these figures should be divided by the magnification ($\times 130$).

It is noteworthy that the bivoltine *A. agestis* from Denmark show a somewhat lower ratio than their British counterpart, but their ratio is considerably higher than the figure for their nearest neighbour *A. allous* s.sp. *vandalica*.



Male genitalia. *Aricia*. Durham coast

Fig. 1 Lateral view showing aedeagus with 'hinge' process on ventral surface.

Fig. 2 Central portion of aedeagus showing structure of 'hinge'.

GENITALIA HINGE RATIOS

<i>Aricia</i> form	Length of aedeagus A	Basal width of Hinge B	Ratio $\frac{A}{B}$	Location
<i>A. agestis</i> S. England				
Preparation 1	15.5	0.50	31.0	Arundel
2	16.0	0.50	32.0	"
3	15.7	0.45	34.9	"
4	17.0	0.52	32.7	Winchester
5	17.0	0.50	34.0	"
6	16.3	0.50	32.6	"
7	17.0	0.50	30.4	Arundel
8	18.0	0.45	40.0	"
9	18.0	0.51	35.3	Winchester
10	18.0	0.53	33.9	Royston
11	18.7	0.57	32.7	"
			GROUP AVERAGE:	33.6
Univoltines N. W. England				
Preparation 12	16.0	0.50	32.0	Warton
13	16.0	0.50	32.0	(Lancs.)
14	16.0	0.65	24.6	
15	15.0	0.50	30.0	
			GROUP AVERAGE:	29.6
Univoltine Inland Durham				
Preparation 16	16.6	0.60	27.7	
17	16.0	0.58	25.9	
18	15.2	0.55	27.5	
19	15.2	0.50	30.4	
			GROUP AVERAGE:	27.9
Univoltine Coastal Durham				
Preparation 20	16.6	0.70	23.7	Blackhall
21	17.4	0.70	24.4	"
22	16.2	0.64	25.3	"
23	16.2	0.51	30.2	"
24	18.5	0.80	23.1	"
25	16.0	0.71	22.6	"
			GROUP AVERAGE:	25.0

<i>Aricia</i> form	Length of aedeagus A	Basal width of Hinge B	Ratio $\frac{A}{B}$	Location
<i>artaxerxes</i> (Stonehaven)				
Preparation 26	17.2	0.70	24.6	
27	17.2	0.65	26.4	
28	17.0	0.65	26.2	
29	17.7	0.73	24.2	
30	19.7	0.90	21.9	
31	19.8	0.84	23.1	
	-			GROUP AVERAGE: 24.4
<i>artaxerxes</i> (Sutherland)				
Preparation 32	18.2	0.70	23.6	
33	17.7	0.70	25.3	
				GROUP AVERAGE: 24.45
<i>vandalica</i> (Jutland)				
Preparation 34	20.0	0.85	23.5	
35	19.0	0.90	21.0	
36	19.3	0.70	27.5	
37	19.5	0.80	24.4	
38	19.0	0.77	24.7	
39	19.0	0.90	21.0	
				GROUP AVERAGE: 23.7
Bivoltine <i>Aricia agestis</i> (Denmark)				
Preparation 40	17.5	0.55	31.8	
41	17.4	0.64	27.2	
42	17.0	0.62	27.4	
43	17.7	0.60	29.5	
44	17.4	0.62	28.0	
45	17.6	0.64	27.5	
				GROUP AVERAGE: 28.6

THEORY OF ADAPTABILITY TO CHANGING PHOTOPERIOD

The fourth Pleistocene glaciation which began about 115,000 years ago was divided into three major cold phases separated by mild interstadials. The first and second cold phases were sufficiently severe to have driven most insect life from northern Europe into the lowland areas of the south (the present southern France and territory to the east). The second phase covered about 60-50,000 B.P. and is most likely to have set the situation for the present distribution of *allous* and *agestis* as in the final colder phase, 30-20,000 B.P., ice caps formed

over high land only in northern Britain. I have already suggested (1963) the manner in which *artaxerxes* could have developed in isolation in northern Scotland during this phase.

There is no reason to question this theory but there is the possibility of a second zone of *artaxerxes* formation in the Firth of Forth area, which geographically is somewhat similar to the Moray Firth. The *artaxerxes* of southern Scotland differ slightly from those of the far north, principally by the presence in many larvae of a pink spiracular shading similar to the lighter forms of *agestis* larvae. It has been shown that the larval-pattern genes are not linked with imaginal genes so that the pink larval shading could remain even if the discoidal and discal spots changed to white.

During the 10–15,000 years after the recession of the second cold phase, insects would have spread north following closely the rise in environmental temperature. *Aricia allous* moved towards Scandinavia and Poland and upwards in the Alps, finally reaching the southern shore of what is now the North Sea, and from thence westwards into the contiguous part of northern Britain. *Aricia agestis* similarly moved north through France and into Britain where the distribution appears to be limited by the 16°C (60°F) July isotherm. It is possible that the *agestis* drift would have been along the east coast, because of unsuitable forested and upland areas, as far as southern Scotland where we now find traces of pink larval colour in the Lowlands.

Migration into Britain is unique because of the surrounding sea. Organisms can go no further; they can either die out, overlap and interbreed if possible, or otherwise adapt themselves to an environment from which there is small chance of escape if their drive is northwards.

The question is—what is the rate of adaptation to a higher or lower light value which would determine the larval photoperiod in relation to diapause?

As *allous* and *agestis* are attuned to their present environments, the adaptation to the upper light value could have taken place in 40,000 years or less (i.e., from a photoperiod of 14 hours in southern Europe to a value of over 21 hours daily in some strains of *allous*). The present photoperiods are apparently fixed as we know from experiment. Is there any indication of the rate of reverse adaptation, that is to the change that would be necessitated by a southward movement into a lower light zone?

Whilst it is known that northward spread depends on favourable temperature, southward spread is limited by the fact that any appreciable movement is barred by higher temperature and shorter summer daylight which induces premature diapause and desiccation. Were this not so *artaxerxes* would have spread extensively towards southern England. However if *artaxerxes* formed in the Firth of Forth has drifted as far south as Co. Durham which is 80 miles, it could have done this in the last 10,000 years. As *artaxerxes* is a recessive its appearance on the Durham coast must be due to southward drift, and not to a mingling of genes by the northward movement of the Durham forms. Were this latter possibility the case we should have expected the *artaxerxes* pattern to have been pushed well back into Scotland in a broad mixing zone.

The photoperiod for *artaxerxes* in Durham is 18 hours and at Hawick is 18.5 hours. This gives a slow rate of adaptation of the order of half an hour in several thousand years, which is rather less than the rate for shorter to longer photoperiod.

Aricia artaxerxes presents a phenomenon which is unique in British Rhopalocera—a single gene recessive which has maintained its status intact since

formation over a large area in Britain. Experimentally we know that if *artaxerxes* is crossed with a typical *allous* or *agestis* dominant for black discoidal spotting all the heterozygotes will be black spotted and in the next generation, assuming that two heterozygotes cross, the *artaxerxes* fraction will be reduced to 25 per cent. With further infiltration of typical forms in a few years the number of *artaxerxes* in the invaded area will be extremely low. This possibility has taken place in the north-west of England and in Yorkshire where *artaxerxes* has been reported as an extreme rarity, but the population of the Durham coast containing about 5 per cent of *artaxerxes* presents a curious problem. From the fragmentary information of past records it does not seem that the percentage has varied greatly since '*salmacis*' was first described by Stephens over 100 years ago. According to E. B. Ford (1945) 5 per cent of recessives in a population represents 34.7 per cent of heterozygotes so we must imagine that the original movement of *artaxerxes* along the Durham littoral must have been massive in order to maintain the present fraction. Just when and how this occurred is a fascinating question to which at present there appears to be no answer.

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Niptus hololeucus (Fald.) (Col., Ptinidae). With regard to Dr. MacNulty's exhibit of this species, I used to take it regularly when I lived in an old property in Highgate, North London, just after the war. Examples were often found wandering around and in the wash basin, though I did not find the larva. The late Dr. K. G. Blair once told me he used to take it in the wash basin and in the bath when he lived in Highgate. I also had examples from a school in Margate, Kent, in use as an army billet in July and August 1941. During the years 1936 to 1938 I obtained several examples of this species in a printing works in Holborn, London, W.C., together with an occasional example of *Trigonogenius globulus* Solier.

Fowler's statement (1890, *Col. Brit. Is.*, 4:182-3) may be an exaggeration, but there is no real reason to believe so. *Niptus hololeucus* (Fald.) was a common enough species before and just after the war in older houses where dust was prevalent. Some of the extensive clearing and rebuilding in the more recent years must be having an effect upon this insect's distribution. It has always been known as a warehouse and granary insect, though even here it is probably declining in numbers under improved conditions.—F. D. BUCK, 9, Elton Walk, Tiptree, Essex. 26th March 1966.

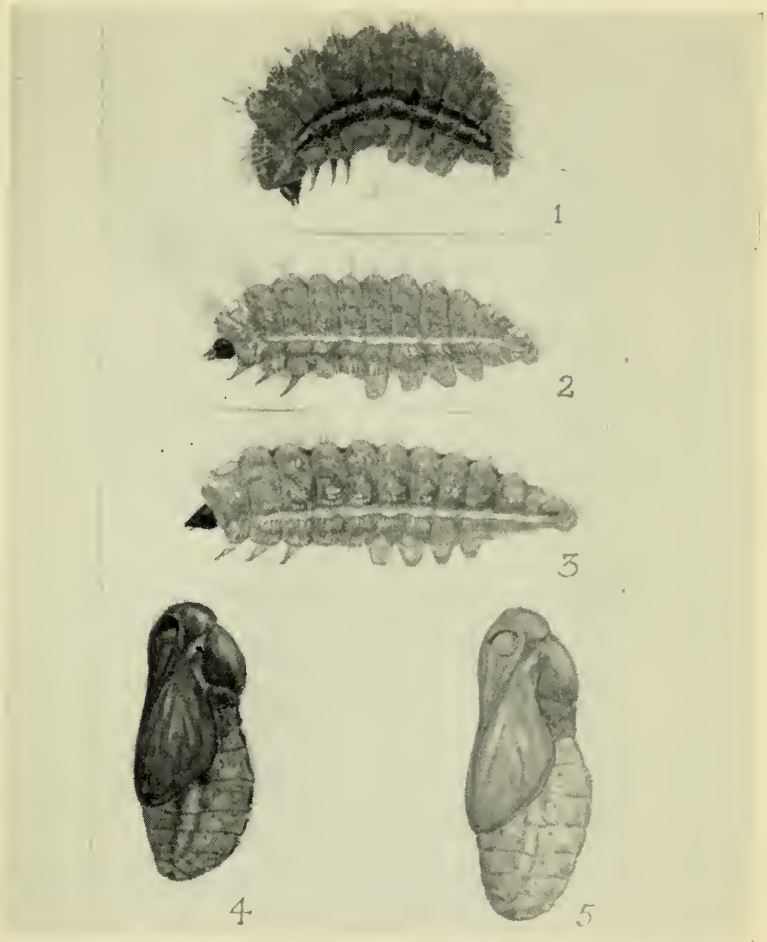


Fig.
1 Adult larva southern English *Aricia agestis*.
2 Adult larva Durham coastal *Aricia* unshaded form.
3 Adult larva *Aricia allous* s.sp. *vandalica*, Jutland.
4 Pupa southern English *Aricia agestis*.
5 Pupa Durham coastal *Aricia* (from unshaded larva.)
(all figures $\times 5$)



PLATE VI (opposite)

Aberrant Lepidoptera taken in the New Forest, Hants, during 1965. A male *Eumenis semele* L. (Pl. VI, fig. 6) taken 31st July has the characteristics of 'post-caeca', with the lower spot on the forewings also obsolete. Among a series of female aberrations of *Maniola jurtina* L., which included *excessa* Leeds, was one *postaulancea* Leeds (Pl. VI, fig. 5) taken by Mr. N. B. Potter at Warminster on 4th August; and another, ab. *radiata* Frohawk (Pl. VI, fig. 4). A female aberration of *Clossiana euphrosyne* L. (Pl. VI, fig. 7) was taken on 5th June. *Aglais urticae* L. ab. *nigricaria* Haverkamp (Pl. VI, fig. 3) was taken in Pignel Inclosure on 21st July. A *Limnitis camilla* L. ab. *seminigrina* Tutt approaching *nigrina* Weym. (Pl. VI, figs 1 & 2) was taken on 19th July.—A. D. A. RUSSWURM, Coridon, Ober Road, Brockenhurst, Hants. 9th March 1966.

SCOTLAND'S FIRST FIELD STUDY CENTRE

By BRUCE ING, *Warden*
Kindrogan Field Centre

Kindrogan Field Centre was opened in March 1964 by the Scottish Field Studies Association. The scheme of operation is essentially similar to that of the highly successful centres of the Field Studies Council in England and Wales. Kindrogan is the first fully equipped field study centre in Scotland.

The basic aim is to conduct courses in all aspects of field biology and geography and to provide facilities for schools, colleges, universities and amateur naturalists. Comfortable accommodation in small bedrooms allows for 55 or more visitors per week, and modern well-equipped biological laboratories and geography work rooms provide ample working space. The library facilities are also of a high standard. Good stocks of equipment for the collection, examination and preservation of specimens of all kinds are available.

Kindrogan Field Centre, at the head of Strathardle in east Perthshire, stands in its own grounds on the banks of the Ardle, a fast-flowing boulder-strewn river. Beyond the house a fine crag towers above spruce woods and behind it a variety of moorland types stretch up to the 2,000 ft contour. Along the private road leading to the house is a disused curling pond, now silting up and of great interest for its aquatic life. Also near to the house are stands of Caledonian birch wood and wet sallow carr.

Botanically the district is very rich, particularly on the limestone, and nearby mountains support many plant treasures. There is a large and varied bird population with Capercaillie, Golden Eagle, Peregrine Falcon and Hen Harrier breeding locally; Crossbills have nested recently in the grounds of the Centre. Among the mammals Red Deer are a familiar sight, as are Red Squirrels. The Scottish Wild Cat breeds below the crag and the Pine Marten has been tentatively identified in the valley.

Strathardle has been neglected by naturalists in the past so that it is not surprising that many exciting finds have been made in the last two seasons. Entomologically the county of Perth is very rich but few areas have been studied at all intensively. The establishment of the Centre at Kindrogan is already adding much to local knowledge. As well as being ideally situated in excellent countryside the Centre is convenient for visiting other districts. Rothiemurchus is two hours to the north by car, Rannoch one and a half hours to the west. Both these areas need no introduction to the entomologist as they have been well overworked.

Three miles north of Pitlochry (our nearest railway station, nine miles to the west) is the Pass of Killiecrankie. This has one of the few good oak woods in the Highlands, and possesses many interesting oak insects, especially among the Heteroptera and Hymenoptera.

The moorland on Kindrogan Hill has proved to be of interest, yielding so far *Poecilopsis lapponaria* Boisd. (Rannoch Brindled Beauty) and several nice carabid Coleoptera, including *Miscodera arctica* Payk., *Carabus nitens* L. and *C. glabratus* Payk. This latter occurs commonly in the district and forms a significant part of the diet of the Kestrels which breed on the crag. Another carabid found in the grounds of the Centre is *Cychrus caraboides* (L.); and on the moors a number of forms of *Nebria rufescens* (Ström.) occur, one aberration exhibiting fusion of the elytral striae. Three species of *Elaphrus* occur in the district. On the Cairnwell mountain (3,059 ft) a few miles to the east several montane species have been found under stones, e.g. *Patrobis assimilis* Cd. On the top of this hill examples of *Urocerus gigas* (L.) (Hym., Siricidae) have been taken; this is common in the district and is occasionally accompanied by its magnificent parasite *Rhyssa persuasoria* L. Other Symphyta recorded in Strathardle are *Sirex juvenus* (L.); *Abia candens* Kon., and many Tenthredinidae. The genus *Pontania* is well represented and the larval galls on *Salix* spp. are widespread. Of these perhaps the most interesting is that of *P. crassipes* (C. G. Thoms.) on *Salix herbacea* L., which is frequent on the base-rich areas of the higher hills.

Solitary bees are not common, only *Andrena albicans* Müll., its parasite *Nomada ruficornis* (L.) and two Halicti being recorded so far. The Bilberry bee, *Bombus lapponicus* F., is not uncommon, visiting *Vaccinium myrtillus* L. Sphecidae are better represented and our garden wall houses several colonies of *Hoplocrabro quadrimaculatus* (F.), as well as a species of *Odynerus*. Also found in the wall is the Tree Wasp, *Vespa sylvestris* (F.) which makes its more usual arboreal nest on larch twigs and even in a peach tree in the greenhouse. The ants are not particularly interesting except in the Black Wood of Rannoch, where *Formica lugubris* Emery, *F. aquilonia* Yarrow and *F. exsecta* Nyl. occur.

The Lepidoptera have not been well studied but casual observations indicate that detailed work would be well rewarded. Colonies of *Erebia aethiops* Esp. (Scotch Argus) occur in the valleys together with *Clossiana euphrosyne* L. (Pearl-bordered Fritillary). The beautiful *Saturnia pavonia* L. (Emperor Moth) is very common among the heather. Two years ago a fine specimen of *Daphnis nerii* L. (Oleander Hawk) was captured in Kirkmichael, three miles south of the Centre, and every year large numbers of *Laothoe populi* L. (Poplar Hawk) come to the lighted windows of the house. They are probably breeding on aspen, our only native poplar, or one of the planted species of balsam poplar. *Callophrys rubi* L. (Green Hairstreak) breeds in the Centre garden.

The river and ponds are full of caddis larvae, including the caseless *Philopotamus*. The most abundant caddis is *Ecclisopteryx gutturalata* (Pictet) which literally darkens the windows on summer evenings; its larvae abound in the

river. Neuroptera and allied orders are well represented and again would repay intensive study. A surprising find during 1965 was a small colony of the dragonfly *Aeshna caerulea* (Ström) in the old birch wood near the house.

Among the bugs the Homoptera are the best recorded at Kindrogan, especially the Psyllidae. Several species occur on willow and gall-inducing species have been found on ash, nettle, rosebay and sheep's sorrel. Work has begun on an ecological survey of local Corixidae, particularly in those peaty pools which periodically dry out.

Little study has been made of the Diptera, except Syrphidae (Speight 1966). A survey of Tipulidae is being carried out by the Zoology Department of Glasgow University. Mammal fleas are being collected as a sideline in trapping routines and several unidentified feather lice have been brought in by students.

Orthoptera are few in the Highlands and all the likely species have been found locally. An attempt has been made to investigate tree species preferences among Psocoptera at different times of the year, but has proved too complicated for the average biological student.

The insect potential of the area round the Centre is enormous and reference collections are being slowly prepared, together with a card index of reliably named species. Courses in Insect Natural History, Freshwater Biology and Plant Galls are being offered during 1966, and insect work plays a large part in our School Biology Courses.

The variety of habitats within easy reach of Kindrogan is more than satisfactory; in spite of being almost exactly in the centre of Scotland we are only 40 miles from the sea, with cliff, dune and salt marsh. About ten miles south of Kindrogan runs the Highland Boundary Fault, and comparison between Lowland and Highland conditions may be conveniently made. Between our service town, Blairgowrie, and Dunkeld lie the splendid lochs of Stormont, rich in bird, plant and insect life.

In autumn the woods are crowded with fungi of all kinds and all year round mosses and lichens festoon the trees, luxuriating in the pure, unpolluted atmosphere.

Briefly, Kindrogan has much to offer any naturalist, but especially the entomologist who welcomes the challenge of unexplored terrain, and is as anxious to patiently record a new area as he is to discover rare species. Members of the Society are assured of an extra-special welcome whenever they visit Kindrogan.

FURTHER READING

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(All the above publications are available at the Centre.)

Kindrogan Field Centre,
 Enochdhu,
 Blairgowrie,
 Perthshire.
 6th March 1966

TREASURER'S REPORT for 1965

It is a pleasure to report that, despite a number of significant changes affecting the Society's administration, the year terminated with the finances in a very satisfactory condition, the income having covered all expenses.

Owing to the impending demolition of Pepys House, a move was made to the apartments of the Alpine Club, in Mayfair, which are more costly, as was to be expected, the annual rent of £286 being nearly double the amount formerly paid. Inevitably, this additional charge on our resources had to be met out of income, and it was decided to alter the subscription rates, as from 1st January 1965, thereby increasing the income from that source from £615 in 1964 to £1,006.

It was also decided that, instead of publishing each year one volume of the Proceedings and Transactions, bi-monthly parts would be issued. In fact, in 1965, only three parts were produced, two only being invoiced to date, plus the 1964 volume, and the total cost of printing was only £434, compared with £861 in 1964.

The society's gilt-edged investments, except £350 Defence Bonds, were sold and the proceeds invested in Ordinary Stocks and Shares of large industrial Companies and Trusts.

BALANCE SHEET

The value of our investments has always been shown at cost, although the current market value has also been indicated, so that, when the investments were sold, there was a 'paper' loss of £848. This was the principal factor responsible for the reduction of the General Fund balance to £2,071. It will be observed that the newly instituted Reserve Fund stands at £170, whilst the other Special Funds balances have all been increased, the Library Fund by £40, the Housing Fund by £20 and the Centenary Fund by £2. Although the cash balance has been reduced from £769 to £246, the Sundry Creditors balance, £999 a year ago, is now only £3, a much happier state of affairs. The Balance Sheet at 31st December 1964 shows a balance of £134 on the Publication Fund but, as the net cost of publications in 1965 is greatly in excess of this, the balance has been carried to the credit of the General Fund. The total assets of the Society at 31st December 1965 as shown on the Balance Sheet amounted to £2,897, which does not include the Society's collections and library, on which no value has been placed. After deducting £580 earmarked for special funds, there is a balance of £2,317 left for general purposes.

GENERAL INCOME AND EXPENDITURE ACCOUNT

The general expenses amounted to £589 compared with £382 in 1964 and £141 of the increase is due to the higher rent payable for the Society's new premises. The increased rates of subscriptions brought in £1,006, an advance of £390 on 1964, and the sale of Christmas cards produced a profit of £56. Interest was down by £25, as a full year's benefit from the new investments cannot be received until 1966. The need to withdraw cash on deposit to meet liabilities outstanding from the previous year, caused a small drop in deposit interest, and a reduction of the cash balance from £769 to £246, the latter figure including £170 donated to the Reserve Fund.

Again we must thank our honorary auditors, Messrs G. Stoughton-Harris and J. L. Messenger, for their good offices.

BALANCE SHEET—31st DECEMBER, 1965

LIABILITIES		ASSETS	
	£	s.	d.
Special Funds—			
Housing—			
Balance at 1st January 1965	408	11	3
Add Transfer from General			
Income & Expenditure			
Account	20	0	0
	428	11	3
Centenary—			
Balance at 1st January 1965	7	19	0
Add Donations	2	0	0
	9	19	0
Library—			
Balance at 1st January 1965	101	15	6
Add Excess of Income over			
Expenditure for the year ..	40	0	2
	141	15	8
Reserve Fund—Donations			580
Subscriptions paid in advance			170
Sundry Creditors			72
			3
General Fund—			
Balance at 1st January 1965			2,663
Add Publication Fund—			
Balance at 1st January 1965 ..			133
			2,797
Deduct Loss on Sale of			
Investments	848	8	10
Purchase of Cabinets ..	64	0	0
	912	8	10
Add Excess of Income over	1,885	2	10
Expenditure			
for the year	186	1	2
	2,071	4	0
	£2,897	0	5
Investments at cost—			
£350 5% Defence Bonds ..	350	0	0
£1,200 5% Conversion Stock 1971	1,130	11	0
Unilever Ltd.			
150 Ordinary Shares of 5/- each	248	9	0
Standard Trust Ltd.			
400 Ordinary Shares of 5/- each	299	5	2
Premier Investment Co. Ltd. ..			
300 Ordinary Shares of 5/- each	274	6	6
Imperial Chemical Industries Ltd.			
£100 Ordinary Stock	220	13	5
Sundry Debtors			2,523
Stock of Christmas Cards			37
Cash at Bank—			100
Deposit Account	41	11	9
Current Account	204	9	1
	246	0	10

The Value of the Society's Library and Collections is not included.

£2,897 0 5

Audited and found to be correct,
 J. L. MESSENGER
 G. STOUGHTON-HARRIS F.C.A.
 January 1966

F. T. VALLINS, Hon. Treasurer

GENERAL INCOME AND EXPENDITURE ACCOUNT—Year ended 31st December, 1965

EXPENDITURE		INCOME	
	£ s. d.		£ s. d.
Rent	286 0 0	Subscriptions	1,006 9 6
Insurance	10 18 9	Interest on Investments	109 3 2
Secretarial Expenses	46 8 3	Deposit Interest	4 15 11
Editorial Expenses	6 5 8	Christmas Cards—Profit	56 1 10
Treasurer's Expenses	18 11 6		
Stationery	94 18 1		
Subscriptions to Societies	9 8 0		
Lectures	20 9 0		
Annual Dinner & Exhibition	37 15 9		
Bank Charges	7 17 0		
Removal Expenses	29 18 6		
Miscellaneous	12 1 4		
Publications	389 16 11		
Housing Fund	20 0 0		
Excess of Income over Expenditure	186 1 2		
	<u>£1,176 10 5</u>		<u>£1,176 10 5</u>

PUBLICATIONS ACCOUNT

	£ s. d.		£ s. d.
To Printing	434 13 6	BY Sales	110 4 11
Proceedings	14 17 3	Donations	14 1 0
List of Members	26 19 9	Income and Expenditure Account	389 16 11
Additional copies Part II 1963	7 15 0		
Amendments to Bye Laws			
Blocks	7 6 2		
Postages	22 11 2		
	<u>£514 2 10</u>		<u>£514 2 10</u>

CHRISTMAS CARDS ACCOUNT

	£ s. d.		£ s. d.
TO Stock at 1st January 1965	100 0 0	Sales	140 8 1
Printing & envelopes	74 14 6	Stock at 31st December 1965	100 0 0
Blocks	3 7 5		
Postages	6 4 4		
Income and Expenditure Account—Profit	56 1 10		
	<u>£240 8 1</u>		<u>£240 8 1</u>

'IRREGULAR' DIAPAUSE IN *PIERIS*,with a note on Corsican *P. brassicae* L. (Lep., Pieridae)

by S. R. BOWDEN

Anyone who frequently breeds the common *Pieris* species comes to certain expectations about the incidence and duration of diapause in these butterflies. He expects, in fact, that either the pupa will not enter diapause or it will—and that if it does, it will go over the winter before developing. Normally, if last-instar larvae are exposed to short, warm nights their pupae produce butterflies immediately, whereas long and cold nights tend to produce diapausing pupae. Broods from many populations of species such as *P. napi* L. habitually produce a mixture of diapause and non-diapause pupae in ordinary breeding conditions, apparently varying in respect of their critical photoperiod and temperature-threshold.

The happy-go-lucky breeder obtaining *Pieris* pupae in the summer watches them for a fortnight or so and then, if they show no sign of development, puts them aside at least till the autumn, when he looks over them before the winter. This procedure almost always proves satisfactory in practice, but occasionally it does not. Particularly in hybrids, one sex may enter a 'weak' diapause only, and emerge at some quite incalculable time.

Eclosion from winter pupae normally extends over a period of a few weeks in the spring, or (if the pupae have been cold-stored) of only a few days in the summer. But if pupae in diapause are 'forced' by high temperature too early in the winter, only a few will develop; if then the remainder are returned to cold storage some will fail to emerge even at the usual time; the extent of the retardation varies.

This apparent reinstatement of any earlier stage of diapause by premature temperature-rise may occur rather widely. Danilevskii (1965:101) states:

'A condition close to diapause may sometimes be induced by high sub-lethal temperatures, e.g. in pupae of the Tree-of-heaven Silkworm *Philosamia cynthia*. . . . A unique form of dependence has been observed in the Wheat Sawfly *Cephus cinctus*. In over-wintering, fully-reactivated pupae of this species it is possible, by means of temporary high temperature [35°C.], to re-induce a state of stable diapause, to break which a second prolonged chilling or natural over-wintering is required.'

A genuine summer diapause, in one stage or another, is not unknown in the Lepidoptera, but as far as we know has not been reported in *Pieris*. Danilevskii (1965:157) describes the Leningrad form of *P. brassicae* L. as reacting much as British broods would, viz.

'Prolonged cooling is essential for normal development of diapausing pupae. . . . With constant temperature above 20° diapause is not broken, or else after four to six months only isolated adults emerge, always very weak and unable to survive.'

But

'In the Sukhumi [Georgia, U.S.S.R.] form, diapause proved to be of much shorter duration. When pupae of this form were kept at a constant temperature of 23°, within 2½ to 3 months fairly uniform development and the emergence of apparently-normal adults were observed.'

Thus the more southern Russian *P. brassicae* seems to enter a shallow diapause which does not require cold to terminate it.

The following incident suggests that Corsican *P. brassicae* may behave rather similarly. On 27 April, 1964 the writer picked up a small batch of eggs of *P. brassicae* on a wild cruciferous plant below the Voile de la Mariée waterfall in central Corsica. There hatched and were reared in Corsica and England, not without some losses by disease, and immediate emergences from 8th to 10th June totalled ten females and seven males.

A further male emerged on 2nd July. This should have served as a warning, but attention was relaxed. On 12th August two more males were found, which may have been out several days. A final male appeared on 9th October, leaving none to over-winter.

One can only speculate as to what effect the liability to such behaviour may have in Corsica. There is no doubt that although in England *P. brassicae* is a known migrant, locally adapted populations exist elsewhere. Study of biological differences among these has probably been rather discouraged by the comparative constancy of the phenotype throughout Europe.

It may be worth while to give measurements of the bred butterflies (the figures are $2 \times$ distance from forewing apex to centre of thorax, in mm). The expanses may be compared with those of English specimens and of *P. brassicae cheiranthi* Hübner (Canary Islands).

	Bowden		Frohawk	Gardiner	<i>cheiranthi</i>
	Corsican	British	British	British 1960 'continuous'	
Female max.	77	69	76	—	70
mean	76*	65	—	57.9	—
min.	75*	63	—	—	65
Male max.	76	68	—	—	65
mean	72	64	63	58.5	—
min.	68	60	—	—	60

*excluding one 64mm.

Frohawk (1934) may not have over-estimated the size of British *P. brassicae* by as much as Gardiner (1963) suggested, but in any event these Corsicans appear to be larger than British.

Some of the specimens have been preserved and are in the collection of Mr. B. O. C. Gardiner.

REFERENCES

- Danilevskii, A. S., 1961 transl. 1965, *Photoperiodism and Seasonal Development of Insects*. Edinburgh.
 Frohawk, F. W., 1934, *Complete Book of British Butterflies*. London.
 Gardiner, B. O. C., 1963, Genetic and environmental variation in *Pieris brassicae*. *J. Res. Lepid.* 2:127-136.

Farningham Wood field meeting, a correction. In the report of this meeting (1965:86) the larva of *Caryocolum fraternellum* Dougl. was incorrectly reported on *Lonicera periclymenum* (Honeysuckle); this should have been *Cerastium vulgatum* L. (Common Mouse-ear Chickweed). EDITOR.

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1924-25	1	10	0	1945-46	2	0	0*	1958	2	10	0
1925-26	1	10	0	1946-47	2	10	0*	1959	2	10	0
1927-28	2	0	0*	1947-48	3	0	0*	1960	2	10	0
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1931-32	2	0	0	1951-52	3	0	0*	1963, Part 2	1	0	0
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The South London Entomological
and Natural History Society

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MEETINGS OF THE SOCIETY

are held regularly at the Society's Rooms, and include the well-known ANNUAL EXHIBITION, which takes place in October in the Libraries of The Royal Society and of the Geological Society of London at Burlington House, Piccadilly, by kind permission of those two Societies. Frequent Field Meetings are held at weekends in the Summer. Visitors are welcome at all meetings. The current Programme Card can be had on application to the Secretary.

OUTLINE LIFE HISTORIES OF SOME WEST AFRICAN LEPIDOPTERA

Part I. Lymantriidae

By B. J. MACNULTY

INTRODUCTION

During the four and a half years' sojourn in Nigeria, I had the opportunity to breed a number of Lepidoptera from larvae found in their natural habitat. Since very few larvae have been described from this part of the world it seems worth while placing their descriptions and the notes I have been able to make as to food plants and behaviour on record. The life histories were noted as a first step to a more serious programme of breeding which had to be abandoned as my stay in Nigeria did not last as long as had originally been anticipated.

The outlines of life histories will be produced in families, each paper covering one family. No special order will be followed, each paper being published as soon after its completion as is possible. The family Lymantriidae is published first as the imagines were kindly identified by the late Mr. C. L. Collenette (1957 and 1960) who described a number of new species from my collection. The order of genera and species is according to Seitz (1930) unless otherwise stated.

Since the last two segments of lepidopterous larvae are usually difficult to separate I have treated them as one and descriptions refer to segments 1 to 13 as necessary, the head being segment 1.

The names of the food plants are as given in Hutchinson & Dalziel (1928).

TERMINOLOGY

In order to avoid ambiguity a number of terms used in this and subsequent papers are defined.

In describing hairs it is often necessary to use such terms as brush, tuft, pencil, bundle, etc. I have endeavoured to define these, but even so there will be occasions when opinions will differ as to which term should have been used, nevertheless using the terms as defined will avoid instances of ambiguity.

Brush A close packed assembly of straight hairs arising vertically from the body surface. They are usually of moderate length. I have restricted this term to describing the bundles of hair arising from the surface of the back of segments 5 to 8 typical of an *Orgyia antiqua* L. or 'Vapourer' larva.

Tuft A close packed assembly of hairs usually short.

Pencil An assembly of a few hairs pressed close together usually abnormally long and always clearly separate from other collections of hair. They normally move as a unit and are usually found on segments 2 and 12.

Bundle The term is used occasionally to describe a rather loose assembly of hairs arising from a common area on the body.

Lines on the body of the larva will be described as far as possible as dorsal and lateral, with the following subdivisions:

Dorsal line A line running longitudinally in the centre of the back from the front to rear. This may apply to the whole larva or to individual segments.

Paradorsal line A line running longitudinally at the side of the back from front

to rear. This again may apply either to the whole larva or to individual segments. Obviously there are usually two of these, one on each side of the back.

Lateral lines will be subdivided into supra-spiracular, spiracular and sub-spiracular according to whether they are above, at the same level as, or below the spiracles. The term will apply to lines running longitudinally at the sides from front to rear. They may apply to the whole larva or to individual segments as indicated in the text.

The terms described above have been defined with respect to lines but they may equally well be used to describe other marks or appendages and will so be used e.g. 'There are two paradorsal warts on segment 12' means 'there is a wart at each side of the back on segment 12.'

LIFE HISTORIES

Leucoma parva Plotz.

Basically this larva is white sparsely covered with long, white, mainly lateral hairs. There is a broad black dorsal line; the colour is a deep velvet black on segments 5, 6 and 10 to 13, but on the remaining segments the black colour is less deep. On each of segments 5 and 6 there is a tight conical dorsal tuft of black hairs. There is a supra-spiracular line of short black dashes and dots. Occasionally the larva is entirely white except for the black dorsal line on segments 5 and 6. The food plant is *Aspilia latifolia* (Compositae), both the leaves and flowers being eaten. The larva spins a cocoon in a partly rolled leaf of the food plant or in debris near the roots of the plant. The imago emerges after about a week.

Leucoma luteipes Walker.

This larva is green or is laterally green with two reddish brown paradorsal bands. There is a yellow dorsal line ending in a long white pencil of hairs on segment 12. The head is orange in colour. The whole larva is covered with fine whitish hairs which project out and are as far as possible laterally adpressed against the surface on which the larva rests. There are a few vertical black hairs on segments 2 to 5. *Oxyanthus brevifloris* is the probable food plant.

Hemerophanes enos Druce.

The larva has nothing in the way of markings to distinguish it. It appears more like an arctiid than a lymantriid. The larva is covered thickly with fairly short rich golden-brown or yellow-brown black tipped hairs over a grey skin. There is a thin black dorsal line sometimes clearly marked, sometimes nearly absent. The dorsum appears to be ridged like a roof.

The larva makes a loose whitish cocoon in which larval hairs are freely admixed and the imago emerges after about ten days. The food plant is *Combretum latialatum* (Combretaceae).

Crorema mentiens Walker.

The body of this larva is a deep chocolate. From segments 2 to 11 there is a pink or white dorsal line; this may be either a single or a double interlaced line, and is sometimes missing from segments 2 to 5. There is a single thick circular red or pink dorsal wart on each of segments 10 and 11. On each segment there is a ring of eight tubercles from each of which there arises a bunch of long thin grey hairs. Each bunch of hairs remains separate from each of the others and can move independently. When alarmed the larva waves the hair bunches about in a random manner. The food plant is *Costos afer* (Zingiberaceae).

The pupa is formed in a loosely spun cocoon amongst the debris beneath the food plant. The imago emerges after about 11 days.

Olapa travatensis Holland.

The basic colour of this larva is provided by the very short thickly packed velvet black hairs from which arise a moderate number of long fine curved white hairs. The centre of the dorsum is largely clear of white hairs. On each of segments 10 and 11 there is a circular dorsal wart of close packed very short white hairs.

The larvae are gregarious and feed together side by side on the leaves of the Balsa Wood tree *Ochroma lagopus* Swartz. It also eats *Gmelina arborea* but not as readily. There may be as few as a dozen or so together or more than a hundred; the usual number lies between 40 and 70. For ecdysis the larvae leave the foliage and retire to a suitable place on a branch or the main trunk of the tree. There they spin a pad of silk and cover themselves with a very thin net of silk and remain there for the skin to change which takes two or three days. In similar manner the larvae pupate gregariously in thickly spun cream coloured cocoons, the whole mass blending well with the smooth trunk of the tree. The imagines emerge in about ten days.

Euproctis fasciata Walker.

A deep chocolate coloured larva covered with short thick close packed hairs. There is a sub-spiracular line of long white hairs which project stiffly sideways; this line of hairs is broken up slightly so that each segment stands out separately. Above this white line on each segment is a thick broad spiracular tuft of closely packed hairs in the shape of a ring, more marked on some larvae than on others. On segments 5 and 6, there are two chocolate dorsal brushes of tight hairs which are longer than the rest. There is a dorsal tuft on segment 12. On segments 7 to 11 is a broad dirty white dorsal band composed of two paradosal rows of thick short tufts of hairs. There is a similar white dorsal band, often not very well marked, on segments 2 to 4. On segments 10 and 11 there is a small reddish dorsal wart. The larvae feed singly on the foliage of the *Casuarina*, *Alchornea cordifolia* and *Markharmia napoleoni*. The pupa is contained in a cocoon which is spun up amongst dead leaves and earth on the surface of the ground. The imago emerges in about three weeks.

Euproctis utilis Swinhoe.

This larva is a general pinkish-brown covered with small tight thick tufts of hair. Segments 4 to 7 are of a darker brown. Each segment has a pair of paradosal tufts; those on segments 5, 6 and 12 are slightly larger than those on the remaining segments. There are similar sets of spiracular lateral tufts of hair. The tuft on segment 12 normally extends to become a transverse, brown dorsal band. All the dorsal hairs on other segments are distinctly tinged with pink. The larvae feed singly on leaves of *Alchornea cordifolia*. The pupa is made in a light cocoon spun up in the shrivelled leaves of the plant or between two leaves. The imagines emerge after three to five weeks.

Euproctis molundiana Auriv.

When young the larva is grey with a pinkish red sub-spiracular line. The head is black and the neck red. There is a dorsal tuft of chocolate hair on each of segments 5 and 6, and a smaller one on segment 12. There are slender sub-spiracular tufts of white hair on each segment. When nearly full grown the ground colour is a brownish grey, and the sub-spiracular line is a dirty white. The dorsal tufts on segments 5 and 6 form a single tuft chocolate in the centre ringed with reddish brown hairs on the outside. There is a blackish dorsal line from segments 7 to 13 and the inter-segmental joints are black. Segments 3 and 4

are covered with long white dorsal hairs as are segments 7 and 8 to a lesser extent. Segment 2 has longish red-brown hairs and segments 3 and 4 are covered laterally in short thick red-brown hair. Segment 12 bears two paradorsal warts each with a tuft of black and red-brown hairs. The lateral tufts of white hair are thicker and shorter than the dorsal ones; the larva feeds on foliage of *Barteria nigritiana* and probably on *Alchornia cordifolia*. The larva pupates in a stiff white cocoon which is spun either in the foliage or in loose debris round the foot of the food plant. The imago emerges after between three and a half and five weeks.

Euproctis mina Strand.

The ground colour of this larva is black or brownish black. When full-fed it is about half an inch long. The head is black. On each of segments 2 to 6 there is a large red lateral dot, on segments 7 to 11 similar elongated dots become a continuous red line. On segments 8 to 10 there is a thin double red dorsal line. Segment 12 is thickly covered with reddish hair, there being the suggestion of a dorsal tuft. The larva is covered with thinly spaced short white hairs. It will eat the leaves of the orange tree *Citrus aurantium* and of *Alchornea cordifolia* but does not thrive on either. In the light of later experience I suspect that they feed at least in part on fungus and lichens on the trunk of the orange tree. Only one specimen was raised and is in the British Museum (Nat. Hist.) collection.

Paraproctis calamolopha Collenette.

This larva was recorded by Roche (1955) who published two excellent black and white illustrations. He did not however give a detailed description. For completeness and in order to fit this species into the key I have with Dr. Roche's collaboration worked out the following detailed description.

The ground colour of the larva is a deep velvet black. On segments 3 and 4 there are four paradorsal short tight tufts of light grey to white hairs in pairs, and on segment 4 the two pairs are joined by a transverse bar of short thick hair. Segments 6 to 12 have two rows of paradorsal very short tight tufts of hair, one tuft of each row to each segment. There is a sub-spiracular line of grey hairs adpressed against the surface on which the larva rests. The hair on a supra-spiracular row of white bushy tufts on segments 5 to 12 is adpressed on to the hair of the sub-spiracular line. The larva feeds on lichens growing on the bark of trees. The pupal stage lasts about a week.

Laelia subrosea Walker.

This is a typical larva of the 'Vapourer' type. On segment 2, there are thin lateral pencils of black hairs inclined anteriorly and extending beyond the head. A similar dorsal pencil of hairs extends posteriorly on segment 12. The general colour is a fawny-yellow. There is a blue-black sub-spiracular line, two dark paradorsal lines and a fawn dorsal line marked transversely with fine darker lines. The brushes on segments 5 to 8 are cream coloured with dark brown centres.

The larva feeds on Gramineae species and has the peculiar habit of eating only the stem leaving the leaves and flower head untouched. The pupa is formed in a typical cocoon attached to a blade of grass. The imago emerges after five or six days.

Laelia fracta Schaus.

The ground colour of this larva is a deep velvet black. The brushes on segments 5 to 8 are greyish-cream. From segments 2 to 8 there is a broad rich red-brown dorsal band which extends right through and includes the hair of brushes on

segments 5 to 8. On segments 9 to 13 there is a variegated bright yellow dorsal band made up of transverse lines, triangles and circles; on segment 12 this changes to a pair of parallel dorsal lines. It is not known whether the convolutions of this band vary. Laterally there are several thin broken cream subspiracular lines. A number of cream hairs are scattered laterally with a number of longer black ones, particularly on segments 5, 6 and 12. The head is black. The larvae feed on various grasses. The imago emerges seven days after the larvae spins the cocoon.

Dasychira hypnota Collenette.

Long tight lateral pencils of black hairs anteriorly inclined arise each side of segment 2. There is a similar dorsal pencil of black hairs posteriorly inclined on segment 12. The brushes on segments 5 to 8 vary from pale red-brown, to dark brown with black tips. Each segment has a transverse ring of thinly spaced short white hairs interrupted with a smaller number of long black hairs. There are two paradorsal lines which may be strong or faint and vary in colour from nearly white to pink. Segments 2 and 4 have very short dark brown dorsal tufts. Segments 9 to 12 have deep maroon dorsal squares. There is a broad white lateral band on segments 2 to 4 which joins a thinner white lateral line, sometimes broken or faint, on segments 5 to 13. The larva is easily distinguished by the large bright white lateral patches across the joints between segments 8 and 9, 9 and 10, 10 and 11, and 11 and 12. The areas of white are separated from each other by the rings of hairs on segments 9, 10 and 11. The upper margins of the patches are more or less heavily edged with a black line. The larvae vary in general colour, some being quite pale and some very dark. The larva feeds on the leaves of *Macrolobium macrophyllum*. The cocoon is dirty white mixed with larval hairs and is soft and thin and is spun amongst the leaves of the food plant or in any other suitable place. The imago emerges after about seven days.

Dasychira isozyga Collenette.

The general colour of the larval skin varies from a pale ochre through cream to very faintly green. On each segment there is a lateral fan of white to golden hairs arising from an elongate white tubercule, with two similar paradorsal fans of hairs. There are rather slender dorsal brushes of white hairs on segments 5 to 8. There are two faint white paradorsal lines, and lateral ones just below the fans of hairs. There is an ill-defined slender dorsal pencil of blackish hairs, posteriorly inclined, on segment 12. The head varies from pale ochre to white; it is roughly triangular in shape with the apex rounded. Down each side of the head from near the apex to the base is a wide, deep brown line.

The larva has a dark form with the dorsum grey and the sides golden brown, hairs grey-brown and pale lateral stripes on segments 7 to 11 running diagonally ventrally and posteriorly; these are edged with pink but are not well-marked.

The food plant is *Chrysophyllum albidum* and the pupal stage lasts eight to 10 days.

Dasychira anisozyga Collenette.

I cannot distinguish the larva of this species from the previous. There is a larval form with dark grey instead of golden hairs which may prove to be *D. anisozyga*. The habits and food plant of both larvae are the same. The male paratype in Collenette's series which I bred is in fact *Hemerophanes enos* Druce.

Dasychira glovera Swinhoe.

A most unusual larva. It has the appearance of a geometrid, the prolegs on segments 8, 9 and 10 being absent although a faint whitish mark indicates their

position. The general colour is pale brown with cream and grey in varying amounts. There are numerous fine short dark longitudinal lines and a pale cream-grey dorsal band on segments 2 to 5 also a pale broad line on segments 2 to 4. On segments 2 to 4 there is a dark mark just anterior to each leg. Posteriorly on segment 6 is a long lateral rod-like protuberance at an angle of 45° to the vertical ending in a slightly rounded club; its length is between one and one-and-a-half times the length of segment 6. There is a similar and much shorter pair of protuberances on segment 7. On segment 8 the protuberances are reduced to a pair of pointed paradorsal warts. On segment 9 there is a very small pair of pointed paradorsal warts. On segment 12 there are two small paradorsal warts with a raised transverse ridge connecting them. On segment 6 there is a dark anterior patch with a raised lip, and a white transverse line across the anterior margin of the segment. At the posterior of each of segments 6 to 10 there is a slightly incised transverse line.

The larva feeds on *Gmelina arborea* and pupates in a cocoon spun up in a folded over leaf from which the imago emerges after about nine days.

Dasychira rocana Swinhoe.

The ground colour of this larva, which is covered with close-packed short hairs, is dark brown. Long thin irregular lateral pencils of black hairs anteriorly inclined arise on segment 2. There is a sub-spiracular lateral line of long white hairs which spread out perpendicularly along the whole length of the body; above this line on each segment (except 1 and 13) there is a lateral wart of thickly packed short maroon hairs. Similar paradorsal warts occur on each segment except 1 and 13, which have none, and 5 and 6 where the warts are modified to form a single large well-marked chocolate coloured ring with lines of demarcation between the individual brushes forming a cross. The four brushes can spread out like the petals of an opening flower exposing stiff urticating bristles or setae. There is a pale coloured dorsal line, which on some specimens may be white, on segments 2 to 4; this pale line is usually completely absent from segments 5 and 6 but appears again on segments 7 to 12. Segments 10 and 11 bear a small red dorsal tuft or wart (not more than 1.6 mm in diameter). This wart can be made to disappear under folds of the skin at will. When the larva crawls rapidly the two warts disappear and reappear in unison with the undulations of the walking caterpillar. The posterior margin of segment 12 bears a posteriorly inclined fan of long white hairs. The larva feeds on *Terminalia catappa* and pupates in a dirty flabby cocoon amongst vegetable litter; the imago emerges after about 17 days.

Dasychira nubifuga Holland.

A chocolate-brown larva with short thick compact pencils of chocolate coloured hairs slightly inclined anteriorly on each side of segment 2; at the base this brush has a white ring. Segment 2 has a line of pale hairs anteriorly extended over the head. There are two broken ill-defined paradorsal lines. On segments 2 to 12 is a supra-spiracular cone of brownish white fairly rigid hairs. Segments 5 to 8 bear each a marked dorsal brush of closely packed, chocolate coloured hairs in the form of a ring. Segment 9 bears a large mask-like dorsal mark. Segments 10 to 12 have two pale whitish paradorsal dots with sometimes a large square black dorsal mark, posterior to which is a transverse brown band or line. Elsewhere there are inconspicuous variegated black and grey markings. The pupal stage is passed in a typical lymantriid type cocoon from which the imago emerges after between five and 12 days. The food plant appears to be a papilionaceous plant, with a pod containing five to eight dark red seeds. It will also eat *Alchornea cordifolia* with reluctance in captivity.

Dasychira gonophora Holland.

This attractive larva has a brown head with segments 2 and 3 a variable grey-brown, sometimes nearly pure grey, sometimes more brown. Segment 4 is white. Segments 5 to 11 have a broad chestnut dorsal band edged with black; there is a faint dark dorsal line on segments 9 to 11. Segment 12 has a very slight dark brown dorsal hump. There are white sub-spiracular lines which meet dorsally at the posterior margin of segment 12. On each segment just dorsal of the white line there is an elongated black dot; these dots are nearly long enough to form a broken line. The sides themselves are dark grey to brown. On segments 5 to 8 there are short dorsal brushes of chestnut-brown hairs interrupted with black ones. The larva is covered with long sparsely but evenly distributed black hairs. The food plant is *Urena lobata* but the larva will also eat *Alchornea cordifolia*. The pupal stage occupies between seven and 11 days.

Dasychira inconstata Collenette.

This is a plain green larva covered with long golden-yellow hairs. The usual dorsal brushes on segments 5 to 8 are somewhat thin and long and are deep gold in colour. There is a tuft of golden hairs arising from the rear of segment 12. The larva feeds on *Alchornea cordifolia* and *Chrysophyllum albidum*. The pupal stage occupies about nine days.

Dasychira hypocrita Hering.

The reddish-brown head is covered with fine brown hairs. The sides and dorsal ground colour of segments 2 to 4 are reddish-orange. The dorsal ground colour of the remaining segments is black. On segment 2 is a short, tight, blunt-ended lateral pencil of nearly black hairs at right angles to the body; a nearly black band, broken in the middle, crosses the back from pencil to pencil. Spiracles on segments 4 to 12 are white, ringed in black. There is a thin black supra-spiracular line and a slightly thicker black line separating dorsal and lateral areas. Well-marked dorsal brushes on segments 5 to 8 are red-brown in colour. Segments 9 to 11 have two broad white paradorsal lines. On each segment posteriorly there is a faint reddish dorsal patch just anterior of two red paradorsal dots one bigger than the other. The larva is very variable and all the red or reddish colour may be replaced to a varying degree by yellow or white, and the diamond dorsal pattern on segments 9 to 11 may be brown or grey. The larva feeds reluctantly on *Alchornea cordifolia* but I was unable to discover the true food plant. The pupal stage occupies between four and 11 days.

Dasychira sublutescens Holland.

A rich velvet-black larva with sprays of long white hairs on each segment arising from paradorsal and spiracular tubercles, the dorsal hairs being somewhat sparse. On segment 2 there are long anteriorly inclined rather sparse black lateral pencils of hair. There are thick dorsal brushes of mixed white and black hairs on segments 5 to 8, the first three being largely black and the last nearly pure white. On segment 12 there is a posteriorly inclined very long, thick, dorsal pencil of black hairs, tipped with white. On segment 13 all the hairs are black. There is a brilliant supra-spiracular lateral crimson line broken only by the edges of the tubercles from which the sprays of hair arise. The sides ventral of this line tend to be a brownish grey. The larva feeds on the foliage of *Chrysophyllum albidum* and the pupa is formed in a typical lymantriid cocoon which is spun in any suitable position either on the food plant or amongst vegetable litter. The imago emerges after five or more days.

Dasychira macrodonta Hering.

This larva appears to be one of the largest of the 'Vapourer' type occurring in Nigeria being, when fully grown, about half as big again as any other larva of this sort which I have noticed. The larva varies between a pale pinkish-brown to a pale chocolate colour. There is an unvarying dorsal black line; on segments 10 and 11 there is a small whitish or pinkish dot on this black line. On each of segments 2 to 4 there are two pinkish dots each side of the dorsal black line; in the pinker forms these become evanescent. On segment 12 there is a long, thin, spreading, dorsal pencil of dark hairs. The food plant is *Macrobium macrophyllum*. The cream coloured cocoon is tough and spun between leaves or at a suitable bend or angle of the branch. The imago emerges after a week to ten days in the pupa.

Dasychira laphyctes Collenette.

The general colour of this larva is pale greenish yellow. The head is yellow with a black line parallel to the upper edge of the vertex. Segment 2 is yellow with anteriorly inclined, long, tight lateral pencils of black hair. Segment 12 which is black, has a small black dorsal tuft. The larva is covered with very pale brown hair. Just prior to ecdysis segments 2 to 8, and 11 to 13 turn nearly black, segments 9 and 10 are green and the prolegs yellow. The larva feeds on the leaves of *Manniophyton africanum*. The pupa is formed in a typical lymantriid cocoon amongst vegetable debris and the imago emerges after about a month.

Dasychira basigutta Walker.

The head is a bright orange brown. Segments 2 to 4 are velvet black with transverse yellow, orange, or cream dorsal lines usually three or four. The posterior lines on each segment are often somewhat broken. Segments 5 to 13 have a pale cream, slightly pinkish, broad lateral band. The back of segments 5 to 12 are marked as the back of segments 2 to 4—the front two yellow lines of segment 5 are missing. The width of the coloured transverse lines on the back varies considerably and there may in some cases be more colour than black. There is a variable vertical black line down the side of each proleg on segments 7 to 10. Segment 13 is nearly always largely yellow or orange with a transverse black band across the anterior margin. The larva is sparsely covered with long white hairs. In some forms, there are hardly any yellow dorsal marks.

There is another form of this larva (Roche, P., Private Communication) which differs from the above in that the transverse stripes have become enlarged into a dorsal band stippled with black, the lateral band has been reduced to a narrow spiracular line, and there are dorsal brushes of buff hair on segments 5 to 8.

The first description was taken from a larva just prior to pupation and this may well have shed its dorsal brushes, although a photograph taken at the time shows little or no sign of them. It is clear that the larva must vary very considerably.

The larva feeds on the leaves of *Manniophyton africanum* and is known to eat yam leaves and also *Smilax kraussiana*. The pupal stage lasts about three weeks.

Dasychira haigi Collenette

There is an orange and white sub-spiracular line; dorsal to this the sides are blue grey. The dorsum is pale blue, edged on the ventral margin with two black lines edged in orange red. Segment 2 is orange as is the head. Segments 3 and 4 are very pale blue to white with fine black, and orange transverse lines. There are thick white dorsal brushes of hair on segments 5 to 8. On each of segments 9 to 11, each side of a dorsal blue line there is a black dot anteriorly. A small black thick

dorsal pencil of hairs arises from segment 12. The larva feeds on the leaves of *Alchornea cordifolia* and more commonly on a similar looking plant with scalloped edges to the leaves. It pupates in a rolled leaf and the imago emerges after about seven days.

Dasychira phenax Collenette.

The general colour varies from white to deep cream-yellow, with very pale grey-green lateral and paradorsal bands. There are the typical lymantriid lateral pencils of black hairs arising from segment 2 and a dorsal one on segment 12. These pencils are easily lost and may even be completely absent, in specimens that have been handled. There are thick white dorsal brushes on segments 5 to 8. Each of segments 3, 4, 9 and 10 bears a deep red dorsal mark in the form of an A or a triangle or two lines; sometimes these marks are black. There is a black patch posterior to each dorsal tuft on segments 5 to 8 and a suggestion of a very small dorsal tuft of black hairs on segments 3 and 4. The head is yellow or ochre in colour. The larva is sparsely covered with long white hairs. The larvae will feed on a variety of plants, *Alchornea cordifolia*, *Maniophyton africanum*, and *Macrobium macrophyllum*. The larva spins up amongst the leaves seeming to prefer withered ones when available. The imago emerges after from eight to 15 days.

The *D. aenotata* group.

The following four or five species (*D. aenotata* Tams, *D. ticana* Schs. and Clem., *D. catori* B.-Baker, *D. spec. incertae sedis* A and B) comprise a group of which the larvae are so similar that with superficial examination they may be taken for varieties of a single species, and in fact when I first collected the larvae I considered them to be so. I have unfortunately never had all the species at the same time and thus have only been able to make indirect comparisons and partially to sort them. I would be very grateful for information from anyone who finds and breeds these moths in quantity and for blown larvae with complete data if possible.

Dasychira aenotata Tams.

The general colour of the larva is chocolate-brown. The head is a pale red with a thick black line running down each side of the face diagonally from near the apex to near the outside of the mandibles. On segment 2 there is a thick lateral pencil of short stubby hairs and a pair of paradorsal lines the same colour as the head from the anterior margin to the middle of the segment and there is a transverse white line on each segment posteriorly. Segment 3 carries a similar transverse white line both anteriorly and posteriorly. On segment 4 there is a similar thin, somewhat obscure, white transverse line. Each of segments 5 to 8 carry a brilliant white dorsal circle of very short tightly packed hairs (as if the normal type of brush had been shaved off close to the skin) in the middle of a quadrilateral of shorter very closely packed velvet-black hairs. On segment 12 is a long thin posteriorly inclined dorsal pencil of black hairs. There is a faint suggestion of a fawn coloured sub-spiracular line; the prolegs are pink. The species has very few long hairs. The food plant is *Veronia conferta* but it may also eat *Alchornea cordifolia* and probably will do so in captivity.

Dasychira ticana Schs. and Clem.

In pattern this species is similar to *D. aenotata*. It differs in that the transverse bars on the face are absent, and that the whole of the dorsal area of segment 2 between the hair pencils is of the same colour as the head. It differs from both *D. aenotata* and *D. catori* in the background colour and in the dorsal circles of

segments 5 to 8 varying from yellow to fawn in colour. It is thinly covered with long white to yellow hairs with black tips. The normal food plant is *Smilax kraussiana* but it is sometimes found on *Alchornea cordifolia*.

Dasychira catori B-Baker.

The general pattern is very similar to that of *D. ticana* but differs from it in that the general colour is grey (wavy longitudinal lines of black over a white background). There is a pair of broad white dorsal lines just separated by a thin black one, and a pinkish-grey sub-spiracular band. The whole larva is sparsely covered with long thin silky white hairs with black tips.

D. spec. incertae sedis A and B

The larvae of these two moths were the first I found and were thought at the time to be dark and light forms of the same species until after the imagines emerged. My notes are not sufficient to separate them accurately from the other three species of this group. Species A has a larva very similar to that of *D. aenotata* and I am at present of the opinion that it is in fact a form of this species. It feeds on *Vernonia conferta*.

Species B feeds on *Alchornea cordifolia* and the larva appears from my notes to be remarkably similar to that of *D. catori* as is also the imago.

Dasychira rochei Collenette.

The full fed larva is 30 mm in length. The head, ventral and lateral surfaces are orange-yellow. The dorsal area is grey. The larva is covered with very long silky cream coloured hairs. On segment 2 the lateral pencils are white and unusually short being not much longer than the lateral hairs and not easily distinguished from them; there is a dorsal pencil of white hairs on segment 12. On segment 4 there is a deep black velvet dorsal patch. The white brushes on segments 5 to 8 are obscured by the abnormally long hairs of the larva.

The cocoon incorporating the larval hairs, is spun up amongst the leaves of the food plant which has not been identified; the imago emerges after about ten days.

Dasychira exoleta B-Baker.

A black larva with a maroon head. On segments 10 and 11 there is a medium sized white dorsal spot. The dirty white dorsal brushes on segments 5 to 8 are much larger and thicker than normal and marked by transverse extensions often being contiguous with the white lateral brushes on these same segments. There are thick pencils of lateral white hairs ventral to the lateral tufts on these segments and on segments 2, 3, 10, 11 and 12 are rather long very thin white pencils, often of only one or two hairs. The larva pupates in a rolled leaf or dead leaf or in vegetable debris. The imago emerges after about a week.

Euproctidion viridipallens Hering.

The dorsum is darkish grey to red brown with a broken white dorsal line. This may be quite evanescent. Each segment has a central transverse ring of red-brown hairs the ends of which are black when the hair arises from the dorsal area of the larva and white when arising laterally; between these rings the remaining portions of the segments are grey with the inter-segmental folds black. On segment 12 are two spreading thin paradorsal tufts of black hairs. The food plant is *Alchornea cordifolia*. The pupal stage lasts about eight days.

Orgyia mixta Snellen.

This larva which feeds on *Alchornea cordifolia*, *Casuarina*, and other trees can

be distinguished from the next species, to which it is very similar, by the bright red collar at the anterior margin of segment 2. The head is shining, reddish to ochre. Thin antenna-like lateral pencils of black hairs arise on segment 2 and a single dorsal one on segment 12. There are thick dorsal brushes of white hair on segments 5 to 8; on segment 5 there is a very long white sub-spiracular tuft of hairs, and a similar tuft of black hairs on segment 6. The bases of all hair tufts are black. Along each side is a grey band made up of several lines enclosing a yellow dot on each segment. On each of segments 9 to 11 is a black or fawn dorsal line in the shape of a diamond with a yellow dot in the centre of each diamond; anterior to the yellow dot there are two minute red or ochre dots. The pupal stage last approximately seven to 10 days.

Orgyia basalis Walker.

The basic colour is a deep black-brown. On segments 5 to 8 there are ivory white dorsal brushes (very rarely these are rather short and chocolate in colour); on segments 5, 7 and 11 are thick lateral pencils of white hair and on segment 6 a thick lateral brush of black or chocolate-brown hairs. On segment 12 there is a thick circular compact dorsal tuft of fairly short hairs; immediately posterior of this tuft there is a row of three white spots. Between the white dorsal brushes on segments 5 to 8 the colour may be black or red as may the back of segments 9 to 12. There are two broken white paradorsal lines which vary considerably in clarity—they are usually absent on segments 5 to 8 and most clearly marked on segments 2 to 4 and 9 and 10. All the hairs and hair tufts except the brushes on segments 5 to 8 arise from pink or red tubercules. The larva is sparsely covered with thin groups of long white hairs chiefly situated laterally. The larva will eat many plants, *Alchornia cordifolia*, *Macrolobium macrophyllum*, *Vernonia conferta*, amongst others. The pupal stage lasts five to eight days.

Terphothrix lanaria Holland.

This larva has yellow, cream, or greyish skin. A radiating lateral cone of cream-yellow hair arises from the centre of each segment. On each segment arise paradorsally very long ribbons of gleaming golden hairs; the centre portion of the ribbons on segments 5 and 10 contain a relatively tight pencil of red-brown, with a centre of extra long grey-black hairs. The centre of the dorsum is sparsely covered with matted yellow hair. The larva rests on the underside of the leaves of its food plant *Vernonia conferta* with the paradorsal ribbons of hair extended flat on either side of the body; when alarmed the ribbons of hair can be raised rapidly into a vertical position over the dorsum. The larva pupates in a delicate golden semi-transparent cocoon spun from silk into which the larval hairs are incorporated.

The cocoon which is of a most unusual shape, is spun on the underside of the leaves of the food plant. It consists of two chambers the first of which is flat and circular next to the leaf and is the chamber in which pupation occurs; beyond this is the second chamber in the shape of a pointed dome. After laying the foundations of the cocoon the larva erects the pointed dome, then it retires to the chamber next to the leaf which is a third to a quarter the size of the dome, seals it off and pupates. The imago emerges after seven days.

Mylantria xanthospila Plotz.

The ground colour of the larval skin is velvet-black. On each segment there is a brown transverse ring from which arise tufts of bright ginger hairs; on all segments there is a tendency for the dorsal tufts to be thicker, this is sometimes especially marked on segments 5 to 8.

There are two narrow white paradorsal lines and a broad white supra-spiracular band with black spots variable both in number and size. This broad band breaks the ring of ginger hairs on each segment. The head varies from dark to pale brown.

The larva feeds on *Aspila latifolia* and occasionally on species of *Phychotria*.

The pupa is made in the usual type of loose cocoon of silk and body hairs which seems to be spun almost anywhere. The imago emerges after about 14 days.

Argyrostigma niobe Weymer.

The head is pale brown to red brown with a black band just above the mouth parts. The ground colour of the back is deep grey; this colour is the result of a mixture of short deep black and deep maroon hairs—the latter are sometimes missing. Laterally the larvae are ochreous to grey with a thin black spiracular line and a varying number of small black dots. Segment 2 has a broad red transverse band anteriorly and a fringe of white hairs extending over the head; thin black pencils of hair inclined anteriorly arise laterally from the segment. Segment 3 has two circular paradorsal marks joined posteriorly by a thin white transverse line, which is sometimes broken; the size of the mark varies and at its largest appears as a crescent; its colour may vary from white to ochre. Segments 5 to 8 have thick dorsal brushes of dirty yellow-brown hair; one or all of these can be deep grey-black.

Segment 9 has a white dorsal mark resembling a crown. It consists of a line in the shape of a semicircle anteriorly concave with a small circular mark at each end; beneath this (on the convex side) is a white to pale yellow line of length approximately the diameter of the semicircle.

On segments 3, 4, 9, 10, 11 and 12 are long lateral pencils of silky white hair which are particularly prominent on the last four. Segment 12 has a long thin dorsal pencil of black hairs pointing rearwards.

The food plant is *Bignoniacia markamia* and probably *Casuarina*. The larva makes a very rough textured cocoon and the imago emerges after about ten days.

DISCUSSION

The total number of larvae described in this paper is thirty-three. This is slightly less than ten per cent of the total number of Lymantriidae known to occur on the west coast of Africa. Even so it seems clear that when our knowledge of the larvae of this group is more complete we will possess a better understanding of the classification of the group. In particular there are indications that we should look again at some of the *Dasychira* where there already seem to be two distinct groups of larvae and at *Dasychira glovera* whose larva has the appearance of that of a geometrid.

Taylor (1949) has described the larva of a species from South Africa which he calls *Euproctis fasciata* Walker. However, it is quite clear both from the larval description and the plate he gives that his species is not *E. fasciata* but another closely related one. The late C. L. Collenette, who identified my specimens, informed me that there are a number of species very similar and closely related to *E. fasciata*. The illustrations in Seitz (1930) also agree with the species I describe as *E. fasciata*.

Despite the relatively few larvae that I have been able to identify I have included a key at the end of this paper. I make no apology as I think it will enable field workers to run down known specimens rapidly, a most necessary

facility in the tropics where a prize larva may, if left undisturbed overnight, be found to have pupated by the morning.

I do not know of any infallible characteristics for separating a lymantriid larva from those of other families. They are most likely to be confused with Arctiidae and Acronyctinae. Generally however the Lymantriidae are more ornate and have more elaborate hair patterns, brushes and tufts than the other groups and the hairs are longer. There are of course exceptions, but most ornate very hairy medium sized larvae in West Africa are Lymantriidae.

KEY TO KNOWN LARVAE OF THE
WEST AFRICAN LYMANTRIIDAE

1	a	Larva with definite thick well marked close knit dorsal brushes of hair on segments 5 to 8	25
	b	Segments 5 to 8 without such brushes	2
2	(1) a	Segments 5 to 8 with a very clear white or yellow circular mark medio-dorsally as if the hair brush had been shaved off close to the skin	23
	b	Segments 5 to 8 not so marked medio-dorsally	3
3	(2) a	There is a marked tuft of hair or process medio-dorsally on segments 5 and 6	19
	b	No marked tufts of hair or processes medio-dorsally except sometimes on segment 12	4
4	(3) a	Larva looper-like with prolegs on segments 7 to 9 absent <i>Dasychira glovera</i>	
	b	Larva not as above	5
5	(4) a	Larva except for a few small marks unicolourous	8
	b	Larva noticeably showing two or more colours	6
6	(5) a	Larva with the dorsum mainly black (60% or more)	12
	b	Dorsum of larva not black	7
7	(6) a	Dorsum of larva mainly blue with black and yellow markings <i>Dasychira haigi</i>	
	b	Larva with segments 5 to 11 chestnut brown para-dorsally lined with black, segment 4 white <i>Dasychira gonophora</i>	
8	(5) a	Body covered with long golden hairs (pencils of hair of other colours are ignored). Body pale cream or green	9
	b	Body not covered with long golden hair	14
9	(8) a	At rest or when not alarmed all hairs are pressed flat against the surface on which it is resting. There is a pencil of darker hairs on each side of segments 5 and 10 <i>Terphothrix lanaria</i>	
	b	All hairs not pressed flat against surface on which larva is resting	10
10	(9) a	Larva with a deep brown mark on front of head	11
	b	Larva without such a mark. Body pale green covered with long golden hair. There is a golden dorsal tuft on segment 12. There is a tendency to form dorsal tufts on segments 5 to 8, but they are very poorly developed <i>Dasychira inconstanta</i>	
11	(10) a	Front of head with a broad deep brown or black line down each side. (There is a dark form with grey rather than golden hair) <i>Dasychira isozyga, Dasychira anisozyga</i>	

- b* Head with a deep brown or black line across the top of the face, slightly concave ventrally. A thin antenna of black hairs arises at each side of segment 2. Segment 12 has a small black tuft medio-dorsally *Dasychira laphyctes*
- 12 (6) *a* Dorsum black with 2 to 4 thin white transverse lines across each segment. Sides coloured like white human skin *Dasychira basiguttata*
- b* Larva not so marked 13
- 13 (12) *a* Larva with red or orange markings only *Euproctis mima*
- b* Larva with a ring of bright ginger hairs round each segment and a broad white lateral band which cuts through the ring of hairs *Mylantria xanthospila*
- 14 (8) *a* There is a clear round medio-dorsal dot or wart on segments 10 and 11 15
- b* Segments 10 and 11 without medio-dorsal dots 17
- 15 (14) *a* Larva chocolate coloured. Dots on segments 10 and 11 pink *Crorema mentiens*
- b* Larva black 16
- 16 (15) *a* Larva, thinly covered with long silky white hairs. Spots on segments 10 and 11 white *Olapa travatensis*
- b* Larva thickly covered laterally with adpressed white or grey hairs. Thick tufts of grey or white hair transversely across segment 4 *Paraproctis calamolopha*
- 17 (14) *a* Larva with a dorsal pencil of black or white hairs 18
- b* Larva without a dorsal pencil of hairs *Hemerophanes enos*
- 18 (17) *a* Larva with a thin dorsal pencil of black hairs posteriorly inclined. Body covered with short pale brown hairs over a brownish skin *Dasychira viridipennis*
- b* Larva with a thin dorsal pencil of white hairs. Body green covered with long white hairs which are adpressed to the surface on which the larva rests *Leucoma luteipes*
- 19 (3) *a* Larva white except for parts of the dorsum *Leucoma parva*
- b* Larva not mainly white 20
- 20 (19) *a* Larva mainly dark grey or grey brown with segments 7 to 12 white dorsally *Euproctis fasciata*
- b* Larva not coloured thus 21
- 21 (20) *a* General colour deep chocolate with a broad white or cream band down the back. Well marked but irregular pencils of hair form antennae on segment 2 *Dasychira rocana*
- b* Larva red-brown, pink or grey-brown over most of its body but not chocolate coloured 22
- 22 (21) *a* Larva with hair in thick tufts banding each segment. Except on segments 5, 6 and 12, the dorsal hairs have a pink tinge. The tufts on the back of segments 5, 6 and 12 are longer and more marked. There is no medio-dorsal line and the tuft on segment 12 forms a continuous band right across the dorsum. Generally no white hairs *Euproctis utilis*
- b* Larva with hair generally much shorter except for tufts on segments 5, 6 and 12 and sparsely scattered white hairs. Colour varies from red to grey but tufts are

always red. There is a black dorsal line at least through segments 7 to 13 which splits the tuft on segment 12 into distinct halves. There are numerous white hairs scattered over the body . . . *Euproctis molundiana*

23 (2) a Overall colour of larva chocolate-brown . . . *Dasychira aenotata*
 b Overall colour of larva not chocolate-brown . . . 24

24 (23) a Overall colour of larva grey . . . *Dasychira catori*
 b Overall colour of larva fawn to yellow . . . *Dasychira ticana*

25 (1) a Pencils of white hairs projecting from the sides . . . 26
 b Larva without such pencils of white hairs . . . 29

26 (25) a Dorsal brushes on segments 5 to 8 white (rarely black but not yellow-brown) . . . 27
 b Dorsal tufts on segments 5 to 8 a dirty yellow-brown colour . . . *Argyrostigma niobe*

27 (26) a Dorsal brushes on segments 5 to 8 transverse in shape, contiguous with similar lateral tufts. Thin lateral pencils of white hairs on each of segments 5 to 8. Overall colour of body black . . . *Dasychira exoleta*
 b Dorsal brushes on segments 5 to 8 not very transverse. No similar lateral tufts. Thin lateral pencils of white hair on some but not each of segments 5 to 8. Overall colour of body not black . . . 28

28 (27) a On segment 12 there is a large tuft of near black hairs extending transversely to form a dorsal band. Posteriorly to it is a well marked white line. (Larva very variable) . . . *Orgyia basalis*
 b On segment 12 is a normal posteriorly inclined pencil of black hairs. Segment 2 has a bright red transverse collar anteriorly . . . *Orgyia mixta*

29 (25) a Pencils of hair forming 'antennae' are short, stiff, very thick, and project from the sides of segment 2 . . . 30
 b Pencils of hair forming 'antennae' normal (much longer and thinner and anteriorly inclined) . . . 31

30 (29) a Segments 9 to 11 with a thick white line down edge of dorsum which is black with some obscure red markings. No ring at base of 'antennae' . . . *Dasychira hypoerita*
 b Variegated light and dark pattern over the body. There is a white ring at the base of each 'antenna' . . . *Dasychira nubifuga*

31 (29) a Ground colour of larva black . . . 32
 b Ground colour of larva not black . . . 35

32 (31) a Dorsal brushes of one colour . . . 33
 b Dorsal brushes of two colours . . . 34

33 (32) a Dorsal brushes dirty white . . . *Dasychira exoleta*
 b Dorsal brushes on segments 5 to 8 buff . . . *Dasychira basiguttata*

34 (32) a Dorsal brushes on segments 5 to 8 are rather long, thin, white tipped with black. There is a bright red lateral line . . . *Dasychira sublutescens*
 b Dorsal brushes on segments 5 to 8 are short compact thick, white tipped with chestnut. On segments 9 to 12 there is a dorsal line composed of a number of complex yellow marks . . . *Laelia fracta*

35 (31) a Dorsal brushes on segments 5 to 8 pure white . . . 37

- b Dorsal brushes on segments 5 to 8 not pure white. Larva not coloured mainly cream or white 36
 36 (35) a A very large white lateral patch on segments 9/10 and 10/11 with similar smaller patches on segments 8/9 and 11/12 *Dasychira hypnota*
 b No such lateral patches. Larva with two dark paradorsal lines and a blue-black lateral line *Laelia rosea*
 37 (35) a Anterior lateral pencils of hair on segment 2 black. Larva laterally creamy-grey. Dark red to black dorsal marks on segments 3, 4, 9 and 10 *Dasychira phenax*
 b Anterior lateral pencils of hair on segment 2 white. Larva laterally orange. Black velvet patch on segment 4 only *Dasychira rochei*

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74, High Bridge Street,
 Waltham Abbey,
 Essex
 17th February 1966

Rhizophagus picipes (Ol.) (*politus* (Hellwig)) (Col., *Rhizophagidae*); an unusual habitat. During the Society's field meeting at Higham, west Kent, 8.v.66, several members worked a large heap of rotting apples, which produced this very local clavicorn in some numbers. This appears to be an unusual habitat for the species, which is normally found under bark or at sap; cf. Fowler, W. W., 1889, *Col. Brit. Is.*, 3:267, London; and Johnson, C. J., 1964, The genus *Rhizophagus* Herbst, *Proc. Manchester ent. Soc.*, 1961-3:3-9.—S. A. WILLIAMS, 79, Cedar Drive, Sutton at Hone, Kent, 10th June 1966.

Diurnal flight in Acilius sulcatus (L.) (Col., *Dytiscidae*). Following Buck's record (*antea* p. 34) of diurnal flight in *Dytiscus marginalis* (L.), I think the following record may also be of interest. At 1 p.m., 17.v.64, at Crowcombe, Somerset, I captured a female *Acilius sulcatus* (L.) which had just landed on the roof of a stationary car, the weather being hot and sunny.

At the time I thought that the beetle had taken the reflection from the roof of the car to be that from a small pond, causing it to land. However the following day an example of *Rhagium bifasciatum* (F.) (Cerambycidae) landed on the roof of the car at the same time and in the same weather conditions, which throws some doubt on the theory.

Diurnal flight in the larger Dytiscidae may not be as unusual as it would seem. Many of these dytiscid beetles are to be found swimming actively in ponds during the daytime and therefore it does not seem unreasonable that they may also take flight during this period.—J. MUGGLETON, 32, Penton Road, Staines, Middx., 14th June 1966.

CYMATODERA CYLINDRICOLLIS (CHEVROLAT)
(COL: CLERIDAE) IN A LEITH WAREHOUSE

By BRIAN MORRISON

I first discovered this beetle on 2.x.61 while inspecting dried chicory root in a Leith, Midloth. warehouse. Only two specimens were found, and one of these was sent to the Department of Agriculture's field station at East Craigs where it was provisionally identified as belonging to the genus *Cymatodera*. Later, on being forwarded to the British Museum (Nat. Hist.), the beetle was finally identified as *C. cylindricollis* (Chev.). Other examples of this species have been found in the warehouse fairly regularly over the past four years during routine inspections; but with one exception, all of them have been dead.

Since *Cymatodera* is a native of Central America, its appearance in a Leith warehouse requires some explanation. It seems most probable that the insect was introduced into this country on second-hand coffee bags. The dried chicory root is put into these bags at the collecting centre in Huntingdonshire (the chicory is grown in England) and it is taken north by train during the months October to December. On arrival at Leith, the chicory is distributed to five different storage premises where some of it may remain for almost a full year. The bags themselves come originally from different parts of Africa and S. America and it seems likely that some may have originated in areas where *Cymatodera* is to be found.

From the information I have collected so far, it seems that this is the only record of *Cymatodera* associated with chicory, and its continued appearance in this one store only despite frequent inspections of other chicory warehouses in the district, presents quite an interesting problem. Of course it is possible that I have just failed to observe it anywhere else. There is, however, another explanation which at first sight may seem rather improbable, and that is that the beetles are breeding in the warehouse. This suggestion could be dismissed on grounds of climate alone and the evidence in support of the idea is purely circumstantial but for the benefit of those who enjoy trying to solve 'entomological enigmas', I feel it might be as well to summarise this evidence briefly:

- (1) The beetles are found regularly in this particular warehouse only.
- (2) One live specimen has been found and most of the dead insects have been in reasonably good condition. This last point is important when you consider that bags are normally cleaned before being used a second time. This may involve brushing, beating or vacuum cleaning, any one of which is aimed at removing residues and insects.
- (3) The beetles have been found in areas of open floor and on windowsills far more often than on bags. Since the warehouse is emptied every autumn and the floor is given a thorough sweeping before the new lot of chicory is brought in, this suggests that beetles are able to walk about in the loft for some time before they die.
- (4) Food supply. *Cymatodera* is a clerid and may therefore be carnivorous. The chicory store has an endemic infestation of *Ephestia elutella* Hübn. (Lep., Pyralidae), in fact it may have been infested with this moth for 20 years, judging from other reports. At the time of my inspection in 1961, I discovered hundreds of larvae migrating over the bags of chicory and up the walls of the store. Here surely, there would be an ample supply of food for our Central American visitor.
- (5) Temperature: this is probably the key factor in the discussion. A beetle used to a Central American habitat is not likely to be able to withstand our cold winters unless some modifications are made in living conditions here. The

chicory loft in question is situated above several offices and shares a common wall with several dwellings. Both sets of premises are heated during the winter. Although no tests have been carried out, it is likely that air spaces, and possible insect harbourages, between the loft floor and walls and the other properties will have a temperature considerably higher than that out of doors.

Paradoxically, it is the presence of the moth infestation which may also provide the reason for the number of dead beetles found. As an infestation inspector, my first duty must be towards seeing that food materials in store are kept free from insects and my feelings regarding unusual species have to take second place. Following the fumigation of the infested chicory in 1961, the store-keeper has been recommended to spray the bagged chicory with pyrethrins every three weeks during the summer in an attempt to keep *Ephestia* under control. Pyrethrin is well-known for its ability to flush insects out of their hiding places and this may be what is happening in the case of *Cymatodera* specimens which are found in open floor areas.

In conclusion I would say that until further evidence (e.g. the discovery of larvae) is forthcoming, it cannot be stated definitely that *Cymatodera* is breeding in the loft. More observation is required, and I hope to be able to report further on this interesting situation some time in the future.

Since writing the above, Mr. Pelham-Clinton of the Royal Scottish Museum has given me some information on two further records. One insect was handed in by an official of the Ministry of Food (April 1946) who found it in 'a warehouse in Leith'. The second beetle was found alive in a house across the road from the chicory warehouse by an inspector from the Edinburgh Corporation Public Health Department. The discovery was made in November, 1961.

25th June 1966

PROCEEDINGS

28th JANUARY 1966

94th ANNUAL GENERAL MEETING
(with which was combined the Ordinary Meeting)

The President, Mr. R. W. J. UFFEN, in the Chair

EXHIBITS

Dr. A. M. MASSEE—The myrmecophilus beetle, *Clytra quadripunctata* (L.) (Chrysomelidae), which is widespread in the British Isles, but its distribution is confined to the areas where the ant *Formica rufa* L. (Formicidae) occurs. The adult beetle is very partial to hazel but also occurs on oak, birch, etc., during May and June. In Blean Wood and Darenth Wood, Kent, it is more common today than formerly, no doubt due to the practice of coppicing of the woodlands in the areas where the two insects occur. *C. quadripunctata* (L.) becomes less common where the woodland and its conservation are neglected.

Mr. A. E. GARDNER—A series of *Gnathoncus nanus* (Scriba) (Col., Histeridae) from the nest of *Parus caeruleus obscurus* Prag. (Blue Titmouse). The beetles were taken from a nesting box in the Wyre Forest, Worcs., emptied by Dr. N. E. Hickin, 12.vi.65.

The TREASURER gave his Report on the Accounts and moved their adoption. This was seconded by Mr. C. G. Roche and carried unanimously.

The Council's Report for the past year was read by the SECRETARY who moved that it be adopted. Mr. B. GOATER seconded the motion which was carried unanimously.

The PRESIDENT announced the following Officers and Ordinary Members of Council elected for the ensuing year: *President*, J. A. C. GREENWOOD, O.B.E., F.R.E.S.; *Vice-Presidents*, R. W. J. UFFEN, F.R.E.S. and R. F. BRETHERTON, C.B., M.A., F.R.E.S.; *Treasurer*, F. T. VALLINS, A.C.I.L., F.R.E.S.; *Secretary*, B. J. MACNULTY, PH.D., B.SC., F.R.I.C., F.R.E.S.; *Editor*, F. D. BUCK, A.M.I.PTG.M., F.R.E.S.; *Curator*, A. E. GARDNER, F.R.E.S.; *Librarian*, S. A. WILLIAMS; *Lanternist*, M. SHAFFER; *Ordinary Members of Council*, D. J. CARTER, T. G. HOWARTH, B.E.M., F.R.E.S., F.Z.S., Mrs. T. G. HOWARTH, B. W. LEONARD, A. M. MASSEE, O.B.E., D.SC., F.R.E.S., C. G. ROCHE, F.C.A., F.R.E.S., A. SMITH, A.R.C.A., D. STIMPSON and W. G. TREMEWAN.

COMMUNICATIONS

Dr. B. J. MACNULTY said that his appeal for the Reserve Fund had fallen short of the £1,000 he had set as a target. He had written to those who had said they would contribute to the fund, saying that though the target had not been reached he would donate his amount, and asking if they would do the same. All had agreed to do so, and he thanked them for their generosity. He added that any further contributions to the fund would be gratefully accepted.

One of our members, Mr. B. Wright, who returned to Canada about two years ago, was reported by Mr. F. T. VALLINS, to be now curator of the Entomological Department of the Nova Scotia Museum at Halifax.

Mr. R. W. J. UFFEN asked if any member knew of a method of persuading the female *Polyphoca ridens* F. (Lep., Thyatiridae) (Frosted Green) to lay, but without eliciting a helpful reply.

Rising to give his Address, the PRESIDENT explained that he would not read a paper in the customary form, but would show some slides dealing with the life histories of some of our coleophorid moths. He then called upon Mr. J. A. C. Greenwood to take the Chair.

Mr. GREENWOOD asked Mr. Uffen if he would write a paper for the Proceedings on the subject. To which Mr. Uffen replied that he had already written several papers on various species of this group, and would be willing to write a covering summary so that they could be published in the Proceedings.

The Officers and Council for the past year were thanked for their services on a motion by Mr. S. N. A. JACOBS. A motion which was seconded and carried by acclamation.

10th FEBRUARY 1966

A Vice-President, Mr. R. F. BRETHERTON, in the Chair

EXHIBITS

Mr. S. WAKELY on behalf of Mr. E. SADLER—An example of *Laspeyresia pactolana* Zell. (Lep., Olethreutidae) which had been taken in Alice Holt Forest, Hants, 12.vi.65. Mr. Sadler's specimen is the first authentic example of *L. pactolana* Zell. to be taken in Britain. From time to time the species has been recorded for this country, but Mr. J. D. Bradley said that all those he had

examined had been wrongly determined, this was the first true example he had seen of British origin. Specimens of *L. cognatana* Barr., *L. coniferana* Sax., *L. cosmophorana* Treits. and *Pseudotomoides strobilella* L. were also shown for comparison.

Mr. T. R. EAGLES—The lichens *Cladonia squamosa* (Scop.) Hoffm. and *C. coccifera* (L.) Willd. He drew attention to the red apothecia on the latter. The exhibited material was collected at Pendine, Carmarthen, by Dr. B. J. MacNulty.

Dr. A. M. MASSEE—Examples of *Stenus kiesenwetteri* Rosen. (Col., Staphylinidae). There are 73 species of *Stenus* in the British Isles, and *S. kiesenwetteri* Rosen, is regarded as one of the least common. It occurs in sphagnum moss, and its headquarters is Mark Ash in the New Forest, Hants, where the insect occurs in a boggy locality where the moss is common. At the beginning of the century it was recorded also on Wimbledon Common and Chobham in Surrey, but it does not occur in these localities today. The species may be recognised from all the others with red spots on the elytra, by the absence of ridges on the sides of the abdomen.

Mr. P. A. GODDARD—Photographs of two distinctive moths seen in Dorset last August; the common tortricid, *Acleris emargana* F., disturbed from sallow on Stoke Heath, and the rare migrant arctiid, *Euplagia quadripunctaria* Poda. The former has an unusual shape which enhances its resemblance to a dead leaf. The latter's forewing pattern resembles a drawn out face when the moth is at rest.

COMMUNICATIONS

Dr. C. G. M. DE WORMS said that on 1st February in the mild spell prior to the meeting, Gen. Sir George Johnson had seen a specimen of *Gonepteryx rhamni* L. (Lep., Pieridae) at Woking, Surrey. He also noted that the early noctuid and geometrid moths were coming to his light trap.

Phigalia pilosaria Schiff. (*pedaria* F.) and *Erannis leucophaearia* Schiff. (Lep., Geometridae) were both reported by Mr. P. A. GODDARD to have been in his light trap.

Mr. PRIOR reported that his wife had seen an example of *Aglais urticae* L. (Lep., Nymphalidae) while at church on 30th January.

A number of examples of the rare weevil, *Chromoderus affinis* Schrank, were reported to have been seen by Dr. A. M. MASSEE, on sallow blossom this year. He suggested that the rarity of this beetle was only apparent, as coleopterists did not start collecting early enough in the year to obtain it. To this Dr. B. J. MACNULTY added that the weevil *Dorytomus salicinus* (Gyll.) was to be found on sallow at Wood Walton Fen at this time of the year.

Referring to Dr. Massee's exhibit, Mr. S. A. WILLIAMS said that most of the specimens of *Stenus kiesenwetteri* Rosen were taken on Wimbledon Common. He had checked the locality for several years now but had been unable to find the species. He also reported that in his collection he had an example from Saffron Walden, Essex.

Mr. R. F. BRETHERTON said that *Acleris emargana* F., photographed by Mr. Goddard, was common in Scotland; there were, he added, very many colour variations there. He asked if this was the case in the south. Mr. Goddard replied that all the specimens he had seen were normally coloured, and Mr. E. S. BRADFORD agreed.

Prof. A. J. CAIN of Manchester University, read a paper on 'The Nature of Taxonomy'.

24th FEBRUARY 1966

The PRESIDENT in the Chair

EXHIBITS

Dr. A. M. MASSEE—The small black weevil, *Apion minimum* Herbat, which is associated with various species of *Salix*. It is widespread in England, and has been recorded in the Solway district of Scotland. It is a rare species that has a local distribution. The species is very interesting because of its very unusual life cycle. The larva feeds in the gall made by a sawfly of the genus *Nematus* (Hym., Tenthredinidae), but is not interested in the sawfly larva that also carries out its transformation within the gall.

Mr. T. R. EAGLES—Flowers of *Mandragora officinarum* L. (Mandrake). They appear in early spring and being on short stalks and thus near the ground are easily overlooked.

COMMUNICATIONS

Mr. J. BURTON of the B.B.C. Natural History Unit introduced two films, 'Unarmed Hunters' and 'The Major'.

10th MARCH 1966

The PRESIDENT in the Chair

EXHIBITS

The PRESIDENT—(1) *Maniola nurag* Ghil. (Lep., Satyridae) a species close to the Meadow Brown, *Maniola jurtina* L., but which is found only in Sardinia. It is not reliably recorded from the nearby island of Corsica which is separated from Sardinia by only a very narrow strait. Females were plentiful at the beginning of August 1965 at an altitude of 1,500 ft, some 15 miles south of Alghero; no males were seen. *Maniola jurtina* L. from Sardinia was shown for comparison. (2) *Catocala dilecta* Hübn. (Lep., Noctuidae) taken while at rest on tree trunks in a forest of young cork trees, at an altitude of 1,500 ft, some 15 miles south of Alghero in early August 1965. This species played a part in an unusual phenomenon. The moth was very conspicuous when at rest on newly barked cork trees, and took to the wing when approached. On each occasion the moth was pursued by large numbers of butterflies of several species. As soon as the moth settled again and hid its hindwings the butterflies instantly lost interest. This was repeated on a dozen occasions on two successive mornings.

Mr. M. P. CLIFTON—Three species of Coleoptera: (1) *Meligethes corvinus* Er. (Nitidulidae) a species represented in the British Museum (Nat. Hist.) by one example in the British collections and three, including the type, in the general collection. The exhibited example was taken on the Arundel field meeting in Sussex. (2) *Blaps mortisaga* (L.) (Tenebrionidae), there are no British examples of this species in the collections in the British Museum (Nat. Hist.) It was taken on a pathway close to the staff canteen of the Royal Aircraft Establishment, Farnborough, Hants. (3) *Anthenocerus australis* (Hope) (Dermestidae) taken on the exhibitor's desk at the British Museum (Nat. Hist.). It is an Australian insect, as far as the exhibitor knew only recorded once before in this country at London Docks. A possible explanation for its arrival is that an expedition from New

Guinea had just returned to the Museum. The first two species caused some difficulty in determination, which in both cases is still not positive.*

Mr. T. R. EAGLES—Cryptogams from Epping Forest, Essex. (1) The moss *Tetraphis pellucida* Hedw. He drew attention to the numerous cups containing gemmae and said that whereas the moss with gemmae but no capsules was common, he had only found one growth with both. (2) The Liverwort *Plagiochila asplenoides* (L.) Dum. He remarked on the ease with which a liverwort can be told from a moss if it is in fruit. (3) Thalli of the lichen *Cladonia coniocraea* (Flk.) Spreng. (4) The fungi *Polyporus brumalis* (Pers.) Fr. and *Stereum hirsutum* Pers. (5) The mycetozoan *Reticularia lycoperdon* Bull. The specimen shown was unusually large and the aethalium was in an early stage of its development.

Dr. A. M. MASSEE—A number of examples of the aquatic bug *Microvelia pygmaea* (Dufour) (Veliidae), taken in the dykes of Higham Marshes in June and August. This is the first Kent record of the species which was first recorded in the New Forest, Hants, and has been found in Cornwall, Herts., and at Petts Level, Sussex. The developed form is rare, but the exhibitor has found it on a number of occasions in the New Forest.

Mr. P. A. GODDARD—The following photographs: *Ochsenheimeria mediopunctinella* Haw. (Lep., Ochsenheimeridae), larva found on a grass seed-head during the Whippend Wood, Herts., field meeting, 26.vi.65, and the resultant most striking imago. *Pempelia dilutella* Hübn. (Lep., Pyralidae), the dull-coloured South Downs form, taken on the Arundel, Sussex, field meeting, 8.viii.65, and two much more strongly marked examples taken at Portland, 15.viii.65.

Mr. C. G. ROCHE—(1) *Bombus terrestris* (L.) (Hym., Apidae) females; one, s.sp. *audax* Harris from the U.K., and another, s.sp. *sassaricus* Tourn. from Sardinia, showing the differences between the two. (2) *Xylocopa violacea* (L.) (Hymenoptera) from Sardinia and a male and female *Xylocopa* (s.gen. *Platynoda*) *latipes* (Drury) from Sabah.

Mr. B. W. LEONARD—Two examples of *Acanthopleurum brunnipes* F. (Dipt., Asilidae) taken in Sardinia, one by Mr. C. G. Roche, 16.x.63, the other by the exhibitor, 10.ix.65. Little is known of the habits of this insect, but it has been said to prey on grasshoppers and other asilids. No dates of occurrence of this fly have been published but one would assume that it appeared in September and was on the wing, certainly, until the third week of October. The example taken in September still has nearly all the golden hairs on the abdomen, but the one taken in October has lost the majority of these hairs. He also showed four examples of *Asilus barbarus* L., two with prey, taken in Sardinia in September 1965. The prey are two beetles, *Chironitens irroratus* Rossi and *Oonthophagus fracticornis* (Preys.).

Mr. S. A. WILLIAMS—The following staphylinid beetles: *Philonthus parvus* from Tuddenham, Suffolk, 3.vii.65 in a dead pigeon, a new county record. The species is normally associated with animal feeding stuffs such as silage. Mr. H. Last (1965, *Proc. S. Lond. ent. nat. Hist. Soc.*, 1965:48) gives its distribution as Kent, Cambridge, Sussex and Cheshire. *Philonthus mannerheimi* Fauv., a single example taken in compost at Sutton-at-Hone, Kent, 1.x.65. The species has a wide distribution in England and Scotland, but is very local and seldom recorded.

Mr. A. SMITH—Slides of his drawings to show the larval habits of several of the British microlepidoptera.

COMMUNICATIONS

Mr. F. T. VALLINS announced that the Society was now a corporate member

*The *Meligethes* has since been determined by Dr. A. M. Easton as *M. aeneus* (F.), but the *Blaps* has been found to be correctly determined.

of both the Kent and Surrey Naturalist's Trusts.

The warm weather was reported by Dr. C. G. M. DE WORMS to have brought out Lepidoptera about three weeks early. He had seen *Achlya flavicornis* L. (Thyatiridae) and *Pseudoboarmia* (*Boarmia*) *punctinalis* Scop. (Geometridae). He also said the sawfly was already over in some places, and that he had seen Orange Underwing moths, *Polygona c-album* L. (Nymphalidae) and *Gonepteryx rhamni* L. (Pieridae) about a week before the meeting.

The PRESIDENT reported *Dasycampa rubiginea* Schiff. (Noctuidae) in his light trap.

Erannis defoliaria Clerck (Geometridae) was reported to have been seen by Mr. P. A. GODDARD on 23rd March, but it was not so common as in previous years. *Orthosia stabilis* Schiff. (Geometridae) was coming to his light trap in the usual numbers, but he had not seen more than six or seven *Erannis marginaria* F. (Geometridae). He added that he had found no *Tortricodes tortricella* Hüb. (Tortricidae) this year, whereas in 1958 he found them commonly at night. He ended by saying that the spring geometrid moths were found to be scarce in his area.

Mr. J. L. MESSENGER reported that *Orthosia gracilis* Schiff. and *O. populeti* F. (Noctuidae) and the geometrid moths were all in about their usual numbers, but some were very early.

This year, said Mr. R. F. BRETHERTON, compared very favourably with others as he had recorded 17 species of moths up to the 16th March.

In his trap on 1st March, reported a member, were four moths, all of the genus *Orthosia* and all different species.

Mr. S. N. A. JACOBS reported that Mr. Valletta in Malta had seen thousands of *Celerio livornica* Esp. (Lep., Sphingidae).

Apocheima hispidaria Schiff. (Lep., Geometridae) was still on the wing according to a report by Mr. T. R. EAGLES, and Dr. de Worms added that they had emerged about the 18th February.

Referring to Mr. Clifton's exhibit, Dr. A. M. MASSEE said the *Meligethes* should be sent to Dr. A. M. Easton for confirmation. He was revising the genus and due to the lack of recent material in this species was considering it to be extinct. Regarding the same exhibit Mr. S. WAKELY said that *Anthenocerus australis* (Hope) had been found by Dr. K. G. Blair in New Britain. Mr. Wakely had found it in wrapping paper which had been chewed by rats in a printing works in Bunhill Row, London, E.C.1.

Mr. R. F. BRETHERTON said he was interested in the cline of *Pempelia dilutella* Hübn., as he had caught several specimens on Box Hill, Surrey, of which three were large and bright, and the rest small and dark. At Ottershaw, Surrey, away from the chalk, he found four large and bright examples. Mr. Wakely said that the dark form was the rarer of the two and he gave details of its life-history. Mr. Messenger said he had caught a very large and bright example on the Burren of Clare.

24th MARCH 1966

The PRESIDENT in the Chair

EXHIBITS

Mr. T. R. EAGLES—Catkins of a monoecious willow, *Salix cinerea* L., grown from a cutting taken near Dorking, Surrey.

Mr. P. A. GODDARD—Photographs of (1) *Tubuliferola josephinae* Toll (Lep., Oecophoridae), a species taken on Stanmore Common, Middx., 19.vii.65. It was mistaken for *T. flavifrontella* Hübn., until recently, when the exhibitor saw Toll's paper (1965, *Ann. Zool.*, 16:171–191, 8 pl.). It is possible that most, or all, examples of *Tubuliferola* which appear to be *T. flavifrontella*, taken after late June, are in fact *T. josephinae* Toll. The latter species can be separated superficially only by its slightly longer, and distinctly more slender, palpi. The genitalia show considerable differences, which should be visible in dry specimens. (2) The common spider *Ciniflo similis* (Blackw.), a number of which were encountered during recent nocturnal entomological visits to Stanmore Common.

Mr. G. M. DE ROUGEMONT—The following Continental cerambycid beetles: *Rosalia alpina* L. from France; *Ergates faber* L., one example each from Aix-en-Provence, France, and Mount Olympus, Greece, both were newly dead; *Aegosoma scabricorne* Scop. and *Morimus asper*, Sulz., from France.

Mr. S. A. WILLIAMS—The beetle *Pseudopsis sulcata* Newm. (Staphylinidae) taken at Horton, Kirby, Kent, 1.iii.66, in rotting straw.

COMMUNICATIONS

Referring to Mr. de Rougemont's exhibit Mr. S. A. WILLIAMS said that he had found the larva of *Ergates faber* L. in rotting pine wood near Bordeaux, France. Mr. DE ROUGEMONT said that both the examples he had found were still quite relaxed, though dead. He added that he had searched both localities for the larva, but had been unsuccessful.

A talk was given by Mr. A. E. STUBBS, illustrated by coloured slides, on 'The future of field meeting localities in Surrey'.

14th APRIL 1966

The PRESIDENT in the Chair

EXHIBITS

Mr. P. A. GODDARD—Photographs of (1) *Laspeyresia gallicana* Guen. (Lep., Tortricidae), found commonly on a railway embankment in Stanmore, Middx., in August; curiously, all but one of the moths were found resting among the upper parts of clumps of *Solidago virgaurea* L. (Golden-rod), and in spite of careful searching none was found in similar clumps of other plants present on the embankment, notably Michaelmas Daisy and Mugwort. No explanation has yet been found for this, the species is known to feed on the seeds of various Umbelliferae. (2) *Swammerdamia heroldella* Hübn. (Lep., Yponomeutidae), a very common species among birch; the larva is easily found in the autumn, as the thin web spun over it is often very conspicuous on damp mornings, but the resemblance of the imago to a bird's dropping makes it very difficult to detect. Although the species is known to be double brooded, the exhibitor has so far observed only autumn larvae and spring imagines.

Dr. M. G. MORRIS—*Apion* (s.gen. *Ceratapion*) *dentirostre* Gerst. (Col., Curculionidae) from the Burren, Co. Clare, Ireland, June 1965, with *A. (C.) carduorum* Kirby from Hunts., Roxburgh, Clare, and Salop for comparison. A single example of *A. dentirostre*, then new to the British list, was taken a few years ago in Co. Galway, Ireland, by Prof. O. W. Richards. I was fortunate enough to take ten examples in the Burren and one in Co. Galway in early June 1965, in every

case by shaking or sweeping *Cirsium vulgare* (Savi) Ten. (Spear Thistle), which would appear to be the food plant. All were females. *A. dentirostre* has only been found elsewhere in southern Spain, so the species seems to have a Lusitanian distribution.

Mr. A. E. GARDNER—the following local beetles: *Eledona agricola* (Herbst) (Tenebrionidae) and *Orchesia undulata* Kraatz (Serropalpidae) both from Windsor Forest, Berks., and *Ampedus pomonae* (Steph.) (Elateridae) bred from larvae taken at Chippenham Fen, Cambs.

COMMUNICATIONS

Mr. P. F. GARTHWAITE gave a talk on 'Wild Life Conservation in the Forestry Commission', which was illustrated by coloured slides.

28th APRIL 1966

The PRESIDENT in the Chair

The meeting began with two colour films, 'The Swallowtail Story' and 'The Purple Emperor', introduced by Mr. V. BASCOMBE.

EXHIBITS

Mr. P. A. GODDARD—Photographs of a sawfly found last May ovipositing in a rose leaf and a cynipid gall wasp found ovipositing in an oak bud in March this year. The latter appears to hunch its back into a curious angular shape when ovipositing.

Mr. B. GOATER—(1) A series of *Diarsia mendica* F. (*festiva* Schiff.) (Lep., Noctuidae) bred *ab ovis* during January–March 1966. The moths, all from the same brood, show considerable minor variation in background coloration and intensity of marking. (2) The saprophytic liverwort *Cryptothallus mirabilis* von Malmberg. This interesting plant was first found near Vienna about 50 years ago, and when first seen was mistaken for the prothalli of a *Lycopodium* sp. (Pteridophyta). In Britain, it was first found near Dumbarton in 1948; since then it has turned up in about a dozen other widely scattered localities, including Brookwood, Surrey in 1951; East Burnham Common, Bucks., in 1957, whence this material came; and Ascot, Berks. in 1959. It grows in wet, boggy but well aerated habitats, usually under *Molinia* litter or *Sphagnum*, but is sometimes under damp pine peat or beneath the thalli of another liverwort, *Pellia*. In these places it is easily overlooked, and it may well prove to be less rare than it seems to be. The plant has several interesting features in its structure and biology. There is a complete lack of chlorophyll, the thallus is heavily infected by a mycorrhizal fungus, and the capsules open by four longitudinal slits instead of by valves.

Mr. E. S. BRADFORD—The larvae of a moth thought to be *Batodes angustiorana* Haw. (Tortricidae), found feeding on Yew in Barnet Lane, Middx., 24.iv.66. He has bred several examples in the last few years, all from apple.

COMMUNICATIONS

An early observation of *Paradrina clavipalpis* Scop. (Lep., Noctuidae) was reported by Mr. P. A. GODDARD who had an example in his light trap on 25th April.

The *Meligethes* (Col., Nitidulidae) exhibited as *M. corvinus* Er. on 10th March last, had been submitted to Dr. A. M. Easton, said Mr. M. P. CLIFTON. Dr. Easton had returned it determined as *M. aeneus* (F.).

Mr. E. S. BRADFORD reported seeing two Waxwings, *Bombycilla garrulus* (L.), in his garden at Boreham Wood, Herts., earlier in the week. They were feeding on apples put out for the Thrushes. A further 16 had been seen in Northern Ireland by Miss A. B. LOGAN, feeding in a holly bush.

The large *Dolomedes* spider exhibited by Mr. D. STIMPSON at the meeting on 14th October last year (see p. 23) which Mr. B. Leonard had taken in Sardinia had now been determined by the British Museum (Nat. Hist.) as *D. plantarius* (Clerck).

12th MAY 1966

The PRESIDENT in the Chair

The deaths were announced of Mr. E. L. Bolton, Mr. W. Gifford and Mr. E. E. Syms.

EXHIBITS

Dr. B. J. MACNULTY on behalf of Mr. B. Morrison of Edinburgh—An example of the beetle *Cymatodera cylindricollis* (Chev.) (Cleridae), a central American species, which was found on the floor of a warehouse used for storing dried chicory root, at Leith Docks, Midloth. The chicory comes from St. Ives, Hunts., in bags which have previously been used for the transport of coffee beans, from central America. It was suggested that this was how the beetle was introduced.

Mr. R. F. BRETHERTON—Examples of four species of *Erebia* (Lep., Satyridae) from Spain, the first three of which are nearly, or quite, peculiar to that country. *Erebia palarica* Chapman, from Puerto Pajares in the Asturian mountains; *E. zapateri* Oberthur, from near Teruel in central Spain; *E. hispania* s.sp. *hispania* Butler, from the Sierra Nevada; *E. cassioides* Howenwarth s.sp. ? *murina* Reverdui from the Picos de Europa. This last species has been referred by Warren to *E. ucleus* Freyer, but the validity of the species is still open to doubt.

Mr. P. A. GODDARD—Photographs of (1) larvae of the local plusiid moth, *Parascotia fuliginaria* L., found among fungus on the undersides of lying dead pine branches during the Ockham field meeting, 23.vi.66. (2) the spider *Segestria senoculata* (L.), found along with the above larvae. It has a very characteristic attitude when at rest, with the front three pairs of legs bunched up in front.

Mr. G. M. DE ROUGEMONT—Two histerid beetles, *Hololepta plana* Fuess. with one of its mandibles larger than the other, and *Hister inaequalis* Ol. Both were taken in France.

COMMUNICATIONS

One of our members said that he had seen very few moths this year, but had taken an *Odontotia carmelita* Esp, (Notodontidae) on 7th April, some three weeks earlier than usual. He also recorded seeing three *Plusia gamma* L. (Noctuidae) towards the end of April. The PRESIDENT said he had taken *Odontotia carmelita* Esp. in early May.

Mr. A. E. GARDNER then brought forward another exhibit: a series of *Ampedus nigerrimus* Lac. (Col., Elateridae), taken in red oak mould in Windsor Great

Park, Berks. He also showed a series of *Rhizophagus picipes* (Ol.) (Col., Rhizophagidae) found under rotting apples at Higham, Kent.

A talk, illustrated by coloured slides, on 'Some pictures of the Picos, Spain' was given by Mr. N. D. RILEY.

26th MAY 1966

The PRESIDENT in the Chair

EXHIBITS

Mr. S. A. WILLIAMS—The following staphylinid beetles from Chippenham Fen, Cambs.; *Stenus lustrator* Er., *S. palustris* Er., *S. nitens* Steph., *Hygromoma dimidiata* Grav. and *Cypha pulicarius* Er. ab. *apicalis* (Bris.), all taken in March this year.

Mr. R. F. BRETHERTON—A male example of the newly separated *Chrysaspidia* (*Autographa*) *gracilis* Lempke (Lep., Noctuidae) taken at lavender blossom on Cumnor Hill, N. Berks., 10.viii.40, together with examples of *C. (A.) festucae* L. for comparison.

Mr. S. WAKELY—Six larvae of *Thalera fimbrialis* Scop. (Lep., Geometridae) which had been reared from eggs laid by a moth taken at Dungeness, Kent, the previous August. The larvae had fed on Yarrow, Golden-rod, mint, birch, hawthorn and various other plants.

Dr. B. J. MACNULTY—A short series of two carabid beetles: *Bembidion harpaloides* (Serv.) from Happisburgh, Norfolk and *B. pallidipenne* (Ill.) from Carmarthenshire. The latter was collected on the shore in an area of some 30 sq. yd although an area of about three square miles was searched for the species. He also exhibited a series of the weevil *Rhynchites cupreus* (L.) taken on the Sheepsleas at Horsley, Surrey on hawthorn, 25.v.66.

Mr. G. M. DE ROUGEMONT—Two unidentified Neuroptera taken on Mt. Vitosha, Bulgaria, in May 1963. He also exhibited a series of the moth *Euprepia striata* L. from Digne, France. With the typical form were four examples of the aberration *melanoptera* Brahm.

Mr. P. A. GODDARD—Photographs of the moth *Pammene argyrana* Hübn. (Olethreutidae) found commonly sitting on oak trunks in the Mill Hill area, Middx. This species is unaccountably scarce in the nearby Harrow Weald and Stanmore areas of Middx. He also showed photographs of many clusters of *Micropteryx calthella* L. (Lep., Micropterygidae) found on various flowers during the Balcombe, Sussex, field meeting, 14.v.66.

COMMUNICATIONS

Several examples of *Vanessa cardui* L. (Lep., Nymphalidae) had been seen by Air Marshall Sir Robert Saundby in his garden at Newbury, Berks., said Mr. S. N. A. JACOBS. It was wondered if these could be the progeny of a migration earlier in the year. Mr. R. L. COLE, reported seeing an example, together with *Macroglossa stellatarum* L. (Lep., Sphingidae) around Torcross, Devon. Later, when moving inland, he saw many more; but about three miles north of Torcross there were none. He thought that this seemed to indicate a migration into Devon from the south just before he left. The PRESIDENT recorded seeing a perfect female *V. cardui* on a plant growing in the bog on Thursley Common, Surrey.

An example of *Colias croceus* Fourc. (Lep., Pieridae) was reported by Dr.

C. G. M. DE WORMS to have been seen by Col. C. W. Mackworth-Praed on the Avon, Hants.

Celerio livornica Esp. (Lep., Sphingidae) was reported by Mr. J. L. MESSENGER to have come to his light trap in Witley, Surrey on 23rd May, but though the specimen was otherwise perfect the head was damaged. The same thing had been encountered by Mr. G. M. DE ROUGEMONT in the south of France He suggested that being a day flying moth as well it was not quietened by the light.

Mr. R. F. BRETHERTON said he had taken a number of *Plusia gamma* L. and *Apamea ypsilon* Schiff. (Lep., Noctuidae) in his trap at Birtley Green, Surrey, on 25th May. To this Mr. P. A. GODDARD added that *P. gamma* L. had been increasing in numbers in his trap in Harrow Weald, Middx. over several days.

Referring to the moths shown by Mr. de Rougemont, the PRESIDENT said that he had found the black form of the female exhibited as common as one in eight of those he had captured. Replying, Mr. de Rougemont said that in the Digne district they were about as common as the normal form. Mr. BRETHERTON added that the black form also occurs in the Pyrenees.

9th JUNE 1966

A Vice-President, Mr. R. F. BRETHERTON, in the Chair

EXHIBITS

Mr. T. R. EAGLES—Leaves of *Tilia vulgaris* Hayne (Common Lime) with galls caused by the mite *Phytoptus tiliae* Pagenst. from Enfield, Middx.

Dr. C. G. M. DE WORMS—Two fully grown, living, larvae, feeding on leaves of the European Strawberry Tree, and a short series of imagines of the Mediterranean Green Hairstreak, *Callophrys avis* Chapman (Lep., Lycaenidae). For comparison he also exhibited a short series of *Callophrys rubi* L.

Mr. C. O. HAMMOND—A male *Brachypalpus bimaculatus* (Macq.) (Dipt., Syrphidae) taken at the south-east corner of Thursley Common, Surrey, on the field meeting of the Society, 28.v.66. It was resting on the trunk of a Scots Pine. The species closely resembles the much commoner *Criorhina asilica* (Fall.), an example of which was taken at Wisley, Surrey, 30.v.66.

Mr. A. E. STUBBS—An uncommon form of the tachinid fly *Alophora obesa* F. with very dark wings, more typical of *A. hemiptera* F. As a result of this variation some difficulty was experienced in using van Emden's key in the Royal Entomological Society's Handbook. A character not mentioned in this key enabled a reliable identification. In *A. obesa* the wing vein M1 + 2 meets vein R4 + 5 at right angles, whereas in *A. hemiptera* this junction is at an acute angle. *A. obesa* is widely distributed but in recent years has proved very scarce in the London area. It is a bug parasite, but so far the only proved hosts are the pentatomid *Neottiglossa pusilla* (Gmelin) and the mirid *Leptopterna dolabrata* L. The example exhibited was taken on Ockham Common, Surrey, 3.vi.65.

Mr. P. A. GODDARD—Photographs of the common gelechid moth, *Bryotropha (Mniophaga) affinis* Haw., taken in Harrow Weald and Stanmore, Middx., at light in July last year. As there is now some doubt about the specific status of this species and its allies, members are asked to look out for these moths, and if possible to take them alive so that attempts can be made to breed them through from the egg. The habits and early stages could throw considerable light on their true status.

Mr. R. W. J. UFFEN—Insects taken on the Pamber Forest field meeting, 5.vi.66: *Osmylus fulvicephalus* (Scop.) (Neur., Osmylidae); *Scythropia crctaeagella*

L. (Lep., Yponomeutidae), larvae and pupae from hawthorn; *Coleophora sicci-folia* Staint. (Lep., Coleophoridae), tiny overwintered cases and cases of half-grown larvae on hawthorn. This last species is stated in textbooks to be a moth in June and a larva in July and August.

Mr. G. M. DE ROUGEMONT—An example of the beetle *Platyrhinus resinus* Scop. (Anthribidae) from Ashdown Forest, Sussex.

COMMUNICATIONS

The SECRETARY announced that the son of the late Mr. E. E. Syms had presented his collection of slides to the Society. These slides include those of Mr. Hugh Main.

Miss A. B. LOGAN said that the Waxwings she had reported seeing at Bangor, Co. Down, at the meeting of 28th April (see p. 94), were last seen there on 6th May.

Half a dozen larvae of *Coleophora saturatella* Staint. (Lep., Coleophoridae) were reported by Mr. R. W. UFFEN to have been taken on *Sarothamnus scoparius* (L.) Wimmer. on Barnes Common, Surrey. To which Mr. S. N. A. JACOBS added that he had taken it in his garden at Bromley, Kent, and also knew that it occurred in Hadley Woods, Middx.

Colias croceus Fourc. (Lep., Pieridae), said Mr. B. GOATER, had been seen by his mother in Hampshire. He also recorded *Pyrausta martialis* Guen (Lep., Pyralidae) from a light trap at Rye, Sussex, and two examples of *Laphygma exigua* Hübn. (Lep., Noctuidae) at mercury vapour light at Bushey, Herts., on the night of 2nd and 3rd June. In addition he reported seeing *Vanessa cardui* L. (Lep., Nymphalidae) in good numbers. Mr. T. R. EAGLES had also seen *V. cardui* at Enfield, Middx. on 5th May and Mr. PRIOR had noted the species at Ruislip, Middx. A further record was contributed by Dr. B. J. MACNULTY who said that Mr. W. Wildridge had seen this insect in early May, and about the same period had also observed *Colias croceus* Fourc. Several other members reported *V. cardui* from a number of places, the most northerly of which was Peterborough.

Nycterosia obstipata F. (Lep., Geometridae) was reported from Norwood in S.E. London.

In the Breck Mr. Goater had found *Anepia irregularis* Hufn. (Lep., Noctuidae); and said that in breeding the geometrid moth *Lithostege griseata* Schiff. was surprised to find that some had overwintered a second winter. In regard to the latter species Mr. T. G. HOWARTH said that it was able to delay inflating its wings for anything up to 48 hours after emergence from pupa.

An article was read by a member from *Woman's Realm* for 21st May in which there was reference to a friend of Mr. L. H. Newman who was releasing butterflies in the Coulsdon area. Later in the article specific mention was made of Swallowtails, Camberwell Beauties and Black-veined Whites and it was wondered if these were the species being released.

A talk, illustrated by coloured slides on 'The Distribution of Reptiles and Amphibians in Britain and Europe' was given by Mr. D. STIMPSON.

Meligethes corvinus Er. (Col., Nitidulidae) recorded in error.—Since the publication of the Tiptree, Essex, record of the above species (*antea*, p. 36) Dr. A. M. Massee has drawn my attention to the fact that Dr. A. M. Easton suspects *Meligethes corvinus* Er. to be extinct in this country. The specimens were therefore submitted to Dr. Easton who returned them determined as *M. erythropus* (Marsh.).—F. D. BUCK, 'Seirotana', New Road, Tiptree, Colchester, Essex, 30th July 1966.

FIELD MEETINGS, 1965/66

BALCOMBE, SUSSEX—10th July 1965

Leader: Mr. A. S. Wheeler

Two Society members and three members of the A.E.S. joined the leader at the station. The day was mainly dry, but dull with a few brief sunny spells. The area south of the station was visited in the morning and woods to the north of the village after lunch.

It was a disappointing day for Lepidoptera in an area usually much more productive, and only common species were seen.

During the day both the Common Spotted Orchid, *Dactylorchis fuchsii* (Druce) Vermeul and Twayblade, *Listera ovata* (L.) R.Br. were noticed.

With the exception of *Apoderus coryli* (L.) all the Coleoptera reported were quite common species, the only hemipteron reported was *Cercopis vulnerata* Ill.

FARNBOROUGH, HANTS—1st May 1966

Leader: Mr. M. P. CLIFTON

The weather for this meeting was fine all day, and 19 members and four visitors came along. Some of the members left in the afternoon to attend to other things, but most stayed to the end.

No rare species were taken at all. Most of those attending were micro-lepidopterists, who worked over the thick vegetation along the edge of the canal for about a mile. From the rushes some larvae of *Elachista poae* Staint. were taken together with those of *E. cerusella* Hübn., but other than this nothing of note was taken by them. Several members visited a piece of heathland on the far side of the canal, but no outstanding captures were made there either. Plenty of *Gonepteryx rhamni* L. were on the wing, and *Nymphalis io* L. and *Aglais urticae* L. were flying round a nettle patch; a few *Pararge aegeria* L. were seen. Just before the meeting closed one member took an example of *Anthocharis cardamines* L. which landed at the leader's feet. This locality is, it seems, good for the more common species of Lepidoptera, but nothing rare appears to occur here.

One member recorded seeing a pair of Blackcaps, *Sylvia atricapilla* (L.), on the canal bank, which appeared to be courting. Besides this, and the Nightingales, *Luscinia megarhyncha* Brehm., which were hurling abuse at us for disturbing them, there were no birds of note.

The meeting concluded with a tea, very gratefully received by members, on the lawn of the leader's house.

HIGHAM MARSHES, KENT—8th May 1966

Leader: Dr. A. M. MASSEE

The weather could hardly have been more unsettled; it was cold early and rained all the time. Despite all this eleven members of the Kent Field Club and the Society assembled near the station. Working *Clematis vitalba* L. near where the party met produced *Xylocleptes bispinus* (Dufts.), *Dromius linearis* (Ol.),

Propylea quatuordecimpunctata (L.), *Metacantharis clypeata* (Ill.), *Pogonochaeris hispidus* (L.) and *Anaspis maculata* Geof.

During the day the following Coleoptera were taken on the marsh: *Clivina fossor* (L.), *Dyschirius globosus* (Herbst), *Carabus problematicus* Herbst s.sp. *gallicus* Géhin, *Pterostichus macer* (Marsh.), *Gyrophynus punctulatus* (Goeze), *Aphodius fossor* (L.), *A. fimetarius* (L.), *A. ater* Deg., *A. rufipes* (L.), *A. rufescens* F., *A. sphacelatus* (Panz.), *A. pusillus* (Herbst), *Dryops striatellus* Fair., *Agriotes obscurus* (L.), *Bagous cylindrus* (Payk.) and *B. limosus* (Gyll.).

Moles' nests were successfully worked for *Heterothrops niger* Kraatz, *Oxytelus sculpturatus* Grav., *Oxypoda longipes* Muls. and *Xantholinus semirufus* Reitt.

A dump of rotten apples by the roadside was examined and three species of Coleoptera were found: *Librodor hortensis* (Geoff.), *Eपुरaea unicolor* (Ol.) and *Rhizophagus picipes* (Ol.). The last named species occurred in profusion, a very unusual habitat since it is a very uncommon species usually found under the bark of conifers.

The botanists in the party noted *Ranunculus trichophyllus* Chaix., *R. aquatilis* L. and *Triglochin maritima* L., also the moss *Drepanocladus aduncus* (Hedw.) Warnst.

Eight members enjoyed tea at the Chequers Inn in the village, but Mr. Last the well-known shepherd of the marshes was unable to attend.

BALCOMBE, SUSSEX—14th May 1966

Leader: Mr. A. S. WHEELER

Four members joined the leader at the station on a dull morning. The party was conveyed to woodland east of the lake where a clearing near the road was most productive. After lunch the party proceeded along a gated road north of the lake which, owing to recent heavy rain, made mobility a bit easier. In the last hour the sun broke through, but the only Lepidoptera on the wing were *Pararge aegeria* L. and *Pieris rapae* L.

Two *Limenitis camilla* L. larvae were found on *Lonicera*, but beating oak, birch and hazel yielded only the usual larvae at this time of the year: *Operophtera brumata* L., *O. fagata* Schiff., *Oporinia dilutata* Schiff., *Erannis aurantiaria* Hübn., *E. marginaria* F., *E. defoliaria* Clerck, *Phigalia pilosaria* Schiff. (*pedaria* F.) and *Colotois pennaria* L.

Micropteryx calthella L. was abundant on the flowers of *Carex*, *Ranunculus*, etc., and a few *Anthophila fabriciana* L. were taken around nettles. Spun shoots of *Chamaenerion angustifolium* (L.) Scop. (Rosebay Willow-herb) produced larvae of *Mompha conturbatella* Hübn., and several examples of *Dasycera sulphurella* F. were discovered around a pile of logs. A few larvae of *Hydriomena furcata* Thunb. occurred in sallow shoots and imagines of *Pseudoswammerdamia combinella* Hübn. and *Adela viridella* Scop. were reported.

The following Diptera were plentiful: *Tipula flavolineata* Meigen, *Mesembrina meridiana* (L.) and *Bibio marci* (L.).

The only arachnid reported was *Pisaura mirabilis* (Clerck).

EDITOR'S CHANGE OF ADDRESS

All correspondence to the Editor should now be addressed to 'Seirotana', New Road, Tiptree, Colchester, Essex.

AMENDMENTS TO BYE-LAWS

At a Special Meeting held on Thursday 27th January 1966 at the Alpine Club, 74, South Audley Street, London, W.1., the following amendments to the Society's Bye-Laws were carried:

1. Para. 10 (a), line 5. Delete 'six', and insert 'ten'.
2. Para. 11. Delete title and replace by 'Life, Country, Ordinary, Junior and Corporate Members'.
 Insert (e) Any recognised Body deemed by the Council a fit and proper establishment for the purpose shall after election in accordance with section (a) of this paragraph and upon paying the entrance fee and annual subscription of £3 3s. 0d. be admitted as a Corporate Member of the Society and sections (b) and (c) of this paragraph shall not apply.
3. Para. 13: Insert: (d) A Corporate Member shall be permitted to send not more than three of its own members to any meeting of the Society, and shall be entitled to receive one copy of the Proceedings and Transactions under the same conditions as an Ordinary Member. A Corporate Member shall not be allowed to vote at any meeting of the Society or to serve on the Council. Members of a Corporate Member authorised by it shall upon production of such authority in writing have access to the Society's collections and library on meeting nights but shall not be permitted to borrow books from the library except by special permission in writing from the Council; such permission being required on every occasion upon which borrowing is allowed.
4. Appendix B para. (4): In the title replace 'or' by a comma and add 'or Corporate Member' at the end.
 Thus the amended last paragraph of Appendix B now reads:
 *A Country Member must reside more than thirty miles from the Society's rooms, and not attend regularly a place of business within the London Postal Area. The entry fee is 7s. 6d. and the Annual Subscription of an Ordinary Member is £2 12s. 6d., of a Country Member £1 11s. 6d., a Junior Member (under the age of 21 years) 15s. 0d., and a Corporate Member £3 3s. 0d. The composition for Life Membership is £35 0s. 0d. The rights and privileges are the same.

Buddleia davidii French (*variabilis* Hemsl.) as a food plant of the larva of *Cucullia verbasci* L.—When rearing these larvae in the past I have frequently tried *Buddleia* as a substitute food plant when short of mullein or figwort. My larvae have always refused this substitute and I doubted the advice of lepidopterists who recommended trying *Buddleia*. Today in my garden I found two well-grown larvae on a plant of *Buddleia davidii* French. There was no possibility of them straying from neighbouring mullein which is a very infrequent plant in this area. *B. davidii* is common in gardens here so it is possible that this plant is regularly used here.—W. H. SPREADBURY, 3, Sherwood Road, Seaford, Sussex, 21st June 1966.

The Society's Publications

Back numbers of the Society's Publications still in print are becoming scarce. We regret therefore that we have had to reassess their value and new prices have been agreed. These are as follows:—

	£	s.	d.		£	s.	d.		£	s.	d.
1919-20	1	0	0	1935-36	1	10	0	1955	2	10	0
1922-23	1	10	0	1936-37	1	10	0	1956	2	10	0
1923-24	1	10	0	1937-38	2	0	0*	1957	3	0	0*
1924-25	1	10	0	1945-46	2	0	0*	1958	2	10	0
1925-26	1	10	0	1946-47	2	10	0*	1959	2	10	0
1927-28	2	0	0*	1947-48	3	0	0*	1960	2	10	0
1928-29	2	0	0*	1948-49	3	0	0*	1961	2	10	0
1929-30	2	0	0	1949-50	3	0	0*	1962	2	10	0
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1933-34	1	10	0	1953-54	1	10	0	1965	1	4	0
1934-35	1	10	0	1954-55	3	0	0*				

All other numbers are out of print, but when available mint or 1st Class secondhand 4 0 0

Other secondhand copies when available according to condition.

* These copies are very scarce and contain papers in great demand. Member's discount cannot therefore be allowed.

A GUIDE TO THE SMALLER BRITISH LEPIDOPTERA

by L. T. FORD, B.A.

This important work on the British Microlepidoptera is still available.

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SUPPLEMENT TO THE GUIDE TO THE SMALLER BRITISH LEPIDOPTERA

by L. T. FORD, B.A.

Printed on one side of the page only so that it can be cut up and inserted into the correct place in the Guide.

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A CATALOGUE OF BOOKS IN THE LIBRARY OF THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY

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THE NATURAL HISTORY OF THE GARDEN OF BUCKINGHAM PALACE

(Proceedings and Transactions 1963, Part 2)

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are held regularly at the Society's Rooms, and include the well-known ANNUAL EXHIBITION, which takes place in October in the Libraries of The Royal Society and of the Geological Society of London at Burlington House, Piccadilly, by kind permission of those two Societies. Frequent Field Meetings are held at weekends in the Summer. Visitors are welcome at all meetings. The current Programme Card can be had on application to the Secretary.

THE COLEOPTERA OF THE BAILLIWICK OF GUERNSEY

By HORACE R. LAST, F.R.E.S.

Several records of species of Coleoptera taken in Guernsey and the neighbouring Islands have been published from time to time. The earliest of these appeared in the Transactions of the Société Guernsaise for 1893, when W. H. Luff compiled a list of species taken in Guernsey, the specimens being identified by the well-known coleopterists of the last century, G. C. Champion, Canon W. W. Fowler and W. G. Blatch; this was followed by a list of Alderney species taken by E. D. and E. P. Marquand published in 1897 with an additional list in 1899. In 1889 an excursion by the Société to Herm resulted in a list of species taken on this island by Mr. Marquand and published in 1904. In 1890 and 1894 the Société organised excursions to Jethou, and a list of captures was also published in 1904. Luff's lists are largely the result of the collecting of E. D. and E. P. Marquand; he also mentions an early record of *Euryuebria complanata* L. by Dr. F. C. Lukis in 1860, and one or two records for Brechou by Mr. Cecil Hurst. As far as I know the next published list was by J. R. Le B. Tomlin (1921 *Ent. mon. Mag.* 57: 13-14) followed by Michael G. L. Perkins (1921 *Ent. mon. Mag.* 57: 90-1). In 1932 Prof. Frank Balfour-Browne made a collecting expedition for water-beetles and published a list (1933 *Ent. mon. Mag.* 69: 67-77), including one or two records by Mr. and Mrs. G. E. Hutchinson, a single record by the Rev. E. J. Pearce (1951 *Ent. mon. Mag.* 87: 75) and more recently a new species of *Anthrenus* 1962 *Ann. Mag. Nat. Hist.* 5(59): 697 described by M. Mrocykowski from specimens sent to Rentokil Laboratories by Lady Bailey from St. Martins. I am indebted to Mr. R. Edwards for sending me the record.

As I have previously compiled a list of the Coleoptera of Jersey, with three additional lists (1951-1957 *Bull. Soc. Jersiaise*) I thought it advisable to compile a combined list of existing records with additions made through my own collecting and that of other entomological friends, of species taken in all the islands comprising the Bailiwick of Guernsey. These have confirmed many of the earlier records of Luff and are noted accordingly.

I acknowledge my indebtedness to Prof. F. Balfour-Browne for allowing me to incorporate his comprehensive list of water-beetles and to Dr. Alan M. Easton for the inclusion of his records of the genus *Meligethes* based on his captures during a visit in 1956, and to the Rev. C. E. Tottenham for help in several difficulties due not only to out of date nomenclature, but also to wrong authors and some spelling mistakes.

Specimens have also been kindly sent by Prof. O. W. Richards taken in Alderney and by Mr. P. M. Miles whose specimens were sent by permission of Prof. G. C. Varley of the Hope Department, Oxford University Museum. Through the kindness of the authorities of the British Museum (Nat. Hist.) I have also been able to incorporate records from a collection made by Dr. Grace E. Pickford in 1923. I am indebted to Mr. K. C. Side who has also sent me a list of species taken during a visit to Sark in April 1966. Several identifications have been made by Mr. R. T. Thompson, Mr. A. E. Gardner, Mr. G. E. Woodroffe and Mr. W. O. Steel. To all of these colleagues I am greatly indebted.

Luff records *Meligethes distinctus* Sturm. from Guernsey, but as this species does not occur in the British List, I asked Dr. Easton for his opinion of this record. He feels sure that this record is a mistake. It is a species occurring in southern Europe and North Africa, and therefore, I have accepted Dr. Easton's authoritative opinion and have omitted it from the list. Luff also records *Haltica*

ampelophaga Guer., for Guernsey. This is not recorded as a British species but it is given as a subspecies of *H. lythri* Aubé, in Winkler's European Catalogue, where its range is given as the Mediterranean region and Siberia. As *Haltica lythri* Aubé is recorded in the British List, I have included it in the list herewith but as the genus itself is still in some confusion and there is some doubt regarding the subspecies, I have not included *ampelophaga* Guer. Five species are recorded, which so far, have not been taken in the British Isles, these I have placed at the end of the main list of species. In the following list, I have indicated the islands by their first letter thus: Guernsey, G; Alderney, A; Sark, S; Herm, H; Jethou, J; Brechou, B; Lihou, L. Where no name occurs behind the letter, it is one of Luff's records, other collectors are recorded by their surnames in brackets immediately behind the island letter. In the list, the species are arranged under the names of their respective genera. I have followed the order as given by Kloet and Hincks, *Check List of British Insects* (1945, Stockport), with the exception of the Staphylinidae, which follows the order of Rev. C. E. Tottenham (1949, *The Generic Names of British Insects* 1 (9): 345-466, London).

The following numerical details are of interest. Number of species, including named varieties, total 1100. For the individual islands, the number of species are as follows: Guernsey 611, Alderney 162, Sark 135, Herm 173, Jethou 27, Brechou 2, Lihou 1. The number of species common to the four islands, Guernsey, Alderney, Sark and Herm, is 27. It is interesting to note that the number of species so far recorded exclusively for Herm is 27 and for Sark 12. These are due to special forms of collecting and more general collecting would possibly considerably increase them.

I would also like to add my thanks to Mr. Cyril Shayer, Secretary of the Entomological Section of The Société Guernsiaisie for useful suggestions, and to Mrs. H. Irving for typing the list.

LIST OF COLEOPTERA FOUND IN THE ISLANDS FORMING THE BAILIWICK OF GUERNSEY

CARABIDAE	LORICERA
CICINDELA	pilicornis F. G.
sylvatica L. H.	CLIVINA
campestris L. G(Tomlin, Perkins);	fossor L. G.
	A,S,J.
CARABUS	DYSCHIRIUS
nemoralis Muel. S.	globosus Hbst. G(Tomlin).
LEISTUS	BROSCUS
spinibarbis F. S(Side); G,A,H.	cephalotes L. G(Perkins); G,A.
fulvibarbis Dej. G,A,S,H.	ASAPHIDIION
EURYNEBRIA	flavipes L. G,S(Pickford).
complanata L. H(Perkins, Lukis).	BEMBIDIION
NEBRIA	harpaloides Serv. G.
brevicollis F. S(Side); G,A,S.	quinquestriatum Gyll. G.
NOTIOPHILUS	guttula F. G.
biguttatus F. G(Last); G,A,S,H.	lampros Herbst. G,S.
aquaticus L. G.	litorale Ol. G,A.
quadripunctatus Dej. S(Side); G.	TRECHUS
substriatus Waterh. L H(Last).	quadristriatus Schr. G,S.
	obtusus Er. S (Pickford)

POGONUS

chalceus Marsh. G.

PANAGEUS

bipustulatus F. G,S.

BADISTER

bipustulatus F. G.

HARPALUS

s.gen. HARPALUS.

aeneus F. G(Last); H(Miles); G,A,H,J.

attenuatus Steph. G,A,J.

tardus Panz. G,A,S,H.

servus Duft. G.

anxius Duft. G,A,S.

serripes Quen. G.

neglectus Ser. G,A.

s.gen. OPHONUS.

puncticollis Payk. G.

schaubergerianus Puel. G,H.

s.gen. PSEUDOPHONUS.

pubescens Muel. G,A,H.

STENOLOPHUS

teutonius Schr. G.

skrimshiranus Steph. G.

ACUPALPUS

exiguus Dej. G.

meridianus L. G.

dorsalis F. H(Last).

BRADYCELLUS

verbasci Duft. G.

DICHEIROTRICHUS

gustavii Crotch G.

ANISODACTYLUS

binotatus F. G,A.

AMARA

apricaria Payk. G,A,S.

bifrons Gyll. G.

ovata F. G,A.

similata Gyll. G(Pickford); G,S.

tibialis Payk. G(Tomlin); G,A,H.

vulgaris L. G,A.

familiaris Duft. G,A.

lucida Duft. H(Miles).

aenea Deg. S(Side), G,A,S,H.

communis Panz. G.

convexior Steph. S,H.

ZABRUS

tenebrioides Goeze. G(Pickford); G,A.

STOMIS

pumicatus Panz. G.

FERONIA

cuprea L. G,A,S.

coerulescens L. G(Tomlin)

kugelanni Panz. G.

madida F. G(Tomlin); G,S(Pickford);
G,A,S,H,J.

crinata Dufour. G.

melanaria Ill. G.

nigrita F. G(Tomlin); G,S.

minor Gyll. G.

gracilis Dej. S(Pickford).

ABAX Bon.

parallelopedus Pill & Mit. S.

CALATHUS

fuscipes Goeze G(Tomlin); G,A.

erraticus Sahl. G,A.

mollis Marsh. G(Tomlin, Last);

H(Miles, Last); G,H.

melanocephalus L. G(Tomlin);

G,A,S,H,J.

SPHODRUS

leucophthalmus L. G.

PRISTONYCHUS

terricola Herbst. H(Perkins); G,H.

SYNUCHUS

nivalis Panz. G,J.

AGONUM

dorsale Pont. G,A,S.

ruficorne Goeze G(Perkins, Tomlin,
Last); G,A.

marginatum L. G.

mulleri Herbst. G.

viduum Panz. G.

ODONTONYX

rotundatus Payk. G,A.

RISOPHILUS

monostigma Sam. G.

atricapillus L. G(Last); S(Side); G,S,J.

DROMIUS

linearis Ol. G(Tomlin); S(Side);

G,S,H,J.

melanocephalus Dej. S(Side).

agilis F. G.

METABLETUS

foveatus Geoff. H(Last).

MICROLESTES

maurus Sturm. G.
 metabletus S.-G. G.
 foveatus Geoff. G,A,H.

CYMINDIS

axillaris F. G,S,H.

HALIPLIDAE**HALIPLUS**

ruficollis Deg. G(B-Browne,
 Hutchinson); G.
 lineatocollis Marsh. G(Tomlin,
 B-Browne, Hutchinson); G.
 confinis Steph. G(B-Browne).
 variegatus Sturm. G(B-Browne).
 immaculatus Ger. G(B-Browne,
 Hutchinson).
 wehncke Ger. G,A(Hutchinson,
 B-Browne)

HYGROBIIDAE**HYGROBIA**

hermanni F. G(B-Browne), G.

DYTISCIDAE**NOTERUS**

clavicornis Deg. G.

LACCOPHILUS

minutus L. G(B-Browne); G.
 hyalinus Deg. G(B-Browne).

HYDROVATUS

clypealis Sharp. G(Tomlin).

HYPHYDRUS

ovatus L. G(B-Browne).

BIDESSUS

unistriatus Schr. G.
 minutissimus Ger. G(B-Browne).
 geminus F. G(B-Browne).

HYGROTUS

s.gen. HYGROTUS s.str.
 inaequalis F. G(Tomlin, B-Browne); G.
 s.gen. COELAMBUS.
 confluens F. G(B-Browne).
 impressopunctatus Sch. G.

HYDROPORUS

palustris L. A.
 pubescens Gyll. G,A.
 flavipes Ol. G(B-Browne).

lepidus Ol. G(Tomlin, B-Browne); G,H.
 lineatus F. G(B-Browne); G.
 angustatus Sturm. F,G(B-Browne).
 gyllenhali Schiod. G(B-Browne); G.
 palustris L. G(B-Browne); A.
 erythrocephalus L. G(B-Browne).
 cantabricus Sharp. G(B-Browne).
 memnonius Nic. G(B-Browne).
 nigrita F. G(B-Browne).
 pubescens Gyll. G(B-Browne); G,A.
 planus F. G(B-Browne).
 tessellatus Drap. G(B-Browne).

AGABUS

paludosus F. G.
 didymus Ol. G.
 conspersus Marsh. G.
 chalconotus Panz. G(B-Browne); G.
 bipustulatus L. G(Tomlin, B-Browne);
 G,A,H.
 nebulosus Forst. G(B-Browne); G.

ILYBIUS

ater Deg. G(B-Browne).

COPELATUS

haemorrhoidalis F. G(B-Browne).

RANTUS

grapii Gyll. G.

COLYMBETES

fuscus L. G(B-Browne); G.

DYTISCUS

marginalis L. G(B-Browne); G.
 circumflexus F. G.

ACILIUS

sulcatus L. G(B-Browne); G,H.

GYRINIDAE**GYRINUS**

natator L. G(Tomlin); G.
 caspius Méné. G(B-Browne).
 colymbus Er. G.

HYDROPHILIDAE**HELOCHARES**

lividus Forst. G(B-Browne, Pickford).

OCHTHEBIUS

bicolon Germ. G(B-Browne); G.
 punctatus Steph. G(B-Browne); G.
 viridis Peyr. G(B-Browne).

- marinus Payk. G.
 nanus Steph. G(B-Browne).
 subinteger Muls. & Rey.
 s.sp. lejolisi Muls. & Rey.
 G(B-Browne).
- HYDRAENA**
 testacea Curt. G(B-Browne).
- HELOPHORUS**
 s.gen. HELOPHORUS
 flavipes F. G(B-Browne).
 s.gen. MEGALEOPHORUS
 aquaticus L. G(Tomlin).
 s.gen. ATRACTELOPHORUS
 brevipalpis Bedel. G(Tomlin).
- HYDROCHUS**
 angustatus Germ. G(B-Browne).
- COELOSTOMA**
 orbiculare F. G(B-Browne); G.
- SPHAERIDIUM**
 scarabaeoides L. G(Tomlin, Miles);
 G,A,S,H.
 bipustulatum F. G,A,H.
- CERCYON**
 litoralis Gyll. H(Last); H.
 lugubris Ol. H.G.
 haemorrhoidalis F. G(Tomlin); G,S.
 unipunctatus L. G.
 melanocephalus L. G.
- MEGASTERNUM**
 obscurum Marsh. G,H(Last); G
 (Pickford)
- HYDROBIUS**
 fuscipes L. G(B-Browne); G,S.
- LIMNOXENUS**
 niger Zsch. G(B-Browne, Pickford); G.
- ANACAENA**
 limbata F. G(B-Browne); G,A.
 bipustulata Marsh. G(B-Browne); G.
- LACCOBIUS**
 atrocephalus Reitt. G(B-Browne).
- ENOCHRUS**
 testaceus F. G.
 bicolor F. G(Tomlin, B-Browne); G.
 ochropterus Marsh. G.
 melanocephalus F. G(Pickford).
- CYMBIODYTA**
 marginella F. G(B-Browne).
- CHAETARTHRIA**
 seminulum Herbst. G.
- HYDROPHILUS**
 piceus L. G(B-Browne); G.
- BEROSUS**
 affinis Brüll. G.
- SILPHIDAE**
- NECROPHORUS**
 germanicus L. A.
 humator Goeze. G,S.
 vestigator Hersh. G.
 vespillo L. G,A,H.
- THANATOPHILUS**
 sinuatus F. G,S,H,J.
- SILPHA**
 tristis Ill. G,A,S.
- ABLATTARIA**
 laevigata F. A.
- PHOSPHUGA**
 atrata L. G,H,J.
- NARGUS**
 velox Spence. H(Last).
- CHOLEVA**
 oblonga Latr. A.
- CATOPS**
 fuscus Panz. G.
 grandicollis Er. G.
 nigrita Er. G.
 tristis Panz. G.
- SCIODREPA**
 watsoni Spence. G,H.
- LEIODIDAE**
- LEIODES**
 rugosa Steph. H.
- CLAMBIDAE**
- CALYPTOMERUS**
 dubius Marsh. G.
- ORTHOPERIDAE**
- SERICODERUS**
 lateralis Gyll. G.

CORYLOPHUS

cassidoides Marsh. G.
sublaevipennis Duval. H.

PTILIIDAE**PTENIDIUM**

pusillum Gyll. G(Last)
punctatum Gyll. H(Last).

ACROTRICHIS

intermedia Gillm. G(Last)

STAPHYLINIDAE**METOPSIA**

clypeata Mull. G.

PROTEINUS

ovalis Steph. G.
macropterus Gyll. G.

MEGARTHRUS

affinis Mill. G.
depressus Payk. G(Last).

OMALIUM

rivulare Payk. G.
laeviusculum Gyll. G,H(Last); G.

PHLOEONOMUS

punctipennis Thom. H(Last).

PHILORINUM

sordidum Steph. G,S,H.

ANTHOBIUM

unicolor Marsh. G(Last).

OXYTELUS

s.gen. SYLOXES
rugosus F. G(Last).
s.gen. ANOTYLUS
sculpturatus Grav. G,A,H(Last); G,H.
tetracarinatus Block. S(Side); G.
inustus Grav. H.

s.gen. EPOMOTYLUS
sculptus Grav. G,A(Last).

PLATYSTETHUS

arenarius Fourc. H(Last); G.

BLIDIUS

s.gen. HESPEROPHILUS
gallicus Grav. G(Tomlin).

STENUS

s.gen. STENUS.
bimaculatus Gyll. G.
clavicornis Scop. S(Side): G(Last); G.

rogeri Kr. G,A,S.

s.gen. NESTUS.

morio Grav. A. H(Last).
nanus Steph. H(Last); G,H.
s.gen. TESNUS.

brunnipes Steph. G(Last); G,S.
s.gen. PARASTENUS.

ossium Steph. G(Last); G.
aceris Steph. G(Last); G,S,H,J.
s.gen. HEMISTENUS.

flavipes Steph. G.

s.gen. HYPOSTENUS

cicindeloides Schall. G,H.
similis Herbst. G,A.
fulvicornis Steph. G(Last).

PAEDERUS

litoralis Grav. G(Last); G,A,S,H,J.
riparius L. G.
caligatus Er. G.

ASTENUS

procerus Grav. H(Last); G.
longelytratus Palm. G.
pulchellus Heer. G.

RUGILUS

rufipes Germ. G(Last).
orbiculatus Payk. G,A,H(Last); G.

SUNIUS

propinquus Bris. G(Last); G.
melanocephalus F. G.

SCOPAEUS

sulcicollis Steph. G(Last); G,S.

LEPTACINUS

pusillus Steph. G(Last); G.

GYROHYPNUS

laeviusculum Steph. A,H(Last).

XANTHOLINUS

s.gen. MEGALINUS.
glabratus Grav. G,A(Last); G,A
fracticornis Müll. G(Last); G,S,H.
angustatus Steph. G(Last).

s.gen. XANTHOLINUS.

linearis Ol. G,A(Last, Thompson).
longiventris Heer. G(Last); A.

PHILONTHUS

s.gen. PHILONTHUS.
splendens F. G.
intermedius Lac. A(Last).

laminatus Creutz. G,A.
 politus L. G(Last); G,A.
 succicola Thom. G.
 tenuicornis Muls. & Rey. G(Last).

s.gen. BISNIUS.

cognatus Steph. A,H(Last); A,S.
 varius Gyll. G,A(Last); G,A,S.
 umbratilis Grav. G(Last).
 cephalotes Grav. G(Last).
 fimentarius Grav. G,H(Last); G,H.
 pachycephalus Nordm. G(Last); G,A.
 cruentatus Gmel. G,H.
 longicornis Steph. A(Last).
 rectangulus Sharp. G(Last).

GABRIUS

nigritulus Grav. G,A,H(Last).
 trossulus Nordm. G,S.
 piliger Muls & Rey. G(Last).
 velox Sharp. G(Last).

CAFIUS

fucicola Curtis. G(Last).
 xantholoma Grav. G,H(Last);
 H(Miles); G,H.
 var. variolosus Sharp. G(Last); G.

s.gen. REMUS.

sericeus Holme. H.

STAPHYLINUS

s.gen. STAPHYLINUS.

caesareus Ced. G.

s.gen. TASGIUS.

ater Grav. G(Tomlin); G.

OCYPUS

s.gen. OCYPUS.

olens Müll. G,S,H(Tomlin); S(Perkins);
 G.

s.gen. PSEUDOCYPUS.

fortunatarum Woll. G,S.

ONTHOLESTES

tessellatus Fourc. G.

CREOPHILUS

maxillosus L. H(Pickford); G,S,A.

HETEROTHOPS

binotatus Grav. G,H(Last).

dissimilis Grav. A(Last).

niger Kr. G.

QUEDIUS

s.gen. QUEDIUS.

fuliginosus Grav. G,A(Last); G,S,H,J.

laevicollis Brüll. G(Last, Tomlin); G,A.
 s.gen. ARPHIRUS.

semiobscurus Marsh G,A(Last); A.
 semiaeneus Steph. A,H(Last); G,H.

s.gen. MICROSAURUS.

assimilis Nord. G(Last).

HABROCERUS

capillaricornis Grav. A(Thompson).

TRICHOPHYA

pilicornis Gyll. J.

MYCETOPORUS

s.gen. SCHINOMOSA

nigricollis Steph. G.

angularis Muls & Rey. A(Last).

CONOSOMUS

testaceus F. G,A(Last); G.

lividus Er. S(Side); G,A(Last); G.

immaculatus Steph. G(Last).

TACHYPORUS

formosus Matt. G(Last); G,H.

chrysomelinus L. G(Last);

G,H,A(Thompson)

atriceps Steph. G(Last); G.

hypnorum F. G,A,S(Last); S(Side);

A(Thompson); G,A,S,H,J.

pusillus Grav. G(Last)

nitidulus F. G(Last); G.

TACHINUS

signatus Grav. G(Last); G,S,H.

subterraneus L. G(Last); G.

CILEA

silphoides L. G.

CYPHA

longicornis Payk. G.

laeviusculus Mann. G.

PHYTOSUS

s.gen. PHYTOSUS

spinifer Curtis. H(Last).

CORDALIA

obscura Grav. G,H(Last).

FALAGRIA

s.gen. FALAGRIA.

caesa Er. G(Last).

s.gen. FALAGRIOMA.

thoracica Curtis. A(Thompson).

MYRMECOPORA

sulcata Kies. A,H(Last).

GYNPETA

carbonaria Mann. G(Tomlin).

ATHETA

s.gen. PHILHYGRA.

halophila Thom. G(Last).

palustris Kies. H(Last).

s.gen. AMIDOBIA.

amicula Steph. G,H(Last).

s.gen. TETROPLA.

coriaria Kr. G(Last).

crassicornis F. G(Last).

trinotata Kr. G,A(Last); S.

triangulum Kr. G(Last).

euryptera Steph. G.

xanthopus Thom. H.

s.gen. STETHUSA.

aquatica Thom. G(Last); G.

pertyi Heer. G(Last).

castanoptera Mann. G(Last).

s.gen. LIOGLUTA.

longiuscula Grav. H(Last).

s.gen. THINOBAENA.

vestita Grav. G,H(Last); G.

s.gen. DIMETROTA.

atramentaria Gyll. H(Last).

s.gen. DATOMICRA.

arenicola Thom. G(Last).

zosteræ Thom. A(Last).

s.gen. CHAETIDA.

longicornis Grav. G,H(Last).

s.gen. COPROTHASSA.

sordida Marsh. G(Tomlin); G,A(Last)

s.gen. ACROTONA.

fungi Grav. G,A,H(Last);

A(Thompson); G,H.

orbata Er. H(Last).

laticollis Steph. G(Last).

muscorum Bris. A(Last).

DRUSILLA

canaliculata F. G,H(Last); G,S,H.

OXYPODA

s.gen. OXYPODA.

opaca Grav. G,H(Last).

s.gen. PODOXYA.

nigrina Wat. G,H(Last).

ALEOCHARA

s.gen. ISOCHARA.

tristis Grav. G,H.

s.gen. COPIATA.

lata Grav. H(Last); H.

s.gen. BARYODMA.

intricata Marsh. G.

s.gen. RHEOCHARA.

cuniculorum Kr. H(Last).

s.gen. POLYCHARA.

lanuginosa Grav. H(Last); H.

s.gen. HOMEOCHARA.

sparsa Heer. G(Last).

s.gen. ALEOCHARA.

bipustulata L. H(Last); G,H.

s.gen. EMPLENOTA.

grisea Kr. H(Last); G,S.

PSELAPHIDAE**BIBLOPECTUS**

delhermi Guill. G(Pearce).

REICHENBACHIA Leach

juncorum Leach. G.

BRYAXIS

puncticollis Denny. G(Last).

HISTERIDAE**ONTHOPHILUS**

striatus Forst. G.

ACRITUS

punctum Aubé. G(Last).

SAPRINUS

semistriatus Scriba. G,A.

aeneus F. G,A,H,J.

PACHYLOPUS

maritimus Steph. A.

KISSISTER

minima Aubé. G,A.

HISTER

quadrifasciatus L. G.

unicolor L. G.

cadaverinus Hoff. G,H.

duodecimstriatus Schr. G.

CANTHARIDAE**CANTHARIS**

pallida Goeze. G(Tomlin, Last); G,A.

fulvicollis F. G.
ab. flavilabris Fall. G.

RHAGONYCHA
fulva Scop. G,A.

MALTHINUS
fasciatus Ol. G.

DRILIDAE
DRILUS
flavescens Geoff. A.

MALACHIIDAE
AXINOTARSUS
ruficollis Ol. G.

DASYTIDAE
DASYTES
puncticollis Reitt. G,H.
aerosus Kies. G.

PSILOTHRIX
cyaneus Ol. G(Tomlin); S(Tomlin,
Last); A(Richards); G,A,S.

CLERIDAE
NECROBIA
ruficollis F. G.

ELATERIDAE
ADELOCERA
murina L. G(Tomlin and Perkins);
S(Perkins); H(Last); G,A,S,H,J.

CARDIOPHORUS
erichsoni Buy. G(Tomlin).

MELANOTUS
punctolineatus Pel. G,A.

ATHOUS
bicolor Goeze. G,A.
haemorrhoidalis F. G,A,S,H,J.

CORYMBITES
cupreus F. G.
incanus Gyll. A.

AGRIOTES
sputator L. G,A.
lineatus L. A,S.
pallidulus Ill. S(Side); S.

DALOPIUS
marginatus L. G.

ADRASTUS
nitidulus Marsh. G,H,S.

HELODIDAE
HELODES

minuta L. G.
marginata F. G.

MICROCARA
testacea L. G,A.

CYPHON
paykulli Guér. G.

DRYOPIDAE
DRYOPS
auriculatus Geoff. G,A.
luridus Er. G(Tomlin).
striatellus Fairm. G(Tomlin);
A(1925? collector).

HELICHUS
substriatus Muel. G.

ELMIS
maugei Bedel var. aenea Muel. G.

LATELMIS
volckmari Panz. G(Tomlin).

DERMESTIDAE
DERMESTES
murinus L. G,S,H,J.
undulatus Brahm. G.
lardarius L. G.

ATTAGENUS
pellio L. G.

BYRRHIDAE
SIMPLOCARIA
semistriata F. G.

BYTURIDAE
BYTURUS
urbanus Lind. H(Last); G.

NITIDULIDAE
BRACHYPTERUS
glaber Steph. G,H.
urticae F. G(Last).

LARIA
dulcamarae Scop. G(Last); G.

MELIGETHES

- atratus Ol. G.
 aeneus F. G(Tomlin, Easton, Pickford,
 Last); S(Tomlin); H(Tomlin, Easton);
 A. viridescens F. G(Easton Pickford,
 Last); L(Easton).
 picipes Sturm. G,H.
 obscurus Er. G(Easton, Pickford, Last);
 S,H(Easton, Pickford); G.
 fulvipes Bris. G,H(Easton,)
 erythropus Marsh G(Easton).
 flavipes Sturm. G(Easton).
 exilis Sturm G(Easton).
 planiusculus Heer. H(Easton).

CARPOPHILUS

- hemipterus L. G.

NITIDULA

- carnaria Schall. G.

OMOSITA

- discoidea F. G,S.

EPURAEA

- aestiva L. H.
 melina Sturm. G.

SORONIA

- grisea L. G.

CRYPTOPHAGIDAE**MICRAMBE**

- villosa Heer. G,S,H.

CRYPTOPHAGUS

- lycoperdi Scop. G,S.
 pilosus Gyll. G,G(Last).
 saginatus Sturm. G.
 scanicus L. G.
 schmidti Sturm. G(Last).
 setulosus Sturm. G(Last).

ANTHEROPHAGUS

- pallens F. G.
 canescens Grouv. H.

ATOMARIA

- atricapilla Steph. G,H(Last); G.
 pusilla Payk. H(Last).
 mesomela Herbst. S(Side).

EPHISTEMUS

- globulus Payk. G.

PHALACRIDAE**OLIBRUS**

- affinis Sturm. G(Andrewes, Pickford);
 S(Pickford).
 liquidus Er. G(Pickford); S(Pickford);
 G,H.
 particeps Muls. G.

STILBUS

- testaceus Panz. G.

LATHRIDIIDAE**LATHRIDIUS**

- nodifer West. G,H.(Last); S(Side).

ENICMUS

- minutus L. G.
 transversus Ol. G(Pickford); G.
 histrio Joy. H(Last).

CARTODERE

- ruficollis Marsh. G.

CORTICARINA

- gibbosa Herbst. G(Last); A(Thompson);
 S(Side); G,H.

fuscula Gyll. G.

- fulvipes Com. S(Side).

ENDOMYCHIDAE**MYCETAEA**

- hirta Marsh. G.

COCCINELLIDAE**SUBCOCCINELLA**

- vigintiquattuor punctata L. G(Miles); G.

COCCIDULA

- rufa Herbst. G(Miles).

RHYZOBIUS

- litura F. G,S,H(Tomlin, Pickford);
 S(Side); G(Miles); G,A,S,H,J.

SCYMNUS

- frontalis F. G(Perkins); G.

MICRAPSIS

- sexdecimpunctata L. G,S,H(Tomlin);
 G(Miles, Last, Pickford)

COCCINELLA

- septempunctata L. S(Sides).
 undecimpunctata L. S(Side).

THEA
vigintiduopunctata L. G,A.

PLATYNASPIS
luteorubra Goeze. G,S,J.

CHILOCORUS
bipustulatus L. G(Last), H(Last); G,A.

CIIDAE

CIS
boleti Scop. G.

ANOBIIDAE

ANOBIUM
punctatum Deg. G(Tomlin); G,A,S,H,.

OEDEMERIDAE

OEDEMERA
nobilis Scop. G(Last); A(Miles); G,A.
lurida Marsh. G(Tomlin, Last); S,H.
(Tomlin); A(Richards); G,A,S.

ANTHICIDAE

NOTOXUS
monocerus L. G,A,H.

ANTHICUS
tristis Schmidt. G,H(Last).
var. schaumi Woll. H.
humilis Ger. H(Last).
floralis L. H(Last).
angustatus Curtis. H(Last).

MELOIDAE

MELOE
proscarabaeus L. G(Tomlin), Last); G,
H,S.

autumnalis Ol. H.
brevicollis Panz. A,S.

MORDELLIDAE

MORDELLISTENA
pumila Gyll. G(Tomlin); G.
brevicauda Boh. G(Tomlin).
parvula Gyll. G(Tomlin).

ANASPIS
maculata Geoff. G,H.
regimbarti Schilsk. A.

LAGRIIDAE

LAGRIA
hirta L. H(Last); G,A,H,J.

ALLECULIDAE

ISOMIRA
murina L. G(Tomlin); G,A,H.

CTENIOPUS
sulphureus L. G(Perkins, Last); H(Last,
Miles); G,A,S,H.

TENEBRIONIDAE

BLAPS
lethifera Marsh. G.
mucronata Lat. G.

PHYLAN
gibbus F. G,H(Pickford).

MELANIMON
tibiale F. G.

OPATRUM
sabulosum L. S(Side); G,A,S,H.

PHALERIA
cadaverina F. G,A.

CRYPTICUS
quisquilius L. G,A.

TENEBRIO
molitor L. G.
obscurus F. G.

CYLINDRONOTUS
laevioctostriatus Goeze. G(Tomlin);
H(Pickford); G,H.

SCARABAEIDAE

COPRIS
lunaris L. G(Tomlin); G.

ONTHOPHAGUS
taurus Schrieb. G.
coenobita Herbst. G.
vacca L. G,A,H.
fracticornis Prey. A(Last); G,A,S,H.
nuchicornis L. G.

TYPFAEUS
typhoeus L. G(Tomlin); G,S,H,J.

GEOTRUPES
spiniger Marsh. G,S.
stercorarius L. S(Side); G,A,S,H,J.
vernalis L. G,A,S,H,J.
stercorosus Scriba. S(Side); G,A.
pyrenaicus Charp. G,S(Perkins);
H(Last, Miles); B(Hurst 1902).

APHODIUS

erraticus L. G,A.
 fossor L. G(Tomlin); G,A,H.
 haemorrhoidalis L. G,A.
 fimetarius L. G(Tomlin); G,A,S,H.
 scybalarius F. H.
 ater Deg. G,H.
 granarius L. A.
 nitidulus F. G.
 pusillus Herbst. G,S,H.
 merdarius F. G.
 distinctus Muel. G,S.
 sphacelatus Panz. G,A,S.
 contaminatus Herbst. G.
 luridus F. G,A.
 rufipes L. G.

HEPTAULACUS

sus Herbst. G.
 testudinarius F. G.

AEGIALIA

arenaria F. G.

TROX

sabulosus L. G.
 scaber L. G,H.

SERICA

brunnea L. G.

AMPHIMALLON

solstitialis L. G(Tomlin); G,A,S.

MELOLONTHA

melolontha L. G(Miles); S.

HOPLIA

philanthus Füss. A.

CETONIA

aurata L. G(Tomlin); S(Last);
 B(Hurst 1902); G,A,S,H.

CERAMBYCIDAE**GRACILIA**

minuta F. G.

LEPTURA

rubra L. A(Richards).

PHYMATODES

testaceus L. G.

CALLIDIUM

violaceum L. G.

CLYTUS

arietis L. G.

PLAGIONOTUS

arcuatus L. G.

ACANTHOCINUS

aedilis L. G.

CHRYSOMELIDAE**LEMA**

lichenis Voet. G.
 melanopa L. A(Last); S(Side); G,A,H.

CRYPTOCEPHALUS

moraei L. G.
 pusillus F. S(Pickford).

CHRYSOLINA

banksi F. G,S.
 polita L. H.
 haemoptera L. G,S,H(Tomlin); G(Last);
 H(Pickford); G,A,H.
 hyperici Forst. G.

GASTROPHYSA

polygoni L. G.

PRASOCURIS

junci Brahm. G(Tomlin); G,A.
 phellandrii L. G.

PHYTODECTA

olivacea Forst. G,A.

TIMARCHA

goettingensis L. S(Side); G,H(Tomlin);
 G(Scudder); H(Miles, Pickford);
 A(Thompson); G,S,H.

tenebricosa F. A.

GALERUCA

tanacetii L. G.

SERMYLASSA

halensis L. G.

PHYLLOTRETA

consobrina Curt. G.
 atra F. G(Pickford); G.
 var. cruciferae Goeze. G.
 nigripes F. S(Side).

APHTHONA

coerulea Geoff. G(Tomlin); G.
 venustula Kuts. G.

LONGITARSUS

- luridus* Scop. G.
atricillus L. G.
melanocephalus Deg. G,A.
jacobaeae Waterh. A(Thompson); G,H
 (Pickford); G,A,S,H,J.
tabidus F. G(Last); G,H.
succineus Foudr. G,H.
ganglbaueri Heik. G(Miles).
rubiginosus Foud. S,G(Pickford).

HALTICA

- oleracea* L. G.
pusilla Duft. G.
lythri Aubé G.

BATOPHILA

- aerata* Marsh. G,H.

LYTHRARIA

- salicariae* Payk. G(Last).

OCHROSIS

- ventralis* Ill. G.

CREPIDODERA

- ferruginea* Scop. G(Miles); G.

CHALCOIDES

- aurata* Marsh G.

MANTURA

- chrysanthemi* Koch. G.

CHAETOCNEMA

- concinna* Marsh G,H.
hortensis Geoff. H(Last); G(Pickford).
arida Foud. G(Pickford).

SPHAERODERMA

- rubidum* Graëlls. G(Pickford); G,A,H.
testaceum F. A(Thompson).

APTEROPEDA

- orbiculata* Marsh. G,H.

PSYLLIODES

- napi* F. G.
chalcomera Ill. G(Tomlin and Last).
hortensis Geoff. G(Tomlin).
chrysocephala L. G(Miles, Pickford);
 G,A.

- affinis* Payk. H.

CASSIDA

- nebulosa* L. G.
vittata Vill. G,S.

- nobilis* L. A.

- hemisphaerica* Herbst. G,S(Derrick).

BRUCHIDAE

BRUCHUS

- rufimanus* Boh. G.

BRUCHIDIUS

- fasciatus* Ol. G.

CURCULIONIDAE

CAENORHINUS

- germanicus* Herbst. G.

APION

- ulicis* Forst. G,A,S,H.
fuscirostre F. G.
malvae F. G.
miniaturum Ger. G,A,S,J.
cruentatum Walt. G,H.
haematodes Kirby. G(Pickford); G.
rubens Steph. G.
semivittatum Gyll. G(Tomlin).
rufirostre F. G(Tomlin); G,A.
difforme Ahr. G,H.
laevicolle Kirby. G,A.
apricans Herbst. S(Side); G.
dichroum Bedel. G.
nigritarse Kirby. G,S,H.
aeneum F. G(Tomlin).
radiolus Kirby. G(Tomlin).
onopordi Kirby. G,S.
virens Herbst. G(Pickford); G.
striatum Kirby. G(Miles); G,S.
immune Kirby. G.
marchicum Herbst. G.
ononicola Bach. G(Pickford).
pomonae F. S(Pickford).
stolidum Germ. G(Miles).
hydrolapathi Marsh. A.
curtirostre Germ. S(Pickford); G.
aestivum Germ. S.
carduorum Kirby. S(Pickford).
violaceum Kirby. S(Side).

OTIORRHYNCHUS

- atroapterus* Deg. G,A,S.
rugosostriatus Goeze. G.
singularis L. G,H,S.
sulcatus F. G(Tomlin); G,H.
rugifrons Gyll. G(Last); G,A,S,H.
ovatus L. A.

- CAENOPSIS**
waltoni Boh. G(Last); S(Side); G.
- TRACHYPHLOEUS**
aristatus Gyll. G.
olivieri Bedel. G.
scabriculus L. G.
bifoveolatus Beck. A(Last); G,A.
- CATHORMIOCERUS**
myrmecophilus Seid. G(Last); G.
- PHYLLOBIUS**
oblongus L. G.
pyri L. G,S,H.
viridiaeris Laich. G.
parvulus Ol. A.
- POLYDRUSUS**
confluens Steph. G.
- LIOPHLOEUS**
tessulatus Muel. G,H.
- SCIAPHILUS**
asperatus Bons. G.
- BARYPITHES**
sulcifrons Boh. G,H.
araneiformis Schr. A.
- STROPHOSOMUS**
melanogrammus Forst. G(Miles); G,H.
capitatus Deg. G(Miles); G.
nebulosus Steph. S(Pickford); G.
faber Herbst. G.
sus Steph. G.
- PHILOPEDON**
plagiatus Schall. G,A,S,H,J.
- SITONA**
griseus F. G.
regensteinensis Herbst. G.
striatellus Gyll. G,S,H,J.
hispidulus F. H(Last); G,A.
humeralis Steph. G(Miles); A.
lepidus Gyll. G.
puncticollis Steph. G(Pickford); G.
suturalis Steph. G,A.
lineatus L. G,S.
sulcifrons Thunb. G.(Pickford); G,S.
- TANYMECUS**
palliatus F. A.
- LIXUS**
vilis Rossi. G.
- CHROMODERUS**
affinis Schr. G.
- CLEONUS**
piger Scop. G.
- PENTARTHURUM**
huttoni Woll. G.
- CAULOTRUPIS**
aeneopiceus Boh. G.
- DORYTOMUS**
tremulae F. G.
tortrix L. G.
taeniatus F. G.
- PACHYTYCHIUUS**
haematocephalus Gyll. G.
- MICCOTROGUS**
picirostris F. G(Pickford).
- SIBINIA**
sodalis Germ. F.
arenariae Steph. A(Richards); G.
- ANTHONOMUS**
rubi Herbst. G(Last); G,H.
- HYLOBIUS**
abietis L. G.
- LIPARUS**
coronatus Goeze. G.
- ALOPHUS**
triguttatus F. G.
- PHYTONOMUS**
austriacus Schr. G,A.
dauci Ol. G.
rumicis L. G.
adpersus F. G,A.
var. alternans Steph. G.
arator L. A(Richards); G.
suspiciosus Herbst. G.
posticus Gyll. G.
plantaginis Deg. G,S.
venustus F. G.
nigrirostris F. G,A,S.
- GRONOPS**
lunatus F. G.

- SITOPHILUS**
granarius L. G.
- ACALLES**
turbatus Boh. G.
- BARIS**
picicornis Marsh. G.
laticollis Marsh. G(Miles).
- COELIOIDES**
rubicundus Herbst. G.
- MICRELUS**
ericae Gyll. G.
- CIDNORHINUS**
quadrimaculatus L. A,H.
- CEUTHORHYNCHIDIUS**
troglodytes F. G,A,S.
rufulus Dufour. G.
- CEUTHORHYNCHUS**
assimilis Payk. G(Tomlin, Miles); G,A,S.
contractus Marsh. G(Miles); G.
quadridens Panz. G(Miles); G.
pollinarius Forst. G,H.
chrysanthemi Germ. G.
- RHINONCUS**
pericarpus L. G.
- DRUPENATUS**
nasturtii Germ. G(Tomlin, Last); G.
- OROBITIS**
cyaneus L. G.
- MECINUS**
pyraster Herbst. A(Last); G(Pickford);
G,A.
- collaris Germ. G.
- GYMNETRON**
pascuorum Gyll. G.
antirrhini Payk. G.
- CIONUS**
thapsi F. G.
hortulanus Geoff. G.
- RHYNCHAENUS**
quercus L. G.
alni L. G(Tomlin); G,A,S,H.
var. ferrugineus Marsh. H.
- SCOLYTIDAE**
- SCOLYTUS**
scolytus F. G.
- HYLESINUS**
fraxini Panz. G.
- HYLASTINUS**
obscurus Marsh. G(Last).
- ERNOPORUS**
fagi F. G.

SPECIES NOT SO FAR RECORDED IN THE BRITISH LIST

- DYTISCIDAE**
Hyphyrus variegatus Aubé.
G(Tomlin, B-Browne).
- SCARABAEIDAE**
Cetonia morio. H.
Amphimallon aestivus Ol. A.
- CHRYSOMELIDAE**
Cryptocephalus vittatus F. G,S(Tomlin);
G,A.
- DERMESTIDAE**
Anthrenus sarnicus Mroc.
G(Lady Bailey).

FIELD MEETINGS 1966

OCKHAM COMMON—23rd April 1966

Leader: Mr. F. M. STRUTHERS

A party of four attended this meeting and as there had been so much rain the previous week, decided to proceed directly to Ockham Common. It was a fine sunny day with little wind and a temperature in the mid-fifties.

On reaching the common, birch trees were examined and young cases of *Coleophora fuscedinella* Zell. and an eriocraniid mine were found. Mines of *Lithocolletis trifasciella* Haw. were found on *Lonicera* leaves, a good number of larvae of *Laspeyresia coniferana* Sax. were dug from the bark of pine trees, and two empty cases of *Soleinobia inconspicua* Staint. were found on a dead pine trunk. A successful search was made for larvae of *Parascotia fuliginaria* L. on fallen trunks and branches.

Imagines noticed on the wing were *Nymphalis io* L., *Pararge aegeria* L., *Heliozela betulae* Staint., *Incurvaria pectinea* Haw. and eriocraniid species.

A specimen of *Eupithecia nanata* Hübn. was swept from the heather. Several large flies noticed flying round the rhododendrons were identified as *Tubifera tenax* (L.).

Whilst waiting for the return train larvae of *Caryocolum fraternellum* Dougl. were found in spun shoots of *Stellaria graminea* L. and larvae suspected to be *Caryocolum tricolorellum* Haw. were discovered in spun leaves of *Stellaria holostea* L. growing on Effingham Common.

THURSLEY, SURREY—28th May 1966

Leader: Mr. J. A. C. GREENWOOD

The weather was warm and sunny, but there was a strong wind which hampered operations. A total of ten members attended. In the morning the area to the east of the Moat pond was worked. This is predominantly birch and heather, with an unfortunately increasing growth of pine. The bog itself, possibly thanks to the work of the Surrey Naturalists' Trust, seemed wetter than in recent years.

The sundew, *Drosera rotundifolia* L., was extremely plentiful. Damage from fires of earlier years was still very evident, but there were no signs of recent burning.

A fresh female *Vanessa cardui* L. had been seen in the area on the previous weekend, shortly after a large scale migration had been reported on the south coast, but no further specimens were noticed. A larva of the Dark Tussock moth, *Dasychira fascelina* L., a species well established in the area, was found. In all some 19 species of Lepidoptera were seen.

Dragonflies were abundant and three species were identified: *Phyrrhosoma nymphula* (Sulzer), *Libellula quadrimaculata* L. and *Cordulia aenea* (L.).

The spiders *Pisaura mirabilis* Clerck and *Thomisus onustus* Walck. were seen, the former abundantly, but only a single example of the latter, an uncommon species, was found on a birch sapling.

After lunch the party worked the eastern edge of the common, north-east of the Portsmouth road, including the margins of the old Hammer pond.

The largest British crane-fly, *Tipula maxima* Poda, was taken at the edge of the lake, and several local Diptera were reported from the lane nearby and later exhibited at indoor meetings.

The area is supervised by the Surrey Naturalists' Trust as a nature reserve by agreement with the owner.

The leader's thanks are due especially to Mr. Goddard and Mr. Stubbs for their helpful notes.

ARUNDEL PARK, SUSSEX—11th June 1966

Leader: Mr. M. P. CLIFTON

This meeting attracted five members and three visitors, but unfortunately Dr. A. M. Masee, who had asked for the meeting to be held here, could not come because of his health. We missed his comments on the Coleoptera captured. One of the visitors made quite a large collection of beetles, which included *Pediacus dermestoides* (F.), *Hedobia imperialis* (L.), *Tomoxia biguttatus* (Gyll.), *Conopalpus testaceus* (Ol.), *Taphrorychus bicolor* (Herbst) and *Endomychus coccineus* (L.), which were some of the more interesting species taken.

There were many *Vanessa cardui* L. about, and *Polyommatus icarus* Rott. was out in very fresh condition. *Pararge aegeria* L. was found in numbers, but was tattered and worn. Of the moths, a fresh female *Zygaena filipendulae* L. was found, as also was the ever-present species on the downs, *Callimorpha jacobaeae* L.; one member taking eggs from which to breed the species.

Several examples of the uncommon Bee Orchid, *Ophrys apifera* Huds., were found on the slope above the wood, one of which was without the purple lip. This seemed to be quite an unusual form and photographs were taken of this and the normal form. The herpetologist on the trip collected a pair of common lizards off the wall at the bottom of the wood.

The weather remained fine all day, and a little sunbathing was indulged in by all members during the lunch break. The meeting ended, still in brilliant sunshine, at about 4.30 p.m.

STORRINGTON DOWNS, SUSSEX—18th June 1966

Leader: Mr. D. A. ODD

Only eight members including the leader attended the meeting. The morning and most of the afternoon was sunny which made the journey pleasant and interesting. A number of Lepidoptera were observed including: *Polyommatus icarus* Rott., *Thymelicus sylvestris* Poda, *Pieris napi* L., *P. brassicae* L., *Coenonympha pamphilus* L., *Vanessa atalanta* L., *Aglais urticae* L., *Gonepteryx rhamni* L., *Colostygia pectinataria* Knoch and *Zygaena trifolii* Esp.

Many wild flowers were noted, particularly: *Ophrys apifera* Huds. (Bee Orchid), *Dactylorhiza maculata* (L.) Vermuel (Spotted Orchid), *Orchis mascula* (L.) L. (Purple Orchid) and *Cepharanthera damasonium* (Mill.) Druce (White Helleborine).

Two Linnets' nests were found containing four and five eggs respectively. After an enjoyable meeting the members were entertained to tea at Dingley Dell by Mrs. Odd.

GREAT CULAND CHALK PIT, BURHAM, KENT—25th June 1966

Leader: Dr. A. M. MASSEE

This meeting was held in ideal weather conditions. It was warm without being too hot and there was practically no wind. Twelve members of the Society and the Kent Field Club attended.

The Great Culand pit is the largest in mid-Kent, and it is noted for the large variety of chalk plants and insects. The following are some of the more interesting plants and insects recorded during the day.

PLANTS: *Ophioglossum vulgatum* L. (Adders Tongue), *Ophrys apifera* Huds. (Bee Orchid), *Polygala calcarea* F. W. Schulz and *P. vulgaris* L. (Milkworts), *Hieracium pilosella* L. (Mouse-ear Hawkweed), and *Linum catharticum* L. (Purging Flax).

LEPIDOPTERA: *Gonepteryx rhamni* L. larvae, *Maniola jurtina* L., *Aglais urticae* L., *Coenonympha pamphilus* L., *Polyommatus icarus* Rott., *Cupido minimus* Fuessl., *Dipsosphesia scopigera* Scop., *Eremobia ochroleuca* Schiff. larvae swept from grass, *Agrotis exclamationis* L., *Apatele rumicis* L. larvae on willow, *Plusia gamma* L., *Scoliopteryx libatrix* L. larvae on willow, *Xanthorhoe spadicearia* Schiff., *Euphyia bilineata* L., *Eupithecia centaureata* Schiff., *Euclidimera mi* Clerck larvae, *Grapholita compositella* F., *Aproaerema anthyllidella* Hübn., *Ectypa glyphica* L., *Salebria obductella* Zell. larvae on marjoram, *Crambus pascuellus* L., *C. pratellus* L., *C. perlellus* Scop., *C. hortuellus* Hübn., *Oxyptilus parvidactylus* Haw., *Eupoecilia angustana* Hübn., *Phalonia tesserana* Schiff., *Dichrorampha petiverella* L., *Epiblemma farfarae* Fletcher, *E. cirsiana* Zell., *Telephila schmidiella* Heyd. larvae on marjoram, *Depressaria douglasella* Staint. larva on *Pastinaca sativa* L., *Agonopteryx nanatella* Staint. and *Scythris senescens* Staint.

HEMIPTERA-HETEROPTERA: *Eurygaster maura* (L.), *Thyreocoris scaraboides* (L.), *Bathysolen nubilus* (Fall.) one nymph, *Dictyonota tricornis* (Schränk), *Lopus decolor* (Fall.), *Hoplomachus thunbergi* (Fall.), *Plagiognathus chrysanthemi* (Wolff), *Hallodapus montandoni* (Reuter) nymphs only, *Systellonotus triguttatus* (L.), *Saldula orthochila* (Fieb.), *Calocoris roseomaculatus* (Deg.), *C. norvegicus* (Gmel.), *Leptopterna ferrugata* (Fall.), *Stenotus binotatus* (F.) and *Orthocephalus saltator* (Hahn).

COLEOPTERA: *Amara aulica* (Panz.), *Bembidion biguttatum* (F.), *B. nitidulum* (Marsh.), *B. lampros* (Herbst), *B. quadrimaculatum* (L.), *Amara plebeja* (Gyll.), *Notiophilus biguttatus* (F.), *Paederus littoralis* Grav., *Cantharis darwiniana* (Sharp), *Scymnus frontalis* (F.), *Mordellistena neuwaldeggiana* (Panz.), *Agriotes obscurus* (L.), *Tychius meliloti* Steph., *T. schneideri* (Herbst), *Gymnetron pascuorum* (Gyll.), *Apion pisi* F., *A. tenue* Kirby, *A. meliloti* Kirby, *Anthonomus rubi* (Herbst), and *Liparus coronatus* (Goeze).

 IVINGHOE BEACON, BUCKS.—2nd July 1966

Leader Capt. J. ELLERTON, R.N.

Eight members joined the leader for this meeting. The weather was warm and sunny with a north-westerly breeze.

Odezia atrata L. was flying in numbers and in good condition, so those who wanted a series had no difficulty. An interesting point was that no one could find any *Conopodium majus* (Gouan) Loret, the Earthnut, which is the recognised

food plant of this species, and which gave rise to speculation as to whether there is an alternative, and if so what.

A colony of *Melanargia galathea* L. was just emerging and gave some of the younger members useful exercise on the hill slopes. Other Lepidoptera seen were: *Maniola jurtina* L., *Coenonympha pamphilus* L., *Aphantopus hyperanthus* L., *Cupido minimus* Fuesl., *Ochlodes venata* Br. & Grey, *Lygephila pastinum* Treits., *Euphyia bilineata* L., *Ortholitha mucronata* Scop., *Dichrorampha petiverella* L., *Epiblemma cirsiaria* Zell. and *Telphusa vulgella* Hübn.

Larvae of *Udea lutealis* Hübn. and *Cnephasia chrysantheana* Dup. were also found.

HOOK COMMON, HANTS—10th July 1966

Leader: Mr. J. EAGLES

Nine members and friends attended. It was a great pleasure to have among them Mr. A. E. Curtis of Billingshurst. The weather was perfect until about 4 o'clock when it rained for the rest of the day. In the morning and for a time after lunch the party worked Hook Common. They were then motored to Odiham for a visit to the Basingstoke Canal. Just as this was ending the rain began.

At Hook Common *Limenitis camilla* L. was on the wing as also was *Gonepteryx rhamni* L. Larvae of the latter were noted as also was the larva of *Quercusia quercus* L. Moths were plentiful and included *Talaeporia tubulosa* Retz., *Laspeyresia succedana* Schiff., *Gyponoma sociana* Haw., *Anacampsis populella* Clerck, *A. blattariella* Hübn., *Anthophila fabriciana* L. and *Argyresthia pygmaeella* Hübn.

Potentilla erecta (L.) Rausch (Common Tormentil) is, as its English name implies, common nearly everywhere but at Hook it was most abundant and in full bloom so that it could not be overlooked. Of more interest was *Dactylorhiza fuchsii* (Druce) Vermeul. of which there were many examples, and two or three forms. The thistle *Cirsium dissectum* (L.) All. was plentiful in spots which at most times would be marshy.

After lunch the party explored the area where *Serratula tinctoria* L. (Saw-wort) is so frequent. It was too early for the flowers and only one plant in bloom was noticed. Here the moth *Rivula sericealis* Scop. was freely taken.

The walk along the banks of the Basingstoke Canal was not so productive as in past years. Almost the only moths noticed were *Nymphula nymphaeata* L. and *Monpha fulvescens* Haw.

COLNEY STREET, HERTS—16th July 1966

Leader: Mr. E. S. BRADFORD

Only one member greeted the leader for this meeting. The weather forecast most likely decided people against attending. It was dull and not promising at all. The rain however, kept off apart from one light shower.

The day was not completely ruined and a number of microlepidoptera were seen or taken. The most interesting were: a single example of the crambid *Catoptria pinella* L., larval cases of *Coleophora paripennella* Zell. on hazel, also larval cases of *C. viminetella* Zell. on *Salix*. Other microlepidoptera seen or taken

during the day were: *Scoparia truncicolella* Staint., *Udea lutealis* Hübn., *Crambus perlellus* Scop., *Platyptilia pallidactyla* Haw., *Pterophorus pentadactylus* Haw., *Agapeta hamana* L., *Cochylis dubitana* Hübn., *Clepsis consimilana* Hübn., *Dichrorampha petiverella* L., *Eucosma cana* Haw., *Epiblemma farfarae* Fletcher, *Notocelia uddmanniana* L., *Ancyliis achatana* Schiff., *Olethreutes lacunana* Schiff., *Brachmia rufescens* Haw., *Mompha fulvescens* Haw., *Schiffermuelleria tripuncta* Haw., *Anthophila fabriciana* L., *Argyresthia goedartella* L., *A. nitidella* F., *A. mendica* Haw.

Only two butterflies were seen all day, *Maniola jurtina* L. and an unidentified skipper. One larva of *Vanessa cardui* L. was seen on a thistle, and a number of larvae of *Callimorpha jacobaeae* L. were observed on ragwort. Other Lepidoptera noted were: *Euproctis similis* Fuessl., *Noctua pronuba* L., *Hypena proboscidalis* L., *Euphyia bilineata* L., *Lomaspilis marginata* L., *Deilinia pusaria* L. and *Zygaena filipendulae* L.

Numbers of picture wing and fruit flies were seen, and photographs were taken of these and various Lepidoptera during the day.

Things became more grey, cold and drizzly as we made our way back to the station after a somewhat disappointing day.

STANMORE COMMON MIDDLESEX—31st July 1966

Leader: Mr. P. A. GODDARD

Four members met the leader on this mainly cloudy day, which threatened much rain. Efforts were concentrated on the south-west part of the Common, where the leader had previously found several interesting species of Lepidoptera. Owing to the poor weather during the preceding few weeks the number of insects was low. *Anacampsis blattariella* Hübn. was plentiful on birch trunks; both common forms of *Epinotia paykulliana* F. were seen; a single specimen of *Panmena regiana* Zell was found on a nearby fence, and one *Acleri emargana* F. was beaten from sallow. Lunch was taken under a large oak which sheltered the party from a heavy shower. Uninvited guests who joined the group for a feast included biting midges (*Culicoides* spp.) and two species of mosquito: *Aedes punctor* Kirby and *A. cantans* (Meig.). The tabanid, *Haematopota pluvialis* (L.) was not much in evidence, although not unnoticed.

After lunch a small area of aspen was searched, especially for the little-known moths *Gelechia nigra* Haw. and *Tuberiferola josephinae* Toll, which had been taken there last year; but neither species was seen this time. This search did however, reveal a pair of the handsome tipulid *Gnophomyia lugubris* (Zett.) in cop. on a dead aspen trunk, and the rather striking muscid, *Phaonia pallida* (F.), was everywhere on tree trunks, especially aspen. Later in the afternoon four specimens of the gelechiid moth, *Telphusa alburnella* Dup., were seen sitting on birch trunks on the edge of a clearing. Thickening clouds and spots of rain indicated an end to the day's collecting.

Although the showing of butterflies, only three *Pieris rapae* L., and other macrolepidoptera was poor, adults of 33 species of Lepidoptera were noted. Over 80 species of Diptera were recorded, more or less local or uncommon species including the syrphids, *Xylotomima nemorum* (F.) and *Sphegina clunipes* (Fall.), and the lauxaniid, *Cnemacantha illota* (Loew). A special watch was kept for the

rare stratomyid, *Odontomyia ornata* (Meig.), which had previously been taken on the Common in 1953, but it did not this time materialise.

Altogether quite a productive day, considering the uninspiring weather.

COSFORD MILL, SURREY—7th August 1966

Leader: Mr. J. M. CHALMERS-HUNT

Several years have passed since the Society last met at this attractive locality, and once again an interesting and enjoyable day was spent here. Mr. and Mrs. Loarridge as usual being so good as to allow us the run of their land.

After continuous rain at night and most of the day before, a pleasantly warm, calm, rainless day, but with some sun, favoured those who attended. Most of the party consisted of lepidopterists, since the main quest was for the scarce tineid, *Caloptilia falconipennella* Hübn. which was first taken by the leader in this locality in 1957, after having been considered for many years a 'lost' species. Several of those present were fortunate in finding folded alder leaves containing larvae. The larva of its congener, *C. elongella* L., which rolls the alder leaves instead of folding them, was plentiful; and has since produced some strikingly marked imagines, including several with black spots and one very remarkable form with a broad black bar extending from base to termen. A number of mined alder leaves that contained larvae of *Heliozela resplendella* Staint., was noted and a single fresh imago of this species was taken by Mr. P. A. Goddard.

Mr. R. W. J. Uffen, with his usual acumen, succeeded in finding a few full-grown larvae of the somewhat scarce *Coleophora siccifolia* Staint. on a hawthorn, but a search on other hawthorns in the vicinity failed to reveal any more. Messrs. S. Wakely and R. Fairclough observed many signs of feeding on *Scutellaria galericulata* L. (Skull-cap), apparently the work of the larva of *Choreutis myllerana* F., or its close ally *C. punctosa* Haw., but since no larvae were actually found it was assumed that we were too late.

Other Lepidoptera noted included the following imagines: *Maniola tithonus* L., *Acleris emargana* F., *Epinotia tenerana* Schiff., *E. solandriana* L., and several *Paltodora cytisella* Curt. in fine condition.

In addition to the lepidopterists present, we were pleased to welcome Mr. D. H. Murphy, a lecturer in entomology in the University of Singapore, and a specialist in Collembola. Mr. Murphy has kindly submitted the following list of Collembola taken on this meeting. On the water surface: *Sminthurides malngreni* (Tullberg) var. *elegantulus* (Reuter), commonly; *S. malngreni* f. *principalis* (Tullberg), one female; *S. schoetti* Axelson, one female; *Sminthurinus aureus* (Lubbock), one female; *Isotomurus plumosus* Bagnall, commonly; and on trees, *Willisia nigromaculata* (Lubbock).

A delightful tea was most kindly provided by Mrs. Loarridge, after which various interesting subjects were discussed connected with the natural history of the mill and its surroundings. One of these was the curious case this year of an apparently feckless hen Spotted Flycatcher that had busied herself with some six nests in various stages of completion, built on adjacent ledges of a wall. However, though laying in at least two of them, for no clear reason she failed to remain to incubate any of the eggs.

After thanking our host and hostess for their generous hospitality, the party dispersed having enjoyed a very pleasant day.

SHOREHAM, KENT—21st August 1966

Leader: Mr. R. W. J. UFFEN

Despite the fine weather, little was on the wing and the small party found very few things of particular note. *Argyresthia quadriella* Haw. (*andereggiella* Dup.) and *Leucoptera laburnella* Staint. (Lepidoptera) were taken on the wing. A very few *Coleophora sternipennella* Zett. (Lepidoptera) and one *Ictericia westermanii* (Meig.) (Diptera) were taken by vigorous sweeping in a weedy stretch immediately above the field at the base of Shoreham Down. *Platycis minuta* (F.) (Coleoptera) was taken further along towards Otford.

The last find of the day was a knowledgeable student of butterflies who had not heard of the Society.

WHIPPENDELL WOOD HERTS.—28th August 1966

Leader: Mr. B. GOATER

Five members and a visitor attended. The day was warm and sunny, but although the number of species of insects encountered was quite large, a disappointing small number of individuals was seen. The morning was spent working marshy ground near the canal at the bottom of Cassiobury Park, and after lunch the party moved across the golf course to the extensive mixed woodland of Whippendell Wood itself.

Several large patches of Hemp Agrimony, *Eupatorium cannabinum* L., growing in the marsh, yielded plentiful mines of *Adaina microdactyla* Hübn. and one imago was seen. The blossoms were attended by *Vanessa atalanta* L. and *V. cardui* L. Fruiting heads of *Galeopsis tetrahit* L. contained small larvae of *Perizoma alchemillata* L., but we were disappointed to find no larvae of *Eupithecia tripunctaria* H.-S. on the abundant *Angelica*; this is usually a good locality for the species, though the larvae are heavily parasitised. A few worn specimens of *Ebulea (Psammotis) crocealis* Hübn. were found near a patch of *Pulicaria dysenterica* (L.) Bernh.; *Udea (Hapalia) lutealis* Hübn. was abundant, and one fresh *U. ferrugalis* Hübn. was seen. Other possible migrants, or progeny of migrants, were *Plusia gamma* L. and *Plutella maculipennis* Curt.

Diptera recorded included *Tipula paludosa* Meig., *Haematopota pluvialis* (L.), *Tubifera (Eristalis) pertinax* (Scop.) and *Myiathropa florea* (L.).

Three species of balsam, *Impatiens capensis* Meerb., *I. parviflora* DC. and *I. glandulifera* Royle were seen. Some luxurious patches of *Marchantia polymorpha* L. (Hepaticae) were growing on the lock gates of the canal, together with several bryophytes.

After lunch the following Lepidoptera were recorded: *Nymphalis io* L., *Lycæna phlaeas* L., *Polyommatus icarus* Rott., *Cosmia trapezina* L., *Plusia gamma* L., *Euphyia bilineata* L., *Ortholitha chenopodiata* L., *Scoparia truncicolella* Staint., *Lathronympha strigana* F., *Mesographe forficalis* L., *Epinotia solandriana* L., *E. tenerana* Schiff., *Cherlaria conscriptella* Hübn., *Caryocolum fraternellum* Douglas, *Mompha raschkiella* Zell., *Argyresthia goedartella* L., *A. nitidella* F., *A. semitestacella* Curt., *Plutella maculipennis* Curt., *Ypsolophus radiatellus* Don. and *Tinea semifulvella* Haw.

Mr. Philip Goddard unflinchingly allowed the mosquito *Aedes maculatus* (Ol.) to sup its fill from the back of his hand before boxing it.

One of the more interesting plants seen was *Thymus pulegioides* L. which largely replaces *T. drucei* Ronn. on the north side of London.

TUDDENHAM, SUFFOLK—3rd September 1966

Leader: Capt. J. ELLERTON, R.N.

Only three members turned up for this meeting, but one had driven over 100 miles and the other two over 80, and all were agreed the journey was well worth while. The day was fine and sunny, though a strong south-westerly wind made collecting difficult.

Crambus hamellus Thunb. was plentiful and in good condition, and *Agriphila geniculata* Haw. was also taken. Much time was spent looking for *Crombrugghia distans* Zell. though we may have been a little late; one was netted, but unfortunately it escaped. One female *Scopula rubiginata* Hufn., freshly emerged was taken.

Other Lepidoptera seen were: *Vanessa atalanta* L., *V. cardui* L., *Aglais urticae* L., *Lycaena phlaeas* L., *Polyommatus icarus* Rott., *Amathes c-nigrum* L., *Plusia gamma* L., *Lyncometra ocellata* L. and *Aspitates ochrearia* Rossi.

The conifers are growing fast and there is a great increase in broom on the main collecting area.

LYMINGTON SALTINGS, HANTS—24th September 1966

Leader: Mr. L. W. SIGGS

Two members joined the leader for a very pleasant autumn day. In view of the interests of those present, it was decided to concentrate on Keyhaven, where there are extensive saltings, with *Spartina townsendii* Groves, and the usual salting plants, with marshy grazing land and *Phragmites* nearby. Few flowers were in bloom, but these included *Inula crithmoides* L., *Aster tripolium* L., *Matricaria maritima* (L.) Koch (*inodora* L.) and *Armeria maritima* (Mill.) Willd.

Birds seen included Redshanks, Curlews, flocks of Lapwing and many migrating Swallows.

Among the Lepidoptera noted were *Pieris rapae* L., *Aglais urticae* L., *Vanessa atalanta* L., *Coenonympha pamphilus* L., *Lycaena phlaeas* L., numbers of *Plusia gamma* L. and several *Plutella maculipennis* Curt.

Numbers of a little-known mite gall were collected from a few plants of *Halimione portulacoides* (L.) Aell. standing amongst *Agropyron* on a path raised above the main *Spartina* marsh. These are being examined by a specialist.

Diptera were neither as abundant nor as varied as earlier in the season. The following were taken: *Tipula paludosa* Meig., *Limonia* (s.gen. *Dicranomyia*) *sera* (Walk.), *Erioptera* (*Symplecta*) *stictica* (Meig.), *Aedes detritus* Hal., *Bibio lepidus* Loew, *Dolichopus plumipes* (Scop.), *D. nubilis* Meig., *Macrodolichopus diadema* (Hal.), *Hydrophorus oceanus* (Macquert), *Syntormon pallipes* (F.), *Campsicnemus armatus* (Zett.), *Lonchoptera lutea* Panz. ab. *trilineata* Zett., *Eristalis* (*Tubifera*) *tenax* (L.), *E. arbustorum* (L.), *Ensina sonchi* (L.), *Paranthomyza nitida* (Meig.), *Scatella stagnalis* (Fall.), *Collinellula fuscipennis* (Hal.), *Scatophaga* (*Scatomyza*) *litorea* (Fall.), *Pollenia rudis* (F.), *Orthellia caesarion* (Meig.), *Morellia* sp. indet. females, *Limnophora* (s.gen. *Spilogona*) *area* (Fall.), *Helina calceata* (Rondani), *Egle cinerella* (Fall.) and *Coenosia pumila* (Fall.).

PROCEEDINGS

23rd JUNE 1966

The PRESIDENT in the Chair

EXHIBITS

The PRESIDENT—Full-fed larvae of *Celerio euphorbiae* L. (Lep., Sphingidae). These larvae were found commonly a fortnight previously along the south coast of France in the neighbourhood of Le Rayol. When small the larvae are bright green and yellow with some black markings, and are relatively inconspicuous on the young spurge plants. In their mature colouring, as shown, they more closely resemble the drying spurge plants on which they are feeding. The plants at this time have purplish-red mottled stems.

Mr. M. P. CLIFTON—A pair of the common Glow-worm, *Lampyrus noctiluca* (L.) (Col., Lampyridae) with eggs, taken at Ash Vale, Surrey; and on behalf of Mr. B. LEVY a visitor to the Arundel Park field meeting the following Coleoptera taken on that meeting: *Pediacus dermestoides* (F.) (Cucujidae), *Hedobia imperialis* (L.) (Anobiidae), *Tomoxia biguttata* (Gyll.) (Mordellidae), *Conopalpus testaceus* (Ol.) (Serropalpidae), *Taphrorychus bicolor* (Herbst) (Scolytidae) and *Endomychus coccineus* (L.) (Endomychidae).

Mr. T. R. EAGLES—The plant *Thymus serpyllum* L. from Tuddenham, Suffolk, with galls caused by the mite *Phytoptus thomasi* Nal. These galls are formed by the clustering together of the terminal leaves and have a thick covering of long white hairs. Thus the galls resemble tufts of cotton-wool.

Dr. B. J. MACNULTY—Two examples of *Buprestis aurulenta* L. (Col., Buprestidae). One was given him from a wood yard in Lymington, Hants, taken in October 1963, and the other was taken in Waltham Abbey, Essex, in April this year. The species is a native of the mainland of North America and has been recorded many times in this country. The Waltham Abbey specimen was found in a room in which a crate, despatched from New York, had been unpacked. Despite careful search no other examples were found. The exhibitor was not aware if the insect bred in this country, but if it could survive in New York, which had greater extremes of temperature than this country, there seemed no climatic reason why it should not survive here.

Mr. M. M. MYALL—An example of the moth *Plusia gamma* L. (Noctuidae) which had the 'Y' on the left forewing reduced to three dashes, and that on the right forewing complete.

Miss A. B. LOGAN—A confluent aberration of *Zygaena trifolii* Esp. (Lep., Zygaenidae) taken on the Pulborough field meeting, 18.vi.66.

Mr. A. E. GARDNER—The following species of Coleoptera: *Ceuthorrhynchus asperifoliarum* (Gyll.) (Curculionidae), a series taken on *Cynoglossum*, Wicken Fen, Cambs, 21.vi.66; *Hebodia imperialis* (L.) (Anobiidae) from a dead ash, Chippenham Fen, Cambs., 22.vi.66; *Dasytes nigra* (L.) (Dasytidae), a short series from the New Forest, Hants, 19.vi.66; living examples of *Cetonia aurata* (L.) (Scarabaeidae), from Umbelliferae in the New Forest, 19.vi.66; a pair of the very rare scarabaeid beetle, *Gnorimus variabilis* (L.), bred from larvae found in oak wood in Windsor Forest, Berks., March 1966. He also showed *Caliprobola speciosa* (Rossi) (Dipt., Syrphidae) taken on a dead beech in Windsor Great Park, Berks., 10.vi.66.

COMMUNICATIONS

The PRESIDENT announced that he had received a letter from Dr. A. M. Massee in which he said that he was very much better after his illness. The President also reported that Air Marshal Sir Robert Saundby was in the Brompton Hospital, but he hoped to be out by the end of the month.

The President also recorded having found the feeding tree of *Charaxes jasius* L. (Lep., Nymphalidae) on two occasions while in the south of France. On one of these he saw four *Charaxes jasius* L., a *Nymphalis polychloros* L. (Lep., Nymphalidae) and a *Vanessa atalanta* L. (Lep., Nymphalidae). He collected a female *Charaxes* while in the south of France on 12th June, and on his return sleeved it on *Arbutus unedo* L. in his garden; he obtained 12 eggs. The butterfly was still active at the time of the meeting having been fed on a diet of honey diluted with water, whiskey and Madeira.

Mr. S. WAKELY asked if the species of spurge on which the *Celerio euphorbiae* L. larvae were found was known to the President. In reply the President said he did not know, but from its shape he suggested it might be some kind of wood spurge.

Referring to Dr. MacNulty's exhibit, Mr. A. E. GARDNER said that the buprestid was a native of western North America, and that it feeds on Scots Pine and Red Spruce, liking charred wood, especially that struck by lightning. He thought it would probably increase in numbers in this country, adding that it was known to have a very long life cycle, 26 years has been recorded, so that it may have emerged from timber in the fabric of the room and not from the crate. Dr. MACNULTY replied that the room in which it was found contained no pine as far as he knew, and that the building had been constructed before the First World War.

Slides of the life-histories of several of the British microlepidoptera were shown by Mr. A. SMITH.

16th JULY 1966

The Secretary, Dr. B. J. MACNULTY, in the Chair

EXHIBITS

Mr. P. J. K. BURTON—A pair of *Monochamus sutor* (L.) (Col., Cerambycidae) from imported timber on the LEP Wharf, Chiswick, West London, 29.vi.66. Six species of this genus are recorded by Duffey (1952, *Handbk. Identification Brit. Ins.*, 5 (12):15) as having occurred in this country in imported timber, and two of these, *M. sutor* (L.) and *M. sartor* (F.) have been admitted as British by several authors. *M. sutor* is distinguished from *M. sartor* by having the pubescent area on the scutellum divided down the middle, and by lacking a transverse depression on the elytra.

Mr. A. E. GARDNER—The following species of Coleoptera: living examples of the Wharf Borer, *Nacerdes melanura* (L.) (Oedemeridae), which was exceedingly common on the forecourt of a garage in Putney, S.W. London, 13.vii.66; *Arhopalus ferus* (Müll.) (Cerambycidae) from beneath pine bark, Oxshott Common, Surrey, 12.vii.66; several examples of *Athous villosus* (Geoff.) (Elateridae) taken under the bark of prostrate beeches in the New Forest, Hants., 17.vi.66; specimens of *Lymexylon navale* (L.) (Lymexylonidae) taken flying around an oak in Windsor Forest, Berks., 10.vii.66; a living example of *Elater ferrugineus* L. (Elateridae) bred from a penultimate instar larva from Windsor Forest during 1965.

Mr. P. A. GODDARD—photographs of the tortricid moth *Grapholita composi-tella* F. which he found fairly commonly on a disused railway embankment in Stanmore, Middx., and also the moth *Schrenkensteinia festaliella* Hübn. found commonly on bramble on Portland, Dorset. The latter photograph showing its peculiar resting posture.

COMMUNICATIONS

Dr. B. J. MACNULTY announced that Miss W. M. A. Brooke had given him the programme of the Alton Natural History Society, and invited any members to attend their meetings. She would be obliged if any member wishing to attend would contact either her or the Secretary of the Alton Society so that directions could be given.

Mr. P. A. GODDARD reported that a specimen of *Blastobasis decolorella* Woll. (Lep., Blastobasidae) had been taken at Mill Hill, Middx. on 7.vi.66. He also said that when he visited Portland earlier, he had seen one *Plusia gamma* L. (Lep., Noctuidae), two *Plutella maculipennis* Curt. (Lep., Plutellidae), one *Vanessa cardui* L. (Lep., Nymphalidae) and one *Nomophila noctuella* Schiff. (Lep., Pyralidae) showing that this appeared to be a bad year for migrants.

A film taken by the Cambridge University Expedition to Mount Kina Balu in Sabah was shown with a commentary by Mr. J. D. HOLLOWAY.

28th JULY 1966

A Vice-President, Mr. R. F. BRETHERTON, in the Chair

Mr. R. F. Bretherton extended a welcome to the meeting to Dr. Valletta from Malta.

EXHIBITS

Dr. B. J. MACNULTY—The following Coleoptera: *Aromia moschata* (L.) (Cerambycidae) obtained from pupal cells in a sawlog in his garden at Waltham Abbey, Essex, in late June; *Judolia sexmaculata* (L.) (Cerambycidae) from the Abernethy Forest, Perthshire, beaten from pine, 7.vi.66; *Scolytus ratzburgi* (Scolytidae) from a dead birch branch at Rannoch, Inv., 2.vi.66, *Hallomenus binotatus* (Quensel) (Serropalpidae) on *Boletus*, 30.vi.66, and *Hypnoidus maritimus* (Curt.) (Elateridae) on fungus, all from Rannoch; *Ampedus nigrinus* (Herbst) (Elateridae) beaten from pine in the Abernethy Forest, 7.vi.66; *Sphaerites glabratus* (F.) (Sphaeritidae) among a pile of small pine logs in the Abernethy Forest, 7.vi.66; *Anisotoma humeralis* (F.) (Leiodidae) in fungus, Rannoch, 30.vi.66; *Rhinomacer attelaboides* F. (Curculionidae) from the Abernethy Forest and Loch Morlich, Inv., 4 and 8.vi.66; *Magdalis phlegmatica* (Herbst) (Curculionidae) beaten from pine in Abernethy Forest, 8.vi.66; and *M. duplicata* Germ. beaten from pine in Abernethy Forest, 8.vi.66.

Mr. E. S. BRADFORD—Several *Coleophora paripennella* Zell. (Lep., Coleophoridae) larvae taken in the Gravel Pits, Hyde Lane, Herts., 16.vi.66, on hazel, blackthorn and bramble.

Mr. S. A. WILLIAMS—*Atheta liturata* (Steph.) (Col., Staphylinidae) from rotting fungus at Chippenham Fen, Cambs., 4.vi.66. He also showed the following Coleoptera taken at the borings of the moth *Cossus cossus* L. (Cossidae) in an oak: *Thamiraeca cinnamomea* (Grav.) (Staphylinidae), *Epurea guttata* (Ol.), *Soronia punctatissima* (Ill.), *Cryptarcha imperialis* (F.) and *C. strigata* (F.) (Nitidulidae).

COMMUNICATIONS

Dr. B. J. MACNULTY reported that Dr. Masee was now out of hospital, but the cause of his illness was still unknown. News was given, by Mr. R. F. BRETHERTON, of Mr. Mere who was in hospital with an ulcer.

During the previous week, Mr. S. N. A. JACOBS had been down to the New Forest, Hants., and he reported that butterflies were plentiful, he had noted 15 or 16 species, among them were two *Colias croceus* Fourc. (Pieridae) and one *Aglais urticae* L. (Nymphalidae). Mr. Bretherton said that in one of his favourite collecting areas, the chalk pit on White Down in the North Downs, there were very few butterflies about, *Lysandra coridon* Poda (Lycaenidae) was just emerging and *Aphantopus hyperantus* L. (Satyridae) was out but all other common species were scarce.

Lysandra coridon Poda was reported in large numbers on Box Hill, Surrey, by Mr. G. PRIOR. He then said that on a visit to Oxford he went to see Dr. Clarke who had succeeded in breeding *Apatura iris* L. (Lep., Nymphalidae) again this year and had set them free in Shabbingdon Woods. He had also bred several hundred *Euphydryas aurinia* Rott. (Lep., Nymphalidae) for releasing. He finally talked of an experiment of Dr. Clarke's to try to control ragwort with *Callimorpha jacobaeae* L. (Lep., Arctiidae). Apparently after putting down several thousand larvae in a large field of ragwort last year he had not seen one specimen this year. Mr. P. A. GODDARD said it had disappeared from many of its old localities, and Mr. Bretherton reported that the earliest specimen he had seen in his light trap this year was in late June. Two almost full-fed larvae had been seen by Mr. S. N. A. JACOBS in the New Forest. Larvae of *C. jacobaeae* L., said Mr. C. I. RUTHERFORD, were uncommon this year in Yorkshire, but the larvae of *Vanessa cardui* L. (Lep., Nymphalidae) were very common. Mr. S. WAKELY reported large numbers of *C. jacobaeae* L. had come to his light trap in Suffolk whilst he was on holiday there. There was, said Mr. Jacobs, a radio broadcast referring to a farmer who had released 20,000 Cinnabar larvae on ragwort in one of his fields, but no moths were found there this year. This, Mr. Prior said, was Dr. Clarke.

Commenting on the *Euphydryas aurinia* Rott. on Hodd Hill, Dorset, Mr. D. O'KEEFE said that it has spread from the small patch set aside for its preservation there and was now common over a wide area on the hill. Mr. Bretherton added that the normal breeding ground for this species on Hodd Hill had been heavily grazed, and so a group of naturalists had fenced off a small area to save the colony.

In Malta, said Dr. Valletta, *Plusia gamma* L. (Lep., Noctuidae) was at present very common and a pest, feeding on many plants. It was both migrant to the island and a resident. He added that at Kew, Surrey, he had seen specimens of *Lycaena phlaeas* L. (Lep., Lycaenidae), *Vanessa cardui* L. and *Nymphalis io* L. (Lep., Nymphalidae).

Mr. F. COLE asked Dr. Valletta if the *Celerio livornica* Esp. (Lep., Spingidae) which he had reported earlier had moved north (see p. 91). To which Dr. Valletta replied that he had left Malta on 17th July and therefore did not know of the movements of the insect. A discussion followed on various migrants.

Mr. Jacobs said that the exhibited *Aromia moschata* (L.) brought back memories, for when he was a child he could, on going to certain playing fields, be certain of obtaining several on each visit.

Referring to his searching the bark of birch for beetles in Scotland, Mr.

Bretherton asked Dr. MacNulty if he had found any clearwing pupae, and Dr. MacNulty replied that he had seen none.

11th AUGUST 1966

The PRESIDENT in the Chair

EXHIBITS

Mr. J. A. C. GREENWOOD—A larva of *Charaxes jasius* L. (Lep., Nymphalidae) from eggs laid by a female taken at Le Rayol, S. France (see Communications 23.vi.66, p. 124). The female lived for 24 days in captivity; only 12 eggs were deposited, and only six of these hatched. Five of the resulting larvae are still living, the largest exceeds 50 mm in length when resting, the other four, possibly males, are considerably smaller. These larvae feed almost exclusively at night on *Arbutus unedo* L., and return to spend the day on the same leaf which had been prepared by the spinning of a small silken resting pad. They are being reared indoors in a temperature maintained between 65° and 72°F, which is appreciably cooler than would be experienced in the south of France at this time. The second brood of *C. jasius* L. flies in August and September and as these eggs were laid towards the end of the first brood's normal period of flight it is hoped to obtain imagines towards the end of September.

Mr. A. E. GARDNER—The following Coleoptera: *Psylloides hospes* Woll. (*luridipennis* Kuts.) (Chrysomelidae) and *Ceuthorhynchus contractus* Marsh. ab. *pallipes* Crotch (Curculionidae), from Lundy Island, N. Devon, 26.vii.66. He explained that both species feed on Lundy Cabbage, *Rynchosinapis wrightii* (O. E. Schutz) Dandy, which grows on the south-eastern cliffs of the island and is only found on Lundy.

Mr. S. A. WILLIAMS—A male and female *Quedius* (s.gen. *Microsaurus*) *aetolicus* Kraatz (Col., Staphylinidae) taken together on the sulphur bracket fungus, *Polyporus sulphureus* (Bull.) Fr., on oak in the New Forest, Hants, 10.vii.66. This very local species appears to be confined to Windsor Forest, Berks. and the New Forest. Donisthorpe (1939, *Prelim. List Col. Windsor Forest*, p. 39) states: 'In birds' nests, under bark, in fungi, at *Cossus* tree, and with *A. (D.) bruneus*; not uncommon'. Joy (1932, *Pract. Handb. Brit. Beetles*, p. 113) considers the insect to be very rare and associated with rotten wood.

Mr. R. W. J. UFFEN—A living female of an unidentified mutillid wasp to illustrate the fact that these creatures squeak when disturbed, as observed by Mr. C. G. Roche at an earlier meeting (see Communications, 14.x.65, 1966:23) He said that this seemed to be effected by telescoping the abdomen.

COMMUNICATIONS

Mr. G. Prior was asked if the *Callimorpha jacobaeae* L. (Lep., Arctiidae) released to control Ragwort had been released in areas where they had bred, or were breeding (see Communications, 28.vii.66, p. 127). In reply Mr. PRIOR said he was not sure, but referring to the other releases added that the *Apatura iris* L. (Lep., Nymphalidae) released by Dr. Clarke were in areas where the eggs were collected. Mr. T. J. G. HOMER confirmed that *A. iris* L. bred in Shabbingdon Wood, but added that *Euphydryas aurinia* Rott. (Lep., Nymphalidae) did not.

The question of obtaining permission from the Conservation Committee for releasing bred insects was raised by Mr. A. E. GARDNER. Mr. F. T. VALLINS

believed it was rather a matter of having records of what was going on in this field, but Mr. Gardner said he knew someone who had applied to the Committee for permission to release bred specimens of a rare water beetle, and it had been refused. The person concerned had however carried out his intentions. It was suggested by Mr. S. N. A. JACOBS that if permission was refused, the Committee should be asked to suggest a better site for releasing these insects. Arising out of the discussion Mr. J. P. T. BOORMAN asked how often the Conservation Committee met, and Mr. Vallins replied twice a year, but that a special meeting could be called if a question arose that could not wait for the next ordinary meeting.

Mr. Vallins announced that the Editor had successfully applied for a grant-in-aid of £50 from the Royal Society towards the cost of the 1965 Proceedings.

The capture of a larva of *Vanessa cardui* L. (Lep., Nymphalidae) on Wimbledon Common, S.W. London, 20.vi.66, and a further two the next day, was reported by Mr. R. S. TUBBS. The PRESIDENT suggested this was probably the result of recent migration of *V. cardui* L.

Collecting methods and preparation techniques were discussed and demonstrated by Messrs. S. N. A. JACOBS, R. W. J. UFFEN, S. A. WILLIAMS, T. P. BOORMAN and E. S. BRADFORD.

8th SEPTEMBER 1966

The PRESIDENT in the Chair

The death was announced of Mr. G. Stoughton-Harris.

Miss Mary Angela English was declared elected a member.

EXHIBITS

Mr. C. O. HAMMOND—An example of the two following Diptera: *Psilota anthracina* Meig. female, taken in Windsor Forest, Berks., 16.v.66, on hawthorn; and *Volucella zonaria* (Poda) from Wood Green, N. London, 26.vi.66; with, for comparison with the latter species, *V. inanis* L. female, also from Wood Green. He commented on the mimicry of *Calliphora* spp. by *Psilota anthracina* Meig.

Mr. G. PRIOR—Examples of the Lepidoptera *Chiasma clathrata* L. (Geometridae), and *Celastrina argiolus* L and *Lycaena phlaeas* (Lycaenidae) all from the reservoir at Hanger Hill, W. London. During the week 22 to 26.vi.64 the exhibitor visited the reservoir which had been disused since August 1949 and had found a great many *Chiasma clathrata* L. in the grass, also present were *Maniola tithonus* L. and *M. jurtina* L. (Satyridae) and *Thymelicus sylvestris* Poda (Hesperidae). Again on 14th August this year the reservoir was visited but none of the above species was found; there were present, however, *Celastrina argiolus* L. and *Lycaena phlaeas* L. (Lycaenidae) and *Plusia gamma* L. (Noctuidae). The vegetation that has grown up since the reservoir was abandoned consist mainly of willow, scrub oak, birch, beech, hawthorn, gorse, broom and bramble.

Mr. A. E. GARDNER on behalf of Mr. F. D. BUCK—A mite accompanied by the following note from Mr. Buck: 'On the evening of 30th August, I discovered the exhibited mite with its head deeply embedded in my left side and with its legs thrust stiffly backwards. I eschewed the old army technique with camel ticks—a lighted cigarette end in close proximity to the tick—and elected to try

swabbing with acetic ether and similar methods; all of which failed to dislodge the pest. An attempt to pull the brute off inevitably ended with the tick in my wife's hand and the head still embedded in my side. The latter being teased out in pieces with needles. Surprisingly, until this very last stage, the tick was causing no inconvenience at all and it was a pure accident that I noticed it at all at that time. I had been collecting in Chippenham Fen, Cambs., the previous Sunday, 28th August, and can only assume that to be the origin of the beast. I have seen this arachnid on the sheet when sieving litter, moss, etc., an occupation I was engaged on at times during that Sunday on Chippenham Fen. The literature immediately available to me does not help much in the identification of the arachnid, but according to Cloudsley-Thompson (1958, *Spiders, Scorpions, Centipedes and Mites*, London, pp. 182-201) the scutellum seems to mark it as an ixodid. Two species appear to be most likely, *Ixodes ricinus* (L.) (*redivius* (L.)) (the Sheep Tick) and *I. hexagonus* Leach (*erinaceus* Andouin) (the Dog Tick). The latter would seem most likely as it appears to have a more catholic taste than *I. ricinus*, parasitizing not only dogs, but foxes, hedgehogs and cattle. In this work I can find no reference to any ixodid mite attacking man, but in an old work by Dallas (1883, *Cassell's Natural History*, 6:184) the Poultry Tick, *Dermanyssus gallinae* (Deg.) *avium* Dugès is recorded from birds other than the domestic fowl, and also of sometimes transferring its attentions from fowl to man. Chippenham Fen is a game reserve and it is possible that this species is present. It is however a member of the family Gamasidae which contains heavily sclerotised species like *Parasitus coleoptratorum* (L.) the species infesting *Geotrupes* beetles. Thus unless *Dermanyssus gallinae* is an aberrant gamasid, it is unlikely to be this species. Members comments on the identity of the exhibited tick and any knowledge they have of ticks attacking humans in this country would be of interest.¹

Mr. A. E. GARDNER—(1) A series of the very local wood-boring weevil, *Mesites tardii* (Curt.) bred from holly, Lee Abbey, N. Devon, July 1966. A portion of the tree showing exit holes and workings was also shown. (2) A series of *Platycis minuta* (F.) (Col., Lycidae) from dead beech, Otford, Kent, 24.viii.66.

COMMUNICATIONS

The PRESIDENT announced the formation of the British Arachnological Society, with Theodore Savory as its President.

He also read a letter from Mr. Barber of the Department of Anatomy, University College, Gower Street, asking members to help in obtaining glow worms for research and investigation into their distribution.

Referring to Mr. Buck's note on the tick, Mr. R. F. HAYNES said that he had a similar experience in Ireland. Mr. P. A. GODDARD commented on ticks in general and their identification, which he said, in some cases was decided by leg spines. The removal of a tick could be effected by dabbing it with alcohol, was the opinion of Mr. S. N. A. JACOBS; while Sir ERIC ANSORGE said that in India he found the best way to remove ticks was a very hot bath and then to have them picked off with tweezers. Mr. Goddard added that knowing the group to which the tick belonged would help in its removal because of their different biting habits. On the subject of identification Mr. T. R. EAGLES asked if anyone knew of a book on these arachnids which would help with determination.

1. Since the date of this meeting I have learned of two cases of mites attacking humans. Mr. K. Crawshaw tells me he picked up a mite in Ireland, and Mr. A. Doncaster also obtained one in his leg in Scotland—F. D. Buck.

Commenting on the capture of *Scopula rubiginata* Hufn. (Lep., Geometridae) on the Tuddenham field meeting, Mr. S. WAKELY said that he had taken it at mercury vapour light at Thorpness, Suffolk; and Mr. R. F. BRETHERTON said that he had taken it in August near Tuddenham. He had little or no success in breeding this species and would be interested to know of a successful method.

22nd SEPTEMBER 1966

The PRESIDENT in the Chair

EXHIBITS

Mr. P. A. GODDARD—Photographs of *Oegoconia quadripuncta* Haw. (Lep., Gelechiidae) and *O. kindermanniella* H.-S., previously thought, in this country, to be merely the light and dark forms respectively of *O. quadripuncta* Haw. The genitalia confirms that they are separate species.

Mr. S. WAKELY—An unidentified insect found in his loft. It was passed round for comment by members.

COMMUNICATIONS

Commenting on the numbers of migrant Lepidoptera, Dr. C. G. M. DE WORMS particularly mentioned the White Point Wainscot, *Leucania unipuncta* Haw (Noctuidae). He added that he had seen very few large hawk moths this year. Mr. R. G. Chatelain said he had seen one *Herse convolvuli* L. (Lep., Sphingidae).

Whilst on the Gower Peninsula, S. Wales, 30.viii.66, said Dr. B. J. MACNULTY, he had seen large numbers of *Plusia gamma* L. (Lep., Noctuidae) gathering round street lamps.

Referring to the insect shown by Mr. S. Wakely, Mr. S. N. A. JACOBS said that it was the larval form of a bug; he had seen the species in his own loft. Mr. WAKELY replied that he had also seen similar insects when sawing wood.

EDGAR ERNEST SYMS

1881-1966

Edgar Ernest Syms was born in Edgware on 29th December 1881. He was educated at the local school in Harrow Road, leaving when he was 12 years old to join the family business as an apprentice carpenter. The first job on which he was employed was the Whiteley building where, though a life-long teetotaler and non-smoker, he fetched the workmen's cans of beer from the local hostelry.

An avid reader, Syms read every book that came his way; his thirst for knowledge led him to evening classes at the London Polytechnic, where he studied social and economic history, and later he attended a course at Birkbeck College in the City of London for his matriculation.

A rift between his father and grandfather ended his association with the family business, and he applied for and gained entry into the teaching profession as a handicraft instructor with the West Ham Education Authority. During his career he was in charge of Handicraft Centres at Credon Road, Drew Road and Odessa Road Schools, all in the West Ham area. He retired from teaching in 1942 after 40 years' service in education and devoted his retirement to entomology.

Being a keen naturalist it was no doubt the proximity of Epping Forest, an area he worked throughout his life, that led him to live at Wanstead. He married in 1908; both he and his wife were keen cyclists and thought nothing of cycling to Felixstowe for their holiday. Their only son was provided with a cycle at the age of eight, and the three would cycle to various parts of Epping Forest where Syms spent the day collecting his insects.

At the outbreak of war in 1914 Syms volunteered for the R.F.C., but was rejected because of a weak heart; the result of rheumatic fever contracted in his 'teens through sleeping rough whilst hiking from London to Southampton.

In 1924 he purchased a motor cycle combination and extended his field work into all the counties of England and Wales, and most of those in Scotland. After some four years he exchanged three wheels for four.

Syms lost his wife in 1956—an awful shock for him; he had assumed, owing to his heart condition, that she would survive him. In fact from the time of his rheumatic fever he suffered only minor illnesses and went into hospital as a patient for the first time when he was over 80 years of age. He lived on his own at Wanstead until three years ago, when he went to live with his son, at his son's insistence, after he was taken ill on a visit. He was rushed to hospital with a suspected burst stomach ulcer. Later he told his son he had handled some fungus from Epping Forest that morning and believed the trouble to have been fungus poisoning. His doctors were left in complete ignorance.

It was in 1916 that he joined the South London and was an enthusiastic member from the start. His interests were 'other Orders', particularly the Orthoptera; but like Hugh Main, a great friend of his, was more concerned with living insects than with cabinet specimens. Unfortunately he did not publish as much as he might, though he wrote several papers for our Proceedings and Transactions, covering a number of the Orders usually neglected. He was a frequent contributor to the Society's discussions and could usually be relied upon to produce some useful information on habits in obscure Orders, or on breeding techniques. In 1926 he was elected Librarian, succeeding Mr. A. W. Dodds. He pursued his duties in a quiet, unspectacular, but efficient manner until he relinquished the responsibility in 1953. Thus for 27 years our books were in his care; his is probably the longest term of unbroken service in a single office in the Society's history. One great asset in this respect was his knowledge of the literature, not only of the volumes on our bookshelves and the works we had published, but of other works as well; if he couldn't produce the book he could usually give a useful reference—and was always willing to spend time searching for the difficult reference.

Inevitably such a man must be elected to our senior office, and he became our President in 1935. Under his chairmanship the Society's fortunes moved steadily forward.

He was appointed an Honorary Member in 1960 having earned that distinction with 44 years of enthusiastic service, contributing much to our meetings both indoors and in the field.

The Essex Field Club claimed much of his attention and for many years he was a curator of the Essex Museum.

In his early days he was an ardent trade unionist, a soap-box orator and something of a fire-brand. Always a man of principles; obviously a youth with fire in his belly, that mellowed with advancing years to make up the man we knew: kindly, helpful, gentlemanly, and a first-class entomologist.

F. D. BUCK

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MEETINGS OF THE SOCIETY

are held regularly at the Society's Rooms, and include the well-known ANNUAL EXHIBITION, which takes place in October in the Libraries of The Royal Society and of the Geological Society of London at Burlington House, Piccadilly, by kind permission of those two Societies. Frequent Field Meetings are held at weekends in the Summer. Visitors are welcome at all meetings. The current Programme Card can be had on application to the Secretary.

OUTLINE LIFE HISTORIES OF SOME WEST AFRICAN LEPIDOPTERA

Part II Limacodidae

B. J. MACNULTY

INTRODUCTION

This paper continues the series, and for general introductory remarks readers are referred to Part I (1966). The order of genera and species follows that of Seitz (1930) unless otherwise stated. The names of the food plants are as given in Hutchinson & Dalziel (1928).

The larvae of this group of insects are easily recognised, being generally rectangular in cross section with prominent cones bearing urticating setae. In a number of cases they are extremely flattened and oval in shape and without cones, but still rectangular in cross section. In a few cases the larvae appear to be more normal, lacking the cones and urticating setae, but they are still somewhat flattened. The ventral surface is always closely adpressed to the surface on which they rest and the legs and prolegs are nearly always retracted. The larvae move with a gliding, slightly undulating motion which no doubt gives rise to the nickname of 'slug caterpillars'. The head, except for feeding is also retracted under segment 2.

The cocoons of this group are all very similar and consist of hard, bare, smooth, papier mâché-like cells pale to deep brown in colour; the emerging imago makes a small clean-cut regular lid at the front end of the cocoon. They may be buried in the earth, attached to branches of trees or shrubs or to the leaves; they are also found amongst vegetable debris on the ground.

A day or so before pupating most of the larvae weep considerable quantities of liquid and look most unhealthy. When they have shrunk to about half their normal size they spin their cocoons. They may remain a considerable time in these cocoons before pupation or may pupate almost at once. The time between spinning the cocoon and the emergence of the imago is in many cases considerably longer than for most families in West Africa.

TERMINOLOGY

In view of the rather unusual features of most of these larvae, and to simplify the larval descriptions, the following terminology is used.

The typical larva is almost square in cross section, with the four longitudinal rows of tubercles bearing urticating setae. There are two rows, one at each side, close to the surface on which the larva rests—these I have called the lateral rows—and a row on each of the corners between the dorsum and the side, which I have called the paradorsal rows. I have used this terminology even when the larva is grossly flattened; in this case there appear to be four nearly parallel rows running from the head on a flat disc-like surface, the two outermost of these are the lateral rows and the inner the paradorsal.

The tubercles which bear the urticating setae I have referred to as cones after Dyar (1890). Even when these are greatly elongated into horns I have used the same term but described the shape.

LIFE HISTORIES

Rhypteira sordida Holland

This larva is unlike any other of the group as there is no sign of any urticating

setae, cones or other protrusions. It is green and somewhat flattened with darker green lines along each side of the dorsum. There are eight orange-coloured spiracles on each side (segments 3 to 10) and two paradorsal rows of faint yellow circles, one circle of each row on each segment. The larva spins up in a leaf of the food plant, which is folded to hide the cocoon completely. The imago emerges after four to five weeks. I have been unable to identify the food plant.

Cosuma rugosa Walker

The ground colour of this larva is green. On segments 3, 4, 5, 11 and 12 are two long yellow to deep orange horn-like paradorsal cones covered with long black sharp urticating setae; the cones on segments 5 and 11 are longest, being about one-and-a-half times as long as the height of the body which is approximately square in cross section; the cones on segments 4 and 12 are two thirds the size of those on segments 5 and 11, whilst those on segment 2 are only about half the size of those on segments 4 and 12. There are similar but much smaller paradorsal cones on the remaining segments. On each segment there is a thin yellow lateral cone with small colourless setae. There are two paradorsal yellow lines and segments 6 to 9 are edged anteriorly and posteriorly with yellow between the paradorsal lines so that the dorsum appears to be divided into squares. There is also a transverse yellow line joining the bases of the paradorsal cones on segments 3, 4, 5, and 12 and a double line on segment 11.

On the side of each segment there is a yellow U-shaped line having its vertical elements close to the anterior and posterior margins of the segment. These are well-marked on segments 6 to 10 but somewhat fainter on other segments. Just before pupation all orange and yellow markings may turn red, the green colour darkening to a deep olive. The larva feeds on *Alchornea cordifolia*.

The cocoon is spun in any suitable place. The imago emerges between four and five weeks later.

Ctenolita anacompa Karsch

The head (segment 1) is brown, segment 2 white, with an appearance of leather; and the other segments are green. In cross section the larva is square. Anterior and posterior margins of segments are raised; the anterior margin is slightly bowed and the posterior margin concave. At the apex of each ridge there is a short paper-thin black protruding strip. Between these ridges the skin is loose giving the whole larva a concertina look. On each segment the intersegmental fold is darker than the area between the ridges. On segments 3, 4, 11 and 12 there are two short black squarish paradorsal cones with a long black seta at each top corner, and between these several small setae. There is a transverse hump at segments 4, 11 and 12.

Each segment except 2 and 12 bears two broad black cylindrical lateral protuberances with bright-pink caps (these are modified cones).

The larvae which feed on *Terminalia catappa* and to a lesser extent on *Gmelina arborea* are gregarious and rest beneath the leaf in closely packed ranks side to side with their heads at the edge of the leaf and the rear pointing towards the central rib, covering sometimes 90 per cent of the leaf surface.

Pupation takes place in the usual type of cocoon which is made preferably in two or three inches of soil. The period between the spinning of the cocoon and the emergence of the imago is unusually long and variable, occupying between 60 and 130 days. Much of this time is spent as larval diapause. Cocoons opened after 40 days have still contained larvae.

Ctenolita pyrosomoides Holland

The larva is bright apple green in general colour and greatly flattened. Segment 1 (the head) and segment 2 are pale grey, with a narrow transverse deep-purple ring round the rear end of the latter. Each of the remaining segments bears two or four short green glassy cones from which arise numerous glass-like urticating setae. Segment 3 has two rather small dorsal cones close together. Segment 4 has four larger cones, two lateral, and two paradorsal further apart than those on segment 3. Segment 5 has two even larger paradorsal cones further apart again than those on segment 4. Segments 6, 7 and 8 each have two lateral cones; segment 7 also has a somewhat degenerate paradorsal cone, coloured bright red with a vivid blue tip. Segments 9, 10, 11 and 12 have two lateral and two paradorsal cones, the lateral ones being rather larger than the dorsal ones. All lateral cones end in a faintly pink opaque tip.

There is a large purple dorsal oval edged in deeper purple, almost black, covering the posterior part of segment 3 and all of segment 4, and a similar one covering segments 9 to 11. On segments 6 to 8 there is a broad purple arrow-head mark, pointing towards the head, with barbs reaching to the spiracles on segment 8, and the point medio-dorsal on segment 6.

As the larva reaches maturity the dorsum gradually yellows. The marks on the back fade through red to pale pink finally becoming yellow in the centre and pink towards the edges. Two days or less before pupating the cones swell, becoming transparent, the larvae shrink considerably, most of the setae drop off and the general colour becomes bright yellow with the dorsal marks a very pale pink, lined in red.

The larva, which feeds on *Combretum latiolatum*, spins its cocoon amongst withered leaves or in debris at the roots of the plant. The imago emerges between 40 and 80 days later.

Baria elsae Druce

The larva is pale apple green in general colour often with a blue tinge. The body is approximately square in cross section. Segment 2 is white.

On each segment there is a lateral cone about twice as long as the body width, with numerous long urticating setae; the tip of each cone is a milky translucent pink. On segments 3, 4, 5 and 11 there are two large, fairly broad, glassy, paradorsal cones with long urticating setae. Each cone on segments 5 and 11 bears on the inside of the base a large milky-pink dot; these dots are sometimes orange. There are two pale-green or yellow paradorsal and a small lateral cone with long urticating setae on segments 6 to 10; each lateral edge of the dorsum is raised into a small ridge. On segments 7 and 8, mainly posteriorly on 7 and anteriorly on 8, is a dorsal oval mark, white or pinky-white in colour with a central blue mark of variable size and shape, which in some cases may be split into two small circular blue marks. The mark is variable and often the portion on segment 8 is missing. Mediodorsally is an evanescent thin paler green line.

The larva feeds on *Alchornia cordifolia*, *Gmelina arborea*, *Terminalia catappa* and *Macrobium macrophyllum*. The pupal stage occupies about forty days.

Paraphanta fimbriata Karsch

A small flattish larva somewhat oval in shape whose general colour is grey or white, sometimes a grey-brown. Segments 4, 5 and 11 have two small paradorsal brown cones, bearing small urticating setae. There is a thin, double, grey dorsal and two similar evanescent paradorsal lines. Segments 4, 5 and 11 are chocolate-

brown or black. The larva is quite small, about 12 mm. long and feeds on *Alchornia cordifolia*. The pupal stage takes about three weeks.

Zinara ploetzi Schs. & Clem.

The larva varies in overall colour from pale chocolate to black. On each segment there are two or four small broad cylindrical truncated cones bearing short urticating setae. On each of segments 3 to 13 there are two paradorsal cones. On each of segments 4 to 12 there is a lateral cone. The dorsal cones on segments 8, 9 and 13 are always yellow ochre in colour. The rest are usually black but sometimes chocolate and occasionally those on segment 12 are yellow. The lateral cones on segments 8 and 9 are nearly always yellow and those on segments 3, 4 and 12 are occasionally so; the remainder are usually black but are occasionally chocolate coloured. Between the dorsal cones is a circular, black, velvet, dorsal patch with two similar but smaller paradorsal ones anterior to it; anterior to these are two very small white dots. Close to the cones there is another white dot. Each segment bears a lateral black streak which extends anteriorly from posterior of the dorsal cone to anterior of the lateral cone except on segments 4, 5 and 12, where they extend vertically down the posterior of the segment. Usually the larvae are nearly black with only a few yellow cones when most other markings are obscured, but occasionally the ground colour is pale chocolate and few other markings are visible.

The larva feeds on *Alchornia cordifolia*, *Clerodendron splendens* and other plants. The pupal stage occupies three to four weeks.

Zinara nervosa Walker

The larva is very flat, adpressed to the food plant. The subspiracular area of the side is so flattened that it forms a marked rim round the dorsal surface. The only cones bearing urticating hairs are flat ones projecting from the lateral edge. From the upper portion of the side the body rises at about 45 degrees to a narrow ridge which forms the dorsum. The ridge broadens at each end of the body. The general colour is green, closely matching the underside of the leaf of the food plant on which it rests. On each side of the ridge there is a yellow line. On each segment on the ridge between the yellow lines is a red dot with a small black line on each side of it, otherwise the space is green. Between the ridge and the edge of the larva on each side is a double row of circles edged in white or very pale green. The centre is the same green as the rest of the larva with faint blue dots except on segment 7 where the centres of the innermost circles are deep purple.

The larva is found on *Alchornia cordifolia* and *Macrolobium macrophyllum*. The pupal stage occupies about three weeks.

Zinara recurvata Hampson

This larva is noticeably flatter than most and oval, the major axis (head to tail) being about twice as long as the minor. Segments 1 and 2 are usually not visible from above. On each of segments 3 to 13 there is a lateral cone which has been flattened into the form of a sharp-pointed broad-based spine edged with pale yellow. From this spine urticating setae arise mostly parallel to the surface on which the larva rests. The general colour is green. The ridge that forms the dorsum has a broken yellow lateral line with a dark blue line inside it, broken in unison with the yellow line. On segment 4 there is a yellow bar between the yellow lines on each side of the dorsum, the blue lines stop short at this. Between the yellow bar and the head the yellow lines diverge. On segment 4 the blue lines are particularly vivid.

On each side of the larva there are two rows of white spots outlined in dark green, one spot of each row on each segment, and a third row close to the side edge, in the form of white smudges.

The larva is found on the underside of the leaves of the food plant, *Alchornia cordifolia*. The pupal stage occupies three weeks.

Thosea aurifrons B.-Baker

The cross section of this larva is approximately square. The larva has a dorsal hump on segments 5 and 11. On segments 4, 5, 11 and 12 there are long narrow dorsal cones bearing numerous black urticating setae; those on segments 5 and 11 are about double the width of the larval body in length and those on 4 and 12 are a little longer than the width of the larval body. Each segment has a short lateral cone bearing small glass-like urticating setae.

The main colour of the larva is pale green and the skin is shiny. There is a broad white lateral band which narrows posteriorly and extends into the outside edge of the long cone on segment 12. There are two purple paradorsal lines adjacent to the lateral white bands. There is also a purple transverse dorsal line between the cones on segments 4, 5 and 11. A transverse white line extends between cones on segment 4 anterior to the purple line and continues up the sides of the cones. There is a similar yellow line on segment 5 and also on segment 11 but on this segment it extends posterior to the purple line. Segments 6 to 10 are separated by yellowish lines dorsally, and the whole dorsum looks rigid. The larva feeds on *Ixora degamensis* and also *Alchornia cordifolia*. The imago emerges approximately three weeks after the cocoon is spun.

Spec. nov. (Imago to be described in a separate paper)

The larva is considerably flattened and fleshy. On each of segments 3 to 13 there is a short, dirty-cream lateral cone from which arise short grey urticating hairs. There is a lateral white band and a white dorsal band which varies considerably in width from segment to segment. The lateral band merges imperceptibly with the dorsal band at both ends. At segment 7 the dorsal band branches on each side to give a transverse band which runs into each of the lateral bands and laterally covers most of segment 6 also. All the white bands are edged with a black line. The form of the white pattern on the larva is that of a white cross in a white oval. There are thus four approximately equal areas totally enclosed by a white band; these are coloured green. A broad transverse ridge rises on either side through segments 3 and 5 to a maximum on segment 4 where there are two peaks on what corresponds to the sides of the dorsum in a normal larva. From these peaks rise two small semicircular grey cones with small nipples. The cones and nipples bear small black urticating hairs. Down each side of the white dorsal band on each segment is a degenerate cone that is practically only a root from which arise black urticating hairs. On each of segments 6 to 11 are two black dorsal dots with a black V below them. The V may be partly or totally absent.

In the final instar there are changes. The inner portions become yellow; these yellow areas vary but become larger as the time for pupation grows near, and most of the white areas become grey except those parts anterior to segment 4.

The food plant is *Cocos nucifera* but larvae have been found on *Barteria nigritiana*. The cocoon is made in the fold of the frond of the food plant usually on a yellowing one. The imago emerges between three and four weeks later.

Stroteroides nigrisignata Strand

The glassy yellow larva is about 12 to 19 mm. long and has two indented narrow green paradorsal lines. On segments 3 to 13 there is a narrow lateral

cone bearing small glassy urticating setae, and similar paradorsal cones. The latter are long on segments 3, 4, 7, 11 and 12, and short on the remaining segments; those paradorsal cones on segments 4, 7, 12 and 13 are a deep red, whilst those on segments 9 and 11 are red tipped. There is a red or red-brown dorsal line from segment 4 to 12, and a broad red transverse band across segment 12 between the cones and a similar yellow-red band on segment 4. There are two large red-brown dorsal squares, the first with its corners medio-dorsally on segments 5 and 8 and the other two corners are on the lower portions of the cones on the dorsum of segment 7. The second square has its corners medio-dorsally on segments 9 (anteriorly) and 10 (posteriorly), the other corners being at each side of the dorsum on the joint between segments 9 and 10.

The food plant is *Alchornia cordifolia* and the pupal stage lasts between two and four weeks.

Hydraphe aprica Karsch

The eggs are laid in batches on the underside of the leaves of species of *Berlinia* and they hatch after four to seven days. Each is shaped roughly like a drum with a deep depression in the head; the upper half is coloured a deep maroon and the lower half is pale olive green. They are stuck to the leaf with a white adhesive. They are finely rugose.

In the early instars the larva is coloured an even maroon to bright scarlet. The cones with urticating hairs are very large compared with the size of the larva and do not appear to increase in size at the same rate as the rest of the larval surface. There is very little other change between the early and the final instars.

The larva has a row of small bright-red paradorsal cones with red, black-tipped urticating setae. In each row there is one cone on each of segments 3 to 13. There are lateral rows of similar cones. All cones are roughly the same size and there is a deep-maroon ring round the base of each. There is a broken ill-defined blood-red zig-zag dorsal line and a similar lateral one. On each segment is a pattern of blood-red lateral lines. Laterally between each segment is a dirty-cream coloured area containing the spiracle. The head is deep scarlet as are the undersides of the prolegs. The skin is very pale pink or white.

The cocoon is spun in withered leaves or on the tree trunk but most often in the vegetable debris beneath the tree and the imagines emerge over a long period sometimes after a week or they may be three months in the pupal stage.

The gregarious larvae feed side by side along the edge of a leaf, anything from six to 30 forming a small colony. They appear to stay on one tree generation after generation until they are finally decimated by disease or because the host plant can no longer provide sufficient food for the thousands of larvae present.

Hyphormia subterminalis Hampson

This is a pale-green larva, approximately square in cross section, with a lateral and two paradorsal rows of glassy cones bearing urticating hairs on segments 3 to 13, there being one cone of each row on each segment. The lateral rows have cones of about equal size, measuring about half a body's width in length. On segment 12, there are only two cones, which could equally well belong to either the lateral or dorsal rows. The cones of the dorsal rows vary greatly in size; those on segments 6 to 10 are much smaller than the lateral ones, those on segment 3 are equal in size to the lateral ones, those on the remaining segments being larger; the dorsal cones on segments 4 and 12 are about three-quarters of the body's width in size, but the ones on segments 5 and 11 are about twice the width of the body.

From segment 3 to 12 there is a black dorsal band with a thin red or orange-red line down the middle. On each of segments 5 and 9, from the black dorsal band, a red line edged with black extends across and over the edge of the dorsum, then extends anteriorly and slightly downward along the side to the anterior margin of the segment.

In the early instars the black dorsal band is often absent but the thin red line is always present.

The larva rests quite openly on the food plant *Alchornia cordifolia* often on the top surface of the leaf. The pupal stage occupies between three and four weeks.

Parasa karschi Dyar

A grey larva with a lateral and two paradorsal rows of long narrow black cones bearing long black urticating setae. There is one cone of each row on each of segments 3 to 12 and on segment 13 two cones which may belong to either row. On each segment, a thin raised black line runs transversely joining the anterior edges of the cones. At the posterior of each of the dorsal cones on segments 12 and 13 is a wart covered with very short deep-red hair. The food plant is *Musanga cecropioides (smithii)* and less often *Lagerstroema flos-regina*. The pupal stage occupies about three weeks.

I found great difficulty in rearing this species and succeeded on one occasion only and then the adult was crippled. I now suspect that it requires soil for pupation unlike most others of the family.

The larvae have a tendency to be gregarious; there are often three or four together on a single leaf.

Parasa vivida Walker

The basic colour is pale yellow; there may be a cream lateral line and/or a dorsal one but these are usually absent. The cones are usually pale yellow, appearing white in strong sunlight. On segments 3 to 13 there are four rows of cones with urticating setae, lateral and paradorsal, one cone of each row to each segment. The lateral cones on segments 3 and 4 and paradorsal ones on segments 3, 4, 5, 11 and 12 are somewhat larger than the rest and are mainly black. The paradorsal cones on segments 8 and 9 are black at the very tips. There is an ill-defined dark dorsal line made up of a number of small circles in black most clearly marked on segments 5 to 11. The larva will spin its cocoon almost anywhere and the imago emerges after about three weeks. The food plant is *Spondeas monbin*.

Parasa ananii Karsch

The bright scarlet larva is approximately square in cross section. On segments 3 to 13 there are four rows of small stumpy cones, almost hemispherical in shape, two lateral and two paradorsal. The cones which bear white yellow-tipped urticating setae are all the same size; the setae overlap with those of the next cone.

There is a lateral line of purple spots, one to each segment, and a deep-purple dorsal line composed of dots joined together. On segments 3 and 4 on the full grown larva there is a transverse scarlet plate-like band joining the base of the dorsal cones. On each side of segment 12 there is a large spherical velvet-black protuberance completely filling the space between the lateral and dorsal cones. In the early stages the larva is a pale yellow-ochre, with a dorsal row of purple spots.

The pupal stage occupies three weeks. The food plant is *Tristemma hirsutum*.

Parasa viridissima Holland

This larva is entirely green, and the distribution and shape of the cones bearing urticating setae are identical with that of the previous species, but the urticating setae themselves are longer and not only interlace with those from neighbouring cones in the same row but also just interlace with those in adjacent rows. The lateral protuberances on segment 12 between the cones are black or very dark red. There is a form in which the setae are somewhat shorter and the spiracles are bright scarlet.

The species, which spends some five weeks in the pupal stage, feeds on *Cocos nucifera*.

Latoia albipuncta Holland

The larva is small, not more than 12 mm. in length and is a bright yellow. It is square in cross section and the cones are degenerate and in most cases appear to be only just visible. There are modified cones on segments 3, 4 and 12. These are long, thin and stiff, without any obvious setae. They are yellow except at the apex where they are black and are more mobile than in other species. At the junctions between the segments there is a dark reddish-chocolate line across the dorsum.

At the ventral margin of each side there is a whitish-brown band with a pale chocolate band above it, then above this a broad chocolate band in which there are squares of yellow on segments 7 and 9 and sometimes on other segments. The bands extend along the whole length of the side. There are two posteriorly inclined cones on segment 13.

The larva feeds on *Alchornia cordifolia* and spins the typical cocoon amongst the plant debris and loose earth near the roots of the plant. The imago emerges between two and four weeks after entering the cocoon. The larvae are gregarious, living in closely packed masses of about 30 individuals. The cocoons are also made close together.

Latoia canescens Walker

The larva is similar to that of *Parasa viridissima* but is bright Cambridge blue and the setae arising from the paradorsal cones appear to be orange-yellow in the middle. Unlike the very similar larva of *Parasa viridissima*, forms with red spiracles have not been noted. The larva, which feeds on *Macrolobium macrophyllum* and *Alchornia cordifolia*, passes about four weeks in the cocoon.

Trychiptena nigromaculata Hering

This is a dark green very flatly depressed larva similar to those of the *Zinara* species. The ridge along the dorsum is outlined in yellow with a row of yellow dots (one to each segment) along each side of the ridge, and on each of segments 5 to 8 a slightly bigger medio-dorsal yellow dot. There are three lateral rows of yellow dots, those nearest the dorsum being more clearly marked. There is one dot of each row on each segment. The larva, which feeds on species of *Cassia*, spends two-and-a-half to three weeks in the pupal stage.

Omocena syrtis Schs. & Clem.

A small and compact yellow or orange larva with a square cross section from which the four rows of cones, two lateral and two paradorsal, protrude from the corners. There is a purple or purple-brown dorsal band which varies in width and outline but usually covers the whole dorsal area. There is also a similar purple spiracular band, which is broken at the intersegmental folds.

There are two rows of almost spherical, subspiracular cones bearing very short urticating setae and two similar rows paradorsally on segments 2 to 13. On

segments 6 to 13 the lateral and, except for segment 11, the paradorsal cones as well are bright yellow; the remaining cones are brown or purple and make segments 2 to 5 appear entirely purple. The paradorsal cones on segment 5 are noticeably larger than the rest.

The larva has been found on many food plants, *Alchornia cordifolia*, *Lagerstroemia flos-regina*, *Aspilia latifolia*, and a number of low growing plants. The pupal stage takes between three and four weeks.

Prolatoia perileuce Holland

The larva, square in cross section, is black. Every segment is thinly outlined in white and the paradorsal supra- and subspiracular lines are white, so that there are three white squares on each segment, one dorsally and one on each side. There are long narrow cylindrical pointed lateral cones on each segment forming a longitudinal row along the side from segment 3 to 13; these cones are black in the basal fourth; there is then a white ring and the rest is a dirty chocolate colour.

There is a raised edge to each side of the dorsum, and a row of black paradorsal cones, one to each segment, on the raised ridge; those cones on segments 6 to 10 are small, less than half the width of the back in size. Those on segments 3, 4, 5, 11 and 12 are much longer; those on segment 3 are just longer than the breadth of the body and the rest at least twice that length.

All setae arising from the cones are black with white tips and are urticating. A transverse raised yellow dorsal band joins the bases of the very long cones on segments 3, 4, 5, 11 and 12.

The larva, which spins its cocoon almost anywhere not in direct sunshine, rests on the upper surface of the food plant, *Alchornia cordifolia*. It has also been found on species of *Nepeta*. The imago emerges from the cocoon after six to seven weeks.

Prolatoia sjostedti Auriv. (*Prolatoia perileuce* Holland)

The larva of this species is identical with that of *Prolatoia perileuce* Holland. The food plants and habits are the same. Whilst I have not bred the species from the female, larvae found in close proximity to each other (and therefore probably the progeny of a single female) have given imagines of both *P. sjostedti* and *P. perileuce*. As only males of *P. perileuce* and females of *P. sjostedti* have been recorded it appears that they are the same species. Detailed examination of the imagines supports this. Since Aurivalius' description is later than that of Holland *P. sjostedti* is pre-empted.

Narosana agbaja B.-Baker

A flat green larva, half as broad as long. The dorsum is in the form of a flattened ridge with a yellow-green line; there are pinkish-red dorsal dots on each segment. On segment 11 the ridge is yellow with a thin medial green line and in the centre a red circle with a pair of black dots posteriorly. The dorsal ridges of segments 7 to 9 are dark green whilst on the rest the ridge is pale green. Posteriorly the ridge is extended in the form of two small horns which are yellow on the outside edge and red dorsally and on the inner side. There are the usual flattened cones on the outside edge, one on each segment. Round the outside edge of the larva is a narrow dark green band edged anteriorly with a pale dirty-pink line on segments 3 to 5.

The food plant is *Spondeas monbin* and the time spent in the pupa is about sixteen days.

Casphalia extranea Walker

A pale green larva round in cross section without markings. There is a lateral and two paradorsal rows of cones very thickly covered with long yellow black-tipped urticating hairs; there is one cone of each row on each segment except on segment 13 where there are only two cones which could belong to either the lateral or paradorsal rows. Both the lateral and paradorsal cones of segments 3, 4 and 5, and the dorsal ones of segments 11, 12 and 13 are about twice the size of the others; the lateral ones on segment 5 are markedly larger than any of the others. The lateral cones of segments 6 to 12 are black on the apical two thirds.

The larva, which feeds on *Spondeas morbin*, buries itself in the earth to pupate and the imago does not appear for about 75 days.

Cochlidion (Limacodes) cretacea Holland

This larva is similar to a very small specimen of *Zinara recurvata* but the dorsal ridge is red between the yellow paradorsal lines posterior to the yellow transverse dorsal bar on segment 4. The dorsal ridge ends posteriorly in two small cones and appears to extend beyond segment 13. It feeds on *Alchornia cordifolia* and *Conava* and is in the pupa about three weeks.

DISCUSSION

The larvae of this group should eventually prove a considerable aid in taxonomy. From the larval character it seems that *Prolatoia*, *Cosima*, *Thosea*, are very closely related; *Zinara ploetzi* does not seem to belong to this group of genera and seems somewhat closer to *Omocena*. The larvae of *Parasa* and *Latoia* seem to be identical although *Latoia albipuncta* appears to belong to a different group and is superficially much more nearly related to *Ctenolita anacompa* which itself seems to belong to quite a different group from *Ctenolita pyroso-moides*.

The *Zinara* species, except for *ploetzi*, seem to be closely related to *Trychiptena*, *Cochlidion*, and *Narosana*.

The classification of Lepidoptera has been built up entirely on imaginal characteristics; there seem to be indications in some instances that the larval characters will modify present groupings. There seem to be grounds for revising classification of this group and re-examining the differences now used in separating the genera in the family.

Obviously we need much more information and we still know only a fraction, about 10 per cent, of the larvae of the West African species of this group. I have once again included a key in the hope of encouraging further exploratory work in the group, and should be very pleased to receive notes, colour photographs and descriptions of any larvae of this group.

In conclusion I wish to thank the staff of the British Museum (Nat. Hist.) and particularly Mr. D. S. Fletcher for help in the preparation of this manuscript.

KEY TO THE KNOWN LARVAE OF
WEST AFRICAN LIMACODIDAE

- | | | | |
|---|---|--|----|
| 1 | a | Paradorsal cones on segments 5 and 12 equal in size to the width of the dorsum between the cones | 20 |
| | b | Paradorsal cones on segments 5 and 12 much shorter or absent | 2 |

2	(1)	a	Larva grey	<i>Parasa karschi</i>	
		b	Larva not grey		3
3	(2)	a	Larva flattened so that it appears to have only one visible surface. Rather short compared to breadth		13
		b	Larva not flattened		4
4		a	Larva without cones on sides of dorsum except on segments 3, 4 and 12		12
		b	Larva with cones on sides of dorsum on all segments		5
		c	Larva without any lateral or dorsal cones. Colour green	<i>Rhypteira sordida</i>	
5		a	Larva with all cones very nearly equal		7
		b	Larva with at least one pair of cones obviously larger than the rest. Body of larva all one colour		6
6		a	Cones on segments 3, 4, 5, 11 and 12 longer than rest and mainly black. Larva yellow	<i>Parasa vivida</i>	
		b	Larva green with cones on segments 3, 4, 5, 11 and 12 larger than rest covered thickly with yellow, black tipped, urticating setae. Much larger than 6a	<i>Casphalia extranea</i>	
7	(5)	a	Larva with a large approximately hemispherical velvet black wart on each side of segment 12		8
		b	Larva without such wart		10
8	(7)	a	Larva all of one colour except for the black wart		9
		b	Larva bright scarlet with a dorsal line of purple dots	<i>Parasa ananii</i>	
9	(8)	a	Larva blue or blue green. Urticating setae, partly coloured yellow or orange	<i>Latoia caesescens</i>	
		b	Larva green, with no hint of blue, urticating setae entirely green (spiracles may be red but are not always so)	<i>Parasa viridissima</i>	
10	(7)	a	Larva essentially of one colour. Skin pink or white with cones and setae bright scarlet variegated markings maroon-scarlet	<i>Hydraphe aprica</i>	
		b	Larva showing at least two contrasting colours on body		11
11	(10)	a	Larva black or chocolate brown with at least dorsal cones on segments 8, 9, and 13 yellow	<i>Zinara ploetzi</i>	
		b	Larva yellow with purple line down back and sides. Segments 3, 4 and 5 are purple to purple brown. (The cones on segments 4 and 5 vary slightly larger than rest but this is not really noticeable)	<i>Omocena syrtis</i>	
12	(4)	a	Larva yellow and chocolate red	<i>Latoia albipuncta</i>	
		b	Larva mainly green	<i>Ctenolita anacampa</i>	
13	(3)	a	Larva not more than twice as long as broad		16
		b	Larva at least three times as long as broad		14
14	(13)	a	Main marks on larva a large white or grey cross inside a white or grey oval	<i>Spec. Nov.</i>	
		b	Larva not so marked		15
15	(14)	a	Larva green with a red or purple oval anteriorly and another posteriorly and a very large red or purple mark in the form of an anteriorly pointing arrow head covering large dorsal and lateral areas of segments 6 to 8	<i>Ctenolita pyrosomoides</i>	

SIPHONAPTERA FROM INARI, FINLAND

By W. SINCLAIR

In July 1963, the Biological Society of the University College of Wales, Aberystwyth, visited Inari, in northern Finland. As part of their studies, a small collection of fleas was made, the specimens being removed from small mammals caught alive in Longworth traps.

Inari lies 69°10'N, 28°10'E. The habitat examined was meadow, filling an abandoned bed of the Joenjoki (joki=river). The Joenjoki has been artificially straightened and brought under control, so that the old bed is not subject to spring flooding.

The mammals examined, and the distribution of the infestation between the host sexes, are shown below:

	Female		Male	
	infested	noninfested	infested	noninfested
<i>Microtus agrestis</i> (L.)				
Field Vole	11	2	1	2
<i>Clethrionomys glareolus</i> (Schreber)				
Bank Vole	0	1	3	3
<i>Sorex minutus</i> L.				
Pygmy Shrew	0	1	1	0

The fleas obtained, with host species and sex, and parasite sex, are as follows:

Host:	<i>M. agrestis</i>				<i>C. glareolus</i>			<i>S. minutus</i>
Host sex:	♂		♀		♂		♀	♂
Flea sex:	♂	♀	♂	♀	♂	♀	♂	♀
<i>Corrodopsylla birulai</i> (Ioff)	—	—	1	—	—	—	—	1
<i>Ctenophthalmus uncinatus</i> (Wagner)	—	—	1	2	—	—	—	—
<i>Hystrichopsylla talpae orientalis</i> Smit	—	1	1	—	—	—	—	—
<i>Megabothris rectangulatus</i> (Wahlg.)	1	2	2	10	1	2	—	—
<i>Malareus penicilliger pedias</i> (Rothschild)	—	—	1	3	1	—	—	—
<i>Peromyscopsylla silvatica silvatica</i> (Wagner)	—	—	2	1	—	—	—	—

When the records described here are compared with those from a similar collection made near Tromsø, Norway (Sinclair, W. and Ewing, A. W., 1963, *Astarte*, No. 23, Tromsø Museum), the general patterns of the results are, as might be expected, basically similar. In both, *Megabothris rectangulatus* (Wahlg.) appears most commonly. The Finnish group differs in recording *Corrodopsylla*

birulai (Ioff), and not containing *Amphipsylla sibirica sibirica* (Wagner).

In collections of this nature, made by students relatively inexperienced in field collecting, the real value lies in the mere recording of the existence of particular species in certain localities, thus gradually increasing our knowledge of the distribution of fleas. I wish to thank Mr. D. Smallwood for collecting Finnish fleas for me. Mr. F. G. A. M. Smit again generously confirmed my identifications, and extended them where necessary, for which I thank him sincerely.

Department of Zoology,
University College of Wales,
Aberystwyth, Cardiganshire
17th November 1966

Diurnal flight in the larger Dytiscidae (Col.) and the attraction of car roofs to Coleoptera in flight.—Muggleton's note (antea p. 84), I read with some interest. I am not sure I can agree with the supposition that because *Dytiscus* and *Acilius* are active in water during the daytime it is not unreasonable that they may take to the wing during the day. There is the difference between the temperature of the water in which the insects occur and that of the atmosphere to be taken into consideration, and this is likely to have an effect when these beetles take flight. My records show that the larger dytiscids fly at dusk and during the late evening and will frequently drop onto any surface at that time which shows a reflection similar to still water, such as the roof of a greenhouse. A car roof may very well show such a reflection even in the daytime on those rare occasions when these species are on the wing.

Most coleopterists have at some time collected Coleoptera from a car roof on hot sunny days in spring and early summer. The range of species which are taken in this way clearly shows that a possible resemblance to still water cannot be the cause of attraction to all of them. As Muggleton suggests, species like *Rhagium* are unlikely to settle on what appears to be water; neither are *Hylesinus*, *Oxytelus*, *Philonthus* or *Lathridius*. One factor which comes to mind is the higher temperature in the vicinity of the car roof under these conditions, though I doubt if this is the initial attraction; nor is it likely to be the cause of attraction in all species. Some of the species which settle on car roofs at these times are pond margin species such as *Cercyon* and *Heterocerus*. If the attraction was a reflection like water one would expect these species to drop at the edges of the car roof; and while it is true some are found in the rain gutters far too many land right in the middle.—F. D. BUCK, "Seirotana", New Road, Tiptree, Colchester, Essex, 31st July 1966.

A record of diurnal flight in Dytiscus.—A large *Dytiscus* beetle landed in the margin of a lake at the Society's field meeting at Cosford Mill, Thursley, Surrey, on 7 viii 1966. The weather was dull and humid, but warm, after 12 hours' rain; the time about noon.—R. W. J. UFFEN, 4 Vaughan Avenue, London, W.6. 31st August 1966.

Thomisus onustus Walck. (Arachnida) recorded in error from Thursley Common Surrey. In the report of the field meeting held at Thursley, 28.v.66 (*Proc. S. Lond. ent. Nat. Hist. Soc.*, 1966:116) the spider *Thomisus onustus* Walck. is reported. This arachnid was determined by a friend, who has since informed me that it is in fact a particularly large and brilliant example of *Misumena vatia* (Clerck), a local species, but not so uncommon a *T. onustus* Walck.—P. A. GODDARD, 69, Weighton Road, Harrow Weald, Middx., 9th December 1966.

LYMANTRIIDAE—EAST VERSUS WEST AFRICA

By D. G. SEVASTOPULO, F.R.E.S.

Dr. MacNulty's notes (*Proc. S. Lond. ent. nat. Hist. Soc.* 1966: 69–84) reveal several differences between East and West African lymantriid larvae and the following comparisons may be of interest.*

Leucoma parva Plotz

I have not bred this species. Recorded food-plants for East Africa are *Aspilia latifolia* and *Wedelia menotriche* (both Compositae).

Hemerophanes enos Druce

Feeds in East Africa on *Quisqualis indica* (Combretaceae). Before spinning, drops of liquid appear on the dorsal ridge.

Olapa tavetenis Holland

I have not seen the larva, but Seitz describes it as 'unicolored black with dense greyish white hair'. The pupa is creamy yellow with black spiracles and black markings on the head and eyes, and is clothed with long yellowish hair. Seitz describes the colour as light brown, possibly from a preserved pupa.

Euproctis fasciata Walker

My description of the larva is as follows: Head blackish brown. Body dark brown, minutely speckled with black. A white sublateral line, below which the ground colour is paler. A white subdorsal spot on 4th somite. First somite with subdorsal tufts of dark hair arising from small tubercles; 4th and 5th somites with double dorsal brushes of dark brown hair; 11th with a single dorsal tuft. Second and 3rd somites with slight fan-shaped tufts of grey hair across the dorsum; 6th to 10th with subdorsal patches of short white setae. A sublateral series of slight tufts of pale grey hair. Dorsal glands red. Legs and prolegs red. Venter brown streaked and spotted with yellow.

A vast list of food-plants are recorded: *Araucaria* (Araucariaceae), *Rhus vulgaris* (Anacardiaceae), *Anona* (Anonaceae), *Ricinus* (Euphorbiaceae), *Lagerstroemia* (Lythraceae), *Gossypium* (Malvaceae), *Acacia*, *Entada* (Mimosaceae), *Oxygonum sinuatum* (Polygonaceae), *Ziziphus* (Rhamnaceae), *Solanum* (Solanaceae). The female larva has one instar more than the male.

Euproctis molundiana Auriv

My description of the adult larva is: Head dark brown. Body dark chocolate brown. First somite with a subdorsal tubercle tufted sparsely with pale hair; 2nd and 3rd somites each with a transverse series of four small orange-brown verrucae; 4th and 5th with double dorsal humps tufted with brown setae; 6th to 10th with large round subdorsal spots covered with minute black urticating spicules; 11th somite slightly humped with two dorsal tufts of brown setae. Second and 3rd somites with orange-brown lateral verrucae; 4th to 10th with round lateral spots covered with minute black urticating spicules; 11th somite with a lateral tuft of brown setae; 12th somite with a transverse series of four orange-brown verrucae. A sublateral series of orange verrucae. Dorsal glands brown. All verrucae and spots emitting longish pale hairs, the dorsal series with a few flattened ribbon-like hairs also. Legs orange, prolegs brown. Venter brown with a median stripe composed of orange transverse streaks.

* The botanical nomenclature is taken mainly from Le Pelley (*Agricultural Insects of East Africa*).

Female larvae have an extra instar. Another long list of food-plants: *Basella alba* (Basellaceae), *Markhamia platycalyx* (Bignoniaceae), *Canarium schweinfurthii* (Burseraeae), *Combretum* (Combretaceae), *Bridelia micrantha*, *Sapium ellipticum*, *Securinea virosa* (Euphorbiaceae), *Eucalyptus*, *Psidium guajava* (Myrtaceae), *Rosa* (Rosaceae).

Laelia subrosea Walker

I have never been able to induce newly hatched larvae to start feeding on any sort of grass.

Laelia fracta Schaus. & Clem.

Recorded East African food-plants are *Panicum* (Gramineae) and *Mariscus* (Cyperaceae).

Dasychira glovera Swinhoe

I have not bred this species, but recorded East African food-plants are *Allophylus subcoriaceus* (Sapindaceae) and *Crassocephalum vitellinum* (Compositae).

Dasychira rocana Swinhoe

I have not bred this species, but the recorded East African food-plant is *Brachystegia* (Caesalpinaceae).

Orgyia mixta Snellen

A very general feeder, recorded food-plants being: *Schinus molle* (Anacardiaceae), *Cupressus pygmaea* (Cupressaceae), *Ricinus* (Euphorbiaceae), *Geranium* (Geraniaceae), *Lagerstroemia* (Lythraceae), *Acacia* (Mimosaceae), *Syzygium* (Myrtaceae), *Pinus radiata* (Pinaceae), *Ziziphus jujuba* (Rhamnaceae), *Ulmus pumilis* (Ulmaceae).

My description of the final instar is: Head orange-red, body grey-green. First somite with a scarlet dorsal plate, and a scarlet subdorsal tubercle emitting a tuft of plumose grey hair; 2nd and 3rd somites with double subdorsal scarlet verrucae and a yellowish lateral one, all emitting short tufts of whitish hair; 4th to 7th somites each with a short dorsal brush of yellow hair, the brushes set in black patches, and a subdorsal scarlet verruca emitting short whitish hair; 4th somite with a lateral pencil of white hair; 5th with one of plumose black hair; all pointing outwards; 8th to 10th somites with a purplish dorsal stripe, a double dorsal scarlet verruca, a scarlet subdorsal and a yellowish lateral, all emitting short whitish hairs; 11th somite with a dorsal brush of brownish hair; 12th with a transverse fringe of long whitish hair. Legs, prolegs and venter greenish-yellow. Dorsal glands red.

Orgyia basalis Walker

Another very catholic feeder, recorded food-plants being *Allium cepa* (Amaryllidaceae), *Ricinus*, *Manihot esculentum* (Euphorbiaceae), *Dovyalis macrocalyx*, (Flacourtiaceae), *Geranium* (Geraniaceae), *Tritonia crocosmaeflora* (Iridaceae), *Gossypium* (Malvaceae), *Albizzia* (Mimosaceae), *Maesa lanceolata* (Myrsinaceae), *Eucalyptus* (Myrtaceae), *Cajanus cajan* (Papilionaceae), *Pinus radiata* (Pinaceae), *Rosa* (Rosaceae).

Uganda larvae are green, my description being: Head pale green, often with a semicircular black patch on either side of the vertex. Early in the instar the body is pale orange, slowly changing to the green of the adult larva. A more olive dorsal stripe edged with yellowish from 8th to 11th somite. Subdorsal pencils of longish grey spatulate hairs on 1st somite; 4th to 7th somites with dorsal brushes of white hair, each brush with a black lateral line; 11th somite with a dorsal

pencil composed of long grey hairs posteriorly and shorter buff ones anteriorly. Lateral tufts of white hair, longest on the 4th, 5th and 10th somites. A sublateral series of small tufts of pale hair from small orange warts. Dorsal glands orange. Prolegs, legs and venter yellowish-green.

The earlier instars are black with black dorsal brushes. The female, as usual, has an extra larval instar.

Mylantria xanthospila Plotz

My description of the adult larva is: Head blackish brown, the clypeus and posterior edge red-brown. Body dark brown, with a sublateral, black-speckled, white stripe from 3rd somite backwards. Clothed with long brown hair arising from a subdorsal, lateral and sublateral series of brown warts, and with a dorsal series of short, sparse, upright brushes of brown hair from 3rd to 8th somites. Legs olive-brown. Venter and prolegs olive-brown, prolegs with lilac feet. Dorsal glands black and shining.

I have always bred it on grasses, but it has been recorded feeding on *Pinus patula* (Pinaceae). The eggs are laid loose, typical of a grass-feeding species.

Argyrostigma niobe Weymer

Again a considerable difference between East and West African larvae. My description being: Head pinkish, so densely speckled with black as to appear brownish to the naked eye. Body dark coffee brown, 1st somite with a pink dorsal plate speckled with black. A subdorsal and lateral line composed of cream specks. A subdorsal, lateral and sublateral series of blue verrucae, the 2nd and 3rd somites with a transverse dorsal series of four in addition; the subdorsal series emitting a few brown hairs, the lateral and sublateral tufts of pinkish brown hair, except on the 8th somite where they are whitish. First somite with subdorsal pencils of long dark hair arising from a black tubercle; 4th to 7th somites with pointed dorsal brushes of brown hair, decreasing in size from front to rear, at rest the first three are pressed together, the fourth separate; 11th somite with a dorsal pencil of long dark hair. Dorsal glands yellow brown. Venter grey. Legs black. Prolegs grey edged with reddish.

Recorded food-plants are *Terminalia superba* (Combretaceae), *Alchornea cordata* (Euphorbiaceae), *Lagerstroemia* (Lythraceae), *Ficus* (Moraceae), *Eucalyptus torrelliana* (Myrtaceae), *Acacia mollissima* (Mimosaceae), *Erythrina abyssinica*, *Cytisus palmensis* (Papilionaceae), *Trema guineensis* (Ulmaceae).

I would suggest that the presence of eversible dorsal glands on the 9th and 10th somites is an infallible characteristic for Lymantriid larvae. The larvae of the syntomid genus *Euchromia* are very like lymantriids in the arrangement of their hair tufts, as are some Lasiocampids.

Mombasa

18th December 1966

MYXOMYCETES AS FOOD FOR OTHER ORGANISMS

By BRUCE ING

Very little has been written on the subject of myxomycete ecology and still less on the relationship with other organisms. The aim of the present paper is to bring together the known observations on organisms using myxomycetes as food, in the hope that more attention will be given to the slime fungi as a well defined habitat for invertebrates and fungi. The following account is by no means exhaustive. An asterisk before the name of a species indicates a strong preference for myxomycetes, but does not imply the exclusion of other food sources. Unless otherwise stated the observations are my own.

Invertebrates

Most of the following are generally saprozoic and myxomycetes are eaten without selection or discrimination. A few species appear to be restricted to slime moulds, however.

NEMATODA

On several occasions nematode worms have been seen in damp colonies of *Trichia varia* (Pers.) Pers. and in other species on wet rotten wood, such as *Comatricha typhoides* (Bull.) Rost. No attempt has been made to isolate and identify the worms.

ISOPODA

Woodlice will eat fruiting structures and plasmodia of slime fungi and may be a nuisance in dishes of litter or dead wood being used to culture myxomycetes. *Trichoniscus pusillus* (Brandt) and *Oniscus asellus* (L.) have been observed feeding on *Trichia varia* and *Arcyria denudata* (L.) Wettst. An interesting sequence of events was noted in 1963 when Mr. F. H. Brightman set up a colony of *Androniscus dentiger* Verh. in a jar containing sterile compost and surface sterilised dahlia tuber slices. After a few weeks extensive plasmodium appeared and ultimately fruited as perfect sporangia of *Didymium iridis* (Ditm.) Fr. The woodlice ate both plasmodium and mature sporangia. The inference is that the spores of the myxomycete were introduced in or on the woodlice. The latter were obtained from beech litter at Darwin's Bank, Downe, Kent, where the slime fungus is common. This prompted me to investigate more closely and I dissected several specimens of *Androniscus* and *Trichoniscus* from the site. In the digestive glands were spores of myxomycetes, apparently unbroken or otherwise affected by digestion. It is possible that woodlice thus act as distributing agents of myxomycete spores, as may many of the organisms mentioned below.

DIPLOPODA

The common millipede *Cylindroiulus punctatus* (Leach) has been observed feeding on sporangia of *Trichia varia*, a slime fungus which is abundant on wet rotten wood.

COLLEMBOLA

No attempt has been made to name the springtails which are frequently a nuisance in moist chamber cultures of bark. Nymphal and adult stages feed avidly on the small myxomycetes which occur on bark and it is possible that the bark-inhabiting collembolans habitually use slime moulds as a food source. On rotten wood springtails have been observed eating *Comatricha typhoides* and *Cribraria piriformis* Schrad.

COLEOPTERA

In nearly all accounts of British Coleoptera, from Fowler onwards, mention is made of 'powdery snuff fungi on trees and stumps'. These are myxomycetes and several of the larger species are rich sources of interesting beetles. The sub-families Anisotominae and Agathidiinae of the Anisotomidae are characteristic of this habitat as are the British members of the Sphindidae.

ANISOTOMIDAE

- **Anisotoma humeralis* (F.) This beetle is very common in Britain and seems to be confined to large myxomycete colonies on logs. I have found it in the following species on many occasions: *Fuligo septica* (L.) Web., *Reticularia lycoperdon* Bull., *Stemonitis fusca* Roth, *Symphytocarpus flaccidus* (Lister) Nann.-Brem. and *Tubifera ferruginosa* (Batsch) Gmel. Set specimens in cabinets often retain the spore dust of the fruit bodies from which they emerged.
- **A. castanea* (Hb.) Far less common than the preceding and so far found only in *Reticularia lycoperdon*.
- **A. orbicularis* (Hb.) Mentioned by Crowson (1962) as occurring in myxomycetes but no other details were given. I have found it once or twice in *Fuligo septica*.
- **Agathidium rotundatum* Gyll. Several members of the genus are reported from myxomycetes. I have found this species once in *Lycogala epidendrum* (L.) Fr.
- **A. sphaerulum* Reitt. Reported from various localities but the myxomycetes do not appear to have been identified.
- **A. rhinoceros* Sharp. I have taken this species only at the Black Wood of Rannoch, Perthshire, in *Symphytocarpus flaccidus*. It may occur at Rothiemurchus, Inverness, in the same species or in an *Amaurochaete*. Its own distribution is not limited by the distribution of these myxomycetes.

STAPHYLINIDAE

Cypha longicornis (Pk.). This very common species of litter and decaying plant material is an accidental myxomycete feeder. I have taken it once on *Comatricha nigra* (Pers.) Schroet.

HYDROPHILIDAE

Megasternum obscurum (Mm.). Another beetle of decaying vegetable material and found on several occasions straying into, and feeding on, the aethalia of *Fuligo septica*.

LATHRIDIIDAE

- **Enicmus testaceus* (S.). An uncommon species which I have found in *Fuligo septica* and *Reticularia lycoperdon*. Crowson (1962) also records it in *Reticularia*.
- Cartodere filum* Aubé. Daltry (1948) records this beetle tunnelling in herbarium specimens of *Fuligo septica*. This is one of the beetles which trouble owners of herbaria and it is not confined to myxomycetes.

SPHINDIDAE

- **Sphindus dubius* Gyll. is noted (Pope, 1953) as feeding on myxomycete fruit bodies but no specific information is available.
- **Aspidiphorus orbiculatus* Gyll. was seen by Brown (1943) to feed on *Comatricha nigra* in Norfolk. It is known to eat other species but no details have been published.

CIIDAE

Cis boleti (F.). A common fungus feeder which I have taken in *Reticularia lycoperdon* on dead standing trunks also attacked by bracket fungi.

ENDOMYCHIDAE

Symbiotes latus Redt. Found in various groups of fungi, including myxomycetes.

Sphaerosoma piliferum (Mu.). A generally mycetophagous species which I have also found in *Fuligo septica*.

DIPTERA

Until the work of Buxton (1954) the myxomycetes had not been considered as food material for larval stages of flies, although one species of fungus midge had been reported from a myxomycete nearly twenty years earlier (Lister, 1937).

Many of the flies reared by Buxton are generally saprozoic feeders and are probably associated with rotting plasmodia or decaying fruit bodies as if these were any other decaying plant material. Others appear to be closely restricted to myxomycetes as a breeding habitat.

MYCETOPHILIDAE

**Mycetophila vittipes* Zett. was convincingly associated by Buxton with the myxomycetes *Arcyria incarnata* (Pers.) Pers. and *A. denudata* (L.) Wettst.

**Platurocypta testata* (Edw.) is a common species in the larger aethalial myxomycetes. The tough puparia of the midge provide extra support and slow down the weathering of the aethalia. The species was first noticed in association with *Reticularia lycoperdon* in 1931 and by Miss G. Lister (1937). Subsequently I have found the cases and the fly in various parts of the country from *Reticularia*, *Tubifera*, *Fuligo* and *Brefeldia maxima* (Fr.) Rost.

**P. punctum* Stannius. Recorded by Buxton from *Lycogala epidendrum*.

SCIARIDAE

Bradysia spp. Buxton records one or more undetermined species of this genus as breeding in the plasmodia of *Fuligo septica* and the fructifications of *Lycogala epidendrum* and *Arcyria incarnata*. There is no evidence that the flies are specifically associated with myxomycetes. *Scaptosciara vivida* Winnertz is mentioned as occurring in a culture of *Fuligo*. The fungus was not visible but as the early stages of plasmodial growth are difficult to detect the relationship with the fly is still obscure.

SCATOPSIDAE

Scatopse fuscipes Mg. Buxton reports the species as developing in a culture of young *Fuligo* plasmodium. The evidence of association is inconclusive.

CECIDIOMYIDAE

Brittenia fraxinicola Edw. was bred by Buxton from sporangia of *Arcyria incarnata*. Another, unidentified, cecidiomyid also appears to be associated with this mould. A species of *Bremia* emerged from *Lycogala epidendrum*, but this may be a chance occurrence.

EMPIDIDAE

Drapetis nigrivetella Zett. Buxton's record of this species emerging from a culture containing young *Fuligo* plasmodium, may be due to chance. The larva may have been feeding on other larvae in the culture. That empids do behave in this way is well known and I have bred *Tachydromia agilis* Meig. in quantity from aethalia of *Symphytocarpus flaccidus*, specimens coming from Stanmore Common, Middlesex. The larvae were abundant in the myxomycetes and were preying on other dipterous larvae. Being more interested in the fungus than the fly I regret that I did not pay more attention to the prey larvae.

The following flies were all reared by Buxton in cultures of *Fuligo septica*; none is likely to be restricted to myxomycetes but the association is clear: *Lonchaea vaginalis* Fn. (Sapromyzidae), *Leptocera fontinalis* Fn. (Borboridae), *Drosophila repleta* Woll. (Drosophilidae) and *Hylemyia cilicrura* Rob.-Desv. (Muscidae).

I have frequently seen drosophilids in the neighbourhood of decaying plasmodia and aethalia of the larger myxomycetes.

Nemopoda nitidula Fn. (Sepsidae) was reared by Buxton from a large unidentified plasmodium.

From the above it appears that while a few insects are specifically associated with myxomycetes a larger number of saprozoic species are able to utilise slime fungi as food or as a shelter for pupation.

Fungi

As with the insects a few fungi are restricted to myxomycetes while others grow over them as easily as on other substrates.

Most of the fungi which follow are saprophytes but several affect the development of the myxomycetes which then produce abnormal spores and capillitium as a result. These fungi affecting development may be regarded as temporary facultative parasites accelerating the breakdown of the slime fungi and thereby making available more food material. 'Mouldy' myxomycete material is often met and may be so deformed as to be impossible to identify with certainty. The broad classification of the fungi used is that suggested by Ainsworth (1966).

ZYGOMYCOTINA: Zygomycetes: Mucorales

Mucor muceado (L.) Bref. This common and familiar mould is a saprophyte and grows over plasmodia in culture and on bark myxomycetes in moist chamber culture. It has also been found in the field on *Trichia decipiens* (Pers.) Macbr., *T. floriformis* (Schw.) G. Lister, *Comatricha nigra* and *Badhamia utricularis* (Bull.) Berk. No obvious malformation of the myxomycetes has been observed.

ASCOMYCOTINA: Pyrenomycetes: Hypocreales

Nectriopsis violacea (Schmidt) Maire (*Hyphonectria violacea* (Schmidt) Petch; *Hypomyces violaceus* Schmidt; *H. candicans* Plowr.; *Diplosporium album* Bon. var. *fungicola* Sacc.). This species is common on *Fuligo septica*, forming a violet hyphal mat on the surface of the aethalium which may also bear dark perithecia. The contaminated *Fuligo* used to be known as var. *violacea* (Pers.) R. E. Fr. The conidial states have been found on *Stemonitis fusca*, *Badhamia* sp., *Physarum didermoides* (Pers.) Rost. and *Diderma spumarioides* (Fr.) Fr. (Petch, 1941).

DEUTEROMYCOTINA: Hyphomycetes: Hyphales

Gliocladium album (Preuss) Petch (syn. *Acremonium album* Preuss). This widespread saprophyte has been found on the following slime moulds: *Cribraria rufa* (Roth) Rost., *C. aurantiaca* Schrad., *C. cancellata* (Batsch) Nann.-Brem., *Arcyria cinerea* (Bull.) Pers., *Trichia varia*, *T. affinis* de Bary, *Stemonitis fusca*, *Comatricha nigra*, *Badhamia* sp., *Physarum nutans* Pers. and *Didymium squamulosum* (A. & S.) Fr. Included in the above records are those made originally under *Gliocladium penicillioides* Corda which does not overgrow myxomycetes. (Petch, 1939 and Wakefield & Bisby, 1941.)

* *Cephalosporium verticicola* Petch (includes records under *C. acremonium* Corda.) This species has only been found on myxomycetes and is frequently collected on the following: *Cribraria argillacea* (Pers.) Pers., *C. aurantiaca*, *C. cancellata*,

Arcyria cinerea, *Trichia varia*, *T. floriformis*, *Stemonitis* sp., *Comatricha nigra* and *C. typhoides*. (Petch, 1931 and Wakefield & Bisby, 1941.)

- * *Verticillium rexiarum* Sacc. I have found this mould on *Physarum compressum* A. & S. and *P. nutans*. It does not appear to occur on other substrates.
- * '*V. niveostratosum* Lindau. On *Trichia botrytis* (Gmel.) Pers. and *Stemonitis fusca*. (Petch, 1931.)

It is possible that the four taxa above are all forms of the same species of *Cephalosporium* (W. Gams *in litt.*) but much work remains to be done before this can be substantiated.

- * *Oospora trichiae* Petch. On *Trichia verrucosa* Berk. (Petch, 1936.)
- * *Stilbum tomentosum* Schrad. ex Fr. (syn *Tilachlidium tomentosum* (Schrad.) Lindb.) This is the most familiar mould on myxomycetes and has been found on the following: *Cribraria argillacea*, *C. rufa*, *C. aurantiaca*, *Perichaena depressa* Lib., *P. corticalis* (Batsch) Rost., *Trichia varia*, *T. lutescens* Lister, *T. affinis*, *T. persimilis* Karst., *T. decipiens*, *T. botrytis*, *Comatricha pulchella* (Bab.) Rost. and *Diderma effusum* (Schw.) Morg. Gams (*in litt.*) suggests that var. *ovalisporum* A. L. Sm. is not conspecific with *S. tomentosum* and that in any case the genus may only be an extreme (synnematous) development of *Cephalosporium*. (Smith, 1903 and Petch, 1945.)
- * *S. orbiculare* B. & Br. This rare species appears to be confined to *Lindbladia effusa* (Ehr.) Rost. (White, 1876 and Wakefield & Bisby, 1941.)
- * *Paecilomyces simplex* (Petch) Brown & Smith. On *Trichia affinis*, Yorkshire. (Petch, 1936 and Brown & Smith, 1957.) This species was originally described as a species of *Spicaria*, a genus which today has no validity. Three other species of '*Spicaria*' are known to occur on myxomycetes of which *S. penicillata* v. Höhnelt has been found in Norfolk on *Arcyria denudata* and *Stemonitis* sp.; *S. fuliginis* Moreau was described from France on *Fuligo septica* and *S. perpusilla* Speg. from Argentina on *Hemitrichia stipitata* (Masse) Macbr. The true identity of these three species is completely obscure.

The remaining fungi are not closely associated with myxomycetes and their occurrence of them is accidental.

Harposporium sp. has been identified on *Diderma* sp. (Herbarium of the Commonwealth Mycological Institute, Kew.) The fungi of this genus trap nematodes and nematodes are known to occur in myxomycete colonies (see above).

Scopulariopsis sp. on *Trichias* pp. (C.M.I.). These moulds are soil and litter saprophytes.

Sporotrichum carnis Brooks & Hansf., *Dendryphiella* sp. and *Penicillium* sp. have all been isolated from unidentified myxomycete sporangia (C.M.I.) Colonies of *Penicillia* often develop on bark species in moist chamber culture.

The above account illustrates the range of organisms which derive nourishment from myxomycetes. Much work remains to be done, especially in breeding out insects and investigating the activities of the imperfect fungi involved.

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25th November, 1966

Oinophila v-flava Haw. (Lep., Tischeridae) in a distillery warehouse. During the inspection of a distillery warehouse in Edinburgh, Midloth., 11.x.66, I found quite a large number of *Oinophila v-flava* Haw. adults resting on *Rhacodium* (probably *R. cellaris* Pers. ex Wallr.), the wine-cellar fungus, which was growing in profusion over a wide area of the walls inside the building. The moths were seen in all parts of the warehouse but only a few larvae were discovered when samples of the fungus were examined in the laboratory.

The discovery of this moth in Edinburgh is interesting for two reasons. Meyrick (1928, *Revised Handbk. Brit. Lep.*, London) reports that it is found in England as far north as York, but makes no mention of it in Scotland. Mr. Pelham-Clinton of the Royal Scottish Museum has suggested to me that this might be the first Scottish record for this species.

Secondly, Meyrick (*loc. cit.*) states that the larva is to be found in May and June and that the moth flies in July and August. The appearance of the moth in October in such numbers suggests that this is not the late emergence of a minority, but rather that the life history of *O. v-flava* Haw., in this distillery at least, may differ from that of more southerly populations. Whether this is a second brood appearing in October or whether the larval life is longer in this part of the country it is not possible to say. Further investigations will, it is hoped, provide the answer.—BRIAN MORRISON, 12, St. Vincent Street, Edinburgh, 3, 24th November 1966.

FIELD MEETINGS, 1966

PAMBER FOREST, HANTS—5th June 1966

Leader: Mr. B. R. BAKER

Seven members met the leader at the Crown Inn, Silchester Common, on a warm, though overcast morning—prolonged sunny spells came later in the day. The Forest, a new excursion site for the Society, offers considerable habitat diversity, with heathland of undulating character abruptly giving way to mixed deciduous woodland and marshy fields along the woodland edge. Working across the heath and through swampy gullies the party found much evidence of *Gonepteryx rhamni* L., (ova and larvae) on the alder buckthorns. Sallows and alders form dense thickets in many areas of the Forest and in one such area the party were shown signs of larval activity of *Aegeria spheciformis* Schiff. An adult of this species was noted in the beating tray along with numerous small nemourid plecopterons and Alder-flies, *Sialis fuliginosa* Pictet. On the small stream, near where lunch was taken, several of the striking lace-wing *Osmylus fulvicephalus* (Scop.) were observed. A third instar larva of *Apatura iris* L. was beaten from these same sallows and came as an unexpected bonus to a diverse morning's work. The early part of the afternoon was spent exploring a long marshy field where many *Clossiana selene* Schiff. appeared as the sun broke through the clouds. The micro-lepidopterists were kept busy and larvae of *Epinotia sordidana* Hübn., and *Coleophora alnifoliae* Barasch were found on alder, and a well tenanted web of *Scythropia crataegella* L. was noted on a blackthorn bush. Adults of *Micropteryx calthella* L. were numerous among the stamens of *Ranunculus*, *Caltha* and other plants. The marshy fields are noted areas for adders and a finely marked specimen was examined from the depths of a kite net and then duly released. Towards late afternoon the party worked back across the higher heathland, where *Macrothylacia rubi* L. were now careering in erratic flight, and then before returning to the cars a visit was paid to the rides of a compact oak coppice where bush tapping soon induced several *Cepphis advenaria* Hübn. to take wing.

HAM STREET, KENT—11th September 1966

Leader: J. M. CHALMERS-HUNT

A dry, calm and rather warm, sunny day was enjoyed by the nine members who gathered for this meeting, which as usual took place in Orlestone Woods.

Many lepidopterous larvae were taken, including the following: *Lophopteryx capucina* L., one on hornbeam; *Orgyia antiqua* L., on *Salix*; *Scoliopteryx libatrix* L., on *Salix caprea* L.; *Rheumaptera (Calocalpe) undulata* L., four fully grown, and signs of others which had gone, on *Salix cinerea* L.; *Biston betularia* L., on *Salix*; *Ectropis biundularia* Borkh. (*bistortata* auct.), one fully grown on broom; *Asthena albulata* Hufn., one on hazel; *Fumea casta* Pall., two cases; *Ancyliis mitterbacheriana* Schiff., several on oak; *A. laetana* F., several on aspen; *Grapholita tenebrosana* Dup. (*roseticolana* Zell.), in rose hips; *Telphusa notatella* Hübn., several on *Salix*; *Coleophora viminetella* Zell., on *Salix*; *Mompha raschkiella* Zell., in leaves of *Chamaenerion angustifolium* (L.) Scop.; *Caloptilia (Gracillaria) elongella* L., on alder; *Tischeria complanella* Hübn., numerous mines on oak, one leaf contained eight mines; and *T. marginata* Haw., on *Rubus*.

Imagines included *Pararge aegeria* L., very plentiful; *Vanessa cardui* L., about 12; *V. atalanta* L.; *Aglais urticae* L., plentiful; the last three mostly at flowers of *Scabiosa pratensis* Moench. (*succisa* L.); and *Udea (Hapalia) ferrugalis* Hübn.

Mr. P. Goddard noted the following: HEMIPTERA: *Palomena prasina* (L.), commonly on birch and mostly immature. HYMENOPTERA: *Hoplocampa crataegi* (Klug.), several larvae on hawthorn. DIPTERA: *Helophilus pendulus* (L.), abundant on flowers and foliage; *Mesembrina meridiana* (L.), a few on foliage; *Aedes annulipes* (Meig.). ARACHNIDA: *Meta segmentata* (Clerck), abundant everywhere; *Misumena vatia* (Clerck), one which was initially the bright yellow form, but was bright green the following day.

The list of Diptera which follows was submitted by Mr. P. J. Chandler. *Metalimnobia bifasciata* Schrank, on woodland path; *Anisopus fenestralis* (Scop.), swept from oak; *Aedes annulipes* (Meig.), females feeding on party; *Theobaldia annulata* (Schrank), a male on fungus-bearing log; *Apoliphthisa subincana* (Curt.), on fungus-bearing logs; *Sciara* female species, probably *S. fenestralis* Zett., on fungus-bearing log; *Phorodonta flavipes* Meig., swept commonly; *Melanostoma scalare* (F.), frequent on Devil's-bit Scabious flowers; *Platycheirus albimanus* (F.) and *Syrphus ribesii* (L.), sparingly on Devil's-bit Scabious flowers; *Syrphus balteatus* (Deg.) a few on Golden-rod blossom; *S. cinctellus* (Zett.), one female on Golden-rod blossom; *S. albostratus* (Fall.) a single female on Scabious flowers; *Volucella pellucens* (L.), a female on Golden-rod blossom; *Neoscasia podagrica* (F.), common; *Rhingia macrocephala* (Harris) (*campestris* (Meig.)), three noted on Scabious flowers in the open; *R. rostrata* (L.), a single female on Scabious flowers by a shady path; *Helophilus pendulus* (L.), extremely abundant; *Eristalis pertinax* (Scop.), abundant on both Scabious and Golden-rod flowers as were also *E. tenax* (L.) and *E. arbustorum* (L.); *E. nemorum* (L.), several examples on Scabious flowers; *E. horticola* (Deg.), a female on Scabious flowers; *Cartosyrphus (Cheilosia) paganus* (Meig.), a female on *Tripleurospermum maritimum* (L.) Koch blossom; *Chilomyia bergenstammi* (Becker), one male on Scabious flowers; *Syrirta pipiens* (L.), common on Scabious flowers; *Xylota segnis* (L.), three males on foliage; *Hypophyllus obscurellus* (Fall.), around marshy path margin; as was also *Gymnopternus aerosus* (Fall.); *Medeterus incrassatus* Frey, on fungus covered logs; *Conopilla (Conops) ceriaeformis* (Meig.), frequent on the flowers of Golden-rod and Scabious; *Minettia lupulina* (F.), swept from grass; *Lyciella pallidiventris* Fall., swept from the foliage of trees; *Sepedon spinipes* (Scop.), marshy margins of paths; and in the same situations, *Pherbina coryletti* (Scop.); *Loxocera albiseta* (Schrank), common on foliage; *Sepsis punctum* (F.) and *S. fulgens* Meig., swept from grass; *Parydra quadripunctata* (Meig.) and *Philygria flavipes* (Fall.), on the marshy margins of paths; *Limosina (Leptocera) fungicola* Haliday, on fungus-bearing logs, as was also *Asteia amoena* Meig.; *Elachiptera cornuta* (Fall.) was also taken on fungus-covered logs; *Echinomyia fera* (L.), common on Scabious and Golden-rod flowers; a single example of *E. ferox* (Panz.) was taken on a Scabious flower; *Pollenia vespillo* (F.) was very numerous on Scabious and Golden-rod, but only a single example of *P. rudis* (F.) was seen; *Hydrotaea bimaculata* (Meig.) was numerous, hovering over and alighting on the sunlit grass at lunch time; *H. irritans* (Fall.) was very abundant; a male *Helina laetifica* R.-D. was taken on an oak trunk, and a female on fungus-covered logs; a male *Fannia umbrosa* (Stein) was swept from pine; *Phaonia basalis* (Zett.) and *P. incana* (Weid.) were taken on Scabious flowers; and *P. scutellaris* was discovered on a twig in the wood. Examples of *Sarcophaga carnaria* (L.), *S. vulgaris* Rohdendorf and *S. subvicina*

Rohdendorf were taken in the hope of obtaining *S. laciniata* Pand. which is known from the locality, but without success.

DARENTH WOOD, KENT—17th September 1966

Leader: Mr. E. G. PHILP

A joint meeting of the South London and the Kent Field Club was held at this classical entomological site. All those present regretted that Dr. Massee was unable to lead the meeting because of illness.

The day was fine and sunny, but unfortunately the whole area is rapidly deteriorating through the encroachment of building, agriculture and quarrying from the outside, and through tipping in the middle. Collecting was mainly carried out by picking one's way carefully through piles of building and garden refuse, and old cars. In fact it was the decaying carcass of a large dog that produced most of the interesting species recorded including the following:

DIPTERA: *Calliphora erythrocephala* (Meig.), *Lucilia caesar* (L.), *Ophyra leucostoma* (Weidemann), *Piophilina nigriceps* (L.), *Nemopoda cylindrica* (F.), *Neoleria inscripta* (Meig.) and *Rhingia rostrata* (L.).

COLEOPTERA: *Creophilus maxillosus* (L.), *Philonthus addendus* Sharp, and *Dermestes maculatus* Deg.

In the afternoon the party moved on to Horton Kirby stopping en route to admire the plant *Bupleurum fruticosum* L. well established on a railway bank. Collecting at Horton Kirby was limited to the area alongside the river Darent where the most notable insect taken was an example of the fly *Chelifera aperticauda* Collin, new to Kent, swept from a bed of nettles by Mr. Chandler.

ASHTEAD, SURREY—1st October 1966

Leader: Mr. S. WAKELY

For this meeting the weather was dull and rainy, and heavy showers were forecast. The leader was not surprised therefore, when he arrived at Ashtead to find nobody present. He decided to explore the Common for an hour or so before returning home, but heavy rain began to fall and serious collecting became out of the question. The few species noted were: *Coleophora hornigi* Toll (*albicornuella* Bradley), a larva on blackthorn; *Leucoptera lotella* Staint., larvae not uncommon, but very local on leaves of *Lotus corniculatus* L.; and a larva of *Poraswammerdamia pyrella* Vill., was found on crab apple.

OXSHOTT, SURREY—15th October 1966

Leaders: Mr. P. C. HOLLAND and Mr. T. R. EAGLES

This meeting was held jointly with the London Natural History Society and was attended by about 30 members of the two Societies and their friends. The day was dry and sunny, but heavy rain had fallen the night before, so the party kept to the high ground. Tea was taken near the railway station.

In addition to those studying fungi there were lepidopterists working for both

macros and micros, dipterists and coleopterists. Larvae of the moths *Anarta myrtilli* L. and *Lycophotia varia* Vill. were abundant on heather; and a *Macrothylacia rubi* L. larva was found near the margin of the Black Pond.

Mr. Chandler and Mr. Stubbs worked for Diptera throughout the day and report as follows: on Oxshott Heath the most notable record was of *Rondaniella dimidiata* (Meig.), a rare but widely distributed fungus gnat. The crane fly *Limonia nubeculosa* Meig. was out, together with winter gnats of which a few were subsequently determined as *Trichocera annulata* Meig. and *T. regelationis* (L.). Fungus flies included the helomyzid *Helomyza notata* Meig. var. *hilaris* Zett., *H. affinis* Meig., *H. fuscicornis* Zett. and *Allophyla atricornis* (Meig.), and the crane fly *Ula sylvatica* (Meig.). The empid fly *Tachypeza nubila* (Meig.) and the calliphorid *Pollenia rudis* (F.) were seen on pine trunks.

The homopteron, *Conomelus anceps* (Germ.) occurred in small numbers on the *Juncus*.

On the edge of Esher Common, by Sandy Lane, a late *Sericomyia silentis* Harris was found hovering over a muddy path running through very young birch, and another *Rondaniella dimidiata* (Meig.) was taken in this area.

Perhaps the most admired fungus was *Pseudohydnum gelatinosum* Pers. ex Scop. in masses on one tree trunk. A smaller fungus, but of great scientific interest, was *Plicaria leiocarpa* (Currey) Boud. A specimen of *Gomphidius rutilis* (Schaeff. ex Fr.) Lund. was found and clumps of *Sparassis crispa* (Fr. ex Wulf.) Fr. A fungus that seemed unusually plentiful was *Cortinarius semisanguineus* (Fr.) Gillett.

An inspection of the Common from the conservation standpoint was made by Mr. Stubbs who writes:

'On the Oxshott slope, a favourite spot for entomologists, I noticed there was a considerable amount of *Erica cinerea* L. among the *Calluna*. This is most unusual, in my experience of Surrey heaths, for an open area. There is a theory that *Erica cinerea* has a higher nitrogen content than *Calluna* and is able to support a higher population of insects. I spent some time searching under clumps of *E. cinerea* and found plenty of *Lycophotia varia* Vill. larvae, plus a few other lepidopterous larvae. Bugs were fewer than expected, only a few *Scolopostethus decoratus* (Hahn), *Nabis ericetorum* Scholtz and one *N. ferus* (L.).

'A complaint was heard of excessive trampling and it was thought that a temporary fence was called for. However, some of the special insects of the area like some bare ground, and trampling may prevent the heather straggling.

'At the top of the slope, northwards to Sandy Lane, Oxshott Heath is rapidly changing in character since much of the tree growth is young. Heather (*Calluna* and *Erica cinerea*) is becoming severely restricted. A ground layer of bramble is forming beneath clumps of medium-growth birch, where these are not too dense. Bracken appears to be thriving where tree growth allows enough light through.

'The Black Pond was a scene of entomological desolation. I saw two male *Sympetrum danae* (Sulz.) and a single example of what was thought to be *Aeshna juncea* (L.), a couple of chironomids, one *Paradixa*, one mosquito and a few syrphid flies. In other words the insects with aquatic or semi-aquatic larval stages were ridiculously scarce, though it was a bit late for dragonflies. Of the areas in which dumping of dredged material occurred the south side shows areas of bare silt sparsely colonised at the pond edge with birch and *Juncus*; and the north side only differs in a denser growth of these plants. Midst this almost barren ground it was a surprise to sweep six female *Palloptera scutellata* Meig

(Dipt.), four of them very teneral, along the south side of the pond. This is a very scarce and local species.

With special reference to the fate of open heathland insects whose *Calluna* habitat is being lost beneath scrub, it is worth recording that sweeping well-grown *Erica tetralix* L., which is present in a very narrow belt of a foot or so along the north margin of the pond, a number of typical heathland bugs were found: *Kleidocerys truncatellus* (Walker), *Nabis ericetorum* Scholtz and *Orius niger* (Wolff). Also in the sweep net were *Stenodema calcaratum* (Fall.) which presumably came off the *Molinia* growing among the *E. tetralix*, and *Kleidocerys resedae* (Panz.) which must have come off the adjacent birch.

'The heathland to the east of Black Pond was in a very sad state and it is now almost lost beneath self-seeded and planted pines and exotic conifers.'

A full list of Myxomycetes and Fungi follows:

MYXOMYCETES: *Arcyria nutans* Grev., *A. oerstedtii* Rost., *A. pomiformis* Rost., *Fuligo septica* (L.) Weber var. *flava* Pers., *Tubifera ferruginosa* Gmel.

ASCOMYCETES: *Claviceps purpurea* (Fr.) Tul. on the grass, *Mollinia caerulea* (L.) Moench., *Coryne sarcoides* (Jacq. ex Fr.) Tul., *Plicaria leiocarpa* (Currey) Boud., *Rhizina undulata* Fr., *Xylospheera hypoxylon* (L.) Dum.

TRAMELLALES: *Calocera viscosa* (Pers. ex Fr.) Fr., *Pseudohydnum gelatinosum* Pers. ex Scop.

APHYLLOPHORALES: *Coltrichia perennis* (Fr.) Murril, *Coriolus versicolor* (L. ex Fr.) Quélet, *Fomes annosus* (Fr.) Cooke, *Merulius tremellosus* (Schraeder) Fr., *Piptoporus betulinus* (Bull. ex Fr.) Karsten, *Sebacina incrustans* (Pers.) Tul., *Stereum hirsutum* (Willd.) Pers., *Thelephora terrestris* (Erhart) Fr., *Trametes gibbosa* Fr. ex Pers., *Sparassis crispa* (Fr. ex Wulf.) Fr.

AGARICALES: *Amanita citrina* (Schaeff.) S. F. Gray var. *alba* (Gillet) E. J. Gilbert, *A. fulva* (Schaeff.) Sec., *A. muscaria* (L. ex Fr.) Hooker, *A. rubescens* ((Pers.) Fr.) S. F. Gray, *A. excelsa* (Fr.) Kummer, *Boletus bovinus* L. ex Fr., *B. luteus* L. ex Fr., *B. scaber* Bull. ex Fr., *B. testaceosaber* Secr., *B. chrysenteron* (Bull.) Fr., *Clitocybe odora* (Bull. ex Fr.) Kummer, *C. aurantiaca* (Wulf.) Studer, *C. ditopus* Fr., *Collybia cookei* (Bres.) J. D. Arnold, *C. maculata* (Alb. et Schwein.) Kummer, *Cortinarius flexipes* (Pers. ex Fr.) Fr., *C. semisanguineus* (Fr.) Gillet, *Galera hyponorum* (Schank ex Fr.) Kummer, *Gomphidius rutilus* (Schaeff. ex Fr.) Lund., *Gymnopilus penetrans* (Fr. ex Fr.) Murrill, *Hebeloma mesophaeum* (Pers.) Quel., *Hypholoma capnoides* (Fr. ex Fr.) Kummer, *H. fasciculare* (Huds. ex Fr.) Kummer, *Laccaria laccata* (Scop. ex Fr.) Cooke, *L. anethystea* (Bull. ex Mérat) Murrill, *Lactarius pyrogalus* (Bull. ex Fr.) Fr., *L. rufus* (Scop. ex Fr.) Fr., *L. tabidus* Fr., *L. turpis* (Wein.) Fr., *Tricholoma nudum* (Bull. ex Fr.) Kummer otherwise *Lepista nuda* (Bull. ex Fr.) Cooke, *Marasmius androsaceus* (L. ex Fr.) Fr., *M. esculentus* (Wulf. ex Fr.) Karst., *Mycena alcalina* Fr., *M. epipterygia* (Scop. ex Fr.) S. F. Gray, *M. galericulata* (Scop. ex Fr.) S. F. Gray, *M. galopus* (Pers. ex Fr.) Kummer, *M. polygramma* (Bull.) Fr., *M. sanguinolenta* (A. & S.) Fr., *Nolanea stauropora* Bres., *Omphalia fibula* (Bull.) Fr., *Omphalina ericetorum* (Fr. ex Fr.) M. Lange, *Paxillus involutus* (Batsch ex Fr.) Fr., *Pluteus cervinus* (Schaeff. ex Fr.) Kummer, *Russula emetica* (Schaeff. ex Fr.) S. F. Gray, *R. fragilis* (Pers. ex Fr.) Fr., *R. ochroleuca* (Pers. ex Secr.) Fr., *R. sardonica* Fr., *Tricholomopsis rutilans* (Schaeff. ex Fr.) Singer.

GASTEROMYCETES: *Scleroderma aurantium* Vaillant ex Pers., *Sphaerobolus stellatus* (Tode) Pers.

PROCEEDINGS

13th OCTOBER 1966

The PRESIDENT in the Chair

EXHIBITS

Mr. B. GOATER—Fourth and fifth instar larvae of *Diarsia mendica* F. s.sp. *thulei* Staud. (Lep., Noctuidae) from ova obtained in Shetland in early August 1966. He remarked on the brighter, richer coloration of these larvae compared with those in the south of England.

Mr. A. E. GARDNER—Two examples of the large grasshopper, *Plymateus viridipes* Stål (Acrididae) taken by Mr. B. J. Brock, May 1966, Fort Jameson, Chizongwe, N. Rhodesia. The grasshopper has drab forewings and very bright hindwings. Mr. Gardner explained that this was 'flash coloration'; when the creature flies the bright colour appears suddenly and on closing its wings disappears instantaneously. This is very effective in confusing predators.

Mr. R. W. J. UFFEN—A living male spider, *Geolycosa blackwalli* Johnson, endemic to Madeira. This example was bred from eggs laid by a female brought back by an expedition to the island.

COMMUNICATIONS

Dr. N. L. BIRKETT spoke on 'Entomology in the Lake District', illustrating his talk with coloured slides.

BOOK REVIEW

North European Groups of *Aricia allous* G.-Hb., their Variability and Relationship to *A. agestis* Schiff. By Ove Hoegh-Guldberg. Pp. 184, 18 text figs., 8 charts, 4 maps, 2 col. pls. Aarhus, Denmark, 1966.

To many entomologists much of the importance of this well produced work will lie in the resultant changes which will be found necessary in the nomenclature of the genus *Aricia* (Lep., Lycaenidae). Breeding experiments and a careful survey of the distribution of the genus have rendered essential a reassessment of the affinity between the various geographical groups and a revision of the nomenclature.

For well over 100 years, entomologists have expressed doubts about the true status of the Scottish form *artaxerxes* Fabricius, and its reputed close affinity with *Aricia agestis* has for long been suspect.

At last, this problem has been thoroughly tackled by two amateurs, Mr. O. Høegh-Guldberg of Denmark and Mr. F. V. L. Jarvis of Bognor Regis, England, whose close collaboration has brought about a satisfactory solution. Jarvis has already published his findings in a similar paper (1966, *Proc. S. Lond. ent. nat. Hist. Soc.*, 1966:37-60). The exchange of living material was of great value to both workers and without this liaison such momentous results could never have been achieved.

The author set out to investigate the relationships which exist between the bivoltine *agestis* and the univoltine forms *artaxerxes* and *allous*. Many different characters, morphological and biological, have been studied and compared, with interesting results. It was found that when *artaxerxes* or *allous* was crossed with *agestis* from southern England there were unmistakable signs of imbalance in the progeny, despite apparent absence of inhibition in pairing. On the other hand, the result of pairings between *artaxerxes* and *allous* displayed no noticeable trace of genetic incompatibility.

This indication of close relationship between univoltine *artaxerxes* and *allous* is considerably strengthened by many other tests. The biotopes and larval food-plants differ from those of *agestis* and the colour, shape and size of the larvae and pupae are also significantly different. The minimum daylight hours required to suspend diapause are shorter with *agestis*. The ratios between tarsal and tibial lengths in the imagines were found to be reliable criteria of specificity. All of these differences are fully described and evaluated.

There were the inevitable disappointments until satisfactory breeding techniques were adopted. For instance, the submission of the larvae to conditions of continuous daylight resulted in uninterrupted and rapid growth, with consequent reduced mortality.

Additional evidence of specific distinction between *allous* and *agestis* was provided by the discovery that at Sandhammaren in Sweden both live together without inter-breeding, the single generation of *allous* flying between the two broods of *agestis*, with short periods of overlap. They behave as two sympatric species, reproductively isolated.

From the evidence provided by breeding experiments, and morphological and biological comparisons, the only reasonable conclusion is that *artaxerxes* and the Scandinavian populations of *allous* are the same species, quite distinct from *agestis*. It is, moreover, important to note that the name *allous* must be discarded in favour of *artaxerxes*, the older name by 44 years. The Scottish population is thus established as the nominate subspecies and all other subspecies must conform to the new nomenclature and become subspecies of *artaxerxes*. These changes add another species to the genus *Aricia* in the British list of Lepidoptera.

In his work on the analysis of the Scandinavian populations, the author discerned differences which he considered justified the erection of four new subspecies, all of which he describes and illustrates in colour.

There is a useful summary and a list of relevant literature. At the end is a section entitled 'Tables and Experimental Journals', which includes detailed statistics of 36 experiments.

Altogether, this is a noteworthy publication, attractively produced and vividly demonstrating the capabilities of amateur scientists.

F. T. VALLINS.

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MEETINGS OF THE SOCIETY

are held regularly at the Society's Rooms, and include the well-known ANNUAL EXHIBITION, which takes place in October in the Libraries of The Royal Society and of the Geological Society of London at Burlington House, Piccadilly, by kind permission of those two Societies. Frequent Field Meetings are held at weekends in the Summer. Visitors are welcome at all meetings. The current Programme Card can be had on application to the Secretary.

STUDIES AND SUGGESTIONS ON THE BEHAVIOUR OF MOTHS AT LIGHT

by J. D. HOLLOWAY

It is a well known fact that moths are attracted to light. How this attraction evolved, and what advantage it confers on the moth can only be surmised.

The only natural source of light present to attract a nocturnal insect is the moon. To fly towards the moon would bring the moth into a region of the air where trees, hedges and other obstructions do not break up air currents. It would bring it into an area of turbulence above the ground boundary layer. Thus moths could take advantage of currents of air for dispersal, and also for increasing the relative size of their interbreeding population. On the ground each species would tend to be restricted into small populations by woods and hills; but higher up these obstructions would not occur and a greater degree of mingling is possible, enabling advantageous genes to spread more rapidly over a larger area.

Johnson (1966) has reviewed insect dispersal and concludes that most migratory insects disperse by moving up out of the boundary layer and utilising wind currents. It is probable that local dispersal may occur in a similar manner.

Another reason given for attraction to light is the light compass reaction. It is possible that migrant species steer to a certain extent in flight by setting a constant angle between their flight path and the moon. It has been proposed (see Wigglesworth, 1965) that attraction to artificial lights is a manifestation of this, the nearness of the light causing the angular setting of the eye to produce flight in a spiral towards the source. This theory conflicts with that put forward by Loeb (1918) following observations on the behaviour of insects in close proximity of a light source in the laboratory. Loeb suggested that the spiralling in the vicinity of a light source occurs when light, falling more on one eye than the other, causes inhibition of flight muscles on that side.

The phenomenon that Loeb observed certainly does occur in moths round a light, but may be referable only to dazzling effects in close proximity to the source; but there is still the initial attraction to light to explain. Johnson's conclusions suggest that the light compass reaction is not so inherent in insect migration as was once thought. Also the majority of moths attracted to light are not migratory in nature. Observations of the approaches of moths to light both in this country and in Borneo indicate that moths approach a light directly, often in a straight line, and often into a strong wind, which would tend to negate any light compass reaction. It is therefore suggested here that the initial attraction to light is a tropotactic reaction as outlined by Fraenkel and Gunn (1961).

H. S. Robinson (1952) proposes that moths are, at a distance, repelled by light, and that occasionally their momentum carries them within a certain distance of the light trap where they become dazzled, in the manner observed by Loeb, and fly to the light. To support this theory he uses the observation that when the light is first turned on there is an initial burst of arrivals, and then the arrival rate slows down to a steady flow. He proposes that the initial burst of arrivals are those within the area of dazzle. The phenomenon may be equally well explained by considering that the moths are attracted to light right from the start, and that this attraction increases with nearness to the trap. This is supported by experiments with release from varying distance that are described later. When the light is first switched on the local population may be assumed to be evenly

distributed throughout the area. At first all those moths within the range of influence of the light source, and those just drifting into it from outside, will be attracted, giving the initial rush. After they have arrived, only those drifting into the area of influence from outside will be caught.

Taylor and Carter (1961), using a non-illuminated suction trap in which a non-selective sample of the aerial insect population is taken, involving no behaviourisms of the insects themselves, have shown that the degree of attraction of various species to light varies over a great range, some moths not being attracted to light at all.

At a source of light it can be observed that some moths are initially attracted to light, yet do not fly right up to it, but settle on nearby foliage, or on the ground. The writer has also observed moths, both in England (e.g. *Catocala nupta* L., a species very weakly attracted to light) and in Borneo (many species) to be attracted to a light, fly round it at a few yards distance, and then fly away again. Also to be considered is the anomaly that moths are attracted to light by night but tend to shun it by day.

These phenomena all suggest that the potential attraction of a moth to light is controlled by some complex internal mechanism, concerning which suggestions are made below.

Robinson (1952) proposes that when moths fly to light, their eyes become desensitised and adapted, and this causes them to become inactive and settle before they reach the light. He supports this with an experiment where moths were placed on a sheet in a layer. Some were covered and a light was shone on all of them. The cover was then lifted, and whereas the exposed ones remained inactive, those that had been covered walked about and flew off. The moths had been lightly anaesthetised initially. He suggests that this behaviour was due to the desensitisation of the eyes of the exposed insects.

This is probably true, but the explanation may be slightly more complex. Moths settled near a light trap will fly away readily if disturbed. It is possible that when the moths come within a certain range of the light, conditions of daylight are simulated, producing the response from the moth that the increasing of light at dawn produces, causing it to seek a dark place, or a flat surface such as a wall or tree trunk on which to pass the hours of daylight. Thus moths caught in a trap go beneath egg boxes fairly quickly and become somnolent.

It is believed that attraction to light depends more on the angle subtended by a source at the eye of a moth than on the intensity, once a lower threshold of intensity has been exceeded.

The moth possibly has two response systems. One, with a threshold at a low angle subtended at the eye, would cause the moth to move towards the source if it was exceeded. As the angle subtended increased, the response would also increase, until the threshold of a hypothetical second system is transgressed. This would cause the moth to shun light, seek darkness and become inactive. The latter may well work by a desensitisation process as Robinson suggests. Specific variance of these thresholds would produce the differential behaviour patterns observed in different species. It is tempting also to suggest that these systems may be subordinate to a diurnal rhythm of light response under hormonal control.

The response system could also be modified by the influence of other drives, such as those for mating, egg laying, migration, or, during the course of the night, through the varying action of some clock hormone. Evidence of such modifications will be presented.

MOTHS AND TEMPERATURE

Taylor and Carter (1961), using a suction trap, have demonstrated that there is a threshold temperature for moth flight over one or two degrees Centigrade through which they pass from an inactive to an active state, or are stimulated into effecting behaviour patterns that are preparatory for flight (such as the warming up, fluttering behaviour of *Sphinx*). This temperature varies from species to species, and one would expect it to show correlation with the average minimum nocturnal temperature at the locality where the moth is inactive during the day, at the date of maximum emergence for the species.

After this threshold has been passed, Williams (1961) has showed that minimum nocturnal temperature (hereinafter abbreviated to M.N.T.) is related to nightly catch in a light trap. This will be discussed further later and a method for determining the degree of population fluctuation will be described.

OTHER CLIMATIC FACTORS

(1) *Cloud*. This has no marked effect except that an overcast sky results in a higher M.N.T. than would occur if the sky were clear. Also it masks the effect of the moon.

(2) *Rain*. Rain, if heavy, seems to restrict the flight of the geometrids, possibly because they have a high wing-area/body-weight ratio, and are more easily beaten down by rain than the noctuids, which seem able to tolerate much heavier rainfall.

(3) *Wind*. Wind has a similar effect to rain, affecting the geometrids before the noctuids. Although geometrids may be flying on a windy night, and may attempt to fly to light, if the wind speed is as fast or faster than their flight speed, they will not be able to do so, and the geometrid catch, if any, will be those moths in the immediate vicinity of the trap if it is in a sheltered position.

(4) *Mist*. On misty nights very large, or very small catches may be obtained, regardless of the temperature factor (Williams, 1939). It would be useful to determine the nature of the mist on these nights. A mist that is dense and close to the ground (below the mean flight height) will tend to scatter the light from the trap within itself and thereby increase the area and effectiveness of the light source, producing a catch above average. If the mist extends above the average flight height, although the scattering effect is the same in the vicinity of the trap, visibility further away will be much poorer, thus decreasing the effective range of the trap.

(5) *Moon*. Williams (1936 and 1939) has shown that moonlight has a marked effect on the catch and, on clear nights, acts in competition with a moth trap. The competitive effect of the moon corresponds with its phase, and its zenith with regard to period of night. Williams suggests that there may be a physiological factor in play besides competition in reducing catch, in that moonlight reduces the general activity of a moth. Another factor to be considered is that of position of the light. It is possible that the response of a moth may be greater to a light source above it than to one below it. This might be expected if the theory that attraction to the light of the moon facilitates dispersal. The factor could easily be tested by release of marked specimens from different altitudes in the vicinity of a trap. The writer, whilst trapping in a clearing in primary forest in Borneo, observed that catches in the clearing were much less than those with a trap on a cleared ridge on a level with the canopy, which forms a thick layer about 70 feet above ground level. The moths fly mainly in the canopy, and it would seem from

this that whilst they will fly to a light on the same level as that of their flight, they are reluctant to fly to one below them.

PERIODICITY

Williams (1939 and 1940) divided the night from sunset to sunrise into eight periods that varied with the seasonal change in night length. He arranged eight cyanide jars on a revolving apparatus under the trap vent, so that each jar sampled the moths for one of these periods. From this he was able to get an estimate of the flight periodicity of each species that was trapped in sufficient numbers.

Carter and Taylor and, later, Lewis and Taylor (1965) made similar periodicity estimates with their suction trap.

In the few cases where comparison was possible, their results differed markedly. Taylor and Carter suggested that this might be due to the fact that the light intensity of the trap relative to the surroundings would decrease towards dawn and dusk from midnight.

But it is thought that area rather than intensity is the controlling factor in attraction. A number of Williams' readings must have been taken on cloudy nights when the light intensity rises and falls sharply during the crepuscular periods from maximum to minimum. Also Williams found that maximum activity was in the second of his eight periods for the majority of species. It seems, therefore, that another explanation should be sought.

There may be a conflict between various drives in behaviour, including that of attraction to light, throughout the night. In consideration of this it would be interesting to study the periodicity of moths in their attraction to sugar, honey-dew, or sallow bloom.

Though this explanation may have some effect, and probably does occur from night to night, as is suggested by experiments described later, there is another that seems more logical, and may be overriding. Williams' observations of greater numbers in the second period and a steady decline following may be a function of temperature. This will fall steadily throughout the night, decreasing the flight activity of the moths, and therefore the effective range of influence of the trap. Actual density of moths would not decrease, as the temperature would not drop below the threshold for flight, and therefore the suction trap records, sampling density, would vary from those of the light trap, which involve activity of the moths in flying to light.

Such a physiological effect is demonstrated later when marked specimens are released at a fixed near distance from the trap at varying times after sunset, the trap being well within range.

HEIGHT OF FLIGHT

Taylor and Carter (1961), using a suction trap, run at different heights above the ground found that, in general, density of moths decreased with height up to about 100 feet. In some species (e.g. *Amphipyra tragopoginis* Clerck and *Agrochola lychnidis* Schiff.) there was a maximum density at 20 feet. These two species were the commonest caught in the suction trap.

Moths must attain their flight height actively, and Taylor and Carter found that height increased with commonness. Both through the night, and from night to night, moths were found to have a higher average flight height when they were commoner. This may have dispersive value. Wynne-Edwards (1962) puts forward a theory of animal dispersion, whereby a population of animals, from an

assessment of density dependent factors of various kinds, receives information on the size of the population, and then reacts by various adjustment mechanisms to keep the level of numbers to an optimum with relation to food supply. Wynne-Edwards presents many examples of where such a mechanism may occur in a wide variety of animal groups. Although some of his examples have been criticised, many others are probably well grounded, and the theory does co-ordinate and explain many hitherto obscure zoological phenomena.

It is possible that the case in question of moth flight height may be such a mechanism. Higher flight when a species is abundant will tend to bring more individuals out of the ground boundary layer into the upper air currents, where dispersal may occur. As flight height is determined by the activity of the moth, then some factor must guide this activity to result in the moths flying higher when commoner—such as a density dependant factor as suggested by Wynne-Edwards. Moths are too few and far between for random contact to be significant. Sight and sound, though possible, seem unlikely. The former is restricted at night except over short range, and the latter is not highly developed in moths, though noctuids and arctiids are known to be able to receive, and sometimes emit sound. But it is well known that moths can detect scents in very minute traces. Each species may have a specific scent emitted in flight, and concentration of this could communicate density of the species and stimulate the mechanisms of dispersal.

SEX PROPORTION IN CATCHES AT DIFFERENT ALTITUDES

Williams (1939) ran two traps, one 35 feet above the other, at Rothamsted. He found that there was a very low percentage of females in the lower trap with most species, but that this percentage increased considerably in the upper trap. Again it seemed to be the commonest species that had the lowest percentage of females in the lower trap.

A possible explanation for this is that the females have a stronger dispersive drive than the males in the manner suggested above. They are the main effectors of any spread of a species (see Johnson 1966). In less common species the dispersal needs are less intense, and therefore the proportions are more equal.

Other factors may contribute to the situation as will be suggested below.

1964-1966: EXPERIMENTAL STUDIES

PROCEDURE

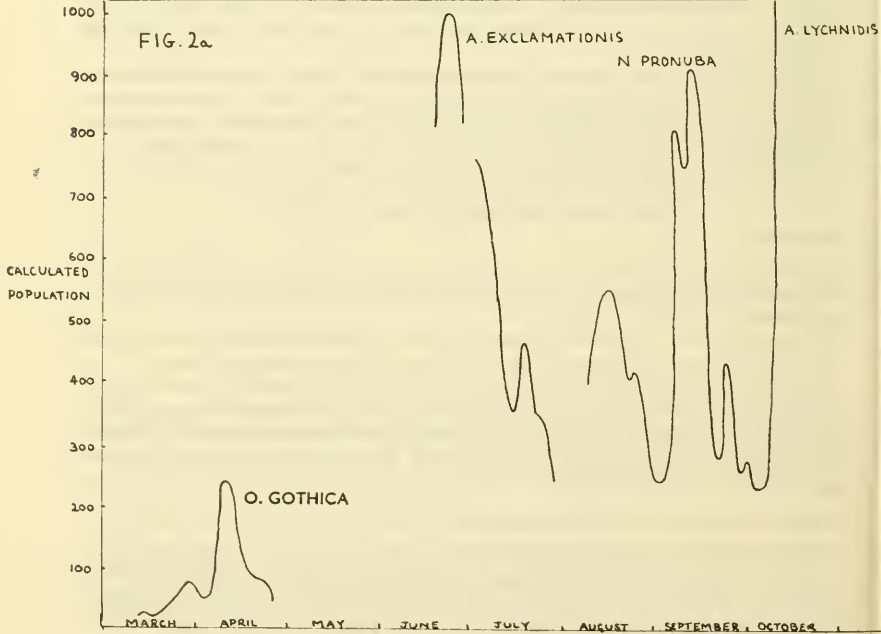
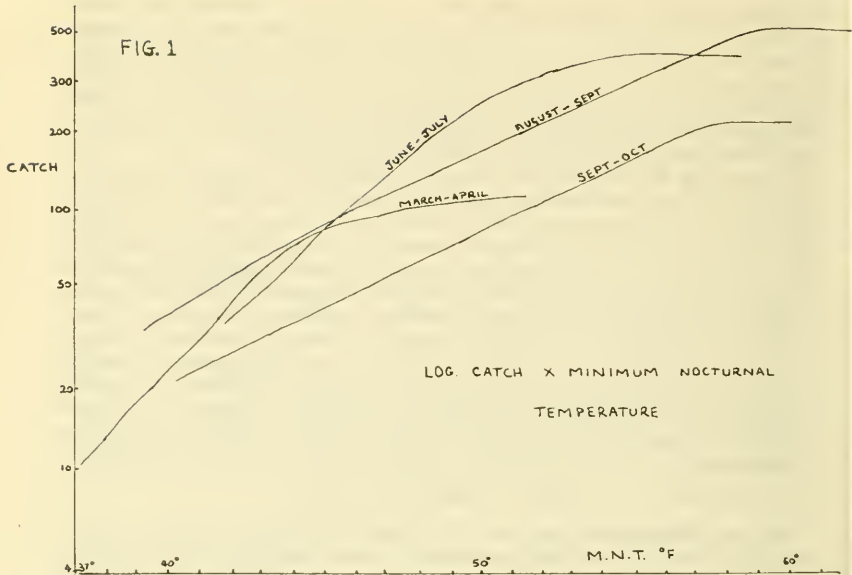
A Robinson pattern mercury vapour trap with a 150 watt bulb was run from mid-June to early October in 1964 and for a similar period in 1966 with only a few breaks.

It was situated in a sheltered garden in a fairly wooded area on the chalk of the North Downs near Leatherhead, on the fringes of the London suburbia.

It was left overnight and emptied in the morning. The numbers of each species present were recorded. The M.N.T. of each night was recorded on a max./min. thermometer situated four feet above the ground on a north facing wall. Various experiments were performed with the intention of elucidating some of the points and problems reviewed above.

SEASONAL RESPONSE OF CATCH TO M.N.T.

Williams (1961) has shown that there is a definite correlation between M.N.T. and catch. A sigmoid curve is obtained if catch is plotted on a log scale, and the writer's curves for various times of year are presented in fig. 1. At extremely high temperatures one might expect the curve to fall off again, but such temperatures



were not recorded in the experimental period. M.N.T. may not be the only temperature factor affecting catch. This is discussed at length by Williams. Nights with cloud belts giving alternate clear and overcast spells often produce results that vary largely from the mean. Nevertheless the correlation is sufficiently high to facilitate the deductions in the next section.

The M.N.T./catch curves varied for different times of the year. The curves, though approximations, suggest that increase in catch with temperature is greater in the earlier parts of the year. This is logical as the range of temperature between the activity threshold and average M.N.T. is less in the early part of the year than in mid summer. Moths might be expected to have their optimum activity temperature correlated with average M.N.T. for the time of their emergence. The flattening off points on the curves in fig. 1 support this as they approximate to the seasonal average M.N.T.

POPULATION ESTIMATES FROM M.N.T./CATCH MEAN CURVES

The fluctuation of points about the mean curves in the catch/M.N.T. graphs is mainly due to fluctuation in population, but other climatic conditions and moonlight will also have some effect.

If these latter are assumed to be slight in effect, then one can make useful deductions about changes in moth population.

The curves flatten off to a maximum. At this maximum the catch is a direct reading of the maximum number of light attractable moths that can stray within the range of influence of the trap at that time of year. Catch is plotted on a log scale. One reads off linearly the vertical distance of each point from the mean curve, and transposes this distance to the mean line at the maximum point. Then, from this error, one can read off a direct estimate of the maximum possible catch on that night for any point at any temperature, for, as far as is known the shape of the curve does not change with changing population. Thus one can follow the fluctuation of total population, or that of a fairly numerous species throughout a long period of time. One has to take into account the variations in the mean curve with season. It must be made clear that the values obtained are not empirical of moth population, but purely of comparative value. It only assesses species attracted to light and this attraction varies from species to species. But the majority of common moths are attracted strongly to light and so this estimation is of some value. Fig. 2a shows results obtained for 1964. Because of the small scale the curves have been somewhat smoothed. The dominant species for each peak are noted.

Fig. 2b shows a similar record for one species over a shorter time. It can be seen that at the peak of emergence there is considerable fluctuation from night to night. It is suggested that this represents a period of intense emergence, invasion, and dispersal, when the density of the species is very high and constant adjustment of numbers is occurring.

MARK AND RELEASE EXPERIMENTS.

Another method that has been used for studying animal populations is that of mark and release. Although not suited for a non-random capture method such as light trapping, it did lead to some interesting conclusions.

(1) Procedure

Every moth in a nightly catch, excepting small geometrids, was marked with cellulose aircraft dope each morning, with a colour and position code for each

FIG. 3

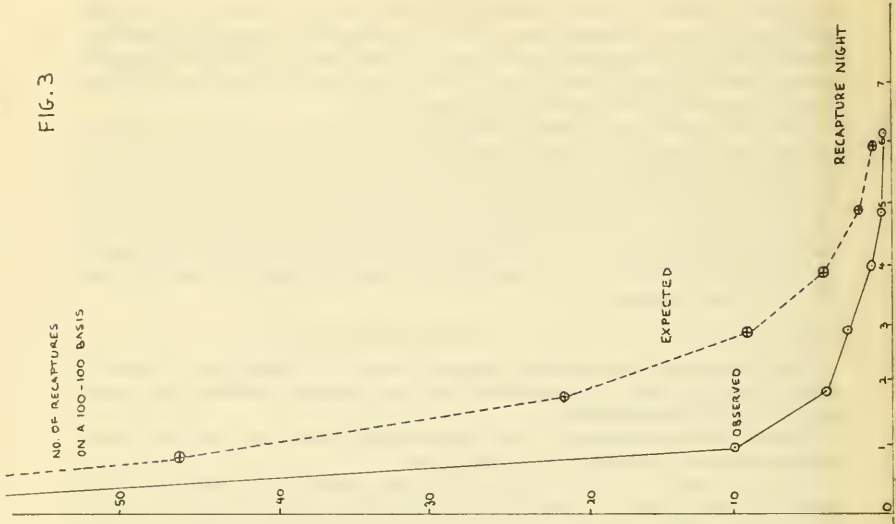
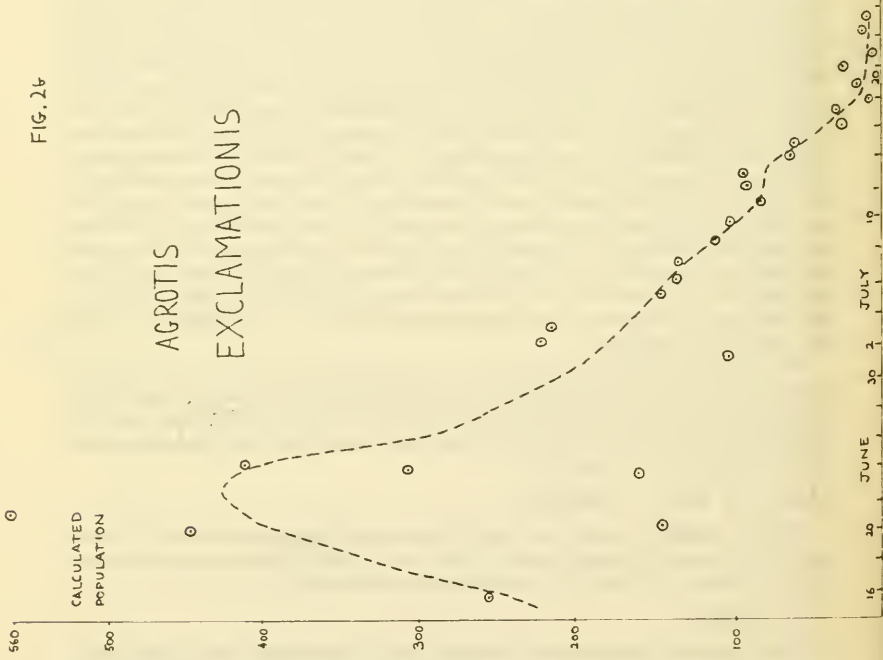


FIG. 2b



night. The number of returns for each night on each succeeding night were noted.

After observing the predations of birds on moths released in amongst the flowers of the garden during the first part of the 1964 session, they were kept in a box until dusk, when the lid was removed, for the later session.

Error in all mark and release records for night flying insects may occur through the predations of bats which, on occasions, were observed to patrol up and down about 20 feet above the trap. This altitude is that recognised by Taylor and Carter as being the average flight height for moths, and therefore the altitude of bat flight may be indicative of this. Observations whilst trapping in Borneo bear this out.

(2) *Longevity records*

Although on average moths seem to live for about six days (see fig. 3) a few (probably exceptions) live longer and return to the trap often after being absent for many days.

The longest records are listed below.

<i>Species</i>	<i>Number of days</i>
<i>Orthosia incerta</i> Hufn.	9
<i>O. gothica</i> L.	14
<i>Plusia chrysis</i> L.	8 (2 records)
<i>Biston betularia</i> L.	8
<i>Agrotis exclamatio</i> L.	9
<i>Melanchra persicariae</i> L.	15
<i>Amphipyra pyramidea</i> L.	11

(3) *Population estimates from mark and release experiments*

The basic formula for calculating populations from mark and release data is as follows. With a random method of sampling:

$$\text{Population} = \frac{\text{Catch on first occasion} \times \text{catch on second occasion}}{\text{Returns from first catch on second occasion}}$$

This assumes that there has been no migration in or out, and no deaths or emergences in the intervening period. These factors can be accounted for in calculations. These are not relevant here as light trapping is not a random capture method, but the first step in these calculations, which is relevant here, is to correct all recaptures as if 100 had been released, and 100 recaptured on all dates. This correction is given by:

$$\frac{\text{Recaptures} \times 100 \times 100}{\text{Catch on release night} \times \text{catch on recapture night}}$$

A colleague, H. S. Barlow, whilst trapping at Eton, made population estimates using the first formula without correction for death etc. The figures he obtained (12,000–13,000 in late June) seem incredibly high.

Even correction for death and migration could not explain the discrepancy between the results obtained by the writer above and these. This suggested that some other factor was involved that tended to make the moths less attracted to light on the second night, thus making the calculated population larger. This indicates that light trapping is not a random capture method, and that the attraction of an individual moth varies from night to night. Fig. 3 shows a plot of the average number of returns over the second 1964 session, reduced to a standard 100–100 basis as above, against number of nights from release. The calculated

*

curve shows the results that would be expected if each moth lived for six days, and was attracted to light each night equally strongly. It can be seen that the returns drop markedly more than they should, suggesting that some other factor is coming into play.

There are a number of possibilities. Johnson (1966) concludes from material on a wide range of insects that prolonged and undistracted flight occurs when insects are immature or have oviposited. Thus moths, when they first emerge, may undergo maturing flights, in which they are strongly attracted to light, such as the moon, which encourages dispersal. On the second and third nights sex and feeding drives may increase in influence and the reaction to light may become subordinate, i.e. there is a dispersal phase, followed by a reproductive phase.

Also a moth, if strongly attracted to light one night, may be less likely to be attracted to light on a second night or later, its light response drive having been sated.

The phenomenon may result from both factors, though the former is possibly more important.

Thus a catch might be expected to consist mainly of fresh, immature individuals. Accordingly a large number of the larger noctuids were examined. To determine age, the degree of wear on scales of thorax and the wing margins was used. This was not fully satisfactory as a certain degree of wear must occur whilst in the trap before settling down that would not naturally be encountered. Dissections were made to determine approximate degree of maturity.

Below are tabulated results for the more common species:

Night of 16th/17th September; *Noctua pronuba* L., 34 males

% scales left on wing border	No.	Marked returns days from release	Thoracic hairs		Gonads	
			Good	Bad	Full	Empty
91-100	10	8, 1	8	2	7	3
81-90	7	3, 2, 2	6	1	3	4
71-80	5	2, 3, 1, 1	2	3	1	4
61-70	2	1		2		2
51-60	4	2, 2, 1, 1		4	1	3
41-50	1		1			1
31-40	2	2		2	1	1
21-30	1			1		1
11-20	2			2	1	1

Night of 2nd/3rd October; *Agrochola lychnidis* Schiff., 4 females

91-100	3	4, 1	3		2	1
81-90	1		1		1	

Agrochola lychnidis Schiff., 23 males

91-100	11	1, 1	11		9	2
81-90	4	1, 2	4		2	2
71-80	3	3	2	1	1	2
61-70	2	4	1	1	2	
51-60	2	2	2			2
21-30	1	1		1		1

These data, though not highly conclusive, support the theory that the majority of moths in a catch are fresh specimens with full or immature gonads.

Sixteen *Agrotis ypsilon* Hufn., 14 females and 2 males, caught on the night of 4th October were dissected. All were in good condition and immature. This species is thought by South to be almost completely immigrant to this country. The predominance of females supports the hypothesis that these are the main agents of spread. It is notable that these insects came strongly to light in the country of destination. Evidence will be presented below to suggest that migration (defined as long range, directional dispersal) involves no response to light, whereas dispersal (a local non-directional effect) is strongly light-orientated.

In order to test further the hypothesis that the main part of the catch consists of young, first night individuals, it was decided to perform releases of marked individuals from a varying distance from the trap. These individuals would be second night individuals from the catch of the previous night for one set of releases and bred 'first night' individuals on the other. For this a species with two generations was needed, and *Amathes c-nigrum* L. was chosen.

Trials were also performed with second night *Noctua pronuba* L. and *Agrotis exclamatoris* L. The results of these are shown in fig. 4. The percentage is from a total release of about 200 for each point. As can be seen, even very close to the trap, where attraction should be greatest, not much more than 50 per cent return, supporting the hypothesis that response to light has abated on the second night.

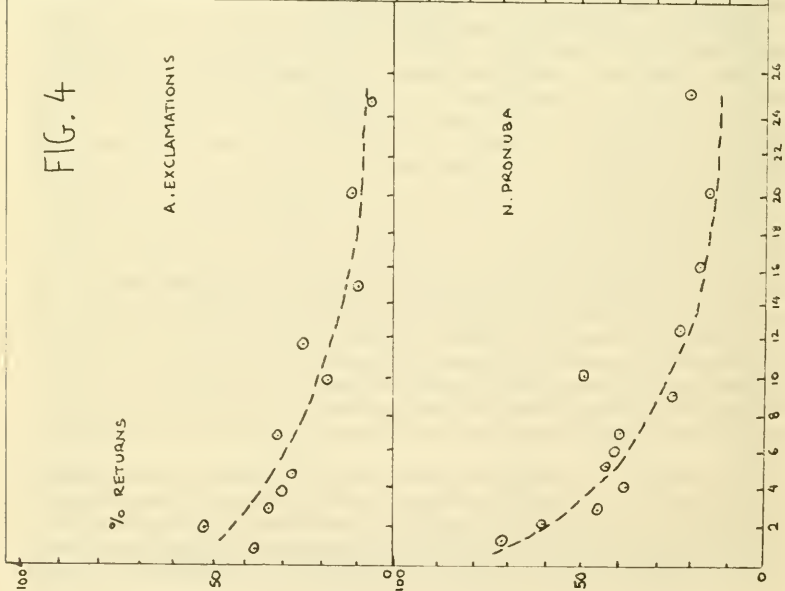
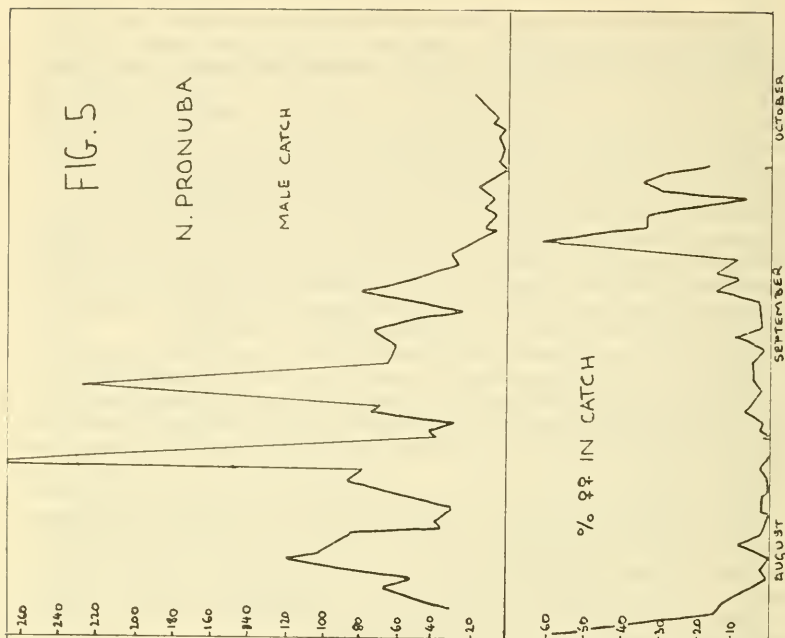
Observations were made on the moths as they were released. Some flew straight to the trap, some flew towards it at first, and then veered off and went away (possibly here the angle subtended by the source at the eye transgressed the postulated second threshold as they moved towards the trap), and others took no notice of the light at all. Some tended to fly out and settle on parts of the writer's clothing that caught the light, supporting the theory that it is area of source rather than intensity that is important in attraction.

The choice of *Amathes c-nigrum* was, in a way, unfortunate, but led to unexpected conclusions concerning the difference between migration and dispersal.

Amathes c-nigrum is a migratory species. A few migrants arrive, or emerge in early June, and in September there is a second generation, consisting of the offspring of the June brood reinforced by immigrants from the Continent. Three hundred were caught in a night at Leatherhead in 1963, and it was hoped that these numbers would occur in 1964; but the maximum catch was 60 and the catches were usually very small. Therefore a second night graph was not obtained.

In mid-June a female was put in a breeding cage with leaves on which to lay. This she did in a random fashion. The eggs hatched after a week and the young larvae were reared on foxglove. As the writer was due to go abroad for a fortnight, the almost fully grown larvae were stocked up with foxglove and moss was put on the floor of the cage. There were 109 larvae. After the fortnight the food-plant had been eaten and 90 pupae were found in the moss. Seven of these had been attacked by mould or predators. On August 13th the first emerged; and 70 emerged in all, the last on 24th August. All these were released five yards from the trap over a period of days. Only two returned on the night following release, one of these being the first to emerge. Two returned on the second night after release.

The conditions for breeding were very unnatural. There was intense larval crowding, part of the pupal life was spent under a mountain of frass, and except for the first to emerge, emergence was into an atmosphere strong with the odours of decaying excreta ejected by the moths on emergence. All these factors could enable individuals to sense intense overcrowding, and stimulate an intense



migratory instinct to which any attraction to light would be subordinate.

The few releases performed with second night individuals suggested that a result similar to that obtained with the other species could be expected. These would be individuals whose migration would have been completed.

This observation on overcrowding fits in well with current theories that migration may be stimulated in migratory species by larval crowding (e.g., locusts).

Thus it seems that moths in migration are not attracted to light. Moths that do not migrate, but undergo dispersal on the other hand would seem to be strongly attracted to light. In 1966 the effect of crowding on second night individuals was investigated.

Noctua pronuba L. was released five yards from the trap after sunset at the same time each night. Numbers released were varied, and returns recorded as a percentage of the release number. Fig. 6 shows the results that were obtained. Though the greatest change occurs where release numbers are small, and the percentage returns therefore more erratic, it is significant that flight to light increases with crowding. This supports the theory that dispersal occurs in response to crowding, and is effected by flight towards the moon, up into the turbulent layers of air. The increase occurs on the graph at low concentrations, but moths in a small breeding cage are abnormally concentrated. This might affect the result, as might the fact that moths kept over the previous day might leave traces that would affect the moths kept in that cage on the next day. The experimental technique is far from perfect, but results indicate that better controlled experiments might yield fruitful results.

(4) *A further experiment on periodicity*

Fifty *Noctua pronuba* L. were released from five yards at varying times after sunset. The results are shown in fig. 7. Those records from very clear, or moonlit nights are indicated. It is apparent that the time of maximum attraction to light is soon after sunset, and the percentage return falls off slowly after this. No effects of temperature could be detected.

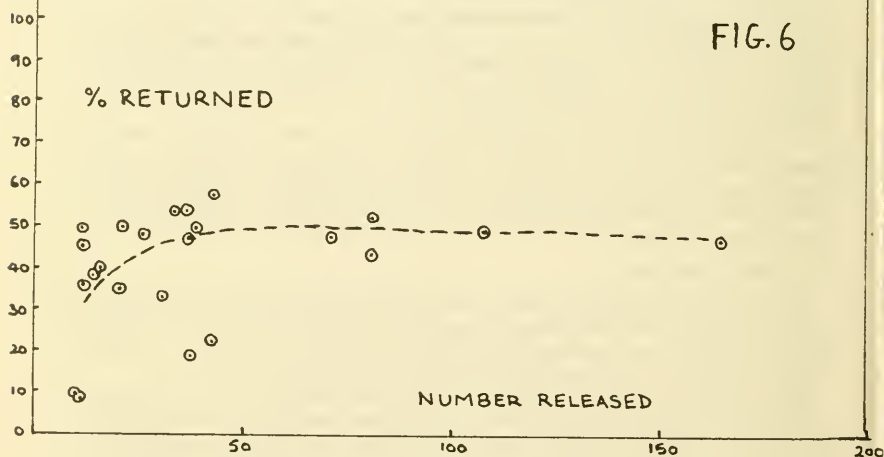
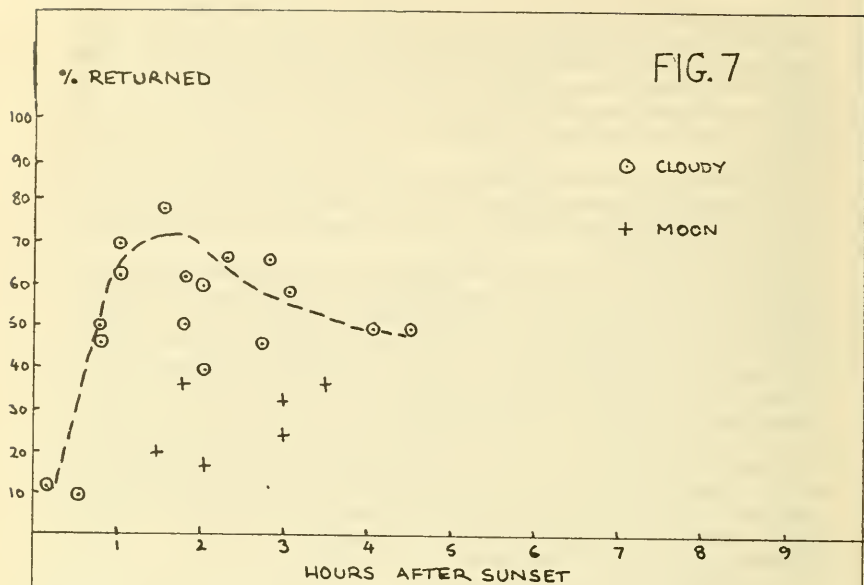
If one assumes that crowded conditions do not affect the result, then this result confirms Williams' observations that the main period of light attraction is in the second period after sunset. Although attraction dropped off after the peak, it was noted that all the moths flew, so it is possible, as Carter and Taylor have shown, that peak activity does not co-incide with peak attraction to light.

(5) *Sex proportions*

Apart from the dispersal factor, there may be another factor influencing the low proportion of females. Females are heavier than males, and their range of flight is probably less than that of the male. They have to nourish the maturing eggs and may have a stronger feeding drive than the males.

Many female moths are mated as soon as they emerge (e.g., many saturnids and apterous forms). In most species the males emerge first and will seek females when mature. Many females potentially trappable may thus be waylaid before they get to the light, and thereafter have a reinforced oviposition drive. The capture of gravid females in the trap, which later laid fertile eggs—viz: the *Amathes c-nigrum* L. from which a second generation was bred and the only two *Gastropacha quercifolia* L. being females that laid fertile eggs—suggests that this hypothesis is open to question, but in support fig. 5 is presented.

Fig. 5 shows the percentage of females in the catch of *Noctua pronuba* L. as



compared with the total number of males caught. Early in emergence there are few males in flight and the female percentage is high, possibly as few are 'waylaid'. The percentage is low during the prolonged peak of male emergence, and again rises when the males die out and the female emergence overlaps.

SUMMARY OF CONCLUSIONS

Evidence indicates that the response of moths to light is part of a local dispersal mechanism involving flight to moonlight at high density bringing moths into dispersive air currents.

This period of dispersal appears to be strongest soon after emergence when the moths are immature.

Long distance migration would seem not to involve light attraction but to preclude it.

A method is described for following population fluctuations throughout a period of time.

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Grape House, Grantchester,
 Cambridge.

27th January 1967

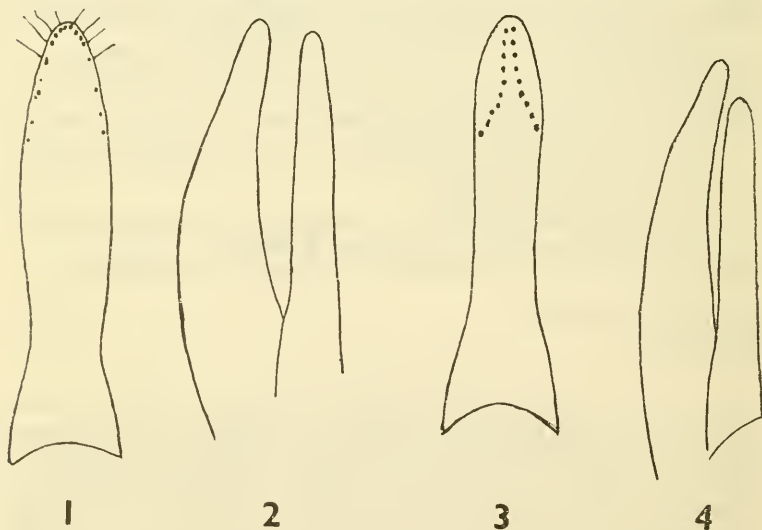
Spiders from Switzerland. Whilst on holiday in the Wengen area (Bernese Oberland), altitude 4,000 to 6,000 feet, in June 1966, my daughters, John F. Miles and I made a small collection of spiders, totalling 109 specimens belonging to 12 families. Two species were of particular interest, namely *Tarentula pinetorum* Thorell (Lycosidae), the male of which was new to the British Museum (Nat. Hist.) collection; and *Sitticus cingulatus* (Simon), of which there are no examples at all in the British Museum. Should any member of the Society be in the Alps and have an opportunity to collect spiders Mr. D. J. Clarke, of the British Museum would be very grateful for further material of these two species.—A. SMITH, 255, Kent House Road, Beckenham, Kent, 28th January 1967.

**PHILONTHUS PARCUS SHARP (COL., STAPHYLINIDAE)
IN BRITAIN**

By the Rev. C. E. TOTTENHAM, M.A., F.R.E.S.

This species was described by Sharp in 1874 (*Trans. ent. Soc. Lond.* 1874:40) from Japan; of recent years it has been found in a number of localities in Britain.

Philonthus parvus is extremely like *P. cephalotes* (Gravenhorst) and might easily be mistaken for that species. Except for the microsculpture of the head and pronotum, and the form of the aedeagus, the differences between the two species are slight and comparative. *P. parvus* is a darker insect than *P. cephalotes* and lacks the slight metallic tint usually seen on the elytra of that species. The legs are darker than in *P. cephalotes*, with all the tibiae black or nearly black; whereas in that species the anterior tibiae are usually brown or slightly infusate, rarely nearly black. The antennae have the penultimate segments slightly more transverse. The elytra are a little less closely and more uniformly punctured than in *P. cephalotes*, but more closely than in *P. pachycephalus* Nordmann. *P. parvus* may easily be distinguished from *P. cephalotes* by the microsculpture of the foreparts; the head has a very distinct microsculpture which is lacking in *P. cephalotes*. Also in *P. parvus* the pronotum has a microsculpture consisting to a great extent of sparse micropunctures, with a very fine transverse striation near the base; feeble traces of this striation may be seen elsewhere if the pronotum is viewed obliquely or with the light from the necessary direction; in *P. cephalotes*, on the other hand, the striate microsculpture is stronger and distinct all over the



Figs. 1-2. *Philonthus parvus* Sharp; 1. Paramere, 2. Apex of aedeagus, lateral view. Figs. 3-4. *Philonthus cephalotes* (Grav.); 3. Paramere, 4. Apex of aedeagus, lateral view.

pronotum. In the male, the aedeagus has the paramere resembling that of *P. pachycephalus* in contour and with the pegs arranged along the margins as in that species. There are 8–10 of these pegs, very close together, round the margin at the apex, and there are 4 or 5 others, very small, widely spaced down the side margins (fig. 1). In *P. cephalotes* on the other hand the pegs are arranged down the centre, from the apex, approximately in the form of an inverted V (fig. 3). The paramere extends nearer to the apex of the median lobe in *P. parvus* than it does in *P. cephalotes* (figs. 2 and 4).

The larger size and the closer puncturation of the elytra will readily distinguish the species from *P. pachycephalus*, which also lacks the striate microsculpture on the pronotum, and has less pronounced microsculpture on the head.

P. parvus was first found in Britain at Ulcombe, Kent, 14.iii.61 (W. I. C. Light), in chicken food. The chicken food consisted of broken grain (home grown) and sun-flower seeds (imported). There was present a high concentration of grain mites, especially *Tyrophagus castellani* Hirst. Subsequently the species has been found at Egerton, E. Kent, 30.viii.61 (J. Last); Ditchling Common, Sussex, 21.ix.63, 7.vi.64, 10.vi.65 (J. Cribb); near Chesterford, Cambs., 1962; Broad-bottom, Cheshire, 6.xii.64 (C. Johnson); Tuddenham, Suffolk (S. A. Williams); Chippenham, Cambs. (Dr. A. M. Masee); Aylesbury, Bucks., xii.64 (I. M. Grisedale).

Mr. H. Last, who sent me some of the above records, has also sent the following record of the species from Australia: Leongatha, Victoria, 28.ii.59 (B. P. Moore); as well as the following record from Japan: Numata, Honshu, 20.vii.48 and 5.viii.48 (T. Takei).

I am also indebted to Mr. Last for the recognition of the species, which I had originally assumed to be a new species.

39, Eltisley Avenue,
Cambridge,
21st February 1967

PROCEEDINGS

10th NOVEMBER 1966

The PRESIDENT in the Chair

The following new members were declared elected: Messrs H. J. Banks, P. T. Chad, M. R. Gibson, F. R. Ivymey, E. C. L. Gilbert and M. C. MacNulty.

EXHIBITS

Mr. B. GOATER—A series of *Dasypolia templi* Thunb. (Lep., Noctuidae), bred from pupae dug from under *Heracleum sphondylium* L. (Hogweed), Sumburgh, Shetland, in August 1966. The moths emerged during September, and are rather dark in coloration, their tendency to greasiness was mentioned.

Mr. T. R. EAGLES—The Hedgehog Moss, *Leucobryum glaucum* (Hedw.) Schp., from Billingshurst, Sussex, with a capsule. He explained that this moss is common in beech woods, but is rarely seen with capsules.*

* Subsequently found to be the capsule of *Ceratodon purpureus* (Hedw.) Brid. embedded in *Leucobryum glaucum* (Hedw.) Schp. (see Communications, 24.xi.66)—Editor.

COMMUNICATIONS

Referring to Mr. Eagles' exhibit, Mr. B. GOATER said that a well-known locality for this moss is the New Forest, Hants, where it could be seen with large numbers of capsules; also that when the moss produced capsules it usually seemed to produce many rather than just one, as in the exhibited example. He added that another locality was near the mouth of the Beaulieu River, also in Hampshire.

Mr. S. WAKELY commenting on Mr. Goater's earlier remarks that the *Dasyolia templi* Thunb. were greasy, said that instead of removing the bodies for cleaning, he used a hair dryer with good results. To which Mr. Goater replied that he thought this might produce some distortion. Dr. C. G. M. DE WORMS said he used a paint brush. Whatever was used added Mr. Goater, a last wash in clean liquid was necessary. He also said that when removing the bodies of the insects a careful numbering system was necessary to ensure the correct abdomen was returned to the right insect. Mr. S. N. A. JACOBS said he found a drawn glass tube and carbon tetrachloride satisfactory.

The meeting ended with an exhibition of coloured transparencies provided by several members.

24th NOVEMBER 1966

The PRESIDENT in the Chair

The following new members were declared elected: Mrs. Marianne V. Bolton, Messrs J. Cadogan, V. H. D. Bascombe, M. L. Ford, R. J. Ford, K. J. Fryer, R. H. Manning, B. P. Meade, M. J. Percival, W. J. Smellie, B. Sparks, M. T. Toogood and F. C. Unwin.

EXHIBITS

Mr. A. E. GARDNER—An example of the Rose Leaf Mantid, *Gongylus gongyloides* L. (Salt., Mantidae) from southern India. He commented on its habit of lying concealed and waiting for prey.

Mr. B. GOATER—The two mosses *Leucobryum glaucum* (Hedw.) Schp. and *Mnium undulatum* Hedw., with ripe capsules. He said that although both mosses are locally abundant they rarely produce capsules. When they do, however, it is usually in large quantities.

Mrs. J. O. I. SPOCZYNSKA—Two female *Eurypelma smithi* F. Cambridge (*Aphonopelma smithi* F. Cambridge) (Araneae, Avicularidae) from Texas, U.S.A. The males are very hard to come by. This species can live for several years and takes about 20 months to reach maturity. Their food in the wild is mainly young rodents and small birds, large beetles, cockroaches, grasshoppers and locusts. They are quite harmless, non-venomous and can be safely handled.

COMMUNICATIONS

Mr. B. GOATER asked if Mr. Eagles had been able to confirm his determination of the moss he exhibited as *Leucobryum glaucum* (Hedw.) Schp. at the previous meeting (see p. 47). Mr. T. R. EAGLES replied that the capsule did in fact belong to another moss, *Ceratodon purpureus* (Hedw.) Brid. which was embedded in the *L. glaucum*.

Mr. A. STUBBS said he was interested in information regarding Sites of Special Scientific Interest in Surrey, as the present list of sites was soon to be revised.

The authorities have to consult the Nature Conservancy about planning for any of these sites and of 37 present sites only two are noted for entomological reasons. Mr. Stubbs also wanted information for the Surrey Naturalists' Trust about the existing sites and any suggestions for new sites. He asked for members' help and said that details of any rarities would be kept confidential. He went on to say material from our field meeting reports was very helpful and asked members to submit to him their own records for eventual publication in our own Proceedings as locality lists. The Bookham Common list published by the London Natural History Society was the only current list of this nature for any locality in Surrey, and many more need publishing. These kind of publications provide a good basis for the management of commons and s.s.i. The two locality lists at present being prepared were Oxshott and Esher Commons, and Wisley Common.

Chobham Common, said Mr. R. F. BRETHERTON, should certainly be included in the list of s.s.i.; not only was it noted for entomological interest, but also for general natural history. Mr. STUBBS replied that this particular piece of information amplified his point, as Chobham Common was not at present listed as an s.s.i.

Referring to Mrs. Spoczynska's exhibit, Mr. D. STIMPSON said that these large mygalomorph spiders could defend themselves by rubbing a cloud of hairs from their abdomen, which severely irritated any predator that got them in its eyes or breathed them. A fresh moult each year produced a new layer of hairs.

It was reported to the meeting that in Dr. Masee's collection was a battered moth that had been taken from a bee-hive. Although completely de-scaled it was thought to be *Acherontia atropos* L. (Lep., Sphingidae).

8th DECEMBER 1966

The PRESIDENT in the Chair

EXHIBITS

Mr. S. A. WILLIAMS—An example of *Staphylinus fulvipes* (Scop.) (Col., Staphylinidae) taken tufting at Lyndhurst, Hants, 3.xii.66. He said it is reputed to like chalky soils (Fowler 1888, *Col. Brit. Is.* 2:251), but few records seem to confirm this.

Mr. R. F. BRETHERTON—Some half-grown larvae of *Eumichtis lichenea* Hübn. (Lep., Noctuidae) bred from ova laid by a female taken at Swanage, Dorset, 9.x.66. These larvae were kept in a room temperature of about 60°F., and are feeding up steadily, though in nature they hibernate when small, complete their growth in May or June, and produce imagines in September to October.

Mr. A. E. GARDNER—A series of the local beetle *Quedius brevis* Er. (Staphylinidae) taken in nests of the Wood Ant, Mark Ash, New Forest, Hants, 4.xii.66; together with a queen *Formica rufa* L. (Hym., Formicidae). He said that though the ants were very sluggish the beetles were active.

Mr. G. M. DE ROUGEMONT—An example of the typical form of *Carabus solieri* Deg. (Col., Carabidae) with an example of the larger form *tarrieri*, and an example of the melanic form *bonneti* Le Mout. He pointed out that the two forms had the ridges on their elytra broken and crooked, unlike the typical form. In this species he found the aberrant forms out-numbered the *forma typica*.

COMMUNICATIONS

Referring to breeding the larvae of *Eumichtis lichenea* Hübn., Mr. J. L. MESSENGER said that he had put them into the refrigerator for the winter and had successfully brought them through hibernation.

Attention was drawn by Mr. D. O'KEEFE to an advertisement in a Croydon newspaper. The advertisement had been inserted by the Greater London Council and referred to Commons. He said that some while ago a Royal Commission had been formed to enquire into the position of Commonland in England and Wales, its ownership, etc. As a result of this, all commonland must be registered within the next two years. If this was not done the rights would be lost and the commonland could be enclosed or built on. Mr. G. PRIOR added that any member of the public could go to the Council responsible and ask that a piece of commonland be registered. It was agreed in discussion that although there had been some publicity in newspapers and leaflets, and that Councils had advised farmers to give notice of commonland registration, not enough publicity had been given to the matter. It was also mentioned that commonland could be used for grazing, and provided other amenities such as peat and turf cutting; and that the appellation 'common' to a piece of land did not necessarily mean that it was commonland.

Mr. and Mrs. J. A. G. BANKS exhibited a series of slides of Indian butterflies photographed in the field.

12th JANUARY 1967

The PRESIDENT in the Chair

EXHIBITS

The PRESIDENT—An unusual Christmas card from Beirut, Lebanon, composed of leaves stuck on a card in the form of a stylised butterfly.

Mr. C. O. HAMMOND—a colour photograph of *Volucella zonaria* (Poda) (Dipt., Syrphidae) taken on ivy in a Wood Green garden in north London, 17.ix.66. This is to be used on the jacket of the new edition of *Flies of the British Isles*, Colyer and Hammond.

Mr. J. BOORMAN—Twenty-two species of the genus *Culicoides* (Dipt., Ceratopogonidae) taken during 1966 in the vicinity of the Animal Virus Disease Research Institute, Pirbright, Surrey.

COMMUNICATIONS

Mr. F. T. VALLINS said that though Mr. Wheeler had been nominated Treasurer for 1967, he would be assisting him by collecting subscriptions. He asked that these should continue to be sent to him and not to Mr. Wheeler.

The meeting was told by Mr. R. F. HAYNES of a new motorway route, planned to run through Worth and Tilgate forests in Sussex.

A new book priced 2s. 0d., said Mr. G. PRIOR had been published by the Commons, Open Spaces and Footpaths Preservation Society. He said he would obtain a copy, find the important and relevant facts from the current Acts, and comment on them at a later meeting.

Several members showed coloured slides, among these was a slide by Mr. R. W. J. UFFEN of *Laspeyresia woeberiana* Schiff. (Lep., Olethreutidae) that had emerged from a Peach trunk. He said that Peach appeared to be a new record for this species in Britain.

The President proposed that we accept an offer from the son of the late Mr. Stoughton-Harris to continue in his father's capacity as members' auditor. This was unanimously accepted.

26th JANUARY 1967

95th ANNUAL GENERAL MEETING

(with which was combined the Ordinary Meeting)

The PRESIDENT, on behalf of the Society, welcomed Dr. A. M. Massee to the meeting after his absence during his long illness.

The deaths were announced of Mr. R. M. Mere and the Rev. F. M. B. Carr.

EXHIBITS

Mr. A. E. GARDNER—A pair of the large, long-horned grasshoppers, *Sasima spinosa* Burm. (Saltatoria), from Mandang, New Guinea, 1966. These are leaf mimics and are not seen very frequently in collections.

The TREASURER gave his reports and accounts for 1966 and moved their adoption. This was seconded by Mr. A. S. WHEELER and carried unanimously.

The Council's Report for 1966 was read by the SECRETARY, who moved its adoption, Mr. T. R. EAGLES seconded the motion which was also carried unanimously.

Mr. S. A. WILLIAMS, the Librarian, reported on the past year. The report was seconded by Mr. B. GOATER and carried without dissent.

The Curator, Mr. A. E. GARDNER, read a report on his activities during 1966, which was seconded by Mr. T. G. HOWARTH and carried unanimously.

The PRESIDENT declared the following Officers and Ordinary Members of Council elected for the ensuing year: *President*, R. F. BRETHERTON, C.B., M.A., F.R.E.S.; *Vice-Presidents*, B. GOATER, B.SC., F.R.E.S. and J. A. C. GREENWOOD, O.B.E., F.R.E.S.; *Treasurer*, A. S. WHEELER; *Secretary*, B. J. MACNULTY, B.SC., PH.D., F.R.I.C., F.R.E.S.; *Editor*, F. D. BUCK, A.M.I.PTG.M., F.R.E.S.; *Curator*, A. E. GARDNER, F.R.E.S.; *Librarian*, S. A. WILLIAMS; *Lanternist*, M. SHAFFER; *Ordinary Members of Council*, D. CARTER, Capt. J. ELLERTON, D.S.O., R.N., B. W. LEONARD, F.R.E.S., A. M. MASSEE, O.B.E., D.SC., F.R.E.S., J. L. NEWTON M.R.C.S., L.R.C.P., F.R.E.S., C. G. ROCHE, F.C.A., F.R.E.S., G. C. STUBBS, T. G. TREMEWAN, M.I.BIOL., A. SMITH, A.R.C.A., R. S. TUBBS, O.B.E., F.R.I.B.A.

Under bye-law 25(b) Mr. S. N. A. JACOBS asked that Council consider a new name for the Society. It was decided by a majority vote that the next Council meeting consider the matter.

Winter outdoor meetings were recalled by Mr. R. F. HAYNES, who asked if these might be revived. The SECRETARY said few people had attended the last one organised, and Mr. T. G. HOWARTH said a coach had been hired to visit Tring. He was not sure of the attendance but would check the records. The PRESIDENT closed the discussion with the remark that this might be something Mr. Uffen might like to consider.

The PRESIDENT read a paper on the development of Petersfield and its effect on the natural history of the area (see p. 53). He then called upon Mr. R. F. Bretherton to take the chair.

A vote of thanks to Mr. Greenwood for his services during the past year was

proposed by Mr. BRETHERTON, coupled with a request for permission to publish his Address. In replying, Mr. GREENWOOD expressed his thanks and readily gave his permission.

Capt. J. ELLERTON proposed a vote of thanks to the Officers and Council, which was seconded by Mr. T. R. EAGLES. A vote of thanks to the auditors was proposed by Mr. A. SMITH and seconded by Mr. M. SHAFFER. Both were carried unanimously.

FIELD MEETINGS, 1966

BOXHILL, SURREY—17th April 1966

Leader: Mr. B. GOATER

This, the first field meeting of the season, was not warm enough to tempt the early entomologists from hibernation, and was attended by the Leader and his family, and two members of the British Bryological Society.

Boxhill is one of the richest and best worked localities for Bryophytes in the London area, and close on a hundred species were seen on the day, occupying a number of distinctly different habitats. Characteristic populations are to be found, for instance, in the short downland turf, on the steep and shaded chalk banks, on the ground under scrub, on the ground in woods, on the roots and trunks of woodland trees, beside the banks of the River Mole, and in various man-made habitats such as walls, roofs, roadsides and footpaths. One of the most interesting microhabitats to be seen at Boxhill is provided by small detached lumps of chalk under the trees on the escarpment, which are often covered by the minute mosses *Fissidens minutulus* Sull. var. *tenuifolius* (Boul.), *Seligeria paucifolia* (Dicks.) and *Tortella inflexa* (Bruch). The last named is a comparatively new British species. It was first noticed in 1951, though not recorded until 1957, and is evidently spreading rapidly in suitable habitats.

The most noteworthy find was *Tortula stanfordensis* Steere, a plant referred to by the leader in his talk to the Society (*Proc. S. Lond. ent. nat. Hist. Soc.*, 1966:11). Having been known hitherto only from California and Cornwall, it turned up on a path by the river Mole last year. So much for well-worked localities!

Other species of interest were *Dicranum bonjeani* de Not. in turf on the south slope of the downs, *D. majus* Sm. in scrub in Juniper valley, *D. montanum* Hedw. on a tree on the escarpment, *D. strictum* Schleich. ex Schwaegr. locally abundant on boughs of *Buxus* and on logs, *Entodon concinnus* (de Not.), *Isoetecium striatulum* (Spruce) on roots of *Buxus* on the escarpment, *Orthodontium lineare* Schwaegr., *Pleurochaete squarrosa* (Brid.) very rare on one chalky bank, *Scleropodium caespitosum* (Wils.) on tree roots by the Mole, *Thuidium philiberti* Limpr., *Tortella tortuosa* (Hedw.) and the liverworts *Metzgeria fruticulosa* (Dicks.), *Porella laevigata* (Schr.) and *Scapania aspera* Bernet.

It was remarked that the number of epiphytic species in the area had decreased noticeably in recent years, and some very promising looking elders yielded only a very little *Orthotrichum affine* Brid. and *Zygodon viridissimus* (Dicks.).

PRESIDENT'S ADDRESS

Read by J. A. C. GREENWOOD, O.B.E., F.R.E.S.

26th January 1967

I propose to follow the usual custom of my predecessors and add to the comprehensive report by our Council some further comments on the events of the past year.

I must first of all refer to the deaths of six of our members since Mr. Uffen spoke to you a year ago. We have already signified our respect to the memories of these members and I do not propose to ask you to stand again.

Mr. E. L. Bolton of Chipstead joined the Society in 1948 and was interested in Lepidoptera.

The Rev. F. M. B. Carr, M.A., L.Th., died on the 13th January 1967 at the age of 88. At the time of his death he was the father of the Society, having become a member as long ago as 1899. He became a Special Life Member on the 1st January 1950. He was interested in Lepidoptera and Neuroptera. Although we have not had the pleasure of seeing him at our Meetings in recent years he is remembered with affection by many of our older members and his record of more than 67 years of uninterrupted interest in entomology and in this Society is most notable. His father, Francis Carr, was a Founder Member of the Society.

Mr. Walter S. Gifford was the Ambassador of the United States in this country in the years just after the war. We were delighted when he did us the honour of accepting Honorary Membership in 1951. He was a recognised authority on the Rhopalocera of North America.

Mr. R. M. Mere died on the 17th January 1967. For many months he had been fighting bravely against increasing ill health but his death has come as a cruel shock to us all. Mr. Mere had built for himself a very great reputation as an entomologist of the highest quality. He was responsible for much research on the macrolepidoptera and microlepidoptera of these islands.

He joined the Society in 1946 and was our President in 1960. By a sad coincidence it was six years ago tonight that he delivered his Presidential address to this Society. Amongst the very valuable work which he did for the Society we also remember with gratitude his services as a Trustee, a task which he shared with Mr. Jacobs.

Mr. Mere will be very sadly missed not only by the members of this Society but in many other places where his kindness and ability gained him so many friends.

Mr. Geoffrey Stoughton-Harris was a man of many talents. He was an accountant of distinction and an ardent philatelist. His interest in butterflies was reawakened during the war when he was stationed in Wiltshire. His specimens were beautifully set and he was a painstaking and able collector. He was for many years the Society's Honorary Auditor, and successive Honorary Treasurers have benefitted from his wide experience and sound advice. He was also an enthusiastic gardener and had the pleasure shortly before his death of seeing the first blooms of an iris which he had raised from the seed resulting from a planned crossing. We are particularly glad that Mr. Stoughton-Harris's son has joined the Society and has accepted the position of Honorary Auditor in succession to his father.

Mr. E. E. Syms had been a member for over 50 years at the time of his death. This is a rare distinction in itself, showing as it does a lifetime of interest in the aims and objectives of the Society. He served as our Librarian for no less than

27 years and was President of the Society in 1935. He was appointed an Honorary Member in 1960. He was particularly interested in Neuroptera, Orthoptera and Trichoptera and was, in his early years, one of the small number who studied these orders at a time when even coleopterists were not numerous. He was a frequent exhibitor at the Society's meetings at which he showed many unusual insects. His wide knowledge was made freely available to all and his encouragement to young collectors was particularly valuable. We are most grateful to his son for presenting to the Society his father's impressive collection of lantern slides, which includes many made by the late Mr. Hugh Main.

When you indicated that you were prepared to honour me by asking me to serve as your President, I was puzzled to know what qualifications I could possess which would enable me to try to play a part in advancing the affairs of the Society. I looked back through the distinguished list of my predecessors, and it was obvious that amongst their other qualities their learning and experience in the field had commended them to you. I, therefore, felt that you wanted me to use, if I could, some knowledge of business administration to try to advance the interests of the Society and particularly to endeavour to carry forward the plans of recent Presidents to increase our membership and to make the Society more attractive to its members. I am only sorry that I have been able to achieve so little. Council's Report shows that as compared with the end of last year our numbers have decreased by eight. However, we have I hope, now reached the end of the period marked by the necessity of increasing our annual subscription which, together with the change in our method of publishing, has regrettably cost us some members whose presence we should much have liked to retain.

There is one very great difference between a Society such as ours and a professional or business organisation. A restricted budget is a common feature of life, not only amongst individuals and Societies, but even extending to Governments. As you all know, we operate on a very slender income, and we cannot employ a staff to carry out the considerable work. All this is done by some of our number, most of whom are already fully employed in their respective careers but who give most generously of their limited spare time in order to organise and perform the many tasks which are required.

Membership of Council, and even more the office of President, emphasises very clearly to the individual concerned the debt which all the members owe to those officers who do so much for us every year. It is, therefore, no empty thanks that I pay to them now.

On several occasions when I have had to be abroad, I have been forced to ask one of the Vice Presidents to deputise for me. I am most grateful to them for making good my shortcomings.

The office of Treasurer is one in which efficiency is vital to our well-being. Mr. Vallins has set an example of meticulous accuracy and I have had the comforting knowledge throughout the year that our financial affairs have been in most capable hands. The fact that, after Mr. Wheeler has taken over the Treasurership, Mr. Vallins will continue to collect our subscriptions will make a most helpful division of work and will lighten Mr. Wheeler's task, in which we wish him well.

Every year is a busy year for our Secretary and naturally this has been no exception. He is a corner-stone of our organisation and I am delighted to add my thanks to those which have been paid to him by my predecessors.

A year ago, Mr. Uffen spoke with gratitude of the work of our Editor. I think it will be obvious to all that our publications are now appearing much more closely to schedule, and the shortness of the interval between one part and the

next emphasises to us both the magnitude and the continuing nature of the work which he does for us with so much efficiency.

We can all see the results of our Curator's enthusiasm, but I am not sure that we fully appreciate how many hours he spends on our collections and on the Society's exhibit, which was so interesting a feature of our own Exhibition and subsequently that of the School Natural Science Society. We are indeed most fortunate to have so devoted and outstanding an expert in this office.

Our Librarian has had a busy year and you can all bear witness to the admirable way in which our books are maintained.

You will have noticed that I have referred to our officers in the order in which they appear on our programme, so that I now come to our Lanternist, whom I should like to thank most particularly for the great contribution which he has unobtrusively made to the success of a number of our meetings this year. When we are enjoying the slides we must not forget that Mr. Shaffer is hard at work.

Your thanks and mine are due to all our other officers and members of Council. If they will forgive me, I will treat them gregariously and simply say that I have been very fortunate in the support which I have received from every one of them.

Early in the year, Council decided that we should try to emphasise to our members, and especially to those who are not often able to attend our meetings, the way in which we used our income to try to give the maximum value for the subscriptions which we receive. I make no apology for dwelling on finance, for it must be one of our principal preoccupations.

There are three points which I should like to emphasise, although these have already been covered in the clear and detailed account of our financial situation which you have just heard from our Treasurer.

As you know, we have operated within our resources this year. A surplus of £76 may seem comfortable but, in fact, it is extremely slender. Without the Royal Society's Grant in Aid of £50, which appears in our Publications Account, our balance would have been cut to £26. We cannot expect to receive a Grant every year, and we must be able to manage without it. The contribution from the sale of Christmas cards of £55 has played a vital part in our affairs. Without this and the Grant we should have spent more than our income by about £30.

This really means that if our membership were to fall by 15 or 20, depending on whether the losses were amongst those paying full subscriptions or those paying at the country or junior rate, we should be operating at a loss. Let us all resolve that by the end of 1967 we shall have a larger membership. Our position cannot be regarded as satisfactory when an additional expenditure of only 1/- per head of our membership, which could easily arise for example as a result of a small increase in printing costs, would absorb the whole of our present margin.

Secondly, the cost of our Proceedings, including blocks, was £711. This is equal to about 24/- per head of our membership. Of course this cost per head would fall rapidly with more members.

Thirdly, the market value of our investments as at the 31st December 1966 is £73 below the cost price of £2,854. This is disappointing, but in a year when the Stock Market has been so depressed we can hardly complain. Various changes have been made in our investments, and I think we are now reasonably well balanced. We have got rid of our undated gilt-edged holdings, nowadays always a source of potential danger, and we have some equity holdings which will, we hope, gradually increase in value and give us growth in investment income.

Our meeting rooms here are, in my opinion, most convenient and suitable, and

enable us to conduct our meetings in an elegant atmosphere which is very pleasant. But West End amenities have to be paid for. However, I am sure that we are all agreed that this is money well spent, and we rejoice that we have been able to find so comfortable a home.

As a result of the letter which I sent to every member, I received a number of most helpful suggestions. Each of these has been carefully considered by Council. Several we have been able to adopt, others we hope to use in the future. Some we reluctantly decided had insufficient general appeal or would have made too heavy demands upon our finance or upon the time of those who would have had to carry them out. However, every letter which we received has been of real value to us if only by emphasising the interest of members in the well-being of the Society. I hope that the letter was also of some use in explaining to those members whom we seldom see here, because of distance, health or other calls upon their time, that we are a friendly Society and that we would like to know all our members better.

I believe that the greatest strength of our Society is this spirit of friendship and co-operation which is so evident. Amongst our members there is a store of knowledge on a variety of subjects so great that it would defy even our Curator to catalogue. All this knowledge, so much of it particularly valuable because it consists of practical experience in the field for which no book can effectively substitute, is made freely available. I think that it would be fitting if I said how much the Society as a whole owes to this evergreen enthusiasm which is always apparent and which is so invaluable to us all.

I deeply appreciate the honour of having been your President. I have achieved far less than I had hoped, but I have the satisfaction that you have elected Mr. Bretherton to succeed me. He is an entomologist of great repute and a highly qualified administrator, who will discharge the duties of his office with great distinction. I offer him best wishes for his year of duty and I am confident that he will do a great deal to advance the interests of the Society.

In his address last year, Mr. Uffen referred to the final task which a President is expected to perform when he has completed the business part of his address and has the freedom of the meeting to express his views on some chosen subject. As I have said, one of the delights of our Society is the blend of professional, expert, amateur, practical and theoretical knowledge which is possessed by our members. At the same time, this unusual combination might almost qualify to be called a Micky Finn, for it means that your President, whatever his personal qualifications, has to choose for his address something sufficiently erudite (if he is capable of it) to interest the experts, or sufficiently popular to prevent (if he wishes) the rest of his audience from sleeping. I am afraid that I shall be able to do neither.

When I agreed to allow my feet to be placed on the rung which, in the normal course of evolution, is the first step to the Presidency, I did not expect that my business life, thanks to mergers and other problems, would impinge so heavily on my leisure as in fact it has done during the last two years. I comfort myself with the illusion that had this not been the case I might have been able to produce for you tonight something more worth while.

Having said this, with your indulgence, I propose to give you some general remarks on a small area of Hampshire, which has been the base of my family for some 200 years. I have made use of my grandfather's notes of his work between 1880 and his death in 1907, and supplemented these, as far as I can, with my own knowledge from 1920, with many gaps, up to the present day.

SOME MISCELLANEOUS NOTES ON THE NATURAL HISTORY OF PETERSFIELD

For some hundreds of years Petersfield has been a Hampshire market town which has changed very little. Long before that it was a Roman settlement, and my ancestors found a well preserved Roman villa in their fields at Bramdean near Petersfield. Even earlier, the ancient Britons had their encampments; stone arrow heads and fragments of pottery are still turned up by the ploughs. During the last war our tenants decided to grow wheat on the relatively flat top of Butser Down. Although the depth of earth over the chalk is very little, quite good crops were produced, and it is believed that the last time the hill-top was under the plough was when the Romans occupied the area.

Petersfield is 25 miles south-west of Guildford and 20 miles east of Winchester. A gazetteer of 1887 shows a population of 1646, two banks, a Literary Institute, an educational establishment called Churcher's College and a Norman church.

Contrast this sleepy, large size village, in many respects little changed for two centuries, with the plans for the immediate future.

The Hampshire County Council planning policy for Petersfield states that by mid-1965 the population of the Urban District had risen to 8,350 and is expected to be 14,500 by the late 1980's, that is nine times what it was only 100 years earlier.

The town is situated in the Rother valley which forms the western edge of the Weald, and the whole district forms part of the East Hampshire area of outstanding natural beauty.

The principal natural feature is the line of the South Downs. The A3, the main London to Portsmouth road, which carries 10,000 vehicles a day, many more on a fine summer week-end, passes through the town, and then two miles to the south, goes through the gap in the downs between Wardown and Butser, which is 889 feet, and the second highest of the whole range. Two miles north of Petersfield is Stoner Hill, about half the height of Butser and, unlike the more massive downs, a heavily wooded area.

Butser Down itself has been recently purchased by the Hampshire County Council and ought to survive as a largely unspoilt area. Butser, in the days of the rabbits, had exceptionally smooth, gently sloping sides. Now the grass is longer and the bushes much more frequent, although some cattle which are grazed on the Down do help to control the growth.

How has the area changed in the last 80 years? The population, still relatively sparse, has increased five times; horse-drawn vehicles have been replaced by cars; lanes have become metalled roads; many of the larger estates have been fragmented; keepers have become rarer; Wardown has been disfigured by the dark shadow of the Forestry Commission's conifer plantations; hedges have been uprooted, and large areas of woodland have been replaced by cultivation or houses. Basically, however, the changes have not yet been as far reaching as they have, for example, in Surrey.

The most obvious change to the animal life has been the reduction in the rabbit population. When I lived in the area rabbits abounded everywhere. Now, although their numbers are slowly increasing again, one is unlikely to see more than half a dozen during a long walk. We all know the results of this reduction on the vegetation, and particularly on the Downs themselves.

Badgers were not uncommon in the past. They are not easy creatures to see, but I believe that they have become much rarer.

One of my most vivid boyhood recollections is of the enormous number of moles. From all reports they are still abundant on the farmland, but seem to be much less often seen in gardens in the vicinity of the town. We know how sensitive they are to vibration. Could it be that they dislike the tremors set up by motor traffic?

Foxes seem much more abundant than they were. Perhaps this is because the breaking up of the largest estates has left pockets of woodland which are not kept and cannot be hunted. The smaller mammals are still numerous, and although new farming methods and the removal of hedgerows has almost certainly reduced their numbers, they continue to be common enough wherever conditions are suitable.

Grass snakes and adders have always been numerous, particularly on the downland, though not so often seen. Both species are still quite plentiful.

I know very little of the birds, but my impression is that the winter of 1962-1963 did far more harm than all the changes in the countryside.

Seventy years ago, my father found red squirrels to be quite numerous. This was before their numbers were seriously reduced by some disease. In the early 1920's I used to see a few, but they were rare even before the invasion of the greys. I have not seen a red one in the area since 1924.

My grandfather was keenly interested in butterflies and moths as well as botany, and I should now like to contrast some of his notes with my own experiences in the same area.

Colias croceus Fourc., the Clouded Yellow, was recorded as extremely abundant on Butser and in the whole area in 1892 and 1895 and common in 1894. I cannot remember seeing it at all commonly before 1928. This was a year when it abounded and when I saw, but failed to catch, a female of the white form, *helice* Hübn., which had white forewings and normal, yellow hindwings.

My grandfather collected his specimens of *Limenitis camilla* L., the White Admiral, in the New Forest where it was so abundant. His only reference to this butterfly near Petersfield is that he noted it was reported in the Langrish woods in 1899, but he added that there was reason to suspect that these had been bred and released by the vicar, and he did not believe they were truly local. I have never seen the species near Petersfield.

Polygonia c-album L., the Comma, had become rare in Hampshire by the end of the 19th century, now however, the butterfly has returned and has been quite common in the last ten years.

Nymphalis polychloros L., the Large Tortoiseshell, was not uncommon. I can remember specimens in and around our garden, but I have not seen it in England since 1924, or perhaps 1923.

The finest specimen which I have seen from Petersfield is the remarkable aberration of *Nymphalis io* L., the Peacock, which was devoid of markings; the eye spots being no more than shadows. It was caught fluttering inside the french windows of a house on Stone Hill, just north of Petersfield.

Argynnis paphia L., the Silver-washed Fritillary, now seems to be quite uncommon in the area, but my grandfather records it as abundant, and in 1899 he captured an aberration which he describes as having a large cream-coloured spot on each of the wings.

Fabriciana cydippe L. (*adippe* Rott.), the High Brown Fritillary, and *Mesoacidalia charlotta* Haw., the Dark Green Fritillary, were both very common 70 years ago, and are still to be found, although the former at least seems to me to have become much scarcer.

Clossiana euphrosyne L., the Pearl-bordered Fritillary, and *C. selene* Schiff., the Small Pearl-bordered Fritillary, were extremely abundant, especially all around Stoner Hill; both now seem to be much more restricted in the number of localities, but are still quite numerous.

At this point I should like to record the capture in 1931 of a specimen of *Danaus plexippus* L., by a friend. This was outside the area I am discussing, but it has not been reported in the past and I therefore make an exception. The locality was some 12 miles north of Southampton, which may suggest the butterfly came across the Atlantic on a liner.

Melanargia galatea L., the Marbled White, is a characteristic butterfly of the chalk downs. It was abundant throughout the 1890's and was described as exceedingly common in 1899. I used to find it regularly throughout my boyhood but not in great numbers. I have not seen it in the area since the war, perhaps because I have not been in the locality at exactly the right time, but I should be surprised if it has disappeared.

Thecla betulae L., is always elusive and I have never seen it in the area. A note, undated but probably about 1890, 'Sussex Downs' probably indicates the area near Ditcham only a mile or so outside my self-appointed boundaries.

Quercusia quercus L., the Purple Hairstreak, used to be seen in profusion in Durford Wood just outside Petersfield on the road from Guildford, and quite commonly in many other places nearby. Durford Wood was sold between the wars and was split into individual building plots each of several acres. The butterfly, however, has remained. Indeed it seems to be remarkably persistent for I have seen it flying round a single oak, the only survivor for perhaps two acres of the original wood.

Calliphrys rubi L., the Green Hairstreak, has always been abundant on the Downs and two or three years ago there were tremendous numbers on the southern slopes of Butser.

Lysandra coridon, Poda., the Chalk Hill Blue, was very abundant on Butser and elsewhere in the area. It is still reasonably plentiful but certainly much less widespread. *Lysandra bellargus*, Rott., the Adonis Blue, was also found on Butser, but I have not seen it in recent years.

Plebejus argus, L., the Silver-studded Blue, was reported from Durford Wood in July 1899 and I have seen it on Petersfield Heath in reasonable numbers.

Cupido minimus Fuessl., the Small Blue, was widely distributed and common from 1895 to 1899 in June, with a large second brood on Butser in August 1896. It is still to be found on Butser but in sadly reduced numbers.

Nemeobius lucina L., the Duke of Burgundy, was very common on and around Stoner Hill and Butser. Above the great chalk pit grow as fine a display of cowslips as can be imagined and here in the 1920's *N. lucina* was to be found in swarms. It is still there, but the numbers are now quite low although the cowslips are as plentiful as ever.

The common skippers are found freely in the area and *Hesperia comma* L., the Silver-spotted Skipper, is sometimes abundant on the slopes of Butser.

I propose to deal very briefly with the moths.

I have few early records for the migrant hawks, but several *Herse convolvuli* L., Convolvulus Hawk Moth, are noted for September 1901; and *Macroglossum stellatarum* L., the Humming Bird Hawk, was very common on Stoner Hill in 1893, 1894 and 1899.

Deilephila porcellus L., the Small Elephant Hawk, is abundant on Butser.

Butser used to be a good locality for *Hemaris tityus* L., the Narrow-bordered

Bee Hawk. I remember that for two or three summers it was quite frequent on the chalk banks where the A3 passes through Butser. In, I think 1922, I found several larvae feeding on *Scabiosa pratensis* Moench. (*succisa* L.).

I never found *Cossus cossus* L., the Goat Moth, in the Petersfield area, but a nearly full-fed larva was discovered in the garden by my grandfather.

Procris statices L., the Forester, was particularly abundant on Butser and is still there in large numbers.

In some of the marshy areas, particularly near Durfold Abbey, that flimsy little moth, *Comacla senex* Hübn., the Round-winged Muslin, is extremely plentiful.

That splendid insect, *Lithosia quadra* L., the Four-spotted or Large Footman, was taken in the area on several occasions just before the turn of the century. I have not seen it in recent years.

Utetheisa pulchella L., the Crimson Speckled Footman, was taken by my cousin, Miss Puxley, at Steep near Petersfield in the 1890's.

Euplagia quadripunctaria Poda, the Jersey Tiger, has not, so far as I know, ever been taken in the area, but my grandfather was successful in breeding nine moths from ten larvae which were given to him by Mr. Arthur Robinson, and which originated from second generation ova, the progeny of a female which he had caught near Starcross.

Another speciality of Butser was *Parasemia plantaginis* L., the Wood Tiger. It was described as very abundant in the 1890's. I can never remember the moth being common, and in recent years it seems to have become quite scarce.

Arctia villica L., the Cream-spot Tiger, was reported as frequent 70 years ago, but I have not found it myself in the area.

That somewhat elusive moth, *Euphyia picata* Hübn., the Cloaked Carpet, was found regularly at Steep by my grandfather, but I have not been able to locate it.

One of my most vivid memories as a small boy is when I found seven pupae of *Griposia aprilina* L., the Merveille-du-Jour, in a single trowel-full of earth from beneath a lone oak in a field at the end of the garden.

I am no botanist but I have always been interested in the wild orchids of Britain. My grandfather's notes on the plants which he found in the area are often a good deal more detailed than those of entomological interest. I have therefore, extracted something of what he had to say on the Orchidaceae.

Anacamptis pyramidalis (L.) Rich., the Pyramidal Orchid was recorded as very abundant in the 1880's, the white variety was also common. It is still found quite frequently.

Orchis morio L., the Green-winged Orchid, another very common species in the past. Also recorded with white flowers. It is still found plentifully.

Dactylorchis maculata agg., the Spotted Palmate Orchid. This species has now been divided into *D. fuchsii* (Druce) Vermuel and *D. ericetorum* (E. F. Linton) Vermuel. I believe my grandfather's note that it was frequent must refer to the former which is very common.

Gymnadenia conopsea (L.) R.Br., the Fragrant Orchid, is common on Butser and elsewhere. A white form is also quite common. In a good year the flowers may be so thick in patches that it is difficult to avoid treading on them.

Coeloglossum viride (L.) Hartm., I have never seen in the area, but my grandfather recorded it in July 1898 a few yards across the border in Sussex. The area was part of a private estate and public access is no longer possible so the plant may well survive.

Platanthera bifolia (L.) Rich., the Lesser Butterfly Orchid, is commoner in the

north of the country. I have not been able to find this myself, but it is recorded from local bogs in 1879 and for a number of years thereafter.

Platanthera chlorantha (Cust.) Rehb., the Greater Butterfly Orchid, is very much commoner in the area and in a number of locations.

Herminium monorchis (L.) R.Br., the Musk Orchid, is not uncommon in several areas round Stoner Hill and Langrish, and also on Butser. I would describe its scent as being rather like honey. In the early summer of 1898 this orchid was extraordinarily common on a small patch of downland at Langrish. There were hundreds of plants, and not satisfied with occupying the down they invaded the neighbouring chalk pit and sprang up in every possible situation. Next year it was noted that it required a good deal of searching to find a single plant.

Ophrys apifera Huds., the Bee Orchid, was described as well distributed, with a number of the white variety, from 1884 to 1897. In my experience in recent years it could only be called scarce.

Ophrys insectivora L. (*muscifera* Huds.), the Fly Orchid, is not at all common and was rarely recorded by my grandfather. He particularly noted one plant at the chalk pit near Butser being in flower on the 8th June 1897, and again on 19th June 1898. I also found a single plant in exactly the same situation in flower on the 2nd June 1963, and as a long search of the neighbourhood did not bring any others to light I could not help wondering whether it could be the same tuber.

Spiranthes spiralis (L.) Chevall., Autumn Ladies' Tresses, is not uncommon in our area. It is a plant which seems to appear and then vanish for years. I can remember three plants which suddenly sprang up on the grassy banks beside the tennis court, but were never seen again.

Listera ovata (L.) R.Br., Common Twayblade, is still very common.

Neottia nidus-avis (L.) Rich., the Bird's Nest Orchid, was noted from several localities in 1887, but I have been unable to find it.

Epipactis helleborine (L.) Crantz., Broad-leaved Helleborine, was quite plentiful on Stoner Hill and is still there.

Cephalanthera damasonium (Mus.) Druce, Large White Helleborine, is quite common, particularly under beech trees on Stoner Hill and near Steep.

Cephalanthera longifolia (L.) Fritsch., Sword-leaved Helleborine, is more restricted, but found on Stoner Hill although I think less commonly now than formerly.

This list could probably be extended, for many orchids are surprisingly difficult to find even when one knows they are in the district. They often seem to be confined to very small areas and are absent from other spots which are apparently, exactly similar. This is true of course, of many plants. For example, *Atropa belladonna* L., Deadly Nightshade, is not common in the area. It is, of course, a large, conspicuous and quite unmistakable species. As long as I can remember, there have been three big plants on Butser. These do not seem to spread, although there are apparently acres of identical downland.

Perhaps Petersfield's greatest botanical find goes back exactly 300 years to 1667, when John Goodyer discovered a small plant rejoicing in the splendid name of the Marsh Isnardia, *Ludwigia palustris* (L.) Eu., near the great pond on Petersfield Heath. I think only three localities have ever been recorded for the plant in this country: Sussex, where it is believed to be extinct; the New Forest, where it was found in 1843, but was not seen between 1852 and 1878 when it was rediscovered. I do not know whether it is still there.

At Petersfield it was apparently not noted after its discovery in 1667 until 1835.

In 1848, when the summer was exceptionally wet, it was found there in plenty having apparently not been detected in dry years. Since then it seems to have vanished again. Writing in 1882, after mentioning repeated searches for the plant, it is noted that the shallow stream where it had been seen 'is now so circumscribed that even during the wet summer of 1879 it expanded into no marshy spots in which *Isnardia* could have a chance of growing. The stream was searched through the common and along its course downwards for about a mile but without success.'

This particular plant is likely to have had only a tenuous existence, but we, who so frequently complain that the changes and vandalism are seriously affecting our wild flowers and insects, should remember that this is no new process. Building, drainage and road construction are inevitable if our numbers go on increasing. Pollution and poisoning can be controlled. The grubbing up of hedges, replacement of mixed woodlands by plantations of gloomy conifers, mowing of banks in order to replace a profusion of wild flowers by a coarse sward of grass can be offset by comparatively little care and discrimination. This is a cause which can be won by education and propaganda in which Societies such as ours can play a part.

As long ago as 1901 it was written that 'In some of the Hampshire hangars where wild daffodils and snowdrops abounded, they are becoming scarcer every year owing to their eradication for purposes of sale and it has become necessary to have a keeper constantly on the watch in order to save the plants from total extinction.'

I think that many of us will be able to remember fields where the fritillary, *Fritillaria meleagris* L., was abundant. How few they seem to be today.

An example of the harm which can be done by selfish uprooting of wild plants is the position of that beautiful shrub *Daphne mezereum* L. which flowers in February and was not uncommon in the Hampshire woods, particularly near Selbourne and Andover. Writing in 1901 it was stated that 'there were those who could remember thirty or forty plants in a single copse.' In 1890 my grandfather found a single bush deep in the woods surrounding my cousin's house at Ditcham near Petersfield. It may still be there, for the area is not open to the public but had it not been for the systematic attack by villagers and casual visitors how many might there be today?

My purpose in presenting this collection of personal notes has been to suggest to you that in this area, which is fairly typical of quite wide stretches of Hampshire, there has been comparatively little change in the last one hundred years.

It is not too late to preserve most of this if we can only have the sense to allow space for nature as well as for the depredations of civilisation and a planned economy. It is intelligence and interest far more than money that are required.

Apart from manuscript notes, I have used three published sources:
Hampshire County Council. 1966. *Petersfield Planning Policy*.

Townsend, F. 1883. *Flora of Hampshire including the Isle of Wight*, London.

Vaughan, Rev. J. 1901. The disappearance of Plants, *Longman's Magazine*.

The Society's Publications

Back numbers of the Society's Publications still in print are becoming scarce. We regret therefore that we have had to reassess their value and new prices have been agreed. These are as follows:—

	£	s.	d.		£	s.	d.		£	s.	d.
1919-20	1	0	0	1935-36	1	10	0	1955	2	10	0
1922-23	1	10	0	1936-37	1	10	0	1956	2	10	0
1923-24	1	10	0	1937-38	2	0	0*	1957	3	0	0*
1924-25	1	10	0	1945-46	2	0	0*	1958	2	10	0
1925-26	1	10	0	1946-47	2	10	0*	1959	2	10	0
1927-28	2	0	0*	1947-48	3	0	0*	1960	2	10	0
1928-29	2	0	0*	1948-49	3	0	0*	1961	2	10	0
1929-30	2	0	0	1949-50	3	0	0*	1962	2	10	0
1930-31	1	10	0*	1950-51	1	10	0	1963, Part 1	18	0	0
1931-32	2	0	0	1951-52	3	0	0*	1963, Part 2	1	0	0
1932-33	1	10	0	1952-53	3	0	0*	1964	10	6	
1933-34	1	10	0	1953-54	1	10	0	1965	1	4	0
1934-35	1	10	0	1954-55	3	0	0*	1966	1	3	6

All other numbers are out of print, but when available mint or 1st Class secondhand 4 0 0

Other secondhand copies when available according to condition.

* These copies are very scarce and contain papers in great demand. Member's discount cannot therefore be allowed.

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2/6

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Proceedings and Transactions of The South London Entomological and Natural History Society

The correct abbreviation for THIS Vol. is:—
“*Proc. S. Lond. ent. nat. Hist. Soc. 1967*”

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R. W. J. UFFEN, F.R.E.S.

10/-

MEETINGS OF THE SOCIETY

are held regularly at the Society's Rooms, and include the well-known ANNUAL EXHIBITION, which takes place in October in the Libraries of The Royal Society and of the Geological Society of London at Burlington House, Piccadilly, by kind permission of those two Societies. Frequent Field Meetings are held at weekends in the Summer. Visitors are welcome at all meetings. The current Programme Card can be had on application to the Secretary.

COUNCIL'S REPORT FOR 1966

The Council is able to report a successful year. The Society has completed two very happy years at The Alpine Club. The membership at 31st December was four Honorary, three Special Life, 17 Life, 250 Ordinary, 255 Country and 50 Junior members—a total of 579 compared with 587 a year ago. During the year 33 members resigned, eight were struck off for non-payment of dues, and four died, but we recruited 37 new members, giving us a reduction of eight members.

In March 1966 your Council was pleased to make Dr. A. M. Massee an honorary member in recognition of his many services to the Society. Both Dr. Massee and Mr. R. M. Mere have, we regret, been seriously ill during the past eight or nine months. We wish them a speedy return to health and hope to see them at our meetings very shortly.

During the year the Society held 21 indoor meetings which included a successful programme of exhibits, discussions and lectures. We thank Mr. T. G. Howarth for his skill and ingenuity in arranging the programme.

Our slide evenings have been of considerable interest and have been notable for the extremely high quality of many of the slides. In view of the number of members wishing to show slides, Council suggest that, in order to concentrate on our objective of furthering interest in entomology and natural history, members should consider reducing the number of scenic views and similar slides, which although attractive, are not perhaps entirely appropriate if shown in large numbers.

For the summer, Mr. R. W. J. Uffen arranged a varied and attractive programme of meetings which was greatly appreciated by the members who attended. We thank him for his efforts.

The Annual Dinner was held again at Fleming's Hotel on Friday, 28th October, when one of the most successful gatherings of recent years was enjoyed by 74 members and guests.

Despite another cold and wet season, members produced some really outstanding exhibits for the Annual Exhibition which was held on Saturday, 29th October, when about 300 members and friends attended. We thank Mr. C. I. Carter and Mr. Howarth for arranging for the photographing of outstanding exhibits and Mr. D. Stimpson and his team for their efficient running of the Exhibition. We also thank the Royal Society and the Geological Society for the use of their rooms.

The special exhibits were a display of the insects of the garden of Buckingham Palace, by kind permission of Her Majesty the Queen, and a selection of insects associated with three types of man-made habitats. Both exhibits were supported by photographs and paintings and aroused considerable interest. Our thanks are due to Mr. J. D. Bradley, Mr. F. D. Buck, Mr. A. E. Gardner, Dr. B. J. MacNulty, Mr. M. T. A. Palmer, Mr. R. M. Mere, Mr. M. Shaffer, Mr. A. Smith, Mr. R. W. J. Uffen and Mr. S. A. Williams who undertook the preparation of the exhibits.

The 'man-made habitat' exhibit was subsequently shown at the School Natural Science Society's Exhibition held at Chelsea where the Society had a stand. In view of the success of this venture we propose to explore the possibility of exhibiting at future exhibitions. Thanks are due to Mr. and Mrs. W. G. Tremewan who sold a number of the Society's Christmas cards on that occasion.

As many of you may know, the Royal Society is moving to new premises next summer. It is likely that their old premises will be completely remodelled. This

work will be in progress next October, so that it is doubtful if we shall be able to hold further Exhibitions at Burlington House. We hope that the Royal Society will be able to provide accommodation at its new premises in Carlton House Terrace but we do not yet know. We may however have to find a new site and the Council would be pleased to receive suggestions.

We thank Mr. Arthur Smith for drawing the original of the Society's Christmas Card this year depicting two Chalkhill Blue butterflies at rest, and we are most grateful to Mr. Tremewan and Mr. Carter and all others who have helped to sell our cards.

The issue of the Proceedings in parts is now getting over teething troubles and regular publication by fixed dates should be achieved in 1967. This will depend largely on the flow of contributions. The main reason at one time given by our members for not publishing in our Proceedings was the length of time it took to get into print. We can now publish in three to four months. In the current year the number of parts was deliberately restricted to four in order that the expenditure on printing should not lead us to spend in excess of our income. The four parts were issued in April, May, September, and December. Part I (36 pages) contained meeting reports including the Annual Exhibition, the President's Address, Council's Report, three original papers and some notes. Part II (32 pages) included the Treasurer's Report, several short papers and an important paper by Mr. F. V. L. Jarvis on the genus *Aricia* (Lep., Lycaenidae). Because of our new system of publication we were able to publish this last paper before the appearance of a parallel continental work. Part III (32 pages) consisted of By-law amendments, Reports of Meetings, various notes and two original papers. Part IV (32 pages) contained one original paper and Reports of Meetings.

The Office of Treasurer is one of great importance to the well-being of the Society, and Council accepted Mr. F. T. Vallins' resignation with much regret. They were most grateful when he indicated his willingness to continue to collect the subscriptions to assist his successor. We are glad to inform you that this generous offer has enabled us to recruit Mr. A. S. Wheeler to the post of Treasurer with Mr. Vallins as Assistant Treasurer. We wish them both well.

Recently, at the suggestion of Mrs. T. G. Howarth, Council have arranged that light refreshments should be available before ordinary meetings. This service, which is organised by Mrs. Howarth, is still in the experimental stage, and promises to be very popular, and we are grateful to her and to Mrs. Lewis of the Alpine Club for her help in this and in other ways.

CURATOR'S REPORT 1966

Satisfactory progress has been maintained during the past year, four hundred drawers of insects now being in good order.

Work on one forty-drawer cabinet of Palaearctic Rhopalocera has been completed and it is hoped to finish the arrangement of specimens in the second cabinet early in 1967. The British Macrolepidoptera-Heterocera have now been expanded from 23 to 95 drawers in Hill units, and much of the recently bequeathed Coulson collection has been incorporated.

Although Council sanctioned the purchase of two Hill units to rehouse the British Microlepidoptera, these have not been available. This project will now be delayed until the cabinets and the new Kloet & Hincks check list are forthcoming. Six empty drawers in one of the Bright Collection cabinets have been used to

house the Leeds collection of Satyridae aberrations and the Palaearctic Lepidoptera-Heterocera have been transferred to a Hill unit.

From the above report it will be seen that the Society's collection of Lepidoptera will be in good order in the near future. Although we now possess a good representative collection there are still gaps in series and species and it is hoped that members will endeavour to remedy this.

Dr. A. M. Masee has checked the Henderson collection of Hemiptera-Heteroptera which, with the Coulson collection, is now being incorporated in our main collection. An eighteen-drawer cabinet has been repapered ready to receive the several collections of Hemiptera-Homoptera, a task it is hoped to complete during 1967. All the Henderson Coleoptera-Staphylinidae have been transferred from store-boxes to a Hill unit.

It is pleasing to record that an increasing number of members are consulting the collections, whilst Coleoptera, Diptera, Hemiptera-Homoptera and Lepidoptera have been lent for critical research. A number of members have taken advantage of the offer of duplicate Lepidoptera and it is intended to keep the two Coulson cabinets to house duplicates.

One binocular microscope has been placed on loan and thanks to Mr. R. W. J. Uffen the Henderson binocular microscope has been overhauled and is reserved for the use of members on meeting nights.

The thanks of the Society are due to the following members for notable accessions: Mr. B. R. Baker (Trichoptera), Mr. L. Christie (Mecoptera), Mr. A. E. Gardner (Coleoptera, Diptera, Orthoptera and Lepidoptera), Dr. A. M. Masee (Coleoptera and Hemiptera-Heteroptera), Mr. B. Morrison (Coleoptera) and Mr. S. A. Williams (Coleoptera). A representative collection of Berkshire Odonata has been presented to the Newbury Museum.

Mr. L. Christie, the Assistant Curator, has rendered valuable help especially with the onerous task of repapering cabinet drawers.

LIBRARIAN'S REPORT

The binding of journals is going ahead slowly, and we have received 12 volumes from Messrs. Fox. These are popular British journals which are bound at the expense of a few members who generously subscribe to the cost. In getting the journals ready for binding I have noticed one or two parts are missing: these will have to be purchased. All journals will now be stamped S.L.E.N.H.S. as soon as received.

It is suggested that continental journals (of which we have several years unbound) should not be bound until we receive offers from members to bear the cost. Meanwhile they will be kept in chronological order behind a transparent plastic blind.

The new books, which had been accumulating over the past few years without being available to members, due to lack of dust free storage space, have now been housed in the bookcases, whilst continental journals from these shelves have been found a new home behind the blinds. Our present blind is working very well and the books appear to be free of dust.

The Assistant Librarian is building up a library of reprints along the lines suggested by Council last year and this is now available. It is hoped the formation of this library of reprints will encourage members to give us copies of published papers as our present collection is very small.

Exchange arrangements have been agreed with The Cardiff Naturalists Society.

A catalogue of the library was published in The Transactions for 1959, since then many new books and separates have been kindly presented, including in the last year the following volumes: Jeannel, R., *Introduction to Entomology* presented by F. D. Buck; Frohawk, F. W., *The Complete Book of British Butterflies* presented by H. G. Tunstall; Michaelis, H. N., *Lepidoptera of Rostherne Mere*, published by Manchester Entomological Society, presented by S. N. A. Jacobs; Ove Høegh-Guldberg, *North European Groups of Aricia allous, G.-Hb. Their variability and relationship to A. agestis Schiff.*, 2 copies, presented by S. N. A. Jacobs and T. R. Eagles; Fraegri, K., *Principles of Pollination Ecology* presented by S. N. A. Jacobs; Frisch, Karl von, *The Dancing Bees* presented by S. N. A. Jacobs; Meyrick, E., *Revised Handbook of British Lepidoptera* presented by H. G. Tunstall; Munro, J. W., *Pests of Stored Products* (Rentokil Library Series) presented by S. N. A. Jacobs; Chandler, T. J., *The Climate of London* presented by F. D. Buck; Moucha, J., *Beautiful Moths* presented by S. N. A. Jacobs; Brightman, F. H. and Nicholson, B. E., *Oxford Book of Flowerless Plants* presented by T. R. Eagles.

We continue to receive the usual journals.

I am most grateful for the help given by the Assistant Librarians, Mr. D. J. Carter and Miss C. Wagner.

Quedius (Microsaurus) scitus (Grav.) (Col., Staphylinidae) a teratological specimen. On 18.vi.66 I took a single example of this interesting beetle whilst sieving rotten wood in the New Forest, south Hampshire. The insect appeared to be quite normal until the aedeagus was removed for examination, when I was surprised to find that it possessed two parameres of the usual, characteristic *Q. scitus* shape, joined together at the base and wrapped around the median lobe.

Quedius scitus is one of our rarer Quediini, recorded from several English counties, mainly in the south, but as far north as Cumberland (Donisthorpe in Fowler, 1913, *Col. Brit. Is.*, 6:231). It is usually associated with rotten wood or under bark and in the present writer's experience is found singly. Donisthorpe (1939, *Col. Windsor For.*, p. 39) also found it in company with the ant *Lasius brunneus* (Lat.), whilst in Denmark Hansen (1952, *Danmarks Fauna*, 58:138) mentions *L. brunneus* (Lat.) and *Formica rufa* L., as hosts. In addition to the New Forest I have also taken the species at Tuddenham, west Suffolk, and Chippenham Fen, Cambs.—S. A. WILLIAMS, 79, Cedar Drive, Sutton at Hone, Kent, 16th March 1967.

Hermaeophaga mercurialis F. (Col., Chrysomelidae). An investigation into factors governing the distribution of this species is being conducted by Dr. R. C. Welch. Any records of this beetle would be of considerable help to him, and should be sent to Dr. Welch, The Nature Conservancy, Monks Wood Experimental Station, Abbots Ripton, Hunts.—Editor.

TREASURER'S REPORT FOR 1966

The first and inevitable reaction to the increased subscription rates, two years ago, was a sharp fall in membership, but this was not as great as might have been expected. The drop was quickly made good and there are now indications of continued steady progress. Nevertheless, every opportunity should be taken by members to make new introductions to the Society. As will be seen from the accounts, we are keeping expenditure within our income, but great care is necessary and the amount to spare at the end of the year is not altogether satisfactory. This position can best be improved by a determined effort on the part of every member to enrol at least one new member.

BALANCE SHEET

During the year there were two changes in our Investments. Our holding of £350 in 5% Defence Bonds, becoming due for redemption, was replaced by National Development Bonds and a balance of £330.15.7 in the Reserve Fund has been invested in 5% Exchequer Stock 1967. Our total securities now stand at £2,854, but owing to a slight fall in values, the current market price is a little below that figure.

There is very little change in the other items. The stock of Christmas Cards remains at £100. We have £285 in the bank, which is nearly £40 more than last year, but against this there is an outstanding debt, estimated at £115, for the cost of Part 4 of the year's Proceedings, which had not been invoiced at the end of the year. A sum of £23.3.0 is also ear-marked for the Reserve Fund, this being the balance not yet invested.

The total of the Special Funds has increased, by donations and interest, to £578, despite a reduction of £26 in the Library Fund, £31 having been spent on new books. The binding of periodicals cost £21, most of which was recovered from members who generously contribute to the binding scheme. The fund benefited by entrance fees to the extent of £13.

The General Fund has been increased by £76 and now stands at £2,147.

GENERAL INCOME AND EXPENDITURE ACCOUNT

Subscriptions were up by £63 and interest on Securities by £38, this being the first full year since our investments were changed. £20 and £10 were transferred to the Housing Fund and Reserve Fund respectively. The profit on Christmas Cards was within a few shillings of last year's figure. The sale of Proceedings shows a severe fall of £65, mainly due to the falling-off in sales of the Buckingham Palace Gardens volume. However, we received a welcome Grant-in-Aid of £50 from the Royal Society, for which we are most grateful.

On the Expenditure side, the cost of producing the Proceedings was, as always, the heaviest item, but the figure of £660 did include the cost of Part 3 and the Index of the 1965 volume, in addition to the whole of the 1966 volume, except for the Index, which has not yet appeared. The high postage item of £60, which is charged to the Publications Account, stresses the inevitable drawback of distribution several times during the year, with postal charges at their present high level.

Mr. J. L. Messenger and Mr. A. G. Stoughton-Harris, the honorary auditors, certify that they find the accounts to be correct and our thanks are due to them for their kind offices.

GENERAL INCOME AND EXPENDITURE ACCOUNT—Year ended 31st December, 1966

INCOME

Subscriptions	£	s.	d.
Interest on Investments	1069	8	0
Deposit Interest	147	0	6
Christmas Cards—Profit	1	12	11
	55	2	6

EXPENDITURE

Rent	£	s.	d.
Insurance	286	0	0
Secretarial Expenses	10	18	9
Editorial Expenses	20	15	3
Treasurer's Expenses	5	0	7
Stationery	10	19	8
Subscriptions to Societies	41	0	11
Lectures	10	10	0
Annual Dinner and Exhibition	47	1	0
Bank Charges	31	7	0
Miscellaneous	42	10	0
Publications	660	9	1
Housing Fund	20	0	0
Reserve Fund	10	0	0
Excess of Income over Expenditure	76	11	8
	£1,273	3	11

PUBLICATIONS ACCOUNT

TO Printing	£	s.	d.
Proceedings	688	19	7
List of Members—Supplement	3	11	6
Amendments to Bye Laws	3	17	6
Blocks	22	1	11
Postages	60	3	6
	£778	14	0
BY Sales	£	s.	d.
Proceedings etc	45	9	11
Exhibition Report	8	6	6
Donations	14	8	6
Grant—Royal Society	50	0	0
Income & Expenditure Account	660	9	1
	£778	14	0

CHRISTMAS CARDS ACCOUNT

TO Stock at 1st January 1966	£	s.	d.
Printing & envelopes	100	0	0
Blocks	37	10	0
Postages	1	0	8
Income & Expenditure Account—Profit	3	9	9
	55	2	6
	£197	2	11
BY Sales	£	s.	d.
Stock at 31st December 1966	97	2	11
	100	0	0
	£197	2	11

ANNUAL EXHIBITION

29th October 1966

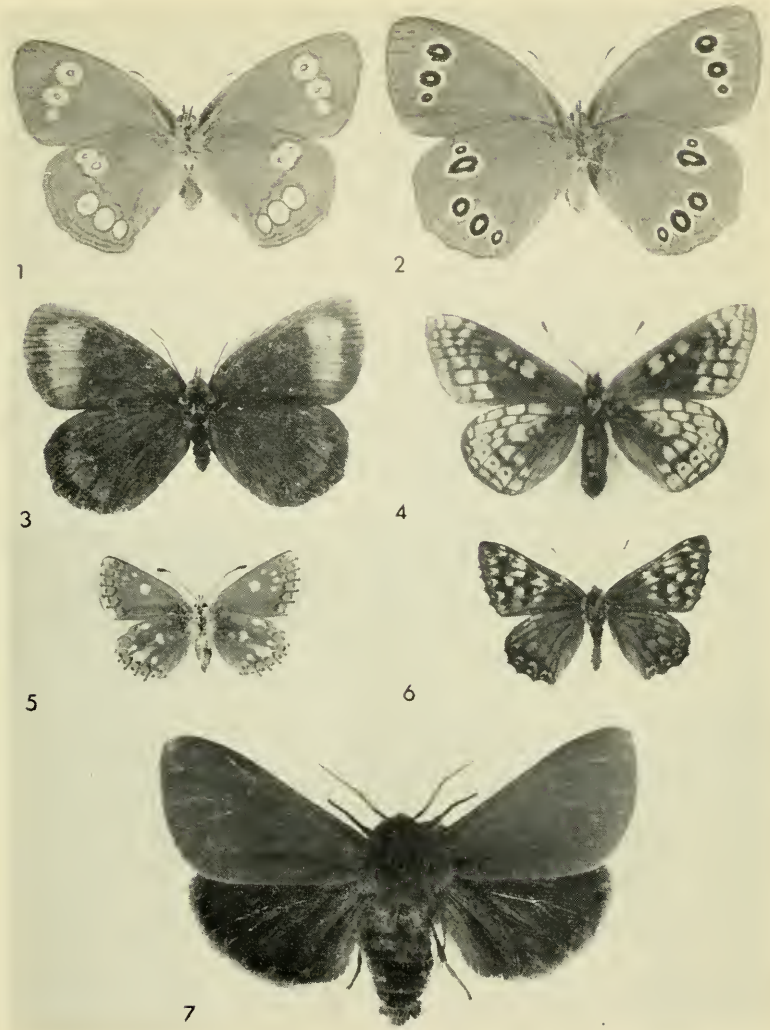
This may well have been the last Annual Exhibition the Society is likely to hold in Burlington House. The Royal Society, who for so long have been our generous hosts, along with the Geographical Society, are moving their rooms. Our association with this venue goes back 21 years to 1945 and it has seen perhaps the finest exhibitions both in attendance and interesting exhibits in the history of the Society. It is regrettable that in both these aspects this event has slowly, but noticeably, declined over the past three or four years; until this year there were only 70 exhibits. No doubt Council will find suitable accommodation for next year's exhibition, and no doubt the attendance and number of exhibits will again reach the peak figures we obtained in the late 1950's. One thing is certain though: the standard of our individual exhibits has always been maintained.

Two special exhibits were arranged this year by the Council; both were originally devised for the Society's exhibit at Alexandra Palace for National Nature Week this past summer, but unfortunately charges for stand space were so high that societies like ourselves were unable to meet them; thus only private enterprises and big corporations were able to exhibit.

The man-made habitats exhibit put up by Dr. A. M. MASSEE, Mr. A. E. GARDNER and Mr. A. SMITH, covering such habitats as canals, quarries, etc., was a polished and beautifully presented exhibit that would have been a credit to any exhibition; and Alexandra Palace lost a valuable contribution to an exhibition which should not have been allowed to become solely commercial.

The second exhibit consisted of the entomology of Buckingham Palace garden, prepared by Messrs. BRADLEY, BUCK, GARDNER and MERE, and was broadly on the lines of the exhibit of Coleoptera and other Orders of Wood Walton Fen, which formed part of our very successful exhibit at the first National Nature Week Exhibition in Vincent Square in 1963. Among the material shown was the moth *Monochroa hornigi* Staud. (Gelechiidae) recorded from nowhere else in the British Isles, and the beetle *Longitarsus waterhousei* Kuts., a scarce chrysomelid on *Mentha aquatica* L., but here found on cultivated mint.

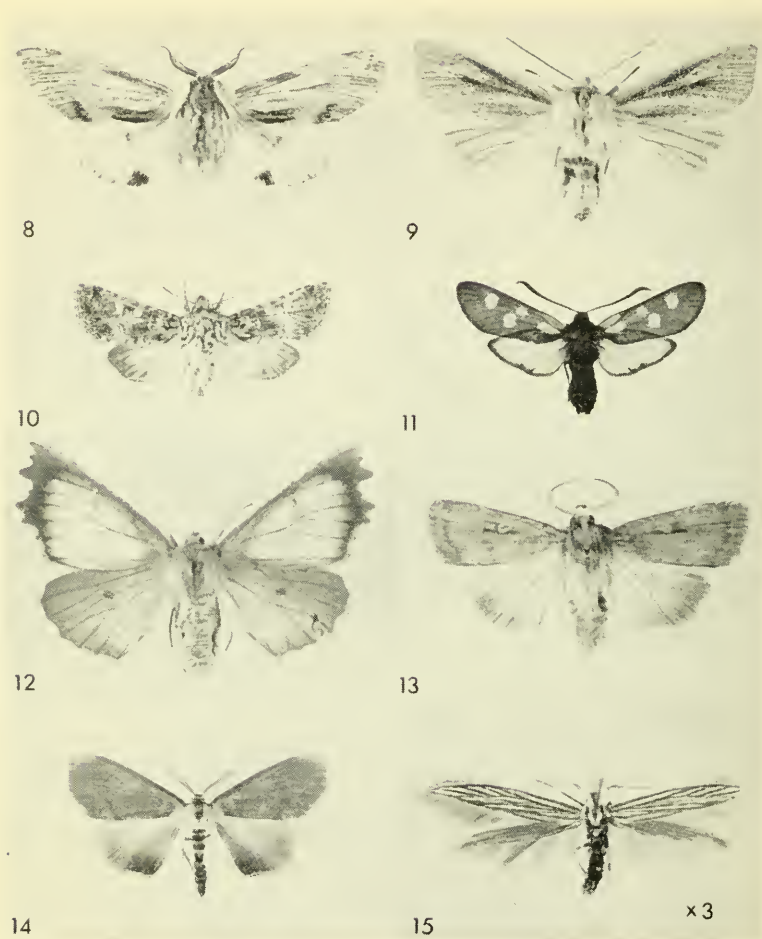
Following the pattern of previous exhibitions the majority of the exhibits were of Lepidoptera, which included a large number of aberrations. Once more a substantial exhibit from the Rothschild-Cockayne-Kettlewell collection was presented by Mr. A. L. GOODSON, and included two additions to the British list. (1) A series of a new species, *Autographa gracilis* Lempke, taken in Wicken Fen, Cambs, Barton Broad, Norfolk and Askham Bog, Yorks, with an example from Holland, sent by the authority for the species, as a typical example. *A. gracilis* Lempke is very similar to *A. festucae* L.; a series of the latter was also shown for comparison. (2) A newly authenticated addition, *Anaitis praeformata* Hübn., a species discovered among a series of *A. plagiata* L. in the collection of Mr. W. I. Bowden, who took the moth in Lawrenny Park, near Pembroke, in 1946. A second example was purchased at the sale of the Buckstone collection in 1952, but was not included in the Tring collection until further proof of its occurrence in Britain was obtained. The Welsh example would seem to furnish the proof that this insect does fly with *A. plagiata* L. A search among the *A. plagiata* L. in existing collections may reveal further examples. The only mention of *A. praeformata* Hübn. in the British Isles in literature is by Stephens (1829, *Ill. Brit. Ent. Haust.*), who says 'supposed to have been taken at Coombe Wood'. Mr. Bowden



(Photographs by Mr. D. J. Carter)

ANNUAL EXHIBITION, 29th October 1966

1. *Aphantopus hyperantus* L., an unnamed aberration, Major A. E. Collier;
 2. *Aphantopus hyperantus* L. ab. *lanceolata* Shipp, Mr. G. A. Cole; 3. *Erebia aethiops* Knoch, Rear Admiral A. D. Torlesse; 4. *Euphydryas aurinia* Rott., Mr. A. D. A. Russwurm; 5. *Aricia artaxerxes* F., Dr. M. W. Harper; 6. *Hamearis lucina* L., Mr. A. D. A. Russwurm; 7. *Arctia caja* L., Mr. T. W. Harman.



(Photographs by Mr. D. J. Carter)

ANNUAL EXHIBITION, 29th October 1966

8. *Hoplitis milhauseri* F., Mr. A. R. Pickering; 9. *Rhizedra lutosa* Hübn. ab. *postradiata* Cockayne, Mr. B. K. West; 10. *Hadena lepida* Esp., Mr. J. L. Messenger; 11. *Zygaena hybrid inversa* Tutt, Mr. W. G. Tremewan; 12. *Gonodontis bidentata* Clerck ab. *fenestrata* Cockayne, Mr. B. K. West; 13. *Coenophila subrosea* Steph., Mr. R. J. Revell; 14. *Plagodis dolabraria* L., Mr. L. W. Siggs; 15. *Coleophora serpylletorum* Hering, Mr. H. N. Michaelis.

presented his specimen to the National collection. The rest of the exhibit included 25 Rhopalocera, among which was a mixed gynandromorph male *Colias croceus* Fourc. ab. *helice* Hübn. with orange scaling, from Littlehampton, Sussex, 20.ix.49; and the following moths taken in mercury vapour light traps: near Tring, Herts, A. L. Goodson, *Leucania unipuncta* Haw., 1.x.66; *Ochropleura plecta* L. ab. *rubricosta* Fuchs., 11.vii.66; *Noctua pronuba* L. ab. *hoegei* H.-S., 28.viii.66; *N. pronuba* L. ab. *fumata* Cockayne, 21.viii.66; and *Ectropis bistortata* Goeze ab. nov., melanic, Geescroft, 2.viii.65; *Notodonta ziczac* L. ab. nov., melanic (bred from a trapped female), near Tring, August 1966, D. Read; *Plusia interrogatoris* L. melanic, Rannoch, Perthshire, July 1963, H. B. D. Kettlewell; and *Epirrhoe alternata* Müll., somatic mosaic, Arundel, Sussex, Haggitt origin, bred 1965, H. B. D. Kettlewell.

In Mr. J. L. MESSENGER'S exhibit were, among other things, two cases of Lepidoptera taken during the year at Witley, Surrey, including *Celerio livornica* Esp. (*lineata* F.), a melanic *Notodonta trepida* Esp. (*anceps* auct.), a fine dark example of *Hadenx lepida* Esp. (Pl. II, fig. 10) and *Alcis repandata* L. ab. *conversaria* Hübn., the last thought to be new to Surrey.

Some attractive aberrations of *Melanargia galathea* L., were shown by Mr. N. A. WATKINS consisting of two males with all black scaling replaced by bronze-brown, and one male with part of the right forewing bleached to light bronze, both from Gloucestershire; nine male ab. *valentini* Williams, three from Somerset and six from Gloucestershire; three female ab. *valentini* Williams, two from Somerset and one from Gloucestershire, including an extreme form, which is rare in the female among the Somerset examples; one typical male ab. *nigricans* Culot, probably the heterozygous form; one male ab. *nigricans* Culot with asymmetrical hindwings, the right having enlarged white marginal wedges, the left having a heavily scaled and enlarged black suffusion round the marginal area. On the underside of this last specimen, the right hindwing has typical ab. *nigricans* black markings, but the left hindwing, although aberrant, has no trace of them. It appears therefore to be ab. *nigricans* on the right side only.

To illustrate the ability of both plants and insects to inhabit land exploited and abandoned by man, Mr. G. PRIOR produced an exhibit of 15 macrolepidoptera and listed 74 plants. The area concerned consisted of approximately eight acres of disused gravel pit at Rickmansworth, Herts, subsequently used as a Council rubbish tip. When filled the site had been covered with earth of a kind different from the surrounding area and left to develop.

Another moth previously unrecorded in this country, *Hoplitis milhauseri* F. (Notodontidae) was shown by Mr. A. R. PICKERING (Pl. II, fig. 8). He took a male at mercury vapour light at Aldwick Bay, Bognor Regis, Sussex, on the night of 11-12.vi.66. According to Seitz its distribution is Central and Southern Europe, but it is far from common. Dr. C. G. M. de Worms has taken it in southern Spain and in Denmark where it is a comparative newcomer. It is a most spectacular insect, feeding exclusively on oak; and in recent years has been spreading its European range, particularly towards the north of France. The meteorological details (Thorney Island) are as follows. 10th June: light north-easterly wind becoming moderate, occasionally easterly; temperature maximum 26.7°C, minimum 16.9°C. 11th June: wind light or moderate easterly, southerly for a time during the afternoon; temperature maximum 21.3°C. Night of 11-12th June: surface wind mainly light easterly (less than 10 knots).

Among the aberrations of *Aphantopus hyperantus* L. shown by Mr. G. A. COLE, was a *lanceolata* Shipp which he took in the New Forest, Hants, 10.vii.66

(Pl. I, fig. 2). Another series, by Major A. E. COLLIER, showed the genetics of an unnamed aberration in which the outer gold rings of the ocelli on the underside have encroached on the inner black ring, in some cases the black ring has entirely disappeared, resulting in a series of white centred gold discs (Pl. I, fig. 1). Breeding results showed this aberration to be a simple recessive.

A most interesting and attractive series of three new aberrations of *Callimorpha jacobaeae* L. formed part of an exhibit by Mr. R. W. WATSON. They were ab. *coneyi* Watson (Pl. III, fig. 1), ab. *intermedia* Watson, (Pl. III, fig. 2), and ab. *nigrofimbriata* Watson (Pl. III, fig. 3); together with a typical example (Pl. III, fig. 4) from the same brood. These were the progeny of a feral female caught by a schoolboy in Dorset, and which laid eggs in a jam jar before being released. The moth appeared to be of a form similar to ab. *coneyi*, if not quite that form; the male with which it paired is, of course, unknown. Seventy larvae were reared on groundsel, 43 by Mr. D. E. Dodswell and another local entomologist, who together obtained 13 moths. From these, one pairing was obtained and five pupae reared. Mr. A. W. Coney obtained 20 pupae from the remaining 27 larvae and gave ten of these to the exhibitor, who took two pairings from the brood, plus one crossed with a feral male. From these, 332 pupae were reared. Mr. Coney also took two pure and one cross pairings, and obtained 334 pupae. Full details and descriptions of each of the new aberrations have been published in the *Ent. Rec.*, 79: 33-35. The Society's grateful thanks are due to Mr. Watson and Mr. S. N. A. Jacobs for their permission to publish the plate of these insects, and in particular to Mr. Jacobs who arranged for our plates to be printed along with those for the *Entomologists' Record*, thus saving the Society considerable expense. The excellent coloured drawings from which the plate was produced were executed by Mr. A. D. A. Russwurm.

An example of *Nymphalis polychloros* L. was shown by Mr. R. M. WILLIAMS, which was taken on the inside of a window at Godalming, Surrey, 19.vii.64.

The rare migrant *Leucania loreyi* Dup. was shown by Mr. L. W. SIGGS, taken in a mercury vapour light trap at Minstead, Hants, 11.xi.65.

Rear Admiral A. D. TORLESSE included in his exhibit an extreme aberration of *Erebia aethiops* Knoch from Inverness-shire, 19.viii.66 (Pl. I, fig. 3). All the black spots are absent, with the exception of a minute black ring round each white pupil; in addition the fulvous band on the forewings is pale.

Two melanic female *Euphydryas aurinia* Rott (Pl. I, fig. 4), bred from a short series of larvae taken on Hod Hill, Dorset, which emerged on 1 and 3.vi.66, were among the Rhopalocera which comprised the exhibit of Mr. A. D. A. RUSSWURM. Another nice melanic which Mr. Russwurm showed on behalf of Mr. H. G. M. MIDDLETON was an example of *Hamearis lucina* L. (Pl. I, fig. 6) with black hindwings and the markings partly obscured on the forewings. This insect was taken in the New Forest, 22.v.66.

Mr. F. V. L. JARVIS showed series of *Aricia* from northern and southern Britain and from Scandinavia, to illustrate the discovery that all the univoltine northern British forms are conspecific with the continental species *A. allous* Hübn. These include both the Scottish form *artaxerxes* F. (having a forewing white discoidal spot) and the northern English univoltine form with a small black discoidal spot and hitherto not clearly distinguished from *A. agestis* Schiff. Since the name *artaxerxes* antedates *allous*, all the northern and montane univoltine forms designated by one or other of these names will have to be regarded as subspecies of *artaxerxes*. This is specifically distinct from *A. agestis*, which occurs in southern England, southern Scandinavia and widely throughout



From the original watercolour drawing by A. D. A. Russwurm.

New aberrations of *Callimorpha jacobæe* L.

- | | |
|----------------------------------|--|
| 1. ab. <i>coneyi</i> Watson. | 3. ab. <i>nigrofimbriata</i> Watson. |
| 2. ab. <i>intermedia</i> Watson. | 4. typical specimen from the same brood. |



Europe; and so one consequence of this study has been to add a butterfly species to the British list. For full details of this work see Høegh-Guldberg, 1966, Northern European groups of *Aricia allous* G.-Hb. their variability and relationship to *A. agestis* Schiff., *Natura Jutlandica* 13:1-184; and Jarvis, 1966, The genus *Aricia* (Lep., Rhopalocera) in Britain, *Proc. S. Lond. ent. nat. Hist. Soc.*, 1966: 37-60.

Of particular interest in the light of the recent extensive work on this and allied species by Mr. F. V. L. Jarvis and Høegh-Guldberg, were the *Aricia artaxerxes* F. (Pl. I, fig. 5). The material, shown by Dr. M. W. HARPER, was taken in Inverness-shire during July 1965.

Arctia caja L. is usually represented by some striking aberrations, and perhaps the most striking this year was the example in the case put down by Mr. T. W. HARMAN (Pl. I, fig. 7).

A small exhibit by Mr. B. K. WEST contained two attractive aberrations, one *Rhizedra lutosa* Hübn. ab. *postradiata* Cockayne from Dartford marshes, Kent, 7.x.66 (Pl. II, fig. 9); and the other *Gonodontis bidentata* Clerck ab. *fenestrata* Cockayne (Pl. II, fig. 12) bred from a feral larva which emerged 4.v.66.

Mr. R. J. REVELL exhibited among other species an example of *Coenophila subrosea* Steph. (Pl. II, fig. 13) taken in Wales during 1965. The first British specimen for 100 years.

From his mercury vapour light trap at Minstead, Hants, Mr. L. W. SIGGS produced an aberration of *Plagodis dolabraria* L. with the forewings deep golden-brown, and without the usual lines; the hindwings were brownish, with an indeterminate dark brown basal patch (Pl. II, fig. 14). This insect occurred on 11.vi.66

One has come to expect a fine display of Zygaenidae from Mr. W. G. TREMEWAN, and again this year a number of interesting series were shown. Among these was a female hybrid *inversa* Tutt (Pl. II, fig. 11), the result of a pairing between *Zygaena lonicerae* von Schev. s.sp. *jocelynae* Tremewan male and a *Z. filipendulae* L. s.sp. *anglicola* Tremewan female from Ranmore Common, Surrey.

A long series of *Cryphia muralis* Forst s.sp. *westropi* C. & W. from Co. Cork, Ireland, was shown by Mr. A. J. WIGHTMAN. This series contained insects collected during 1965 and 1966. Among these examples were jet black, deep jade green and deep olive green forms, several colour variants of ab. *similis* C. & W. (Cork *impar* Warren), and numerous colour forms. Also, for comparison with the Cork insects, a series of the same subspecies from Co. Kerry taken by Mr. H. C. Huggins, and a long series of English examples of *C. muralis* Forst from many localities, including s.sp. *impar* Warren, from Cambridge, and its aberration *glauca* Cockayne.

The microlepidoptera seldom receive the same amount of attention that is given to the macros, but Mr. H. N. MICHAELIS produced an exhibit which contained a number of the scarcer and more local species, and which included an example of *Coleophora serpylletorum* Hering (Pl. II, fig. 15).

Mr. E. C. PELHAM-CLINTON exhibited British *Elachista* species which he had bred during the year; among these were examples of *E. cerusella* Hübn. from Dumfriesshire bred on *Phalaris arundinacea* L., a species not previously recorded from Scotland. Local species shown were *E. paludum* Freyer, from Surrey, on *Carex paniculata* L.; *E. cinereo-punctata* Haw., from Caenarvonshire larvae on *Carex serotina* Merat, collected by Mr. H. N. Michaelis; and *E. gleichenella* F., from Surrey on *Carex paniculata* L. and from Inverness-shire on *Luzula pilosa* (L.) Willd.

A most interesting exhibit was provided by Mr. S. WAKELY who showed many of the species that were the subject of notes that were written for the *Entomologists' Record* during the year.

Staphylinid Coleoptera were exhibited by Mr. S. A. WILLIAMS, all of more than usual interest. The most outstanding species being *Velleius dilatatus* (F.), a species usually associated with the nests of hornets, but very rarely found, the exhibited example however was taken at a 'cossus tree' in the New Forest, Hants, 6.vii.66. Other particularly noteworthy species in his exhibit were *Bolitobius cingulatus* Man. also from the New Forest, 30.iv.66, taken in carrion, a most unusual situation; *Staphylinus erythropterus* L., from the edge of a sphagnum bog in the New Forest, 17.vii.66; and *Quedius brevicornis* (Thoms.), taken in an old nest of *Vespa crabro* L., the common hornet, also in the New Forest, 17.ix.66.

The following members and friends contributed to the success of the exhibition with their exhibits, which unless otherwise stated were of Lepidoptera: Sir Eric Anson, K. E. J. Bailey, Mrs. B. A. V. Bailey, J. V. Banner, A. G. M. Batten, Mrs. M. V. Bolton, S. R. Bowden, B. Boyce (Diptera), J. D. Bradley, R. F. Bretherton, F. D. Buck (Coleoptera), J. M. Chalmers-Hunt, R. G. Chatelain, H. E. Chipperfield, G. A. Cole, Major A. E. Collier, S. Coxey, P. W. Cribb, R. P. Demuth, R. C. Dyson, J. Eagles (Fungi), T. R. Eagles (Fungi), A. M. Emmet, L. J. Evans, A. E. Gardner (Odonata, etc.), P. A. Goddard (Photographs, Lepidoptera), A. L. Goodson, J. A. C. Greenwood, G. M. Haggitt, T. W. Harman (Lepidoptera and Coleoptera), Comdr. G. W. Harper, Dr. M. W. Harper, C. R. Haxby, R. Hayward, G. E. Hyde (Original drawings of Lepidoptera), F. V. L. Jarvis, Major-Gen. Sir George Johnson, R. P. Knill-Jones, S. A. Knill-Jones, C. G. Lipscombe, R. I. Lorimer, Dr. A. M. Masee (Coleoptera and Hemiptera), R. M. Mere, J. L. Messenger, H. N. Michaelis, E. C. Pelham-Clinton, A. R. Pickering, G. Prior, R. J. Revell, T. S. Robertson, A. D. A. Russwurm, L. W. Siggs, E. C. L. Simson, A. Smith (Drawings), R. E. Stockley, the late G. Stoughton-Harris, A. Stubbs, Rear Admiral A. D. Torlesse, W. G. Tremewan, M. W. F. Tweedie (Photographs), R. Tubbs, F. T. Vallins (Fungi and Lepidoptera), S. Wakely, D. H. Walker, J. R. Walker, N. A. Watkins, R. W. Watson, B. W. Weddell, B. K. West, L. S. Whicher (Photographs, Botany), A. J. Wightman, R. M. Williams, S. A. Williams (Coleoptera), Dr. C. G. M. de Worms.

The Society's grateful thanks are due to Mr. D. J. Carter who produced the photographs for the plates, and to Mr. T. G. Howarth for his assistance in selecting the subjects for photography.

LEPIDOPTERA DISTRIBUTION MAPS SCHEME

J. HEATH

The collection and publication of information on the distribution of Lepidoptera in the British Isles has been a major activity of entomologists for many years. This information is widely scattered in museums, private collections and literature, both published and unpublished. If all this were put together in the form of distribution maps and published as an *Atlas*, an important contribution would be made to the study of British Butterflies and Moths. The Biological Records Centre at Monks Wood therefore proposes to organise a Distribution

Maps Scheme and asks all lepidopterists in Britain for their support. Initially only the macrolepidoptera will be dealt with.

Outline of method

The basis of the scheme is to indicate by means of a conventional symbol the presence of each species of macrolepidoptera in each ten kilometre square of the Ordnance Survey National Grid in which it occurs. To achieve this for the 900 species involved it is estimated that over a million records will have to be assembled and transferred to maps. This will be done using the punched card system with mechanical sorting and mapping used for the production of the *Atlas of the British Flora*.

It is probable that almost complete distribution maps of the rarer species can be prepared from data already available, but it is also certain that data on the distribution of common species will be inadequate. For the latter field recording will be necessary and it is in this part of the scheme that the amateur lepidopterist can play a vital role. Lists, as complete as possible, are required from each of the 3,500 ten-kilometre squares which cover the British Isles: special record cards have been designed which will be sent to all volunteers. In addition some individual record cards will be necessary to support records of special interest. These cards are now available and will be sent to any entomologist who wishes to take part in the scheme, together with detailed instructions on their use.

Accuracy of records

To ensure absolute accuracy for every record is impossible but checks will be made (1) by referring records to County Recorders who will indicate which require verification, (2) by specialist examination of material from the critical groups and (3) by noting and checking outlying records when interim and final maps are produced. A list of critical species has been prepared and as soon as possible illustrated keys to the identification of these will be published.

Completeness of survey

As the project proceeds a pattern of unrecorded areas will emerge and it is anticipated that special expeditions to these areas will be organised in order to give as complete and uniform coverage as possible. With maximum co-operation from lepidopterists it should be possible to complete the project in ten years.

Publication of results

As soon as sufficient data are available provisional maps will be published in the entomological journals together with progress reports. Also as the records build up it will be possible to produce rapidly and economically county lists, nature reserve lists and habitat lists for all the Lepidoptera or for specific groups.

This project offers an opportunity for co-operation between amateur and professional entomologists and the various Societies and Naturalists' Trusts on a scale not previously known in entomological science in this country. Full details of the scheme, record cards and instructions are available from Biological Records Centre, Monks Wood, Huntingdon.

Monks Wood Experimental Research Station,
The Nature Conservancy,
Abbots Ripton,
Huntingdon.

8th February 1967

PROCEEDINGS

9th FEBRUARY 1967

The PRESIDENT in the Chair

The PRESIDENT announced the death of Col. V. R. Burkhardt.

The following new members were declared elected: A. J. Stoughton-Harris M. C. Singer, J. R. Neidhoffer, R. H. Allen and H. H. Beamish.

EXHIBITS

Mr. G. M. DE ROUGEMONT—Four live examples of *Chrysocarabus auronitens* L. (Col., Carabidae) which were typical specimens from Orne, France. He commented on their aberrations and their habits.

Mr. W. H. SPREADBURY—A twig of gorse from Seaford, Sussex, 2.ii.67, covered with gorse mites. He said that this was not a common sight now, but where it occurred there were usually large infestations.

Mr. A. E. STUBBS—Two parasitic Hymenoptera: (1) *Chalcis sispes* (L.) (Chalcidae), a female taken at South Benfleet, Essex, 23.viii.66. It occurred commonly among vegetation at the edge of a pond at the back of the salt marsh, and was seen previously at the same spot in late June 1966. The species is said to be widespread in England and also occurs in Ireland. Some members of the genus are recorded as parasites of dipterous larvae. (2) *Proterops nigripennis* Wesmäl (Braconidae), a female taken by the Basingstoke Canal, Farnborough, Hants. Marshall in 1888 knew of only two British records, one from Kent and the other from Scotland. The British Museum (Nat. Hist.) have no British examples in their collections. The only recorded host is *Arge enodis* (L.) (Hym., Argidae), for which there is only one certain British (Surrey) record. Mr. T. Huddleston of the British Museum (Nat. Hist.) was good enough to determine these insects.

COMMUNICATIONS

The mild weather, said Dr. C. G. M. DE WORMS, had produced many interesting records: *Alsophila aescularia* Schiff., *Erannis marginaria* F. and *Phigalia pilosaria* Schiff. (Lep., Geometridae). He had also had reported to him by Mr. D. ffennell, *Tathorhynchus exsiccata* Led. (Lep., Noctuidae), *Eromene ocellus* Haw. (Lep., Crambidae) and *Nomophila noctuella* Schiff. (Lep., Pyralidae), from Marty Worthy near Winchester. *T. exsiccata* Led. was first seen in this country in 1952, the nearest locality till then was in the Canary Islands. It was last seen in this country in 1955. Mr. ffennell took three examples altogether.

Mr. J. L. MESSENGER recorded *Xylocampa areola* Esp. and *Orthosia gothica* L. (Lep., Noctuidae).

Gonepteryx rhamni L. (Lep., Pieridae), said Mr. S. N. A. JACOBS, had been reported to him from Surrey during the past week. Mr. E. S. BRADFORD said he too had seen *Phigalia pilosaria* Schiff.

Mr. R. W. J. UFFEN remarked that he had recently brought in and warmed up some coleophorid cases and had been successful in obtaining *Coleophora sylvaticella* Wood (Lep., Coleophoridae).

Commenting on the gorse mites exhibited by Mr. Spreadbury, Dr. A. M. MASSEE said that this harmful mite which is related to the greenhouse red spider

mite and is recorded from the south, east, and Midland Counties. It also occurs, but not so commonly, on the Continent and in North America. The population of the mites is mainly female, the males appearing later. The species is parthenogenetic. Mr. S. WAKELY added that he remembered it from Freshwater, I.O.W., in his youth and also from Suffolk last year.

A paper was read by Mr. J. R. G. TURNER on 'Butterflies and Passion Flowers in the West Indies'.

23rd FEBRUARY 1967

The PRESIDENT in the Chair

The following new members were declared elected: Mr. G. Edwards and Lt-Comdr. L. R. E. Gilchrist.

EXHIBITS

Mr. S. A. WILLIAMS—Three species of the beetle genus *Atheta* (s.gen. *Philhygra*) taken among small stones on the banks of a tiny stream in the New Forest, Hants, 9.vii.66. These were *A. elongatulus* (Grav.), a very common species generally distributed in Britain; *A. magniceps* (Sahlb.), very local and normally regarded as a northern insect; and *A. obtusangula* Joy, a local beetle, but recorded from several southern counties.

Mr. A. E. GARDNER—The Jerusalem Cricket, *Stenopelmatus fuscus* Hazld. (Salt., Gryllidae), from Faber, Texas, 17.ix.47. This large cricket with an enormous head can be very destructive to young plants in North America.

COMMUNICATIONS

Mr. P. A. GODDARD said that he had seen a Common Lizard, *Lacerta vivipara* Jacquin, near Harrow Weald Common, Middx., on 5th February.

Commenting on the two films, 'Wildlife in Trust' and 'Between the Tides', Dr. B. J. MACNULTY said that whilst on a ship off West Africa, he had seen a migration of Gannets from south of the equator that had lasted three days. During this time there had always been Gannets in sight. They were also seen diving for fish.

9th MARCH 1967

The PRESIDENT in the Chair

EXHIBITS

Dr. C. G. M. DE WORMS—A living example of *Callophrys avis* Chapman (Lep., Lycaenidae), the Mediterranean Green Hairstreak, which emerged 9.iii.67.

Mr. B. GOATER—Two rare mosses from Petersfield, Hants: *Rhynchostegiella curviseta* (Brid.) Limpr., which grows on damp greens and rocks in lane cuttings, and occasionally on concrete edges of village ponds; and *Eurhynchium schleicheri* (Hedw. fil.) Lor., which occurs on sandy banks; this last specimen had capsules, which are very uncommon in the species.

Mr. A. E. GARDNER—The following stick insects (Phasmida, Phasmidae) now placed on the British list by Dr. D. R. Ragge in his recent book *Grasshoppers, Crickets and Cockroaches of the British Isles*: (1) *Carausius morosus* Brun., Laboratory Stick Insect, breeding in greenhouses in south Devon and Surrey.

(2) *Clitarchus hookeri* (White), Smooth Stick Insect, breeding out of doors in Tresco, Scilly Isles, and on Rossdorhan in the Bay of Kenmare, S. Kerry.
 (3) *Acanthoxyla prasina* (Westwood), Prickly Stick Insect, breeding in Tresco and at Paignton, S. Devon. The last two species are natives of New Zealand, and were probably introduced with plants early in the present century. Both examples were collected by Mr. E. Gowing-Scopes.

COMMUNICATIONS

Dr. DE WORMS said that the mild weather last week-end had produced some interesting moths. On Chobham Common, Surrey, the previous Saturday he and Mr. J. A. C. Greenwood had set up two lights 50 yards apart with a Heath trap between them, and had recorded *Apocheima hispidaria* Schiff. and *Achlya flavicornis* L., and had noted many of the spring noctuids and sawflies.

Referring to Dr. de Worms' exhibit, the PRESIDENT said that he had noticed the prolonged emergence of the Green Hairstreak in captivity as opposed to its relatively quick emergence in nature.

23rd MARCH 1967

The PRESIDENT in the Chair

The following new member was declared elected: Mr. B. Hargreaves.

Congratulations were extended to Prof. J. V. Dacie on his election to fellowship of the Royal Society.

EXHIBITS

Mr. G. PRIOR—Living larvae, a pupa and imagines of *Dorcus parallelipipidus* (L.) (Col., Lucanidae), taken at Rickmansworth, Middx., 17.iii.67, from a rotted branch of a fallen Lombardy Poplar.

COMMUNICATIONS

Talking of the effects of the recent warm spell, Dr. C. G. M. DE WORMS said he had seen birch in full leaf on Horsell Common, Surrey, and he had also seen many Prominents. Mr. N. D. RILEY reported *Gonepteryx rhamni* L. (Lep., Pieridae) in Sussex and *Aglais urticae* L. (Lep., Nymphalidae) had also been seen. Dr. de Worms also reported seeing *Gypsites leucographa* Schiff. (Lep., Noctuidae).

On behalf of Dr. Smith of Polperro, Mr. S. N. A. JACOBS reported records of four *Vanessa cardui* L. (Lep., Nymphalidae) on 26.ii.67 and 5.iii.67. He wondered if these could have been specimens that had hibernated during the mild winter. Mr. P. A. GODDARD suggested that these might be due to the migration earlier this year. He also said that although he had seen no butterflies in the Harrow Weald area of Middlesex, he had seen *Nymphalis io* L. (Lep., Nymphalidae) at Pirbright, Surrey.

The PRESIDENT, remarking on the migration of several species early in February, said that the *Vanessa cardui* L. might be a second wave of the migration.

Referring to Mr. Prior's exhibit, the PRESIDENT asked the difference in habitat between *Dorcus parallelipipidus* (L.) and *Lucanus cervus* (L.). Dr. B. J. MACNULTY replied that in his experience *L. cervus* (L.) seemed to appear in trees at ground level and on damper sites. It also attacked fence posts below ground level. *Dorcus parallelipipidus* (L.) seemed to be more widespread, particularly in

poplar. Mr. Prior added that he had seen the *Dorcus* species in a diseased branch where they had apparently bored through the protective paint applied. He also said that when he kept six larvae and a beetle together, all the larvae but one disappeared. To this Dr. MacNulty replied that the larvae had been known to be cannibalistic. When rearing this beetle he had always bored holes in the wood to help the larvae start feeding and boring.

A paper, 'Woodland and Forest', was read by Mr. K. KEEBLE-SMITH.

13th APRIL 1967

The PRESIDENT in the Chair

The following new member was declared elected: Mr. J. Marshall.

EXHIBITS

Dr. C. G. M. DE WORMS—A living example of *Odontosia carmelita* Esp. (Lep., Noctuidae) from Woking, Surrey, 11.iv.67. He remarked that this is about 10 or 14 days ahead of its normal time of emergence.

Mr. S. WAKELY—A specimen of *Coleophora tricolor* Wals. (Lep., Coleophoridae) from Norfolk, and for comparison, *C. lixella* Zell. with its spring larval cases.

Mr. R. W. J. UFFEN—(1) Six examples of *Coleophora sylvaticella* Wood (Lep., Coleophoridae) which he presented to the Society. They were reared in April 1967 from cases which appeared in August 1965 on seeds of *Luzula sylvatica* (Huds.) Gaud. collected in the Wye Valley, Mon., 20.vi.65. No moths emerged in 1966. (2) A colour plate of Willy Lott's cottage at Flatford Mill Field Centre in Suffolk, from the Royal Photographic Society's Colour Group bulletin. The picture was of the reflection of the cottage in water, turned upside down.

Mr. S. A. WILLIAMS—*Atheta* (s.g. *Dimetrota*) *laevana* (Muls. & Rey), usually considered a rare species, but found abundantly in horse dung in the New Forest, Hants, near Lyndhurst, 18.iii.67. Donisthorpe recorded it in a hawk's nest and by evening sweeping. Also exhibited was a specimen of *Bolitobius inclinans* (Grav.) (Col., Staphylinidae) taken by tufting near old beech trees, also in the New Forest near Lyndhurst. It is local and rare but occurs throughout Britain.

Mr. A. E. STUBBS—(1) An aberrant *Stenodema calcaratum* (Fall.) (Hem., Miridae) taken in May 1965 on Ockham Common, Surrey. It had two spines on the left hind femur, which is characteristic of the species, but three spines on the right hind femur as in *S. trispinosum* Reuter. (2) A small millipede, *Polyxenus lagurus* L., taken under bark on dead hawthorn on Bookham Common, Surrey, 9.iv.67. This is the only member of the sub-class Pselaphognatha, all other British diplopods belong to the sub-class Chilognatha. It is an extraordinary creature bearing lateral tufts of bristles and two dense brushes on the telson. It is probably widely distributed in England but is easily overlooked and records are few. (3) An example of the floating form of the liverwort *Riccia fluitans* L. which was found to be locally plentiful on the Isle of Wight pond on Bookham Common, 9.iv.67. Although widely distributed this species is not generally common.

COMMUNICATIONS

Dr. A. M. MASSEE gave a talk on 'The Hemiptera-Heteroptera of the British Isles'.

27th APRIL 1967

A Vice-President, Mr. B. GOATER, in the Chair

The death was announced of Mr. R. E. R. Parsons.

The following new members were declared elected: Messrs. B. Levey, M. R. Longdon and B. G. Withers.

EXHIBITS

Mr. A. E. STUBBS—(1) A male and female stone fly, *Nemoura dubitans* Morton (Nemouridae), from Thursley Common, Surrey, 15.iv.65. Mr. Stubbs said that in the Royal Entomological Society's Handbook, D. E. Kimmins had not recorded this species from Surrey. (2) A larva of *Cylindrotoma distinctissima* (Meig.) (Dipt., Tipulidae), swept from grass in an alder wood at Thatcham, near Newbury, Berks., 26.iv.67, an exceptional habitat for a tipulid larva. The larva was flattened and green to blend with the situation in which it was found. (3) Specimens of a *Scutellinia* fungus, taken at Horsley, Surrey, on the Sheepleas from rotten beech wood. There are two British species, *S. scutellata* (L. ex Fr.) and *S. trechiopora* (But. Br.) Boud., but the exhibit had not yet been determined.

COMMUNICATIONS

Mr. J. A. C. GREENWOOD reported taking *Harpya furcula* Clerck (Lep., Notodontidae) at Woking, Surrey, 16.iv.67.

A paper, 'Recording of the British fauna and flora', was read by Dr. H. F. PERRING.

 11th MAY 1967

The PRESIDENT in the Chair

The following new members were declared elected: Professor R. Warwick, Dr. C. C. Warwick and Mr. B. Rideout.

EXHIBITS

Mr. E. BRADFORD—A series of photographs of Jean-Henri Fabre, his home and collections, used in the ATV programme 'Ici, La France'. Mr. Bradford presented them to the Society.

COMMUNICATIONS

Dr. V. C. BARBER read a paper on 'Glow worms and fireflies'.

 25th MAY 1967

The PRESIDENT in the Chair

The death was announced of Mr. K. Self and of a former President, Mr. W. J. Kaye, a fortnight before his 92nd birthday.

EXHIBITS

Mr. A. E. STUBBS—Hoverfly (Dipt., Syrphidae) puparia from dead wood and the adults bred from them. (1) *Caliprobola speciosa* (Rossi). A very rare and spectacular fly which has apparently never been seen in its early stages in this

country. The puparium was obtained from a rotten beech stump in Windsor Forest, Berks., 13.v.67 and produced an adult female 17.v.67. (2) *Xylota nemorum* F. The exhibited puparium was obtained at Sheepleas, Surrey, beneath the bark of a fallen beech, 22.iv.67. The adult emerged in early May. Coe (1951, *Roy. ent. Soc. Handbk.* 10(1)) was only able to cite a continental description of the puparium of this uncommon species. (3) *Brachyopa pilosa* Collin. An extremely rare species known only from the New Forest, Hants, Windsor Forest, Berks., and single localities in Wiltshire and Bristol, Glos. Coe makes no reference to the early stages in Britain or the Continent. The puparium was obtained from beneath the bark of a fallen beech on Ranmore Common, Surrey, 4.ii.67, and yielded an adult in early May. This constitutes a new county record.

Mr. S. N. A. JACOBS—Two examples of the primitive South African moth *Prototheora petratoma* Mayr. from Cape Town, sent him by Mr. C. G. C. Dickson.

Mr. B. GOATER—Examples of two distinct forms of *Diarsia mendica* F. s.sp. *thulei* Staud. (Lep., Noctuidae) bred from ova laid by a female taken on Unst in August 1966. Examples of the southern English form were included for comparison.

The PRESIDENT—The following Hesperidae (Lep.) *Erynnis marloyi* Boisd., *Reverdinus orientalis* Rev., *Spialia orbifer* Hübn. and *Carcharodus alceae* Esp., recently taken in Greece, together with examples of the closely related *Erynnis tages* L. from England, and *Reverdinus alchymillae* Hübn. and *Spialia sertorius* Hoff. from western Europe. He commented on the largely vicarious distribution of these species in Europe.

Mr. E. P. WILTSHIRE—An article from a German magazine showing a method of using a light trap, with an umbrella and a gauze or net covering, to make moths settle instead of fluttering around an unenclosed light.

COMMUNICATIONS

The PRESIDENT remarked how few moths were coming to his light. An average of 12 a night and four the night before the meeting.

Mr. B. GOATER reported taking *Cucullia chamomillae* Schiff (Lep., Noctuidae), a moth he had not seen before at Bushey, Herts.; and the PRESIDENT added that he had taken one in Surrey.

The PRESIDENT raised the query whether *Erynnis tages* L. occurred in Greece; and Mr. WILTSHIRE replied that it did, but in different situations to *E. marloyi* Boisd.

Commenting on the size of Mr. Goater's *Diarsia mendica* F. s.sp. *thulei* Staud., Mr. COLE said that his own had always been smaller. Mr. Goater replied that this surprised him, there had also been difficulties with moulting and only a small number had hatched properly. In this group, the PRESIDENT believed all bred examples appeared to be larger than feral specimens.

Dr. B. J. MACNULTY had also experienced difficulties with moulting in this species. He had also noticed the head of the old caterpillar adhering to the mouth parts of the freshly moulted larva.

Explaining that his larvae had been fed on primula and kept in humid conditions, Mr. GOATER thought that conditions may have been too humid.

On moulting problems in general Dr. MACNULTY said that under artificial conditions, when the skin of a larva ready to moult had become ready to split, he believed the larva expanded too quickly inside the dead skin, and thus the old skin grew too tight for the larva to escape from easily.

A discussion ensued on collecting and preparation techniques, during which the moth trap article exhibited by Mr. WILTSHIRE was discussed.

8th JUNE 1967

The PRESIDENT in the Chair

Mr. E. P. Wiltshire was declared elected a member.

EXHIBITS

Mr. D. R. M. LONG—Third and fourth instar larvae of a species of the endemic Australian notodontid genus *Hyleora*, reared from eggs sent to him by Mr. N. MacFarland of the South Australian Museum, Adelaide. The genus *Hyleora* comprises three apparently distinct, but closely related, species; *H. eucalypti* Doubleday, *H. inclyta* Walker and *H. dilucida* Felder. Mr. MacFarland suggests that the larvae may be *H. dilucida*. The eggs were laid by a female taken at light in April, at Blackwood, Mount Lofty Range, south of Adelaide. The larvae, reared by Mr. Long, are being fed on the hardy Tasmanian eucalyptus, *Eucalyptus gunnii* Hooker fil.

COMMUNICATIONS

The Hon. MIRIAM ROTHSCHILD read a paper on 'Fleas'.

22nd JUNE 1967

The PRESIDENT in the Chair

The death was announced of Mr. D. Wright of Bordon, Hants.

EXHIBITS

Mr. B. GOATER—Examples of Pugs from the Shetland Islands. A series of *Eupithecia venosata* F. r. *fumosae* Gregson (Lep., Geometridae) bred from larvae taken at Urafirth, Mainland and Haroldswick, Unst; and of *Eupithecia satyrata* Hübn. s.sp. *curzoni* Gregson bred from larvae taken at Mangaster, Mainland.

Mr. C. O. HAMMOND—A large female *Ctenophora pectinicornis* (L.) (Dipt., Tipulidae) with a normal sized example for comparison. He explained that as in the very large females of the genus *Tanyptera* the red or orange coloration on the first abdominal segment extended down the sides, sometimes as far as the eighth segment, to offset the amount of black on the abdomen.

Dr. P. ROCHE—Hemiptera taken in Singapore, 18 and 19.v.67, of the families Pentatomidae, two species; Scutelleridae, one species; Reduviidae, two species; Alydidae, three species; Pyrrhocoridae, one species; and Lygaeidae, four species. Also a large water beetle taken at Calcutta airport on the night of 19-20.vi.67.

Mr. M. CLIFTON—Two botanical specimens from Powdermill Nature Reserve, Pennsylvania, U.S.A. (1) 'Red Grass' from the edge of a bituminous coal 'Strip Mine'. The edge of which consisted of large piles of shale found with the coal seams and which were pushed aside and left. This had broken down to leave no piece larger than about an inch across. In this very dry surface few plants lived. On a typical warm day in September one side of the valley in this shale the temperature was 72°F, whilst on the other, in the shade, it was still at the overnight temperature of 27°F. The plant is not grazed as it contains small crystals of

silica. (2) The seed pod of a Milkweed, *Asclepias* sp., the foodplant of *Danaus plexippus* L., the Milkweed butterfly. A seed removed from the pod showed its structure.

Mr R. W. J. UFFEN—A living example of *Coleophoraonosmella* Brahm (Lep., Coleophoridae), from Hackhurst Down.

COMMUNICATIONS

The PRESIDENT remarked how bad the season was for moths at light. His average per night in his mercury vapour trap had been 26 examples for May, his lowest yet; and last week it had dropped to 12. Mr. G. COLE also reported poor results.

Beating oak in Pamber Forest recently, said Mr. UFFEN, had produced no case bearers at all. The President asked if this could have been due to frosts in May; but Mr. Uffen replied that no frost damage was apparent on the leaves of the trees.

Replying to a question from Mr. Uffen about the large scutellum of the scutellerid bug he had exhibited, Dr. ROCHE replied that in this country Hemiptera of the family are not active fliers, but in the tropics they are not hampered in flight by the large scutellum, and were most often taken whilst flying.

Referring to the *Eupithecia* species shown, Mr. Bretherton said *E. satyrata* s.sp. *curzoni* Gregson also occurred in Scotland, and asked if *E. venosata* r. *fumosae* Gregson also did so. Mr. GOATER said that the race *fumosae* did not occur in Scotland; this was confirmed by Dr. C. G. M. DE WORMS, who added that another race existed on the Orkneys.

Commenting on breeding his *Eupithecia*, Mr. GOATER said that he had experienced no trouble with parasites when breeding species of this group. He also said that when changing the foodplant (Devil's Bit Scabious) for the s.sp. *curzoni* Gregson he had damaged a larva, and noted other larvae feeding on the injured specimen. Cannibalism had developed from this incident.

Mr. R. TUBBS drew attention to Professor Varley's interest in parasites, and he suggested that members sent any they might breed to Professor Varley with full data.

Mr. BRETHERTON asked if the Milkweed seeds shown by Mr. Clifton were of the species on which *Danaus plexippus* L. fed; to which Mr. CLIFTON replied that there are five species of Milkweed, but until they flower identification is impossible. He is hoping to raise the seeds exhibited to obtain a determination.

FIELD MEETINGS 1967

SHEEPLEAS, HORSLEY, SURREY—21st May 1966

Leader: Mr. A. E. STUBBS

Ten members attended and collected over 200 species. The day was dull until late afternoon, otherwise species lists would have been somewhat higher with flower visitors, the hawthorn in particular being in fine bloom. The area visited consists of chalk grassland with areas of scrub and beech woodland.

Sheepleas is managed by Surrey County Council as a public open space. Surrey Naturalists' Trust have negotiated an agreement with the Council whereby amenity management and conservation management are integrated so that this renowned spot for *Hamearis lucina* L. will, it is hoped, continue to support this

insect. The meeting was a little early for this butterfly, but it was found in some numbers when the sun came out, and appeared to be flourishing in some of the managed areas. The difficulty is to maintain its habitat; grassland with scrub, and the foodplant, cowslip. Neglect results in the development of woodland, but mowing of grassland prevents scrub developing and destroys the foliage of the cowslip on which the early stages of the insect are spent. By thinning scrub and mowing the intervening grass on a rotation basis, it is hoped to maintain the butterfly population whilst accommodating amenity needs.

Members are invited to inspect the managed areas and comment on the results this management may have on their specialist groups of insects. Advice and records for the entire Sheeples area are urgently required.

Because of the high quantity of records only a selection can be mentioned, and much of the related field observation has been omitted.

On a managed area with chalk grassland and thinned scrub (which was formerly very dense) the flies *Tipula vernalis* Meig., *Dicranomyia sericata* (Meig.), *Palloptera quinquemaculata* Macquart, *Sciophila nigronitida* Landrock, *Rhamphomyia atra* Meig. and *Amaurosoma flavipes* (Fall.) were found. The last three species are of special note. Among the ants *Myrmica* species were well represented, and included *M. laevinodis* Nyl., *M. ruginodis* Nyl., and *M. sulcinodis* Nyl.; *Lasius niger* was common. The sawflies *Dolerus sanguinicollis* (Klug.) and *Arge nigripes* (Retz.) were taken. Heteroptera included *Nabis rugosus* (L.) and *Stenodema laevigatum* (L.), the black and red homopteron *Cercopis vulnerata* Germ. occurred on grasses and *Centrotus cornutus* (L.) was beaten from bushes. Other captures included the scorpion fly *Panorpa communis* L., the spider *Heliophanus cupreus* (Walck.), the woodlouse *Philoscia muscorum* (Scop.) and the millipede *Glomeris marginata* (Villers). A wide range of beetles was taken from the scrub and herbage. The only butterfly, other than *Hamearis lucina* L., reported was *Pararge aegeria* L., but several other Lepidoptera were taken: *Bapta bimaculata* F., *Phlogophora meticulosa* L., *Grapholita jungiella* L., *Ancylys badiana* Schiff., *Pyrausta aurata* Scop.

A large clearing of chalk grassland surrounded by scrub woodland margin yielded the moth *Elachista argentella* Clerck on grasses, *Parornix anglicella* Staint., *Capua vulgana* Fröl., *Ptycholoma lecheana* L. on bushes, and *Microstega pandalis* Hübn.; the scorpion flies *Panorpa communis* L. and *P. germanica* L.; the orthopteron *Tetrix undulata* (Sowerby); a cockroach, *Ectobius* species; the sawflies *Dolerus aeneus* Hartig and *Blennocampa confusa* Konow (*Monophadnus puncticeps* (Konow)); the flies *Sericomyia silentis* Harris, *Cheilosia fraterna* Meig., *C. honesta* Rondani, *Criorrhina berberina* F., *Anthracophaga strigula* (F.), *Oedalea stigmatella* Zett (a new county record), *Lissempris nigratarsis* (Meig.) and *Madiza glabra* Fall. and shells of the gastropods *Pomatias elegans* (Müll.) and *Helix pomatia* L.

The top field of the dry valley of Sheeples proper, consisting of disturbed chalk grassland and scattered bushes, was particularly productive. The hawthorn bushes in full bloom yielded many insects. Lepidoptera included *Hamearis lucina* L., *Aethalura punctulata* Schiff., *Xanthorhoe ferrugata* Clerck, *Delinia pusaria* L., *Archiearis parthenias* L., *Parornix anglicella* Staint., *Caloptilia syringella* F., *Crambus nenorellus* Herbst (*pratellus* auct.), *Panacalia leuwenhoekella* L., *Lathronympha strigana* F., *Telphusa sequax* Haw., *Adela viridella* Scop., *Mompha conturbatella* Hübn. (spinning shoots of rosebay) and a *Micropteryx* sp.

The local scorpion fly *Panorpa cognata* Rambur was taken and thus all three British species are present. Also in this area were found the sawflies *Blennocampa*

confusa Konow and *Macrophya annulata* (Geoff.); and the flies *Criorrhina floccosa* (Meig.), *Cordilura pubera* L., *Tipula pseudovariipennis* Czizek, *Wagneria lentis* Meig., *Tachydromia aurantiaca* Collin (a new county record).

In a damper piece of grassland lower down the valley a cockchafer, *Melolontha melolontha* (L.), was found, and nearby on drier grassland, under a log, Mr. Uffen found the larva of a horsefly, *Tabanus* sp.

A privet thicket on the edge of one of the lower fields yielded the crane-fly *Limonia nigropunctata* Schummel.

In the beechwoods, a fallen dead beech contained larvae of a cardinal beetle, *Pyrochroa* sp., under the bark. A sample of wet pulp from a rot hole was taken home and a number of flies were bred out; including abundant *Limonia decemmaculata* Loew, *Austrolimnophila ochracea* (Meig.), *Ula* sp. and *Anisopus cinctus* (F.), there is no published record for the breeding site of the last named.

Mr. T. R. Eagles remarked that all the hawthorn he examined was rather surprisingly *Crataegus monogyna* Jacq., and that most of the rose was sweet briar, either *Rosa rubiginosa* L. or *R. micrantha* Borrer ex Sm., but some *R. canina* L. seemed also to be present. He considered that the first two species of rose should be encouraged at the expense of *R. canina* L. He found the fungus *Bolbitius vitellinus* (Pers.) Fr. to be numerous and since it is generally coprophagous, he thought that the dung of some small animal must be responsible. He also noted the occurrence of the galls of *Oligotrophus solmsi* Kieffer on *Viburnum lantana* L., and the orange acecidia of the rust fungus, *Puccinia coronata* Corda, on the leaves of *Rhamnus catharticus* L.

Dr. de Worms provided useful advice on the relative merits of the various species of bushes which have been left during the thinning operations, but the lepidopterists have otherwise made surprisingly little comment.

The above records have made extensive use of lists provided by Mr. C. O. Hammond (Diptera), Mr. R. W. J. Uffen, Mr. P. Goddard and Mr. E. Bradford (micro-lepidoptera) and Mr. Chandler (who made the new county record of Diptera).

BOOKHAM COMMON, SURREY—9th April 1967

Leader: Mr. R. W. J. UFFEN

This meeting was held on the same day as the London Natural History Society's monthly survey meeting at Bookham, so that members could see the facilities provided in the LNHS research hut on the Common and be encouraged to work at Bookham on their own groups when convenient.

Collecting during the day did not prove very rewarding. Despite sunshine, the cold wind depressed the activity of Diptera and no *Meriania puparum* (F.) were found. Most of the Tachinidae seen were *Lypha dubia* (Fall.). Other calypterates were *Pollenia vespillo* (F.), *P. excarinata* Wainwright, *P. rudis* (F.), *Hydrotaea occulta* (Meig.), *H. dentipes* (F.) and *Scatophaga anale* Meig. The crane fly *Ormosia lineata* (Macq.) was flying in the woods.

One example of the millipede *Polyxenus lagurus* (L.) was found under the bark of a dead hawthorn. This extraordinary animal resembles nothing of its size so much as a dermestid beetle larva, having curved lateral tufts of expanded setae, with paired anal tufts of straight setae. Blower (1958, *A Synopsis of the British Millipedes*, Linnean Society of London) gives, on page 15, an excellent drawing of the species. It is only 2 to 3 mm. long and rather inconspicuous, so perhaps the

small number and scattered distribution of British records is not so surprising as might be thought for so distinctive an animal. The species is the only representative of the subclass Pselaphognatha in Europe.

The floating liverwort *Riccia fluitans* L. was noted in the S.E. corner of the Isle of Wight Pond.

THETFORD, NORFOLK—16th April 1967

Leader: Mr. A. M. EMMET

The gunners of a Medium Regiment, Royal Artillery, may have been somewhat bewildered, as they drove out to their range for a Sunday morning shoot, to see seven of our members spread like a loose flock of sheep over a wide stretch of fallow ground, with their noses to the earth and their tails pointing skyward. They were persuing the main object of the meeting, which was to search for the larval cases of *Coleophora tricolor* Wals.; the larva feeds inside the seed capsules of *Acinos arvensis* (Lam.) Dandy (Basil Thyme) before hibernation and, we believe, on grasses in the spring. An extensive search, however, lasting nearly two hours drew blank, and *C. tricolor* still guards its secret. Cases of two other species of *Coleophora* were found; Mr. Uffen took *C. onosmella* Brahm on *Echium*, and Mr. Chalmers Hunt found an overwintered case of *C. squamosella* Staint. (*erigerella* Ford). The warm, sunny weather favoured the searchers, and was also bringing out the first pierid butterflies.

During the lunch interval members directed their attention to two big larches, which produced a good supply of the larvae of *Blastotere laevigatella* H.-S., which mine the terminal twigs, and a mine of *Aspilapteryx tringipennella* Zell. was taken on *Plantago lanceolata* L. The conversation turned to the effects of the hot, dry, scantily clad sandy soil. Mr. Uffen noted the remarkable dwarfing effect on wild flowers; *Eriophila verna* (L.) Chevall was commonly as short as 0.7 cm, the tallest plant reaching 5.0 cm; *Cardamine hirsuta* L. was only 5.0 cm tall. *Erodium cicutarium* (L.) Herit. and *Myosotis ramosissima* Rochel (*hispidula* Schlecht) were already coming into flower. The leader suggested that these conditions also had a forcing effect on insects, since the cases of *Coleophora squamosella* Staint. had been far more advanced there on the 10th September last year than they had been ten days later at Mickleham, Surrey.

After lunch the party moved to Elveden, which is four miles south-west of Thetford, to look for the galls made in larch by the larva of *Laspeyresia zebeana* Ratz.; the leader had bred a moth from a gall found here in 1966. Several suspicious looking swellings were taken in anticipation, and old galls were in evidence. Some were well out of reach and an element of comedy entered into the efforts of members to secure them. Possibly no galls were found which were tenanted, and members had to content themselves with the cases of *Coleophora laricella* Hübn. on the larch needles.

Nearby there is a tract of well-grown heather, and here *Argyrotaenia pulchellana* Haw. (*politana* Haw.) was flying freely in the afternoon sunshine; among them was a sprinkling of *Acleris hyemana* Haw. (*nixtana* Hübn.) and a single specimen of *Epinotia pygmaeana* Hübn. was also taken. Numerous cases of *Coleophora juncicolella* Staint. were swept from the heather. Two species of *Dolerus* sawflies were on the wing, namely *D. possilensis* Cameron and *D. picipes* (Klug.). The tree trunks were buzzing with the parasitic fly *Gymnocheta viridis* (Fall.).

Finally the party went on to Barton Mills to collect fallen poplar catkins for

the young larvae of *Cirrhia ocellaris* Borkh.; these proved to be present, but were outnumbered by the larvae of the weevil *Dorytomus longimanus* (Forster). Mr. Uffen reared some *Dorytomus* and noted that when disturbed they stridulated by rubbing the tip of the abdomen against a file beneath each elytron, very much like *Rhynchaenus* as described by Hellings (*Proc. R. ent. Soc. Lond.*, C, 32:5).

SHEEPLEAS, HORSLEY, SURREY—22nd April, 1967

Leader: Mr. A. E. STUBBS

Records are particularly lacking in the early spring species for this locality. The weather had been rather erratic for several months, which may have partly accounted for the rather low numbers of insects taken. Results were much poorer compared with the rich haul at the meeting in May last year.

Eight members attended the meeting, three dipterists, four lepidopterists in the morning, and one botanist. Mr. S. Wakely reported larval cases of *Coleophora viminetella* Zett., on sallow, *C. hemerobiella* Scop., on apple, and *C. gryphipennella* Bouch. on rose.

Along the margins of the northern fields of the Leas the flies *Cheilotrichia cinerascens* (Meig.) and *Sepsis violacea* Meig. were taken; also the sawfly *Dolerus puncticollis* C. G. Thomson. At one spot beech leaves were peppered with small holes caused by the small beetle *Rhynchaenus fagi* (L.). In the top field of the Leas a few *Pararge aegeria* L. were on the wing, the flies *Eristalis pertinax* Scop. and *E. tenax* L. were seen and an example of the local beetle *Timarcha goettingensis* (L.) was found crawling over the grass.

Yew trees growing beneath mature beech harboured some craneflies; *Limonia nubeculosa* Meig., *Dicranomyia chorea* (Meig.) and *Cheilotrichia cinerascens* (Meig.). The last named was of interest as the first member of the sub-family Eriopterini taken in this locality of the 20 or so Tipulidae recorded. The flies *Anisopus punctulatus* (F.) and *Asteia amoena* Meig. were taken at the same spot.

On the 'cricket pitch' the tachinid fly *Lypha dubia* (Fall.) was seen. In the car park area, chalk grassland with controlled scrub, further *Pararge aegeria* were about; and the flies *Gymnochaeta viridis* (Fall.), *Tephritis conjuncta* (Loew), *Sepsis violacea* Meig., *Bibio johannis* (L.) and *Cheilotrichia cinerascens* (Meig.) were noted. The beetle *Scaphidium quadrimaculatum* Ol. was found under a birch log.

A hoverfly puparium found beneath the bark of a fallen beech tree yielded an adult *Xylota nemorum* F. There is no published record of this species having been reared in Britain before, one has to refer to German works for the life history. The puparium was exhibited to the Society on 25th May last (see page 81).

OTFORD, KENT—29th April 1967

Leader: Mr. R. W. J. UFFEN

This meeting was well attended by South London and Kent Field Club members on a warm, sunny day.

The party ascended the downs by the path nearest the station, paying little attention to the slopes, where the downland herbs are choked by long grass, and scrub is rapidly becoming dominant. Most of the party worked their way to the road on top of the down, whilst the microlepidopterists worked across the valley

set into the downs hoping to find thyme on the Shoreham side. This plant was found to have almost disappeared from the area. The microlepidopterists therefore moved on to Trottscliffe during the afternoon and found depressingly similar trends in the vegetation. The few anthills that still bore thyme yielded, on this and other occasions, a total of 14 larvae of *Coleophora niveicostella* Zell. Dr. A. M. Masee shares the leader's opinion that these downs have rapidly deteriorated in both the variety and abundance of the insects present.

Coleoptera recorded included: *Pterostichus niger* (Shaller) in grass tufts, *Dromius meridionalis* (Dej.) under bark, *Tachinus signatus* Grav. with *Tachyporus hypnorum* (F.) and *Lathridius bifasciatus* Reitt. by beating *Clematis*, *Cerylon histeroides* and *C. fagi* Bris. under beech bark, *Meligethes pedicularius* (Gyll.) on dandelion flowers, *Adalia bipunctata* (L.) by beating *Clematis*, *Aphodius ater* (Deg.) and *A. fimetarius* (L.) in cow pats, *Psylloides attenuata* (Koch) by beating *Clematis*, *Hermaeophaga mercurialis* (F.) and *Apion varipes* Germ. by sweeping *Mercurialis perennis* L., *Rhynchaenus fagi* (L.) and *Pityogenes bidentatus* (Herbst) from *Clematis*, *Cidnorchinus quadrimaculatus* (L.) and *Stenocarus umbrinus* (Gyll.) by sweeping nettle.

Beside the road on top of the down *Cardamine amara* L., *Sanicula europaea* L., *Euphorbia amygdaloides* L., *Galium odoratum* (L.) Scop. and *Milium effusum* L. were conspicuous, and Mr. Eagles thought that he had never seen so much *Galeobdolon luteum* Huds.

Lepidoptera at Trottscliffe were: *Pyrausta aurata* Scop., larvae of *Oidaematophorus carphodactylus* Hübn., *Ancylis comptana* Fröl., *Scrobipalpa acuminatella* Sircom, larvae of *Agonopterix nanatella* Staint., *Acrolepia granitella* Treits., larvae of *Coleophora conyzae* Zell., various *Elachista* spp., including *E. biatomella* Staint.

Lepidoptera at Otford: *Pyrausta purpuralis* L., *Phytometra viridaria* Clerck ab. *fusca* Tutt, *Grapholita jungiella* L., *Lithocolletis faginella* Zell., *Heliozela stanineella* F.R., *Nepticula aurella* Staint., mines of *Coleophora gryphipennella* Bouché.

A single bee fly, *Bombylius major* L., visited various members of the party in turn at Otford.

The meeting ended with the party fragmented between two localities and sustaining a bandaged casualty: a member who tried to referee a dog-fight found that the participants did not obey the Queensbury Rules. At least your Field Meetings Secretary can claim that the meetings he chooses to lead are lively, if not always in the manner intended.

ASH VALE, SURREY—6th May 1967

Leader: Mr. R. W. J. UFFEN

A small party enjoyed a fine day exploring the bank of the Basingstoke Canal, and later, the heathland near Ash Vale station.

Numerous rowan trees of various ages were searched without success for the larva of *Coleophora trigeminella* Fuchs. The rowans all appeared to have spread from seed dropped by one tree much older than the rest, which were saplings of all ages. An example of *Coleophora trigeminella* Fuchs. had been reared by Captain J. Ellerton, from a larva found on rushes by the canal at the meeting in 1966.

Pinus sylvestris L. near the station yielded a few larvae of *Laspeyresia coniferana* (Ratz.); and seedheads of *Typha latifolia* L. produced many fully-fed larvae of *Limnecia phragmitella* Staint., which were heavily attacked by a hymenopterous parasite, the latter emerging shortly afterwards.

Few of the insects noted on the wing or swept were particularly characteristic of the habitats in which they were taken, so lists of them are not appended.

COSFORD MILL, SURREY—21st May 1967

Leader: Mr. J. A. C. GREENWOOD

There had been a spell of cold and wet weather before this meeting, and the forecast was most discouraging. However, nine members attended, and were rewarded with a fine, dry day with some sun, until rain began to fall about 4 p.m.

The bad weather of the previous weeks had produced a high water level in the ponds and low lying areas but, as always, it was possible to move in comfort on the tracks and slopes. A sharp frost earlier in the month had severely damaged spring growth, particularly in beech trees, some looking as though they had been scorched by a forest fire.

The usual spring larvae were abundant and included *Pseudoips prasinana* L. and *Euproctis similis* Fuess.

Macrolepidoptera on the wing or at rest were less noticeable, but included a number of spring butterflies and hibernating species; among which were: *Anthocharis cardamines* L., *Gonepteryx rhamni* L., *Pararge aegeria* L., *Aglais urticae* L., *Nymphalis io* L., *Clossiana euphrosyne* L.

Microlepidoptera were numerous both as imagines and larvae.

Mr. P. A. Goddard reported the great abundance and variety of Diptera, particularly Tipulidae. Thanks to the absence of strong sunshine, many of these could be conveniently observed at rest. The following species were recorded: *Tipula lunata* L., *T. selene* Meig., *T. luteipennis* Meig., *T. pseudovariipennis* Cizek, *T. luna* Westhoff, *Culicoides impunctatus* Goetgh., *C. scoticus* Downes & Kettle, *Bibio leucopterus* (Meig.), *B. marci* (L.), *Dilophus febrilis* (L.), *Limonia flavipes* (F.), *L. nubeculosa* Meig., *L. tripunctata* (F.), *Rhingia macrocephala* (Harris) (*camprestris* Meig.), *Tachypeza nubila* (Meig.), *Rhagio scolopacea* (L.), *Syrphus balteatus* Deg., *S. venusta* (Meig.), *Leucozona lucorum* L., *Mesembrina meridiana* (L.).

Mr. T. R. Eagles commented on a fine growth of the Lady Fern, *Athyrium filix-femina* (L.) Roth., including the form with a purple rachis, and two or three species of cionid beetle from the figwort, *Scrophularia modosa* L. He also noticed the rather local plant *Chrysosplenium oppositifolium* L.

Amongst the fungi reported by Mr. Eagles were *Taphrine deformans* (Berk) Tul. the Peach Leaf Curl, *Neobulgaria pura* (Fries.) Petrak, *Anthracobia melaloma* (A. & S. ex Fries.) Boud., *Reticularia lycoperdon* Bull. on a fallen birch trunk, and *Exidia glanulosa* (Bull.) Fr. known as Witches' Butter.

The meeting was, as always, enjoyable and productive. Once again Mr. and Mrs. Loarridge provided members with a memorable tea. Their kindness in giving to us, once again, the freedom of the estate is deeply appreciated.

WATLINGTON HILL, OXFORDSHIRE—27th May 1967

Leader: Mr. G. PRIOR

The weather in the morning was extremely bad with heavy rain in London, but by the time the rendezvous at Henley was reached it had almost ceased. In addition the ground was covered by a heavy mist. In spite of conditions six members attended the meeting.

The site is a chalk hill on the escarpment of the Chilterns, a mile from Watlington. The ground was rough, and ideal for Lepidoptera. There are a remarkable number of wayfaring trees in the locality, also white beam and the usual chalkland trees. Wild Thyme, Cowslip and violet were fairly thick on the ground and many Spotted and Early Purple Orchids were noted.

After lunch the weather improved, the sun shone continuously till evening, and it became quite hot.

The blue-spotted form of *Anguis fragilis* L., the Slow Worm, was seen; and *Lacerta vivipara* Jacq., the Common Lizard, and *Rana temporaria* L. the Common Frog, were reported.

On the open grassland of the chalk several lycosid spiders were noted. *Tibellus oblongus* (Walck.) was common, and one other crab spider of the genus *Xysticus* was seen.

Three members went on to Stoke Row for an hour or so during the evening and collected with some success, reporting *Ancylis geminana* Don., *Lithocolletis faginella* Zell. and two *Coleophora* species not yet determined.

Following is a list of Lepidoptera seen or collected during the day: *Pieris napi* L., *P. brassicae* L., *Anthocharis cardamines* L., *Erynnis tages* L., *Pyrgus malvae* L., *Gonepteryx rhamni* L., *Coenonympha pamphilus* L., *Polyommatus icarus* Rott., *Callophrys rubi* L., *Euclidimera mi* Clerck., *Ectypa glyphica* L., *Ematurga atomaria* L., *Callimorpha jacobaeae* L., *Epirrhoe alternata* Müll., *Xanthorhoe ferrugata* Clerck (*unidentata* Haw.), *X. quadrifasciata* Clerck, *Chiasmia clathrata* L., *Pyrausta purpuralis* L., *P. cespitalis* Schiff., *Syndemis musculana* Hübn., *Ancylis uncana* Hübn., *Griselda stagnana* Schiff., *Pancalia leuwenhoekella* L., *Simaethis pariana* Clerck, *Glyphipteryx cramerella* F., *Elachista argentella* Clerck, *Coleophora albitarsella* Clerck, *C. laricella* Hübn., *C. paripennella* Zell., *C. niveicostella* Zell., *Lithocolletis spinicolella* Zell. and *Adela fibulella* Schiff.

HURT WOOD, SURREY—3rd June 1967

Leader: Mr. R. F. BREThERTON

Nine members attended. The day was warm and without rain, but there were only occasional gleams of sunshine. Hurt Wood is new ground for the Society. Though no particularly notable Lepidoptera were found, the rich growth of *Vaccinium myrtillus* L. (Bilberry) produced many larvae and an abundance of that rather local moth *Cepphis advenaria* Hübn.

Other Lepidoptera seen included *Pieris brassicae* L., *P. rapae* L., *P. napi* L., *Anthocharis cardamines* L., *Gonepteryx rhamni* L., *Clossiana euphrosyne* L., a single *Vanessa atalanta* L., *Pararge aegeria* L., *Coenonympha pamphilus* L., *Pyrgus malvae* L., *Macrothylacia rubi* L., *Scopula lactata* Haw., *Xanthorhoe montanata* Schiff., *Dysstroma truncata* Hufn., *Deilinia pusaria* L., *Pseudopanthera macularia* L., *Ematurga atomaria* L., *Lithinia chlorosata* Scop., *Ectropis consonaria* Hübn., *Aethalura punctulata* Schiff., *Capua vulgana* Fröl., *Eucosmomorpha albersana*

Hübner, *Clavigesta purdeyi* Durr., *Griselda myrtillana* Westw., *Ancylis uncana* Hübner, *A. mitterbachiana* Schiff., *Olethreutes lacunana* Schiff., *Lespeyresia succedana* Schiff.

Bilberry under oak is a scarce habitat in southern England, though the Lower Greensand of the Leith Hill range is noted for this vegetation. Little is known of fauna associated with this bilberry, except for Lepidoptera, so some time was spent sweeping this plant by Mr. A. E. Stubbs. The following Diptera were taken: the crane flies *Tipula scripta* Meig., *Limonia nubeculosa* Meig., *L. tripunctata* (F.), and *Ormosia nodulosa* (Macquart); the empid fly *Bicellaria nigra* (Meig.) recorded from Kent, Hants, Dorset, Oxon, Devon, Hereford and various Scottish counties (Collin, 1961, *British Flies*, 6, Cambridge) though this species has been previously taken in Surrey in the Sheepleas at Horsely; the acaelypterata flies *Helomyza bicolor* Zett. and *H. fuscicornis* (Zett.), the latter recorded by Collin (1943, *Ent. mon. Mag.*, 79:234-251). In addition the bug *Anthocoris confusus* Reuter; the telephorid beetle *Cantharis pallida* Goeze, which was also abundant on the deciduous trees everywhere; and the scorpion flies *Panorpa communis* L. and *P. germanica* L.

Sweeping the foliage of fairly mature oaks, which were scattered in an area of bracken, yielded the following Diptera: *Empis praevia* Collin, previously recorded from two heaths in N.E. Surrey, Berks and Hants (Collin, 1961, *loc. cit.*), though Mr. Stubbs has also seen it abundantly on the heathland at Ockham and Wisley Common, Surrey, and it has also been recorded from Kent; *Oedalia stigmatella* Zett., the second record for Surrey; female *Chaldrus spurius* (Fall.), a very small species parasitic on typhlocybid homoptera, of which Coe (1966, *Handbk. Identification Brit. Ins.*, 10 (2)) says this sex is infrequently met; the lauxanid fly *Lyciella rorida* (Fall.) and the beetle *Cantharis pallida* Goeze.

Sweeping mixed deciduous foliage (birch, beech and rowan) produced further dipterous species: a male *Chalarus spurius* (Fall.), *Empis praevia* Collin, *Sicodus arrogans* L. and *Ula sylvatica* (Meig.). From the foliage of some small birches over bracken growing in the open, but fairly enclosed by mixed woodland, two males and three females of a very small empid fly with a cloud across the wing, *Euthyneura gyllenhali* Zett. were obtained. Collin (1961, *loc. cit.*) gives only four British records, Oxon, Cheshire, Yorks and near Glasgow.

In a valley on the dip slope of the Lower Greensand a grassy patch yielded a specimen of the crane fly *Nephrotoma maculata* (Meig.). Near this spot a small boggy area with *Sphagnum* and *Juncus effusus* L., a rare habitat in the area, contained several interesting flies: a large hoverfly with white bars on the abdomen, *Spericomomyia lapponica* L., a species difficult to find in the London area; the crane flies *Limmophila fulvonervosa* (Schummel) and *Pedicia schummeli* (Edwards), the latter is an uncommon species which was however common at this spot; the empid *Rhamphomyia stigmosa* Macquart; the dolichophid *Campsicnemus loripes* (Hal.); the scalypterate *Diastata nebulosa* (Fall.), a local species; and abundant small ephydriids. This spot was quite well enclosed by small pine and birch, but as these trees grow up the habitat will become more shaded and the water balance of the boggy ground may change. This change will not be helped by the adjacent ground having been planted with spruce.

Mr. Stubbs followed this valley southwards, up the dip slope, where a broad bare sandy forestry ride passes through heather with birch and planted pine. Here the empids *Hilara maura* (F.), *Empis praevia* Collins and *Tachypeza nubila* (Meig.) were taken, and a single tiger beetle, *Cicindela campestris* L. was seen.

On the plateau on top of the hill, just behind the escarpment, there is an area

of bracken and young oak. On an old stump a click beetle, *Ampedus balteatus* L., was found; a species said to be local though often abundant on Surrey heaths.

A holly bush beneath oak near the crest of the hill contained a specimen of the empid fly *Oedalia holmgreni* Zett. and the crane fly *Ula sylvatica* (Meig.).

Walking on short grass at the crest of the hill, at the view point, was a male of the local beetle *Sinodendron cylindricum* (L.).

An interesting botanical find was a large patch of *Ajuga reptans* L. (Common Bugle) having the flowers dwarfed and crimson instead of blue.

The party adjourned for tea to the garden of the leader's house not far off.

BROWNDOWN, GOSPORT, HANTS—11th June 1967

Leader: Mr. B. GOATER

Six members and two visitors attended. The day was warm and sunny. The party assembled at Fareham Station and was taken by cars to the collecting ground. The morning was spent on the extensive area of shingle between the road to Lee-on-Solent and the sea. Great quantities of *Silene nutans* L. were known to grow in this locality, and it was hoped to find evidence of both *Hadena albimacula* Borkh. and *Coleophora otitae* Zell. There are old records of the former from 'Gosport', and Mr. Sadler reported having taken a single example at light about a mile away, but the *Coleophora*, common at Dungeness, Kent, is unrecorded in Hants. Unfortunately, there were no suitable posts to provide a resting place for *H. albimacula*, though by strenuously overturning some old railway sleepers which lay on the shingle we did find one *Heliophobus albicolon* Hübn. *Coleophora otitae* Zell. is evidently absent, though the foodplant occurred in huge patches; on a few plants, the flowers were deep pink instead of the normal dingy yellow.

Platytes cerusellus Schiff. was quite frequent among sparse grass on the shingle; a few *Scoparia dubitalis* Hubn., one *Epirrhoe galiata* Schiff., two *Aspitates ochrearia* Rossi. and a few *Euclidemera mi* Clerck were seen, also the butterflies *Pieris brassicae* L. (possibly a migration), *Aglais urticae* L., *Nymphalis io* L., *Pararge megaera* L., *Maniola jurtina* L., *Coenonympha pamphilus* L., *Lycaena phlaeas* L. and *Polyommatus icarus* Rott. A larva of *Orgyia antiqua* L. was found feeding on *Quercus ilex* L., of which there were several self-sown seedlings on the shingle. *Neofaculta betula* Haw. and *Pleurota bicostella* Clerck occurred among *Calluna*. A number of *Coleophora gryphipennella* Bouch. were smoked from *Rosa pimpinellifolia* L. (*spinossissima* L.), another plant which showed a pink flowered form. Other interesting plants from this area included *Cerastium atrovirens* Bab., *Carduus tenuiflorus* Curt., *Lepidium heterophyllum* Benth. (*smithii* Hook.), *Sedum anglicum* Huds. and *Bromus lepidus* Holmberg.

After lunch, the party made for the reed bed inland from the road, and saw abundant larvae of *Marasmarcha lunaedactyla* Haw. on *Ononis* at the roadside. There was great excitement when immediately upon reaching the reeds, one member caught *Nascia ciliata* Hübn., but no more could be found. There were larvae of *Acleris lorquiniana* Dup. in spun shoots of *Lythrum salicaria* L. together with those of *Clepsis costana* F. The workings of *Paltodora cytisella* Curt. were found in *Pteridium* on adjacent heathy land, and it was pleasing to see the local plant, *Corydalis claviculata* (L.) D.C. here. The last find of an enjoyable and interesting day was a freshly emerged *Arctia villica* L.

OBITUARY

ROBIN MARCUS MERE

(1909-1966)

The untimely death of Robin Mere will have come as a sad blow to a wide circle of members of the South London. It has indeed robbed the Society of one of its best friends and keenest supporters whose interest in it never flagged even during his long and bravely borne last illness.

He was born in St. John's Wood in 1909 and educated at Westminster School and Christ Church College, Oxford, where he graduated in law, subsequently qualifying as a solicitor. For many years he practised on his own account but recently returned as a partner to Messrs. Peake & Co. of Bedford Row with whom he had served his articles as a young man. This happy reunion left him less tied than he had been in the past and provided him with a little more time to pursue his entomological studies.

He served with the Royal Navy during the war and Captain C. W. Robertson, R.N., his Commanding Officer in H.M.S. *Capetown* in 1943, writes that 'he served with distinction in the Royal Navy including sea service in the Indian Ocean and Persian Gulf and obtained promotion to the rank of Commander'.

After the war he settled in Surrey and lived near Chiddingfold for the last 15 years.

His interest in Lepidoptera dated from his early youth and his collection still contained material gathered together in North London in those days. Entomology was, however, not his only interest in the pre-war era as he was also a keen racing motorist which, with his work, naturally left him only limited leisure.

On demobilisation he again turned to entomology with renewed enthusiasm and joined the Society in 1946, at once becoming one of its most keen and energetic members. He rarely missed an Indoor Meeting, sometimes led Outdoor Meetings and could be relied upon to provide outstanding exhibits at the Annual Exhibition. His work for the Society was unlimited; he was president in 1960 when he founded the Housing Fund, he served on the Council from 1956 to 1964 and acted as trustee from 1958 until the time of his death. Those who had the good fortune to serve with him will remember his wise counsel and considered legal advice which he so readily offered. The Society will always be grateful to him for his generous gifts both to its collections and its funds, and finally for the legacy left in his will to the Housing Fund in expression of his hope that at some future date the Society would be able to acquire premises of its own.

Among his other activities he served on the Council of the Royal Entomological Society of London from 1962 to 1965 and was one of its vice-presidents in the year 1964-5; he was a member of the Entomological Club, a regular attender of the Verrall Supper and a frequent contributor to the entomological journals. He will also always be remembered in connection with the work he did on the investigation of the natural history of Buckingham Palace Gardens in which he was joint recorder of Lepidoptera, among which two species new to the British list were taken, i.e. *Earias biplaga* Walker and *Monochroa hornigi* Staud.

Although he must be classed among the scientific amateur entomologists of his time, his greatest enthusiasm lay in field entomology, in which he excelled. Such time as he could make available was spent collecting and his visits to

Scotland, Western Ireland, the Scilly Isles as well as other better or less well known localities brought him great rewards. His name will always be associated with the discovery of a number of previously unrecorded species for the most part made in company with other entomologists with whom he made his various expeditions, but two species, *Perinephela perlucidalis* Hübn. and *Nephopteryx albicilla* H.-S., were entirely his own discoveries, the former at Woodwalton and the latter in the Wye Valley. Other noteworthy first records which were made in company with others include *inter alia*, *Empithecia egeuaria* H.-S., *Pterophorus icterodactyla* Mann., *Amelia unitana* Hübn., *Scrobipalpa murinella* H.-S., *Nothris congressariella* Bruand and *Nepticula dryadella* Hoffman. He was also associated with a large number of records new to the Irish list.

His mercury vapour light trap, well situated near Chiddingfold, attracted many interesting visitors, perhaps the most notable of which was one of the only four known British records of *Hymenia recurvalis* F., taken in it in 1951; but many other good migrants came his way, including *Hippotion celerio* L., *Celerio galii* Rott., *Plusia confusa* Steph., *P. ni* Hübn., *Eublemma parva* Hübn. and *Diasemia ramburialis* Dup.

He was a keen breeder with considerable skill at bringing through hibernating larvae but he also succeeded in breeding many species of microlepidoptera which particularly of recent years had become one of his chief interests.

His quiet and kindly disposition endeared him to all those with whom he came in contact and many of us will remember delightful visits to the Mill House where he and Mrs. Mere extended so much hospitality.

He is survived by his wife, their son and both his parents to all of whom members of the Society will want to express their sincere sympathy in their sad loss.

J. L. MESSENGER.

The Coleoptera of Essex. An annotated list of the Coleoptera of the County is in the course of compilation by Mr. Peter Hammond. He is anxious to cover the County as fully as possible, and would welcome any records, particularly of the lesser-worked families and the not so well-known localities; but all records will be of value. These should include date, locality and any other relevant data, and should be sent to Mr. P. Hammond, 211, Beehive Lane, Chelmsford, Essex.—*Editor.*

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MEETINGS OF THE SOCIETY

are held regularly at the Society's Rooms, and include the well-known ANNUAL EXHIBITION, which takes place in October in the Libraries of The Royal Society and of the Geological Society of London at Burlington House, Piccadilly, by kind permission of those two Societies. Frequent Field Meetings are held at weekends in the Summer. Visitors are welcome at all meetings. The current Programme Card can be had on application to the Secretary.

THE FUTURE OF FIELD MEETING LOCALITIES IN SURREY

By ALAN E. STUBBS

Surrey offers so much on the doorstep of entomologists and other naturalists living in the London area. It is one of the richest counties in wild places where one may roam free and is exceptionally rich in the diversity of the countryside it offers; broad tracts of sandy heathland (by far the best near to London), chalk grasslands and woods of the North Downs (with Box Hill an incomparable locality) and grassy plains and oak woodlands (such as Bookham Common), in addition to innumerable other choice spots. Needless to say Surrey localities dominate the field meeting agenda and provide the first venues for field meetings by this Society. If any region should demand the attention and concern of the Society's membership, then Surrey must surely head the list.

One all too easily takes one's favourite haunts for granted, but we have entered a period where events move so rapidly that prevention is the only course because a cure is often out of the question. Consider the hazards threatening a few of the top entomological field meeting localities in Surrey:

Oxshott. The afforestation of the whole of the open part of Esher Common, with exotic conifers as well as pine. The decision to construct the Esher By-pass right through the heathland, and the fairly recent ill-managed draining and dredging of Black Pond.

Ockham. A major programme of pine afforestation and amenity development. The planned dual carriaging of the A.3 raising critical problems at Bolder Lake, and an orbital motorway and interchange.

Chobham. The imminent construction of a motorway right through the Common, plans to develop the common as a public golf course and the rapid swamping of the open heath by natural pine colonisation.

Thursley. A major portion of the open heath is subject to afforestation plans.

These are all heathlands, a single habitat type I take as an example, but reflect that every one of the best field meeting localities for this type of country is under threat of imminent and drastic change.

Other major habitat types are under less immediate threat at present, but that is no reason for complacency, for a short time ago we appeared to have plenty of heathland. At Shepleas one must meet the demands of amenity management of this chalkland area, Bookham Common is rapidly changing in character with unchecked natural changes as well as management under several headings, Ashstead is obviously well out of prime condition and needs management and perhaps only Boxhill has a fairly stable future.

Why should this situation have arisen now? The areas have, by and large, survived to the present. The answer is not simple. All these localities have seen change in the past, but the present time sees the coincidence of unwanted natural changes with an upsurge in development and catering for amenity.

Natural spread of the pine across Surrey heathland has proved devastatingly rapid in recent years and the situation is worsened by afforestation programmes. One must remember that pine is an introduced species in southern England, first planted in Surrey in the early nineteenth century. Heathland was probably formerly kept open for centuries by grazing and regular firing and certainly the majority of special heathland insects require open sunny conditions. The spread of the pine may well severely deplete the variety of heathland species, and there will soon only remain a very small remnant of open heath with a corresponding diminution in microhabitats. It has been argued that since localities such as Oxshott were once wooded with pine, and open heathland

insects are still there, they should be able to survive the resurgence of woodland. I am sure most field entomologists would see the flaw in that argument—species of insects are not randomly scattered across the heath, it is that little sunny spot or the favoured tree which are the stronghold of perhaps a single uncommon species, it is the compounding together of these spots which makes a given piece of heathland so good and its size enables some mobility. Restrict the size of the common and the number of 'good' spots, give a temporary or permanent spell of afforestation and it is very doubtful if all species survive. Oxshott is not the locality it was, it is the outer ring of heaths which have never, so far, been afforested that now hold the richest open heath fauna. It must therefore be of particular concern that these outer heaths are now also under threat.

Another major factor is the outburst for amenity management. With new powers likely after commons registration and, the growing pressures of the car picnic age, the County Council and other local authorities have stepped up their programme for the acquisition of common land. Whilst I must say at this stage that there can be benefits to the naturalist, inevitably it is the supposed needs of the masses that must be first catered for; car parks, conveniences, dry paths, draining of marshy areas, use of lakes for swimming, boating and fishing, mowing of grass and amenity afforestation.

One must accept multipurpose land use in this crowded country, but it is also possible to come to terms with it. Motorways and other major road schemes cannot always be avoided but these with luck will not be a recurring problem. Amenity management is the concern of the naturalist, and a field where he can play a useful part, for he can appreciate and advise better than the average person upon the long term affects of a given policy. Very often good ecological advice will be listened to and taken, it is largely a case of presentation. For instance, why cut rough herbage when the public presumably prefer to see wild flowers and butterflies? Why plant acres of monotonous pine at a time when the public criticise the Forestry Commission plantations—do not the public delight in picking heather and a spread of flowering *Calluna* is surely an amenity attraction? The alternative view is that it is far better for the kiddies to have short grass to kick their ball about on and why should one take notice of a few bugs—bugs indeed! Surely all the public does not wish all countryside to resemble the average suburban park.

I have taken a generally gloomy view of the future, but now consider what is being achieved and what could be done. The body specialising in these problems is the Surrey Naturalists Trust, a voluntary body supported by modest membership subscription.

The safest course of action in safeguarding land is to reach an agreement with the owner and lease or preferably purchase land, and in this manner the Trust has been able to declare eight areas as nature reserves. The only one at present covering a field meeting locality is at Thursley Common where part of the heath is managed as a reserve by agreement with the owner and a full time warden is on duty, Raymond Fry, who incidentally has a good knowledge of entomology. Declaring reserves is not the end of the matter, for to maintain the desired habitats in peak condition one must often manage. The amount of voluntary labour required for management is considerable and it is doubtful whether much of the heathland can realistically be kept clear of the invading pine. Among the management measures of entomological value are the maintenance of the bog water table, the clearance of pine from heath, the management of areas containing very rare mirid bugs and a management programme for dragonfly habitats—in which our members Messrs C. O. Hammond and A. E.

Gardner are playing an important advisory role. In the near future the Trust hopes to set up experimental plots to study long term management techniques for open heathland insects and spiders.

The Trust is negotiating over the future of Ockham and Wisley Common where already the County Council has carried out management, including clearance of pine and building a sluice, specially to meet entomological demands, despite these works being contrary to their amenity management plan. At Chobham the Trust presented evidence for construction and contracting restrictions at a public inquiry concerning the motorway proposals, having drawn up an inventory of areas of special importance for which Mr. R. F. Bretherton submitted a report as expert adviser on Lepidoptera. At Shepleas the County Council have already compromised their management programme towards the maintenance of the Duke of Burgundy Fritillary, *Hamearis lucina* L., which may have otherwise severely suffered from amenity measures.

This account has been kept brief in the hope that it will be readily readable, for the matters discussed must be the concern of all entomologists and other naturalists who use the countryside. No doubt all counties face similar problems, and all counties have a Trust to meet the situation, but the usage the membership of our Society makes of Surrey surely justifies an account of these local problems appearing in this journal.

The help that is needed is quite simply, records. Records to build up the case for given areas—to make a solid case for negotiation and to counterbalance the case of other claimants to the countryside. Unfortunately the position is too delicate to rely on unsubstantiated claims of what looks like a good area, nowadays the competition is too strong. Records for given localities are helpful, but it is much more valuable if a clear statement of area of distribution and habitat is available. One has often to compromise over part of a common and select the most valuable habitats. Records are also essential if one is to effectively manage small areas so that one may assess whether the techniques are succeeding or require modification. Several members are already helping in field surveys in connection with these aspects including Messrs. C. O. Hammond, R. W. J. Uffen and P. J. Chandler. Entomologists must have their say, since the management ideals of the botanist and ornithologist are not always suitable to insect faunas, and entomology being such a wide subject, it demands that the specialist on each group should be allowed to express his opinion.

All entomologists rely on the availability of insects in the field, whether field worker or museum taxonomist, and this affects everyone from the casual amateur to the academic ecologist. The membership of this Society has gained considerable benefit from the ready availability of Surrey field meeting localities for over three-quarters of a century, but let us hope our centenary will not be marked by reflections of what was not done today. A healthy natural history society depends, directly or indirectly, on field localities for its members to use, and should see a sense of duty in helping to maintain for future generations of members assets which have proved of major value to past and present members.

Wasps attacking other insects. Apropos the discussion which took place on this subject during the meeting of 27th July last (page 104-5), only that week my wife had watched a wasp attack a large fly in the kitchen window here at Tiptree, kill it, dismember it and carry away the pieces.—F. D. BUCK, 'Seirotana', New Road, Tiptree, Colchester, Essex, 3rd September 1967.

LIMACODIDAE—EAST VERSUS WEST AFRICA

By D. G. SEVASTOPULO, F.R.E.S.

I am afraid that I must start this comparison with Dr. MacNulty's paper, Outline Life Histories of some West African Lepidoptera, Pt. 2, Limacodidae (1967, *Proc. S. Lond. ent. nat. Hist. Soc.*, 1967:1-12), by pointing out five errors in spelling. The euphorbiaceous generic name *Alchornea* has been printed throughout with an 'i' instead of an 'e' (it was given correctly in the lymantriid paper) and *Spondias* has been printed as *Spondeas*. Also *Paryphanta*, *Hadrapphe* and *Trachyptena* have been printed, both in the text proper and in the key as *Paraphanta*, *Hydrapphe* and *Trychypテナ*.

Janse, in *Moths of South Africa—Limacodidae*, published in December 1964, has made a number of changes in generic names, and I will deal with these as they occur.

Paryphanta fimbriata Karsch

I have not bred this species, but the food-plant in East Africa is said to be *Ipomoea batatas* (Convolvulaceae).

Thosea aurifrons B. Baker

I have not bred this, but the East African food-plant is recorded as *Coffea* (Rubiaceae). Janse erects a new genus, *Neothosea*, for *albilineata* Hamps., which Hering in Seitz treats as congeneric with *aurifrons*, and suggests that *Thosea* proper may be confined to the Indian fauna.

Parasa karschi Dyar

Janse treats *Parasa* Moore (1858) as a synonym of *Latoia* Guérin (1844), so that all the *Parasa* species mentioned in Dr. MacNulty's paper become *Latoia*.

Parasa vivida Walker

A very long and varied list of East African food-plants: *Mitragyna stipulosa*, *Coffea arabica* (Rubiaceae), *Lagerstroemia* (Lythraceae), *Quisqualis* (Combretaceae), *Gossypium* (Malvaceae), *Pyrus malus* (Rosaceae), *Arachis hypogaea* (Papilionaceae), *Ricinus* (Euphorbiaceae), *Ipomoea batatas* (Convolvulaceae), *Gloriosa superba* (Liliaceae) and *Zea mays* (Gramineae).

Larvae I found in Uganda were black with an oval dorsal and an oblique lateral grey-green spot on each somite.

Parasa viridissima Holland

Another species that I have not bred; East African food-plant records are: *Rosa* (Rosaceae), *Citrus* (Rutaceae), *Sapium ellipticum* (Euphorbiaceae), and *Musa sapientum* (Musaceae).

Latoia albipuncta Holland

Janse has transferred this species to *Latoiola* Hering, and the insect that I had identified under this name now stands in the National Museum, Nairobi, under *Latoia brunnea* Holland, which does not appear in Seitz.

My larvae had a broad, pale rust-coloured, dorsal stripe edged with whitish and a broad, dark chocolate brown lateral stripe. The dorsum with the intersegmental areas dark chocolate brown.

In addition to *Alchornea cordifolia*, the following food-plants are recorded in East Africa: *Sapium ellipticum* (Euphorbiaceae), *Pygeum africanum* (Rosaceae), *Ficus* (Moraceae) and *Syzygium guineense* (Myrtaceae).

Latoia canescens Walker

Presumably remains in *Latoia*, but I only know the insect from the very brief description in Seitz.

Omocena syrtis Schs. & Clem.

Janse places this in *Neomocena* Janse (gen. nov.). I have bred it from larvae found on *Ricinus* (Euphorbiaceae) and *Corchorus* (Tiliaceae). My larvae were green with three fine white dorsal lines and a broader white subdorsal line. The scoli are orange or colourless.

Finally, with reference to Dr. MacNulty's remarks on the value of the larval characters in taxonomy, Hampson, in *Fauna of British India, Moths*, 1, makes use of these in his key, an extract from which is as under:

A—Forewing short, the outer margin evenly rounded

a—Larva (of known species) segmented and bearing series of spinous tubercules

b—Larva (of known species) segmented and non-tuberculate

c—Larva non-segmented, smooth and oval, with very thick cuticle

B—Forewing elongate, the apex produced, etc.

Mombasa

1st August 1967

Hypocyptus nitidus Palm. (Col., Staphylinidae) in the Joy collection. I recently had the opportunity to dissect all the specimens of the genus *Hypocyptus* (*Cypha* Samouelle) in the Norman H. Joy collection. The single example standing over the name *ovulum* Heer, proved on examination of the aedeagus to be *nitidus* Palm. This interesting insect had been discovered a few days earlier at Manchester University by Colin Johnson (1967, *Entomologist*, 100:193–5). Joy's specimen was taken at Bradfield, Berks., during September 1905. I am indebted to our curator, Mr. A. E. Gardner, for allowing me to examine the material in the Joy collection; and to Colin Johnson for confirming my identification.—S. A. WILLIAMS, 78, Cedar Drive, Sutton at Hone, Kent, September 1967.

Lathridius bifasciatus Reitt. (Col., Lathridiidae) habitats. Since this insect was first placed on the British list by Allen (1951, *Ent. mon. Mag.*, 87:115–5), when he took specimens by evening sweeping on Esher Common, Surrey, and at Chipstead, Surrey, it has spread considerably and has become, in places, quite common. This in itself is not remarkable in some introductions, but it seems also to be occupying a wide range of habitats. I have taken it sweeping and beating, seldom during the evening; I have found it in profusion in garden refuse in central London, and at the roots of plants on the tide line on the Kent side of the Thames estuary. During this summer it has begun to appear quite commonly in my office at Tiptree. Some of the lathridiids have been called 'plaster beetles', having been found associated with plaster work in old properties. Thus the species might appear to be commencing to occupy what could be considered a normal lathridiid niche in our fauna, though the tidal habitat at Higham, Kent, is unusual. However, the building in which it has been occurring during the summer is less than 18 months old, contains no plasterwork, and is hardly the situation in which one would expect this species.—F. D. BUCK, 'Seirotana', New Road, Tiptree, Colchester, Essex, 24th November 1967.

BUTTERFLIES AT COLLOBRIÈRES, VAR. ALPES MAURES,
PROVENCE IN JULY AND AUGUST 1967

By P. CALDERARA

The outstanding feature of our visit to the south of France this summer is one of reassurance. As an amateur entomologist of some mere 45 years experience whose central interest in England has passed from collection to conservation, it was indeed reassuring to be able, in only four days field work totalling 20 hours, to take 34 different species of macrolepidoptera, see a number of others, and obtain a few interesting examples of other Orders. The Rhopalocera taken or seen are recorded at the end of this paper.

The whole episode was a delightful experience starting with an easy trip on 22nd and 23rd July from London by road, ferry and rail to St. Raphael in a little over 24 hours, thence to a camp near Collobrières in the heart of the Chataignier forests of the Alpes Maures (where most of the world's supply of Marrons glacées come from).

What is more, even in these days of foreign currency restrictions, the whole three week tour cost less than the £60 per head and absorbed only 70 per cent of the allowance of French francs at our disposal.

Immediately on arrival at the 'camp', the brain child of an enterprising English family, the le Pine Haighs of Bournemouth, one was dazzled by the galaxy of butterflies flying in the early morning sunshine. Almost the first remark after we arrived and were offered the ceremonial welcoming 'cuppa' was 'the butterflies up there are our camp pets'. Above our heads as we sat under an immense chestnut tree was a group of three Great Tree Browns, *Brintesia circe* F., which were hand tame (with the assistance of a little honey on the finger). These large Satyridae were eventually quite an embarrassment to me since I wanted one or two examples to set and had quite a struggle on the steep hillsides away from the camp to take a pair of wilder ones.

This area of the Alpes Maures is a Forêt Communale and appears to be completely wild for many square miles. The roads on the 1 cm IGN maps (roughly equivalent to our 1 inch OS maps) which we used were really unprotected dirt roads and some of the secondary roads we used were marked 'difficult' or 'dangerous' on the ½ cm Michelin maps issued last year. The natural history of this region, therefore, appears to be completely unimpaired by pollution with persistent chemical sprays and poisons. In the immediate vicinity of the camp at 2,200 ft *Melitaea didyma* Esp. was in abundance, very bright and fresh, also *Mellicta athalia* L., *Polyommatus icarus* Rott., *Aricia agestis* Schiff., *Lycaena dorilis* Hufn. and *L. phlaeas* L.

Hipparchia fagi Scop. was everywhere on the sun-baked rocks, where it could best be taken by placing an extended net bag over it by stealth, as it seemed to have a remarkable ability to avoid a sweeping net. Equally plentiful among the rocks near the camps were *Melanargia galathea* L., *Pararge megera* L. and *Coenonympha pamphilus* L.

Leptidea sinapis L. was always present near water courses and dried up beds of the torrents and streams. *Gonepteryx cleopatra* L. appeared at all levels and was more plentiful lower down in the vineyards and villages. None of the clouded yellows were seen at the camp during the two weeks spent there, but on my field days when I travelled all over the mountainside from the Sauvette peak 2,524 ft to the valley of the Rael Collobrier as low as 400 ft, some *Colias croceus* Fourc., *C. hyale* F., *Papilio machaon* L. and *Iphiclides podalirius* L. were seen,

the last named in profusion, but usually rather worn, resting on scabious flowers at the roadside.

Also at the lower levels of the mountain, particularly in the deserted and overgrown orchards in which this region abounds, the day-flying Crimson Underwing, *Catocala dilecta* L., and the Cream Spot Tiger, *Arctia villica* L., were frequently seen; also several of the larger Nymphalidae on *Spiraea*, and *Pandoriana pandora* D. & S. and *Argynnis paphia* L. on yellow thistles. The Continental Small White Admiral, *Limenitis anonyma* Lewis, was found, always singly, in damp shady clearings and deep bracken growing near springs. Vanessa butterflies seen at the camp included *Vanessa cardui* L., *V. atalanta* L. and *Polygonia c-album* L. We did not see *Aglais urticae* L. or *Nymphalis io* L. however.

Being unused to continental butterflies since 1930, I had great difficulty in distinguishing the smaller fritillaries, but in order of abundance the population was headed by *Melitaea didyma* Esp. and the most infrequent was the one later identified as *Clossiana dia* L., the season of which appeared to finish by the end of the first week in August.

The chief advantage of using this camp, other than the excellent company present and perfect weather, was that observation could easily be continued on site from sunrise to sunset, and the whole nine kilometers of *chemin d'exploitation* or *laïes forestiers* could be covered in minutes whereas travel from the popular Côte d'Azur resorts to reach the forest would take hours. Equally, living in the centre revealed the lavish mammal and bird population which is more active early and late in the day. Badgers, foxes and innumerable pine martens and mountain hares were seen on the dirt road at night, and we noted several pairs of short-tailed eagles, flocks of great spotted woodpeckers, cirl buntings and gold finches each day. Hoopoes were also frequent particularly on the Col de Babao. A large green lizard and several smooth snakes were seen in old deserted vineyard retaining walls; also tortoises and a short-tailed Siamese cat, obviously living feral.

If you make a trip from Collobrières where the local Hotel de Notre Dame is especially recommended although nothing appears in any guide book, to the town of Gremaud, you descend to relative civilisation down the valley of the dried up river Gisle, where on purple loosestrife flowers actually growing in the river bed we found colonies of *Lysandra coridon* Poda. The local people explained that the whole region had been in drought conditions before and since the great fires of August 1965 and vegetation was growing extensively in the beds of most of the streams we saw. Even when heavy showers were falling on the Hautes Alpes 100 miles further north, the Alpes Maures were dry, and midday temperatures were always 85–95°F. throughout the time we were there and continuing to the second week of August.

At camp level, the principal Hesperidae seen or taken were the Large Skipper, *Ochlodes venata* L., the Silver Spotted Skipper, *Hesperia comma* L., and the Large Grizzled Skipper, *Pyrgus fritillarius* Poda. The blues included *Polyommatus icarus* Rott. and *Celastrina argiolus* L. at camp level, while the lower slopes produced the hairstreaks *Strymon ilicis* Esp. in poor condition and *Quercusia quercus* L. which was very fresh.

The following species were either seen or taken during the visit:

Papilio machaon L., *Iphiclides podalirius* Scop., *Leptidea sinapis* L., *Pontia daplidice* L., *Pieris rapae* L., *P. brassicae* L., *Colias croceus* Fourc., *C. hyale* L., *Gonepteryx cleopatra* L., *Limenitis anonyma* Lewis, *Melitaea didyma* Esp., *Mellicta athalia* Rott. s.sp. *celadussa* Fruh. (*pseudathalia* Rev.), *M. deiona*

Geyer, *Argynnis adippe* L., *A. paphia* L., *Pandoriana pandora* D. & S., *Clossiana dia* L., *Vanessa cardui* L., *V. atalanta* L., *Polygonia c-album* L., *Melanargia galathea* L., *Pararge megera* L., *P. aegeria* L., *Hipparchia statilinus* Hufn., *H. fagi* Scop., *Arethusana arethusa* Esp., *Brintesia circe* F., *Maniola jurtina* L., *M. ida* Esp., *Coenonympha pamphilus* L., *Lycaena phlaeas* L., *L. dorylis* L., *Strymon ilicis* Esp., *Quercusia quercus* L., *Lysandra coridon* Poda, *Aricia agestis* Schiff., *Polyommatus icarus* Rott., *Celastrina argiolus* L., *Prygus fritillarius* Poda, *Hesperia comma* L., *Ochlodes venata* Br. & Grey.

Stratton Lodge,
26, Manor Road, Barnet, Herts.
25th November 1967

BOOK REVIEW

Caddis Larvae. By. N. E. Hickin. 9" × 5 $\frac{3}{4}$ ", 476 pp., 980 text figures. London: Hutchinson. Price £10.10.0.

For a great many years Dr. Hickin has worked among the Trichoptera, and this book on the British species is the very creditable result of those years of patient study and recording. Though primarily directed towards the larval attention is paid to other stages where warranted. Unfortunately he is unable to provide a description to all our species and in consequence there are occasions where he has to say the immature stages are unknown. Some of these instances include species like *Oligotricha clathrata* (Kolenati) which does not appear to have been taken at all in recent years in its larval stage. In this respect the work highlights the weak areas in our knowledge of the larval stages of this Order, and clearly indicates where the student may most profitably direct his investigations.

The treatment of the subject is on a systematic basis. After the introduction, and dealing with the evolution of the Order, its classification and characteristics, the life cycle, collecting, preserving and rearing larvae, and a general account of the biology of Trichoptera, the following chapters are each devoted to a single family. Within these chapters the general diagnosis of the imagines is given; an up-to-date check list included; distribution covered, mainly on a county basis, with brief habitat details; adult flight periods are tabulated; a general diagnosis of larval characters at family level is given; and finally detailed descriptions of the larva of each species, where it is known, completes the chapter.

The book is copiously illustrated with excellent line drawings of larvae, cases and various details of morphology. Keys are provided to all families, except Hydroptilidae, which appears to have the greatest number of species with an unknown larval stage; and the Odontoceridae which contains only one British species. An adequate bibliography completes the work and is given at the end of each chapter, covering the subject matter of that particular chapter.

This is a major work on the Order and one which should be in the hands of all trichopterists.

F.D.B.

Corrections to the Ham Street field meeting report. Mr. P. J. Chandler makes the following corrections to the report of the meeting held on 11th September 1966 (*antea* p. 25): *Limosina (Leptocera) fungicola* Haliday should be deleted. *Fannia umbrosa* (Stein) should be amended to *Fannia rondanii* Strobl (*aerea* Meig.). The *Helina* female taken on the fungus covered log was not *H. laetifica* R.-D. but *H. obscurata* (Meig.).—EDITOR.

PROCEEDINGS

13th JULY 1967

A Vice-President, Mr. B. GOATER, in the Chair

The following new member was declared elected: Mr. D. G. Gooding.

EXHIBITS

Mr. J. A. C. GREENWOOD—A specimen of *Herse convolvuli* L. (Lep., Sphingidae), taken by himself and Mr. G. Prior in a restaurant in Seefeld, near Innsbruck, Austria, at 9 p.m. in mid-June. He remarked on the earliness of the occurrence, and on the altitude of 4000 ft. He asked if it was likely to have migrated from the plains. Mr. Greenwood also reported a fresh male *Rhodometra sacraria* L. (Lep., Geometridae) on the outside of his mercury vapour light trap at Woking, Surrey, 25.vi.67.

Mr. S. N. A. JACOBS—A living larva of the micropsychid moth *Melasma lugubris* Hübn. from Saas Fee, Vallais, Switzerland. The larval case is made, in the fashion of a caddis fly larval case, of silk covered with small flakes of mica. These cases are very difficult to see on the ground below the screes, where there is a considerable amount of mica particles. The larva feeds on mountain shrub-plants, but seems to favour *Genista* spp. He also exhibited a large tabanid fly present in some numbers at Montana Vallais, and a book, *General Entomology for Agricultural Students* by H. L. Kulkarny.

Mr. A. E. GARDNER—Examples of *Colydium elongatum* (F.) (Col., Colydiidae), and *Ampedus pomonae* Steph. and *Athous villosus* Geoff. (Col., Elateridae) taken near Lyndhurst, New Forest, Hants, 8.vi.67. He explained how he obtained these and many other nocturnal species by torchlight on an ancient beech.

Mr. N. A. SMITH—A pathological specimen of *Odezia atrata* L. (Lep., Geometridae) from Bison Hill, Dunstable Downs, Beds. The right forewing was affected.

Mr. C. O. HAMMOND—A reliable method of sending fragile insects through the post by suspending one box inside another by tensioned elastic bands. This obviates outside packing and allows easy return and exchange of set specimens. He demonstrated its effectiveness.

COMMUNICATIONS

During the past three weeks mercury vapour light trap catches had improved said Mr. B. GOATER, but numbers were beginning to fall off again, probably due to the dryness of the atmosphere.

Mr. S. WAKELY reported *Diasemia ramburialis* Dup., (Lep., Pyralidae), a very rare migrant, and *Nycterosia obstipata* F. (Lep., Geometridae), another rare migrant, from Camberwell, S. London, 12.vii.67.

Nomophila noctuella Schiff. (Lep., Pyralidae) was reported by Mr. J. L. MESSENGER to have occurred in his light trap at Witley, Surrey, 10.vii.67.

Dr. MACNULTY said that he had noticed Swans on many occasions paddling with one leg only and also cygnets, always with the right leg. He asked if any other member had noticed this.

Tits were reported by Mr. S. N. A. JACOBS to have been seen skimming the waves when he went to Denmark by the sea route in 1937. The possibility of small birds resting on the sea, with the oil in their feathers keeping them afloat was suggested by Dr. RYDON.

Commenting on Mr. Gardner's exhibit, Dr. A. M. MASSEE said that he too had often taken *Athous villosus* Geoff. and other species by this method of late collecting.

Sir ERIC ANSORGE reported taking a large elaterid beetle in his mercury vapour light trap.

'Some of the characters used in classifying moths' was the subject of a talk by Mr. W. H. TAMS.

27th JULY 1967

The PRESIDENT in the Chair

The following new member was declared elected: G. S. Woollatt.

EXHIBITS

Dr. A. M. MASSEE—Examples of the male glow worm, *Lampyrus noctiluca* (L.) (Col., Lampyridae) attracted to the bedroom light of a house in Highstead Valley, near Sittingbourne, Kent, 30.v.67. As the light of the male is quite faint it is less frequently noticed in the field. He said this insect appears to be as plentiful this season as in previous years.

Dr. P. J. L. ROCHE—Insects of the family Colobathristidae (Hem.), rather mosquito-like bugs of tropical distribution. In all the known species there is a long, very slender spine projecting upwards from the scutellum. The material exhibited was taken during two years' collecting in the Jesselton district of Sabah, Borneo. (1) A new species of *Symphylax* to be described by Dr. Ghauri from material derived from Sabah; his manuscript is now in the Press. (2) Two new and undescribed species of the genus *Phaenacantha*. The principal characters separating these two genera are the wing venation, the morphology of the genitalia, both male and female, and the shape of the head.

Mr. G. PRIOR—The Swallow Tail Moth, *Ourapteryx sambucaria* L. (Lep., Geometridae) and a small wasp, *Vespula vulgaris* (L.) (Hym., Vespidae). The wasp was found attached to the underside of the thorax of the moth which was on the ground outside the conservatory door at the rear of his house at North Harrow, Middx.

Mr. G. A. COLE—A number of the immigrant species *Leucania unipuncta* Haw. (Lep., Noctuidae) which included caught specimens from Dorset, south and north Devon, and bred series from the Scilly Isles and north Devon, showing some colour variation. The darkest were those which had been bred from eggs obtained from a north Devon female in September 1966, the pupae of which had been kept in a cold room. This had prolonged the pupal stage to as much as 54 days, compared with about 21 to 24 days in the case of the Scilly Isles pupae which had been kept in a warm room. When the room temperature dropped below 44°F. the moths either failed to emerge from the remaining pupae, or if they did manage to emerge, failed to expand. He also showed bred *Haena conspersa* Schiff. (Lep., Noctuidae) from Unst, Shetland; and a *Plusia* taken at light at Witherslack, Westmorland, 2.vii.67, which he thought might be *Plusia gracilis* (Lempke). (Lep., Noctuidae), the comparatively recent addition to the British list.

Mr. R. W. J. UFFEN—A series of *Coleophora tricolor* Wals. (Lep., Coleophoridae) associated with *Acinus arvensis* (Lam.) Dandy, taken on the slopes of the Simplon Pass, Switzerland, in mid-July 1967. The species appears not to have been recorded outside England before.

Mr. A. E. GARDNER—Examples of the following rare Coleoptera: *Dasytes*

niger (L.) (Cantharidae) and *Ischnomera sanguinicollis* (F.) (Oedemeridae), from Lyndhurst, Hants, on 10-11.vi.67.

Mr. C. O. HAMMOND—A female *Tabanus fulvus* Meig. (Dipt., Tabanidae) taken on the field meeting at Thursley Common, Surrey, 23.vii.67. This is a rare species found only in extensive old bogs.

Mr. P. N. CROW—A specimen of *Zygaena lonicerae* von Schev., ab. *bercei* Sand. (Lep., Zygaenidae) from the Wallingford area, Berks.

COMMUNICATIONS

Mr. G. A. COLE reported *Thecla w-album* Knoch (Lep., Lycaenidae) in his garden at Dorking, Surrey, flying to roses and settling on the blooms irrespective of colour, which he thought unusual. He also said that he could not trace their colony and although the Common Elm is found around his garden, there is no Wych Elm. Mr. B. GOATER said that roses have no nectar, although bees visit them for pollen; and the PRESIDENT asked if they might not be getting honeydew or something similar.

Two pierids (Lep.) were reported by Mr. S. N. A. JACOBS sitting on wet cement. The President added that it is said that in congregations of Lepidoptera at water, dung, etc., only males are present.

Replying to Mr. G. PRIOR's observation that it had been a remarkable year for aphids, Dr. A. M. MASSEE said that this was probably due to the cold spring, during which the aphids bred and were not attacked by predators. Then in the warm spell after spring they spread. He added that there were 840 species in Britain that feed on a wide variety of plants.

Mr. E. BRADFORD commented that Mr. R. W. J. Uffen had reported *Enarmonia formosana* Scop. (*Laspeyresia woerberiana* Schiff.) (Lep., Eucosmidae) in Peach, and that he had now found it in the bole of a pear tree in Bedford. Dr. Massee said he had taken it in 1919.

Referring to Mr. G. Prior's exhibit, Mr. D. STIMPSON said that he had watched a wasp sting a bluebottle to death on his lawn, dismember it and carry off the pieces one after the other. It also carried off a small fly, swatted and put in the place of the bluebottle when it had been removed. Mr. A. E. GARDNER said he had experienced wasps attacking moths and also removing parts of moths still on the setting boards. A wasp had been observed by Mr. M. CLIFTON attacking a bred butterfly, the wasp turning over and coming at the butterfly from its side. He had also seen wasps attacking small dragonflies. On Farthing Downs, Surrey, a wasp had settled on Mr. UFFEN's knee with a Large White butterfly it had caught. Mr. T. G. HOWARTH said that he had many times seen wasps coming to his mercury vapour light traps and collecting moths from them, adding that he thought Mr. Prior's moth would probably have been at rest when attacked. In West Africa, said Dr. B. J. MACNULTY, he had watched tree ants catching moths at light.

The President said that whilst in Switzerland he had seen a large blue butterfly, *Maculinea alcon* Schiff. being towed away by two ants; it was paralysed, but otherwise unharmed. Dr. MacNulty reported similar occurrences in West Africa.

Turning to another aspect of Mr. Prior's exhibit, Mr. A. E. Gardner remarked that *Ourapteryx sambucaria* L. fluoresces. Mr. T. G. Howarth pointed out that fluorescence is not common in Lepidoptera and that Dr. Cockayne did a survey of this phenomenon in the British Museum (Nat. Hist.).

The *Leucania unipuncta* Haw. shown by Mr. Cole prompted the President to draw attention to the melanic form bred by Mr. Austin Richardson. This was

confirmed by Mr. Howarth, who added that Mr. Langmaid had obtained a deeper red form.

The President confirmed Mr. Cole's *Plusia* to be undoubtedly *P. gracilis* (Lempke).

14th SEPTEMBER 1967

The PRESIDENT in the Chair

The death was announced of Dr. A. M. Masee.

EXHIBITS

Mr. B. GOATER—Larvae of *Eupithecia extensaria* Freyer s.sp. *occidua* Prout (Lep., Geometridae) feeding on *Artemisia maritima* L., Sea Wormwood, from the north Norfolk coast.

Mr. M. CLIFTON—A male *Rana ridibunda ridibunda* Pallas from a dyke near Brookland in the north of Romney Marsh, where the frog is quite common. The exhibited example had been living in a cage with an earthen floor for a fortnight and had turned almost black to hide itself; normally the colour of the back is bright green.

Mr. S. WAKELY—The following Lepidoptera taken in the moth trap in his garden at Camberwell, S. E. London, during July 1967: *Plusia pulchra* Haw. (Noctuidae), on the 11th; *Euphyia unangulata* Haw. (Geometridae), 21st; *Nycterosea obstipata* F. (Geometridae), 12th; *Diasemia ramburialis* Dup. (Pyralidae), 12th; and *Lozotaeniodes formosana* Frol. (Tortricidae), 23rd.

Mr. C. O. HAMMOND—A specimen of *Scaeva selenitica* (Meig.) (Dipt., Syrphidae) taken at Ockham Common, Surrey, 20.viii.67. The species is distinguished from the common *S. pyrastris* (L.) by the black band on the hind tibia and the golden hairs on the lower squama.

Dr. C. G. M. DE WORMS on behalf of Capt. R. A. Jackson—Cells of a leaf-cutter bee, *Megachile* sp., possibly *M. centuncularis* (L.), made in an overcoat hanging in an outhouse.

The PRESIDENT—Melanic larvae of *Dasychira pudibunda* L. (Lep., Lymantriidae) in their last instar. These were offspring of a unicolorous dark female, probably ab. *concolor* Staud., taken at Bramley, Surrey, in June. In earlier instars, the larvae did not differ markedly from the usual pattern of pale green ground colour with yellow tussocks; but in the last instar the whole brood assumed this melanic form. The genetics of ab. *concolor* appear to be unknown.

Mr. E. S. BRADFORD—Larva of the moth *Yponomeuta vigintipunctata* Retz. (Lep., Yponomeutidae) found feeding on the flower heads of Orpine or Livelong *Sedum telephium* L., growing in the Boreham Wood area of Herts.

COMMUNICATIONS

Last weekend at Hod Hill, Dorset, said Dr. C. G. M. DE WORMS, he had seen the following Lepidoptera: *Lysandra bellargus* Rott. (Lycaenidae), several *Nymphalis urticae* L. (Nymphalidae) and eight or nine *Colias croceus* Fourc. (Pieridae); whilst in the New Forest, Hants, he had seen several *Amathes agathina* Dup. (Noctuidae). He also said that Mr. L. W. Siggs had taken *Leucania vitellina* Hübn. (Noctuidae).

The Pale Clouded Yellow, *Colias hyale* L., (Lep., Pieridae) was reported by Mr. J. M. CHALMERS-HUNT to have been seen by Mr. R. F. Birchenough on Kemsing Chalk Down on 20th August. It was suggested however, that this

might have been *Colias australis* Verity (*callida* Verity) rather than *C. hyale* L.

Diasemia ramburialis Dup. (Lep., Pryalidae) was reported for Mr. H. E. Chipperfield by Mr. S. WAKELY, occurring on about 12th August, nearly one month after the example he had exhibited.

Mr. Chalmers-Hunt said that Mr. D. R. M. Long of Bromley had taken three *Rhodometra sacraria* L. (Geometridae); and Mr. J. A. C. GREENWOOD added that he had taken one at Woking, Surrey, towards the end of July.

Commenting on *Vanessa cardui* L. (Lep., Nymphalidae), Mr. R. W. J. UFFEN said he had heard no reports of larvae, though the butterfly had been numerous earlier. The PRESIDENT said the same seemed to apply to *Vanessa atalanta* L. (Nymphalidae), and he suggested the cold spring had adversely affected breeding. Mr. P. A. GODDARD said he had noted none at Portland.

Mr. B. GOATER said he had taken two examples of *Spaelotis ravida* Schiff. (Lep., Noctuidae) at Bushey, Herts.

Referring to the melanic *Dasychira pudibunda* L. larvae, Mr. T. G. HOWARTH said the late Mr. Bolton had given him some larvae and that the moths had all been dark, though he could not remember if the larvae were. Mr. Chalmers-Hunt asked if there was any relationship between melanic larvae and the subsequent imagines being melanic. Drawing attention to the example of *Lasiocampa quercus* L. (Bombycidae), the President said there was; and Mr. GOATER added the case of *Biston betularia* L. (Geometridae), which produced dark moths from dark larvae in one brood he had reared.

Mr. P. A. GODDARD gave a talk on 'An entomologist at Portland'.

28th SEPTEMBER 1967

The PRESIDENT in the Chair

The following new member was declared elected: Mr. A. S. Yeoh.

EXHIBITS

Mr. B. GOATER—A series of *Cynaeda dentalis* Schiff. (Lep., Pyralidae) from Dungeness, Kent, showing variation in hindwing coloration. The female hindwing tended towards uniform dark grey, but the male hindwing varied in background colour and in intensity of markings. When resting this moth strongly resembles a cluster of dried spikelets of a grass such as cocksfoot.

COMMUNICATIONS

Mr. J. A. C. GREENWOOD reported seeing *Aglais urticae* L. (Lep., Nymphalidae) at 10,800 feet on Mount Etna, Sicily, some flying in sulphurous fumes. The PRESIDENT remarked that he has seen them on Mount Etna, quite commonly about 3,000 feet from the top (approximately 7,800 feet above sea level). They were also a very well-marked form.

The President asked if Mr. Goater had seen *Cynaeda dentalis* Schiff. flying by day, and Mr. GOATER replied that he had not.

In reply to a question on the range of this insect, Mr. P. A. GODDARD said he had taken it at Portland, Dorset; Mr. S. WAKELY had seen it at Lewes, Sussex, and at Betchworth, Surrey; and the President reported it on the North Downs in Surrey, a little distance from Hackhurst Down.

Mr. WAKELY remarked on the unusual uniformity in the size of Mr. Goater's specimens.

Mr. A. M. HUTSON gave a talk on 'Bats'.

12th OCTOBER 1967

The PRESIDENT in the Chair

The President announced the death of two Honorary Members, Professor W. A. F. Balfour-Browne and Mr. M. Niblett.

The following new members were declared elected: M. J. Clark, L. F. Crick, R. A. Gambrell and G. L. Wills.

EXHIBITS

Dr. B. J. MACNULTY—A series of the bug, *Alydus calcaratus* (L.) (Coreidae), from Black Heath, Surrey, 16.ix.67. He explained that this bug is usually found when there is bright sunshine, but on this occasion it was found when the weather was dull, by examining the heather and ground very closely.

COMMUNICATIONS

Mr. G. A. COLE said that he had taken an example of *Rhodometra sacraria* L. (Lep., Geometridae) in his mercury vapour light trap at Abinger Common, Surrey, 5.x.67, and had released it the following afternoon in an open meadow. On release it flew straight up into the air until out of sight. Mr. Cole thought this might be due to the migratory instinct.

A migrant, *Palpita unionalis* Hübn. (Lep., Pyralidae), was reported by the PRESIDENT from Bramley, Surrey. He said that although now more frequent on the coast, this species is still uncommon inland.

The following members showed a selection of their slides: Dr. P. J. ROCHE, Mr. C. O. HAMMOND, Mr. E. P. WILTSHIRE, Mr. R. B. YATES-SMITH and Mr. D. O. CHANTER.

9th NOVEMBER 1967

The PRESIDENT in the Chair

EXHIBITS

Mr. J. D. HOLLOWAY—A collection of moths from the top of Mt. Kinabalu, 3,000 ft, Borneo, illustrating the intermingling of faunal elements from different source areas as a result of spread during the cooler phases of the Pleistocene Period. Especially of note was the genus *Poecilasthena* centred on S.E. Australia and New Zealand, yet with a 'rassenkreis' of closely related montane species extending up through the East Indies as far as Burma. Similarly a spread down from northern sources was illustrated by the genera *Alcis*, *Phthonoloba* and *Steirophora*, centred on the hills of Burma, S. China and N. India, and by species of *Diarsia* and *Euxoa* which probably spread down from the Palaearctic region. Also exhibited were species of *Chloroclystis*, *Sauris* and *Epiplima*.

Mr. A. E. STUBBS—An example of a species of *Norellisoma* (Dipt., Cordiluridae) with maculated wings taken by sweeping chalk scrub-grassland at Sheepleas, Surrey, 13.vii.66. A female of the same species was taken at the same spot, 30.vii.67. No species of *Norellisoma* with maculated wings has hitherto been reported from Britain, and it differs in numerous other characters from its near relatives. A specimen of the common species, *N. spinimanum* (Fall.) was exhibited for comparison.

Mr. D. R. M. LONG—Some photographs, lent him by N. McFarland of the South Australian Museum, Adelaide, of larvae of the endemic Australian notodontid genera *Hyleora*, *Sorama*, *Donina*, *Epicoma* and *Trichetra*. He

commented on their superficial resemblance to certain Palaearctic genera and outlined their characteristics which are typically notodontid.

Mr. A. E. GARDNER—(1) A series of *Ptenidium gressneri* Eric. (Col., Ptiliidae) from the New Forest, Hants, 21.x.67. These minute beetles recorded from the New Forest, Windsor Forest, Berks., and Sherwood Forest, Notts., were abundant in rotting wood inside the bole of an old beech. (2) A series of *Quedius microps* Grav. (Col., Staphylinidae) taken the same day, but from wood mould in an old beech.

Mr. C. O. HAMMOND—An example of the rare brown-veined lacewing fly *Nathanica capitata* (F.), taken on the promenade at Bournemouth, Hants, 6.viii.67. The species is almost exclusively associated with pine trees and rarely comes down to the ground.

COMMUNICATIONS

Mr. GARDNER said that he had seen an example of *Vanessa atalanta* L. (Lep., Nymphalidae) at Chippenham Fen, Cambs., 5.xi.67.

Referring to Mr. Hammond's exhibit, Mr. Gardner said that green lacewings turn brown during hibernation and then turn back to green after hibernation. Mr. HAMMOND confirmed this.

ANNUAL EXHIBITION

28th OCTOBER 1967

A colourful display of fine examples of British and foreign Lepidoptera once again filled the tables. The Conversazione Room at the British Museum (Nat. Hist.), though small in comparison with the venue we have enjoyed for so long, did at least restore something of the intimacy of our annual display of the season's prize captures; and if it was a little difficult to locate no doubt Council will give the matter due consideration.

Continental collecting has been increasingly popular over the past decade or so and no less than 18 of the 79 exhibits contained at least an element of material from outside the British Isles. With the exception of six, all were European and predominantly Rhopalocera, though Mr. R. W. J. UFFEN's were microlepidoptera and he included some continental Diptera; while Dr. I. HOWAT showed among his South American Lepidoptera some magnificent Arachnida and Coleoptera from the Amazon basin.

Mr. L. J. EVANS' exhibit was a fine example of the results of collecting in southern Europe; containing not only species familiar to us, like *Maniola jurtina* L., and species closely allied to our British insects, but many quite distinct from our fauna, such as species in the genera *Issoria*, *Hipparchia* and *Agodactylus*. Less familiar was the material belonging to Mr. J. H. PAYNE and taken in Ontario, Canada, though the *Danaus plexippus* L. is quite well-known to most of us, if not on the wing in this country at least from exhibited examples of those fortunate enough to have taken one. Most attractive were his examples of *Papilio polyxenes* Schiff. and *Limenitis arthemis* Drury.

Whilst on the subject of the exhibits of exotic origin, Miss W. M. A. BROOKE presented an interesting display of ferns from valleys in the Bolivian Andes.

Among the British species, that which created the most interest was probably *Coenophila subrosea* Steph., unrecorded as a resident since the mid-nineteenth century. Three members, Mr. J. L. MESSENGER, Mr. AUSTIN RICHARDSON and

Dr. C. G. M. DE WORMS, included the species in their exhibits, showing moderate to longish series, one of them reported the species to be common. All three recorded the insect from the same locality—Wales. This will present quite a problem to those operating the Lepidoptera recording scheme.

An interesting and very well presented exhibit was that of Mr. B. R. BAKER, who showed three drawers illustrating the signs exhibited by the presence of clearwings (Sesiidae) in the Reading, Berks., district; and a panel of photographs of *Tristateles emortualis* Schiff. in various stages.

A fine female underside aberration of *Lysandra coridon* Poda figured in the exhibit of Mr. G. A. COLE (Pl. 4, Fig. 4). It was taken on the North Downs, Surrey, during 1967.

Col. A. M. EMMET placed an impressive display of microlepidoptera, plus some macros, from the south and east of England, and from Galway, Ireland. Among these was a new county record for *Monopha conturbatella* Hübn. which he bred from *Chamaenerion angustifolium* (L.) Scop., taken at Thorpeness, Suffolk, 16.vi.67. Other examples were shown by Mr. S. WAKELY from Aldringham, Suffolk, only a few miles away, and Mr. J. M. CHALMERS-HUNT had also bred some from Suffolk. Among his macros Col. Emmett also showed *Aporophylla luneburgensis* Freyer from Ballyconelly, West Galway, Ireland.

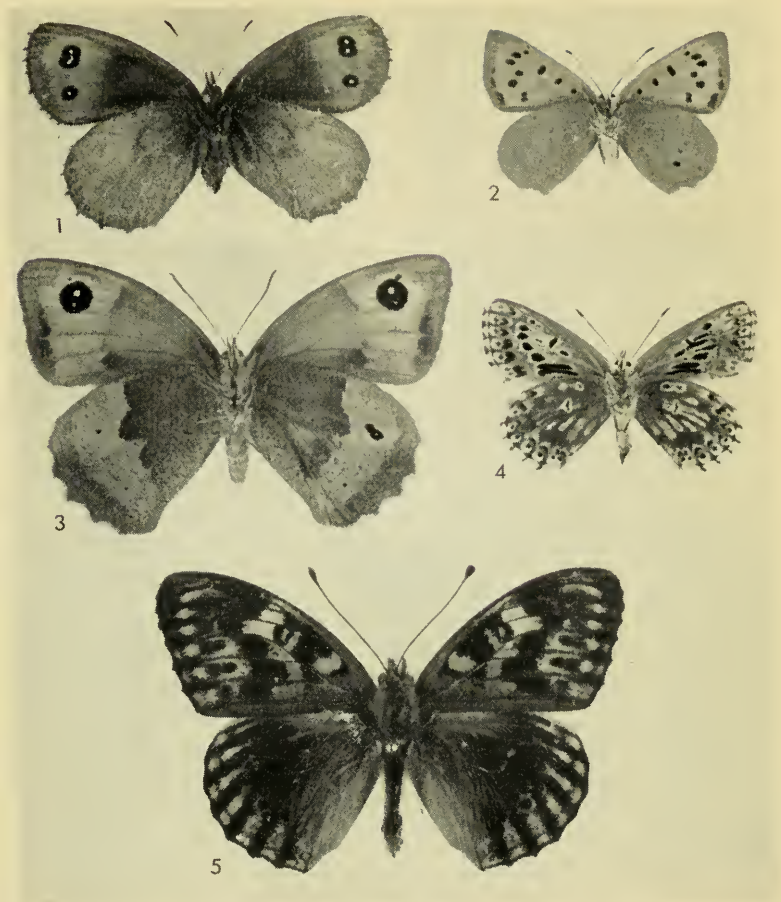
Migrant Lepidoptera taken at Martyr Worthy, Hants, at mercury vapour light were exhibited by Mr. D. W. H. FFENNEL, comprising; *Tathorhynchus exsiccata* Led., one male and two females, 2-3.iii.67; *Diasemia ramburialis* Dup., 9.x.67; *Uresiphita polygonalis* Schiff., 30.ix.67; and *Eromene ocellus* Haw., 3.ii.67.

Besides *Diasemia ramburialis* Dup., taken 16.ix.67, Mr. L. W. STIGGS included the following migrants taken in his mercury vapour light trap at Minstead, Hants: *Lithosia quadra* L., 13.vii.67, a female, males are frequent; *Leucania vitellina* Hübn., 16.ix.67; *Rhodometra sacraria* L., 30.ix.67; *Palpita unionalis* Hübn., 25.ix.67; and *Plutella maculipennis* Curt., 3.x.67. Admiral A. D. TORLESSE showed *Uresiphita polygonalis* Schiff., taken at Burley by C. W. Macworth-Praed in 1966 in his mercury vapour light trap. He also showed an aberrant example of *Pararge aegeria* L. with the yellow outer edges of the apical white-pupilled black spot absent on the forewings, and the other yellow markings reduced or vestigial. On the hindwings of this specimen, except for a slight clouding indicating the central yellow mark, all the yellow marking is absent. It is similar to that figured by Frohawk (1924 *Natural History of British Butterflies*, pl. 35, fig. 19).

Industrial melanism is still attracting the attention of some lepidopterists, and Mr. B. GOATER prepared an excellent display of comparative industrial, and other, melanism, as a result of 13 years study of the subject in north Middlesex, south Herts and north-east Essex. He divided his exhibit into six groups: (1) species in which the whole population is darker than those from rural areas, though not necessarily truly melanic; (2) species in which there is a significantly higher proportion of melanics in the local as opposed to the rural population; (3) species in which melanics, though rare, are evidently beginning to turn up and may be expected to increase; (4) species with well-known, but very local, populations containing a proportion of melanics; (5) rural melanic species; (6) unexplained occurrences of a dark form, mostly as single examples, which appear to have no adaptive significance and which cannot be anticipated to increase.

Dr. M. W. HARPER showing some west of England aberrations, had an unusual *Eurrhyncha hortulata* L. (Pl. 6, fig. 18) taken at Ledbury, Heref., 26.vi.67.

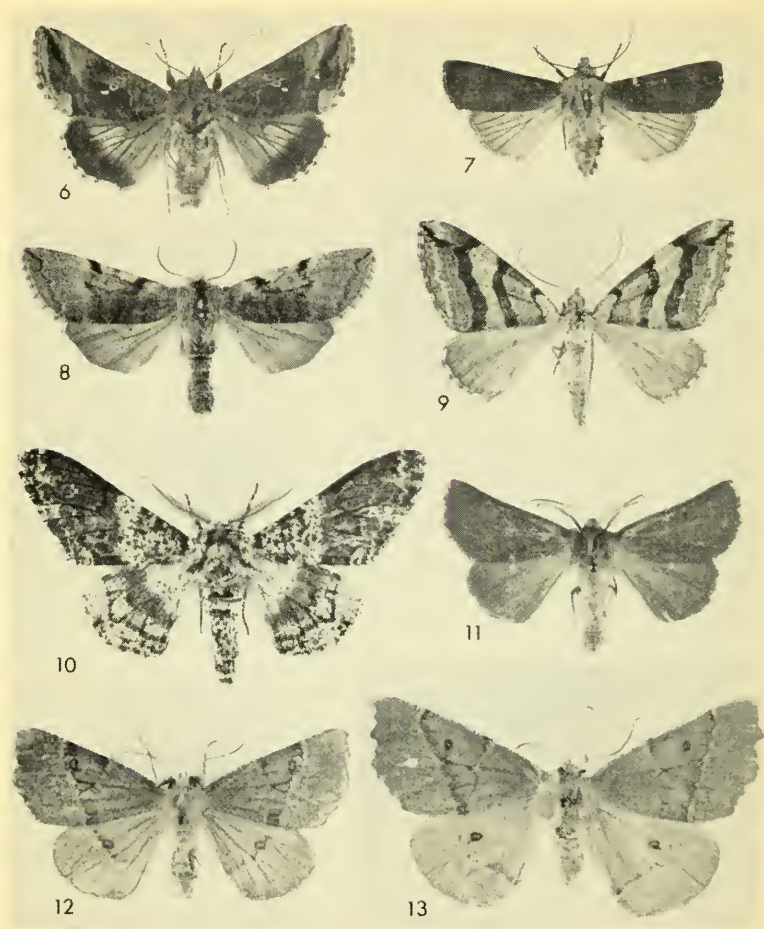
Two unusual aberrations and a bilateral gynandromorph figured in the



(Photographs by Mr. D. J. Carter)

ANNUAL EXHIBITION, 28th October 1967

1. *Erebia aethiops* Esp., Mr. A. D. A. Russwurm; 2. *Lycaena phlaeas* L., Mr. F. S. Reeve; 3. *Maniola jurtina* L., Mr. H. G. M. Middleton; 4. *Lysandra coridon* Poda, Mr. G. A. Cole; 5. *Mesoacidalia charlotta* Haw., melanic aberration, Mr. B. G. Withers.



(Photographs by Mr. D. J. Carter)

ANNUAL EXHIBITION, 28th October 1967

6. *Plusia gamma* L., Messrs. R. P. & S. A. Knill-Jones; 7. *Agrotis puta* Hübn., melanic aberration, Mr. Austin Richardson; 8. *Achlya flavicornis* L., Mr. R. Hayward; 9. *Anaitis plagiata* L. s.sp. *scotica* Richardson, Mr. Austin Richardson; 10. *Biston betularia* L. ab. *morleyi* Chalmers-Hunt, Mr. E. C. Pelham-Clinton; 11. *Crocallis elinguaris* L., Mr. Austin Richardson; 12. *Gonodontis bidentata* Clerck, Mr. B. V. Rideout; 13. *G. bidentata* Clerck, asymmetrical aberration, Mr. B. V. Rideout.



(Photographs by Mr. D. J. Carter)

ANNUAL EXHIBITION, 28th October 1967

14. *Psilocephala ardea* (F.), Mr. P. N. Crow; 15. *Forficula auricularia* L., gynandromorph, Mr. R. J. Ford; 16. *Ecliptoptera silaccata* Schiff., Mr. R. Hayworth; 17. *Cosymbia linearia* Hübn., Mr. R. Hayward; 18. *Eurrhpara hortulata* L., Dr. M. W. Harper.



(Photograph supplied by Major C. G. Lipscombe)

ANNUAL EXHIBITION, 28th October 1967

Pararge aegeria L., melanic aberration, Major C. G. Lipscombe (*above*); *P. megera* L., Major C. G. Lipscombe (*below*).

exhibit of Mr. R. HAYWARD: *Achlya flavicornis* L. (Pl. 5, fig. 8) from Aviemore, Inv., 8.iv.67, *Ecliptopera silaceata* Schiff. (Pl. 6, fig. 16) from Bath, Glos., 10.viii.67; and *Cosymbia linearia* Hübn. (Pl. 6, fig. 17) from the Wye Valley, 17.vi.67.

An exhibit which regularly receives a great deal of attention is that put down by Mr. A. L. GOODSON and Dr. H. B. D. KETTLEWELL, consisting of choice material from the Rothschild-Cockayne-Kettlewell collection. This year it was predominantly aberrations, and included *Papilio machaon* L. ab. *confluens* Schultz from Wicken, Cambs., taken in 1898 by Mr. W. J. Bulmer; *Melanargia galathea* L. ab. *nicholeti* Culot, which had also unchecked fringes, from Godstone Hill, Surrey, 3.viii.51; *Colias hyale* ab. *nigrofasciata* Grm. Gersh., taken by W. P. Curtis near Boscombe, Hants, in 1923; an example of *Panaxia dominula* ab. *conjuncta* Kettlewell, bred from Oxfordshire material by Dr. Kettlewell; and an undescribed aberration of *Notodonta ziczac* L., with melanic hindwings, bred 5.v.67 by Mr. D. K. Read from a female taken at mercury vapour light at Aldbury, Herts. Aldbury provided a number of interesting aberrations for Mr. Goodson this year which were included in the exhibit: *Orthosia gothica* L. ab. *hirsuta* Warren, 25.iv.67; *Ochropleura plecta* L. ab. *anderssonii* Lampa, 19.viii.67; and another undescribed aberration of the same species with a restricted costal stripe, 8.vii.67; *Meristes trigrammica* Hufn. ab. *convergens* Wehan., 12.vi.67; *Apatele leporina* L. ab. *sagittata* Lempke, 25.vi.67; *Crocallis elinguaris* L. ab. *olivaria* Ljungh., 21.viii.67; *Colocasia coryli* L. ab. *melanotica* Haverk., with a scale defect, 9.v.67. Also a nice bilateral gynandromorph and somatic mosaic *Cleora repandata* L. was included. It was bred by Dr. Kettlewell from parents taken in Black Wood, Rannock, Inv. and Morecambe, Lancs.

An unusual example of *Lycaena phlaeas* L. was shown by Mrs. D. F. GREENWOOD, this was the form *alba* Tutt and was taken on Thursley Common, Surrey, 23.vii.67.

A combined exhibit by Messrs R. P. & S. A. KNILL-JONES contained many interesting aberrations and included a *Plusia gamma* L. with the Y broken (Pl. 5, fig. 6). This specimen was taken at Freshwater, I.o.W. 15.v.67.

An introduction bred from a larva found in bananas from a warehouse in Chesterfield, Derbyshire was *Euchromia lethe* F. which was included in the exhibit of Mr. T. W. HARMAN on behalf of Mr. B. E. Elliott.

An example of *Eupithecia pini* Retz. was shown by Mr. C. R. HAXBY, who says doubt is attached to the references to this species in Porritt's list; the exhibited example is the only fully authenticated Yorkshire specimen of which he is aware. It was taken in a mercury vapour light trap in Bradford, 14.vi.66, by Mr. C. Denman, in a completely built-up area two miles from the city centre. Mr. Haxby has been unable to locate any foodplant in the area to account for the moth's appearance.

Mr. S. N. A. JACOBS showed 57 of his excellent water colour drawings illustrating feeding places and other life cycle details of microlepidoptera.

Aberrant Lepidoptera filled the case of Mr. H. G. M. MIDDLETON. Of these the following two specimens were perhaps the most interesting: *Maniola jurtina* L. female exhibiting homoeosis, the right hindwing having an area of the orange ground colour of the forewing reproduced near the base, and the subapical spot appearing on the outer half of the wing; it was taken at Worth, Dorset, 22.vii.67. (Pl. 4, fig. 3). An asymmetrical male aberration of *Aphantopus hyperantus* L. from the New Forest, Hants, 15.vii.67. In conjunction with Mr. A. D. A. RUSSWURM, he also showed a series of *Erebia aethiops* Esp. aberra-

tions which included an extreme female taken by Mr. Russwurm, set to show the underside, with all the hindwing markings obsolete (Pl. 4, fig. 1).

Unusual satyrids also figured in the exhibit prepared by Major C. G. LIPSCOMB. One was an example of *Pararge megera* L., a female showing suffusion of the black veining in the outer area of the forewings on the upperside, and was taken in north Dorset, 26.v.67 (Pl. 7, below). Another was an extreme melanic *Pararge aegeria* L., also a female, taken in south Wilts., 2.ix.67 (Pl. 7, above).

Once more Mr. E. C. PELHAM-CLINTON's microlepidoptera were as attractive and as interesting as ever, but the outstanding specimen was the female allotype of *Bucculatrix merei* Pelham-Clinton, taken at Aviemore, Inv., 9.ix.66, which he described in honour of his great friend Robin Mere (*Ent. Gaz.*, 18:155-8). This specimen is now in the collection of the Royal Scottish Museum. He also showed a banded form of *Biston betularia* L. ab. *morleyi* Chalmers-Hunt, a male from Philpstoun, W. Lothian, 15.vii.67 (Pl. 5, fig. 10).

An example of *Lycæna phlaeas* L. taken at Portland, Dorset, was shown among other Lepidoptera by Mr. F. S. REEVE, which exhibited homoeosis (Pl. 4, fig. 2). The underside of the left hindwing showed a slight repetition of the colouring and spotting of the forewing.

The main part of Mr. B. V. RIDEOUT's exhibit showed aberrations obtained in the second generation when breeding *Gonodontis bidentata* Clerck from some 30 ova taken on a privet hedge at Bramcote, Notts. This included an asymmetrical aberration (Pl. 5, fig. 13) and the aberration figured on plate 5 (fig. 12).

Mr. AUSTIN RICHARDSON usually manages to obtain a number of moths of more than passing interest, and this year he showed a melanic *Crocallis elinguaris* L. of a chocolate colour (Pl. 5, fig. 11), an unusually heavily marked *Anaitis plagiata* L. s.sp. *scotica* Richardson (Pl. 5, fig. 9), and a melanic *Agrotis puta* Hübn. taken on the Scilly Isles (Pl. 5, fig. 7).

The series of zyaenid moths prepared by Mr. W. G. TREMEWAN were of more than ordinary interest. They were: a series of *Zygaena purpuralis* Brunn. s.sp. *caledonensis* Reiss from the Isle of Mull (Loch Tuath, Loch Scridan and Carsaig Bay) and the Isle of Ulva. A series of *Z. loti* Schiff. s.sp. *scotica* Rowland Brown from the Isle of Mull (Loch Tuath and Loch Scridan) and the Isle of Ulva, including two confluent specimens from Ulva. A cocoon of *Z. loti* from Loch Tuath, together with a cocoon of *Z. filipendulae* L. from Carsaig Bay for comparison. A short series of *Z. filipendulae* L. s.sp. *anglicola* Tremewan from Ulva and Mull (Grass Point, Loch Tuath, Carsaig Bay). Two orange-red aberrations (*intermedia* Tutt) of *Z. filipendulae* L. s.sp. *anglicola* Tremewan and two yellow aberrations (*lutescens* Cockerell) of *Z. trifolii* Esp. s.sp. *palustrella* Verity, were shown from Ranmore Common, Surrey; and three yellow-orange aberrations of *Z. trifolii* Esp. s.sp. *palustrella* Verity and an aberration of the same species in which red is replaced by brown in both forewing spots and the hindwings were shown from Betchworth, Surrey. Another zyaenid, shown by Mr. P. N. Crow, was *Zygaena loniceræ* von Schev. ab. *minoides* Selys from the Wallingford district of Berks.

Back in 1945 a considerable stir was created by the discovery of *Sedina buettneri* Her. in the marsh at Freshwater, I.O.W., and for several years this locality was regularly recorded for this species, until the draining of the marsh destroyed the habitat. This year Mr. M. W. F. TWEEDIE exhibited an example taken in a light trap at Playden near Rye, Sussex, 14.x.66. As far as is known this is the only locality in the British Isles outside the Freshwater marsh in which the species has been taken.

In Mr. S. WAKELY's exhibit, as full of interest as ever, were several species

taken in Camberwell, S. E. London, all unusual for the metropolis; *Rhizedra lutosa* Hübn., taken at rest in his garden; and from a mercury vapour light trap also in his garden the following species:

Polychristia moneta F., *Plusia pulchrina* Haw., *Scopula promutata* Guer., *Nycterosea obstopata* F., *Euphyia unangulata* Haw., *Eupithecia icterata* Vill., *Diasemia ramburialis* Dup., *Homoeosoma binaevella* Hübn., *Euzophera pinguis* Haw., *Stenoptilia zophodactyla* Dup., *Lozotaenoides formosana* Frol., *Croesia forskaleana* L., *Oegoconia deauratella* H.-S., and *Epitheatis mouffetella* Schiff.

Last year for the first time we saw the remarkable aberrations of *Callimorpha jacobaeae* L. exhibited by Mr. R. W. WATSON. These were shown again this year together with new aberrations resulting from continuing the stock. The new aberrations were *nigrociliata* Watson, *paluda* Watson, *flavarsosa* Watson and *rubrasuffusa* Watson. In addition he showed many asymmetrical forms and minor aberrations from the continuation of the breeding of this unusual strain.

Besides showing a series of *Leucania unipuncta* Haw. taken in a mercury vapour light trap at Chipping Norton, Oxon., Mr. B. G. WITHERS also showed some Rhopalocera aberrations which included a melanic aberration of *Mesoacidalia charlotta* Haw. (Pl. 4, fig. 5).

Fungi from Epping Forest was displayed by Mr. T. R. EAGLES who usually manages an interesting display. Also showing fungi were Mr. A. E. CURTIS, Mr. W. H. SPREADBURY and Mr. H. G. TUNSTALL, who presented a joint exhibit including *Trametes rubescens* (Alb. et Schw.) and *Stereum hirsutum* Pers. and *Polyporus lacteus* Fr.

Living arthropods from the Zoological Society of London shown by Mr. G. J. ASHBY included many large, spectacular, exotic species and attracted a lively interest, particularly by the younger visitors.

Coleoptera have never produced more than a handful of exhibits and this year was no exception. Mr. A. E. GARDNER put up some of our scarcer and more interesting species from various parts of the country, which included *Leistus rufomarginatus* Dufts., from the New Forest, Hants, 10.vi.67, a new county record. Also *Eurynebria complanata* (L.), from Braunton Burrows, Devon, 7.viii.67; *Quedius ventralis* (Arag.), New Forest, 17 & 22.x.67; *Thamiaria cinnamomea* (Grav.), New Forest, 8.viii.67; *Necrodes littoralis* (L.), Kentisbury, Devon, 17.viii.67; *Cryptophagus micaceus* Rey, from a hornet's nest in the New Forest, 22.x.67; *Lymexylon navale* (L.), Windsor Forest, Berks, 6.vii.67; *Psylloides hospes* Woll., Lundy Island, Devon, 11.viii.67; and *Rutidosoma globula* (Herbst), Ham Street, Kent, 3.vii.67.

Among Dr. M. J. DAVIES' beetles were *Ptinus fur* (L.), *Cryptophagus pubescens* Sturm., *C. scanicus* (L.) and *Corticaria crenicollis* Mann., taken in a wasp's nest in Orpington, Kent; and also the rare *Carpophilus marginellus* Mots., taken under some old bones on a rubbish tip at Sidcup, Kent, 18.iv.67.

Attention is regularly drawn from time to time to gynandromorph examples of Lepidoptera, but gynandromorphs in other orders seem to be of rare occurrence. This may well be due to the ease with which the sexes of many species of Lepidoptera are recognised. It was therefore very interesting indeed to see the gynandromorph earwig, *Forficula auricularia* L. (Derm., Forficulidae) which Mr. R. J. FORD exhibited. In this example the left side was male and the right side female. It was taken at Yarmouth, I.o.W. (Pl. 6, fig. 15).

An unusual site for the nest of a wall mason wasp, *Ancistrocerus parietum* L. (Hym., Vespidae) was exhibited by Mr. I. G. FARWELL. It was a 15 amp electric plug kept in a garage near Lymington, Hants. The nest was discovered in June 1967.

Diptera, Hymenoptera and Homoptera were shown by Mr. P. N. CROW, besides some Lepidoptera. His exhibit included the rare therevid fly, *Psilocephala ardea* (F), (Pl. 6, fig. 14) from Berks; a handsome example of the syrphid fly *Caliprobola speciosa* Rossi also from Berks.; a hymenopterous parasite bred from a *Plusia* larva and the cocoon from which it emerged; and the homopteron *Ledra aurita* (L.), which closely resembles a flake of bark.

The following members and friends contributed to the success of the day. Except where otherwise stated the exhibit was of Lepidoptera: Rev. D. J. L. Agassiz, Sir Eric Ansorge, G. J. Ashby (living Arthropods), B. R. Baker, J. V. Banner, A. G. M. Batten, Mrs. M. V. Bolton, E. S. Bradford, R. F. Bretherton, Miss W. M. A. Brooke (Montane Tropica! Ferns), F. C. Brown (Saltatoria), P. Calderara, H. E. Chipperfield, G. A. Cole, R. M. Craske, P. W. Cribb, G. S. E. Cross, P. N. Crowe (various orders), A. E. Curtis (Fungi), S. R. Davey, M. J. Davies (Coleoptera), T. R. Eagles (Fungi), Capt. J. Ellerton R.N., Col. A. M. Emmet, J. L. Evans, R. Fairclough, I. G. Farwell (Hymenoptera), D. W. H. Fennell, D. Firth, R. J. Ford (Dermaptera), A. E. Gardner (Coleoptera and Saltatoria), B. Goater, A. L. Goodson, Mrs. D. F. Greenwood, J. A. C. Greenwood, B. Hargreaves (Lep. paintings), T. W. Harman, R. Hayward, Comdr. C. W. Harper, Dr. M. W. Harper, C. R. Haxby, T. J. G. Homer, Dr. I. Howat (Lepidoptera, Coleoptera and Arachnida), S. N. A. Jacobs (Lep., watercolours), G. E. Hyde, Maj.-Gen. Sir George Johnson, Dr. H. B. D. Kettlewell, R. P. Knill-Jones, S. A. Knill-Jones, Dr. J. R. Langmaid, M. J. Leech, Maj.-Gen. C. G. Lipscombe, J. Messenger, H. N. Michaelis, H. G. M. Middleton, P. M. Myers (Lepidoptera and Dictyoptera), D. O'Keefe, J. H. Payne, E. C. Pelham-Clinton, G. Prior, F. S. Reeves, Austin Richardson, B. V. Rideout, P. G. Russell (various orders, slides) A. D. A. Russwurm, L. W. Siggs, W. H. Spreadbury (Fungi), R. E. Stockley, F. A. Swain, Rear Admiral A. D. Torlesse, D. A. Trembath, W. G. Tremewan, R. Tubbs, H. G. Tunstall (Fungi), M. W. F. Tweedie, R. W. J. Uffen, S. Wakely, D. M. Wankhar, R. W. Watson, B. G. Withers, Dr. C. G. M. de Worms, L. D. Young.

FIELD MEETINGS, 1966

STOKE ROW, OXFORDSHIRE—14th May 1967

Leader: Col. A. M. EMMET

Seven members arrived at the rendezvous at Henley station. The main object was to search the beech woods in the Stoke Row area for *Coleophora antenariella* H.-S., which was taken there by workers in the 1920's, but has not been heard of since. As it was unlikely that the moth would fly before the afternoon, we decided to spend the morning on the downs at Moulsoford, where there is an extensive area of juniper. Here the leader had, in 1962, taken a specimen of *Phalonia rutilana* Hübn., a species which seems to have disappeared from its Surrey haunts. Though we were a bit early for it, members were hoping to find the young larvae starting to feed on the juniper needles.

Arriving on this ground the party set to work in a drizzle which soon became a downpour. No larvae of *P. rutilana* Hübn. were forthcoming, but the imagines of *Argyresthia arceuthina* Zell. were out in plenty, mingled with a smattering of *A. praecocella* Zell. Beating trays were soon waterlogged, and work became increasingly difficult. The party therefore adjourned to an inn for lunch, where they decided to call a halt.

PAMBER FOREST, HANTS—17th June 1967

Leader: Mr. B. R. BAKER

Six members met the leader at the Crown Inn, Silchester Common, on an overcast morning which promised sun later in the day, but which remained so during the entire visit. The forest therefore presented a somewhat subdued aspect to those members visiting it on this, the Society's second consecutive visit.

The party penetrated deeper into the woodland than on the previous visit, working along the wide oak bordered rides, and lunch was taken at a point where the oaks gave way to a compact conifer plantation in the centre of the forest.

An interesting crab spider, *Misumena vatia* (Clerck) well camouflaged in the flowering head of a spotted orchid was pointed out to the party; the spider had been seen in this flower for three consecutive days.

Mr. E. S. Bradford has kindly submitted the following list of Lepidoptera: *Pararge degeria* L., *Euphyia bilineata* L., *Lithina chlorosata* Scop., *Bupalis piniaria* L., *Crambus pratellus* L., *Eulia ministrana* L., *Bactra lanceolana* Hübn., *Olethreutes lacumana* Schiff., *Acleris tripunctana* Hübn., *Glyphipteryx thrasonella* Scop., *Elachista albifrontella* Hübn., *Lithocolletis trifasciella* Haw., *Nemotois degeerella* L., and *Hepialus hecta* L.

Also reported was the dragonfly *Agrion virgo* (F.), the neuropteran *Osmylus fulvicephalus* (Scop.) and the megalopteron *Sialis fuliginosa* Pictet.

Mr. T. R. Eagles kindly submitted the following list of plants: *Equisetum sylvaticum* L., *Blechnum spicant* (L.) Roth., *Dryopteris filix-mas* (L.) Schott., *D. carthusians* (Viller) H. P. Fuchs, *D. dilatata* (Hoffm.) A. Gray, *Thelypteris limbosperma* (All.) H. P. Fuchs, *Polypodium interjectum* Shivas., *Ranunculus aquatilis* L., *Callitriche platycarpa* Kütz. and *Cicuta virosa* L.

ICKLINGHAM, SUFFOLK—24th June 1967

Leader: Mr. B. GOATER

The weather was cloudy at first, following rain the previous night, but it soon became warm and sunny. These conditions lasted until late afternoon when there was more heavy rain.

Five members attended the meeting, and two others called briefly in mid-afternoon. By happy chance, the party met Dr. M. G. Morris and his family who were picnicking in the area.

The rough breck grassland was productive of *Crambus hortuellus* Hübn., *C. pratellus* L. and *Thisanotia chrysonuchellus* Scop., the last unfortunately past its best; and the locally abundant *Platytes cerusellus* Schiff. including females. Two fresh female *Mesotype virgata* Hübn., a female *Euphyia cuculata* Hufn. and a male *Diacrisia sannio* L. were disturbed. The *E. cuculata* was retained for

eggs, but could not be persuaded to lay. Fence posts and tree trunks were resting places for several specimens of *Hadena bicolorata* Hüfn. (*serena* F.), *Cucullia umbratica* L., *Procus strigilis* Clerck and *Lyncometra ocellata* L.; and an old sack hanging over a wire fence yielded two *Apamea remissa* Hübn. (*obscura* Haw.). A very worn female *Heliothis reticulata* Vill. (*saponariae* Borkn.) was netted and two *Agrotis exclamationis* L. were seen flying in the sunshine. The only special breckland moth to be found was one *Lithostege griseata* Schiff. We were unable to find any larvae of *Anepia irregularis* Hüfn. on the Spanish Catchfly, *Silene otites* (L.) Wibel, nor were we successful with the particular object of quest, *Coleophora laripennella* Zett. Examples of the plume moths, *Pterophorus pentadactylus* L., *Stenoptilia pterodactyla* L. and *S. bipunctidactyla* Scop. were seen.

The area is rich in plant life, and species of particular interest which were observed were *Silene otites* (L.) Wibel, *S. conica* L., *Medicago falcata* L., *M. sativa* L., *M. falcata* × *sativa* with flowers of all shades of yellow, greenish and purple, *M. minima* (L.) Bartel, *Descurania sophia* (L.) Webb ex Prantl, *Astragalus danicus* Retz., *Potentilla argentea* L., *Saxifraga granulata* L. (fruiting), *Anchusa arvensis* (L.) Beib. (*Lycopsis arvensis* L.) *Allium oleraceum* L., *Vulpia myuros* (L.) C. C. Gmel., *Bromus diandra* (Roth.) Tutin, *Apera interrupta* (L.) Beauv. and *Phleum phleoides* (L.) Karst.

FAVERSHAM CREEK, KENT—1st July 1967

Leader: Mr. K. C. SIDE

Although the weather was fine and warm only four members met at Faversham station and these went on by car to the creek. Before lunch an area of waste ground to the landward side of the seawall was thoroughly worked. It is in this area that the very local umbellifer, *Pseuedanum officinale* L., grows so profusely. The afternoon was spent on the saltings which lie between the seawall and the creek.

Species noted during the day included the following:

Lepidoptera: *Coenonympha pamphilus* L., *Maniola jurtina* L., *Hepialus lupulina* L., *Fumea casta* Pall., *Scopula emutaria* Hübn., *Ostrinia nubilalis* Hübn., *Agdistis bennetii* Curt., *Phalonidia affinitana* Dougl., *Laspeyresia aurana* F., *L. nigricana* F., *Agonepteryx putridella* Schiff. (larval spinings were common on the plant mentioned above, but only one larva was found), *Crambus pratellus* L., *C. perlellus* Scop., *Euphyia bilineata* L. *Anthophila fabriciana* L. and *Argyresthia cornella* F.; also numbers of *Coleophora* were found together with their larval cases amongst clumps of *Juncus gerardii* Lois. These were later found to be *C. glaucicolella* Wood and *C. alticolella* Zell.

Diptera: *Tipula oleracea* L., *Nemotelus uliginosus* (L.), *Dioctria baumhaueri* Meig. and *Platystoma seminationis* L.

Coleoptera: *Harpalus tardus* (Panz.), *Mordellistena pumila* (Gyll.) and *Zaclusus exiguus* (Ol.).

On the saltings a Common Lizard was seen.

STORRINGTON, SUSSEX—8th July 1967

Leader: Mr. D. A. ODD

A small party met at Pulborough Station and made their way to the Downs. The morning started dull, but improved later. The warm sunshine then brought

out quite a number of insects on the wing, particularly the butterflies *Aphantopus hyperantus* L. (in numbers), *Maniola jurtina* L., *Coenonympha pamphilus* L. and *Polyommatus icarus* Rott.

During the afternoon it was decided to visit Wiggon Holt Common, Parham, which was only two miles away. The heather yielded only one larva of *Anarta myrtilli* L., the moth being already on the wing. A number of *Diacrisia sannio* L. of both sexes were seen and a female was taken for eggs. *Lycophotia varia* Vill. and *Hydriomena furcata* Thumb. were flying among the birch trees. Growing along the lanes and on the downs the following characteristic plants were noted: Round-headed Rampion (*Phyteuma tenerum* R. Schulz), Nettle-leaved Bellflower (*Campanula trachelium* L.) Yellow Wort (*Blackstonia perfoliata* (L.) Huds.), Stemless Thistle (*Cirsium acaulon* (L.) Scop.) and Fragrant Orchid (*Gymnadenia conopsea* (L.) R.Br.). A Linnet (*Carduelis canubina* (L.)) was disturbed from its nest, having three eggs, in a low birch tree.

At the end of the meeting the party were entertained to tea at Dingley Dell, Washington, by Mrs. Odd.

THURSLEY, SURREY—23rd July 1967

Leader: Mr. J. A. C. GREENWOOD

A sultry day with some sunshine, which followed a prolonged period of dry and sunny weather, meant that the party of thirteen had excellent conditions although the low water level in the bog gave some cause for concern.

Mr. Hammond and Mr. Stubbs met the warden by appointment to discuss the preservation of suitable conditions for the well-being of the large dragonfly population. During the day Mr. Hammond identified the following species: *Anax imperator* Leach, one male; *Aeshna juncea* (L.), one female; *Orthetrum coerulescens* (F.), common; *Sympetrum danae* (Sultz.), very common; *Agrion virgo* (L.), several; *Lestes sponsa* (Hanse.), very common; *Ceriagrion tenellum* (de Villers), common; *Pyrrhosoma nymphula* (Sultz.), several; and *Ischnura elegans* (V. d. Lind.), in one area. He also reported the capture of the rare horse-fly *Tabanus fulvus* Meig.

The tiger beetle, *Cicindela sylvatica* L., was common on the drier parts of the heath, and Mr. Uffen found the large weevil, *Coniocleonus nebulosus* (L.).

Butterflies were quite numerous and fifteen species were recorded, including *Plebejus argus* L., *Eumenis semele* L. and *Aphantopus hyperantus* L. The best capture was made by the leader's wife who netted a superb *Lycdena phlaeas* L. ab. *alba* Tutt (form *schmidtii* Gerh.) within a few yards of the luncheon rendezvous. Only a few examples of *L. phlaeas* L. were seen, but this extremely rare form, in which the copper ground colour is replaced by a pale creamy white, was conspicuous and in excellent condition.

Larvae of *Anarta myrtilli* L. were very abundant on heather and some full-fed caterpillars of *Panolis flammea* Schiff. were found by beating; and on gorse near the pond a larva of *Callophrys rubi* L. was taken.

A few specimens of the local and rather uncommon moth *Selidosema brunnearia* Vill. (*ericetaria* Vill.) were aroused from the heather.

The following Diptera were noted at the bog: the crane flies, *Erioptera nielseni* de Meijere, of which the only previous records appear to be Studland, Dorset and Anstwick, W. Yorks.; *Molophilus occultus* de Meijere; *Limnophila meigeni*

Verrall and *Erioptera fuscipennis* Meig., on bare wet mud below the dam; the hoverflies *Sericomya silentis* Harris and *Volucella bombylans* (L.); and the tachinid fly *Linnaemya vulpina* (Fall.), which was abundant on a boundary bank. Also on the bank was the grasshopper *Omocestus viridulus* (L.).

In the afternoon, on the west side of the common, the flies *Thyridanthrax fenestratus* (Fall.) and *Asilus crabroniformis* L. were noted, the grasshopper *Myrmeleotettix maculatus* (Thunb.) was seen in various forms (pale mottled, green and dark brown), and the solitary wasp *Ammophila campestris* Brit. auct nec L.

An alder swamp yielded a good selection of crane-flies, mostly the subfamily Hexatomiinae; these included *Limnophila lucorum* (Meig.); *L. sepium* Verrall; *L. fuscipennis* (Meig.), of which the only previous records appear to be for Sussex and Hants; and *Molophilus flavus* Goetghbaer, probably not previously recorded south of Bucks. The rare fly *Ptychoptera minuta* (Tonnoir) was also taken.

A few days before this meeting, Mr. Uffen reared the momphid moth, *Sorhagenia janiszewskae* Reidl., from a few drooping shoots of *Frangula alnus* Mill., collected from the area early in June.

At least Mr. Hammond and the leader felt that this had been a successful meeting.

COLNEY STREET, HERTS—29th July 1967

Leader: Mr. E. S. BRADFORD

Three members arrived at Bricket Wood; and whilst awaiting the train for other members, an inspection of the vegetation around the station yard was made, and one larva of *Notodonta dromedarius* L. was found on a birch. A number of *Udea lutealis* Hübn., *Haritala ruralis* Scop. and *Argyresthia goedartella* L. were disturbed from the undergrowth in this disused area of the station forecourt. On *Chamaenerion angustifolium* (L.) Scop., also growing in the area, were mines and larvae of *Mompha raschkiella* Zell; and a specimen of *Parornix* was seen on hawthorn.

The weather this year was again unkind. Although there was no rain it remained overcast for most of the day, and as a consequence much that would have been active and on the wing remained quiescent.

When the train eventually arrived and no further members appeared, the party made off to the gravel pits. On entering them the first insect found was *Procus fasciuncula* Haw. on a thistle, and a little later a full grown larva of *Cerura vinula* L. was discovered on a row of willows, but after searching for a while no more were found.

A large area of the gravel pits, which was becoming rich in vegetation has now been filled in, but a new and larger piece of ground is being worked, and may be promising in the future. One area has been left for many years and is by far the most luxuriant. A number of things were seen or taken there, including the butterflies: *Parage megera* L., *Maniola jurtina* L., *Maniola tithonus* L., *Coenonympha pamphilus* L., *Lycæna phlaeas* L., *Polyommatus icarus* Rott. and *Thymelicus sylvestris* Poda. Moths noted were: *Zygaena filipendulae* L., *Plusia gamma* L. *Calothyranis amata* L., *Euphyia bilineata* L., *Agriphila straminella* D. & S. and *Platyptilia gonodactyla* Schiff.

Having some time in hand after traversing this area, it was decided to visit

a long open cutting in Bricket Wood, which is not far away. On the way the party were met by a member of the Amateur Entomologists' Society who had intended joining them at the station, but who had been delayed. Little was found in the cutting apart from one of the Brocade moths. There was uncertainty about this insect and it is being determined by the member who took it. Eventually the party retraced their steps to the station as it looked increasingly like rain.

Other Lepidoptera noted during the meeting were: *Opisthograptis luteolata* L., *Witlesia mercurella* L., *Pyrausta purpuralis* L., *Cochylis dubitana* Hübn., *Pandemis heparana* Schiff., *Dichrorampha simpliciana* Haw., *Epiblemma scutulana* Schiff., *E. farfarae* Fletch., *Zeiraphera insertana* F., *Epinotia tenerana* Schiff., *Aucylis badiana* Schiff., *Olethreutes lacunana* Schiff., *Carcina quercana* F., *Argyresthia nitidella* F., *Lithocolletis messaniella* Zell. and *Plutella maculipennis* Curt.

Several flies were seen during the day including an example of *Syrphus lucorum* (L.) (Syrphidae), numbers of *Episyrphus balteatus* (Deg.), one *Nephrotoma flavipalpis* (Meig.) (Tipulidae); several *Paroxyna misella* (Loew.) (Trypetidae), and a specimen of *Dioctria baumhaueri* Meig. (Asilidae).

CADSDEN, BUCKS—6th August 1967

Leader: Capt. J. ELLERTON R.N.

The day broke foul and wet, and it was with some trepidation that the leader went to the rendezvous. However he was joined by 11 members and their families whose enthusiasm was well justified, as the day steadily improved and the sun appeared.

The hillside was looking at its best with masses of wild flowers, and it was a real joy to see so many *Lysandra coridon* Poda of both sexes flying around. Other macrolepidoptera noted included: *Pieris brassicae* L., *P. rapae* L., *Maniola jurtina* L., *Coenonympha pamphilus* L., *Nymphalis io* L., *Aglais urticae* L., *Lycæna phlaeas* L., *Polyommatus icarus* Rott., *Aricia agestis* Schiff., *Thymelicus sylvestris* Poda., *Phytometra viridaria* Clerck, *Colostygia olivata* Schiff., *Euphyia bilineata* L., *Epirrhoe alternata* Müll., *Anaitis plagiata* L., *Ortholita chenopodiata* L. and *O. bipunctaria* Schiff.

Of the microlepidoptera *Pyrausta aurata* Scop. was plentiful, but in worn condition; the local *P. nigrata* Scop. was also present in fair numbers. Other species seen or taken were: *Pyrausta purpuralis* L., *P. cespitalis* Schiff., *Udea lutealis* Hübn., *Haritala ruralis* Scop., *Crambus perlellus* Scop., *Agriphila culmella* L., *A. tristella* Schiff., *Stenoptilia bipunctidactyla* Scop. *S. pterodactyla* L., *Platyptilia ochrodactyla* Schiff., *Phalonia tesservana* Schiff., *Argyresthia aurulentella* Staint., *Parectopa ononidis* Zell. and *Ypsolophus xylostellus* L. Mines containing larvae of *Mompha raschkiella* Zell. were seen, and a number of cases of *Coleophora silenella* H.S. were collected.

Sweeping for Coleoptera was not very rewarding, but the following were noted: *Rhynchaenus fagi* (L.), *Meligethes viridescens* (F.) and *Mecinus pyraster* (Herbst).

A few *Ceriocera cornuta* (F.) (Trypetidae) were obtained by sweeping *Centaurea scabiosa* L. and *Trypeta tussilaginis* (F.) came from *Arctium minus* Bernh.; other flies seen were *Rhynchista prolixa* (Meig.) and *Helicobosca distinguenda* Ville-neuve.

BOOKHAM COMMON, SURREY—13th August 1967

Leader: Mr. A. S. WHEELER

Four members, all lepidopterists, and a number of visitors joined the leader on a dry day with warm sunny periods; but despite the fine weather, very few Lepidoptera were seen.

This meeting was held jointly with the London Natural History Society but that society was represented by ornithologists and botanists and we went our separate ways; only meeting again briefly at lunchtime by the Isle of Wight pond, the established rendezvous of the London Natural History Society.

Lepidoptera noted were: one *Vanessa cardui* L., two *Limenitis camilla* L., a few *Quercusia quercus* L. were believed to have been seen, and *Maniola tithonus* L. was in numbers.

The orthopteron *Pholidoptera griseoptera* (Deg.) was reported, and the last instar of the hemipteron *Troilus luridus* (F.) was beaten from oak.

OCKHAM, SURREY—20th August 1967

Leader: ALAN E. STUBBS

The day was sunny throughout and provided ideal collecting conditions, with the heather in full flower. Only six members attended.

The party worked one of the few remnants of open dry *Calluna* heath remaining on Ockham and Wisley Common. Pine and birch woodland now dominates the common, both as a result of natural colonisation and deliberate pine afforestation by the County Council who now manage the area for amenity. The open heath inspected probably only survives because it was burnt in the early 1950's, but pine, birch and bracken are now colonising. Recent flailing of a broad zone may prove an advantageous method of maintaining heather as a regular substitute for firing.

The following insects were observed.

HETEROPTERA: *Picromerus bidens* (L.); *Nabis ericetorum* Scholtz, common; *Kleidocerys truncatulus* (Walk.) (*resedae* (Panz.) s.sp. *ericde* (Hovarth)), abundant; *Deraeocoris ruber* (L.), one; *Orthotylus ericetorum* (Fall.), abundant; and *Phytocoris insignis* Reuter, frequent.

HOMOPTERA: *Erythroneura rubovittata* (Lethierry), common.

COLEOPTERA: *Cicindela campestris* L., occasional; *Chilocorus bipustulatus* (L.), frequent; *Exochomus quadripustulatus* (L.), occasional on young birch; *Coccinella septempunctata* L., one; and *C. hieroglyphica* L., dark form common.

HYMENOPTERA: *Annophila pubescens* Curt. (*campestris* auct. nec Lat.), one in flailed zone; and *Mellinus arvensis* (L.), mostly around young birches and in flailed zone.

LEPIDOPTERA: *Macrothylacia rubi* L., one larva; *Anarta myrtilli* L., larva common and adults occasional; *Saturnia pavonia* L., an empty cocoon; *Lycaena phlaeas* L., a few examples.

DIPTERA: *Musca autumnalis* Deg., common; *Eriothrix rufomaculata* (Deg.) ab. *monochaeta* Wainwright, occasional; *Coptophlebia vitripennis* Meig., common; *Dilophus febrilis* (L.), common; and *Sepsis cynipsea* (L.), frequent. The following Syrphidae were observed feeding at, or hovering around, the flowers of *Calluna vulgaris* (L.) Hull: *Pyrophaena granditarsa* Forst., one; *Sphaerophoria scripta* (L.), occasional; *S. menthastris* (L.), occasional; *S. ruepellii* Wiedemann,

one seen but not taken for confirmation; *Platychirus albimanus* F., common; *P. scutatus* Meig., common; *Scaeva pyrastris* (L.), one; *S. selenitica* (Meig.), one; *Syrphus balteatus* Deg., frequent; *S. auricollis* Meig., occasional; *S. luniger* Meig., one; *S. corollae* F., common; *S. vitripennis* Meig., occasional; *Helophilus pendulus* (L.), common; and *Syritta pipiens* (L.), one. The absence of the common genera *Eristalis* and *Melanostoma* was particularly marked. The addition of the uncommon fly *S. selenitica* (Meig.), caught by Mr. C. O. Hammond, brings the total of Syrphidae for the common to 62 species in my survey list.

The alder woods were briefly visited, areas which have seen very drastic management in a partial attempt to drain them and open up access for the public. Very extensive survey records have been made for these localities, but among the more interesting observations on this occasion were the beetle, *Platycis minuta* (F.) and the Diptera *Dolichozepea albipes* (Stroem) and *Pteromicra glabricula* (Fall.). The last named is a very local species and brings the list of Sciomyzidae to 19 species, a remarkable number for a heathland locality since the larvae feed on snails.

Beside a deep ditch across a small open spot on the heath a good stand of flowering Hemp Agrimony, *Eupatorium cannabinum* L., attracted many insects. Four *Vanessa cardui* L. and one *V. atalanta* L. provided a pleasant sight and the hoverflies were represented by *Eristalis intricarius* L., one of the white-tailed form; *E. tenax* L., common; *E. pertinax* Scop., frequent; *E. arbustorum* L., frequent; *Syrphus vitripennis* Meig., occasional; and *Syritta pipiens* (L.), occasional. Three species of the dipterous family Conopidae were present, the first two of which attracted some interest; one *Physocephala rufipes* (F.), three *Conops flavipes* L. and one *Sicus ferrugineus* (L.). All too often the amenity programme on the common involves mowing vergeside vegetation, an extraordinary policy since many of the public enjoy seeing flowers and butterflies.

A piece of wet *Calluna*/*Erica tetralix* heath was worked at about 4 p.m. to produce a hoverfly list for comparison with that made earlier in the day at 11.30 a.m.—12.30 p.m. on the dry *Calluna* heath: *Pyrophaena granditarsa* Forst., one; *Sphaerophoria menthastris* (L.), common; *Platychirus albimanus* (F.), occasional; *Syrphus corollae* (L.), common; *S. ribesii* L., fairly common; *Eristalis horticola* Deg., frequent; *Helophilus trivittatus* (F.), one; *H. pendulus* (L.), frequent; and *Rhingia campestris* Meig., one. It is interesting to find that only one species of *Eristalis*, the least frequent on the common, has appeared and *Melanostoma* was again absent apart from one *M. mellinum* (L.) which was almost certainly a stray from the adjacent *Molinia* tussocks where this species was common. At this spot a shield bug, *Picromerus bidens* (L.) was found feeding on a larva of *Macrothylacia rubi* L., but time did not permit a more extensive faunal survey. The locality being one of particular interest, the Council has cleared invading pine.

Many other records were made in various heathland habitats, but these will appear at a later date as part of a survey of the insect fauna of the common. Records and habitat assessments are of vital importance at the present time to meet the challenge of a major change or obliteration of important entomological localities on the common. A wide range of damaging management policies were demonstrated, but it was also shown how the Surrey Naturalists Trust had been able to use entomological advice as a means to negotiate for the future well-being of certain areas. Any members reading this account who are able to provide records in any group of invertebrates can provide a useful service towards the effort to save the vulnerable parts of the common and enable a more complete faunal survey—which it is intended to publish (minus certain vulnerable rarities).

ASHSTEAD, SURREY—26th August 1967

Leader: Mr. S. WAKELY

There were five members present for the start of this meeting; however, two other members arrived in the afternoon, making seven in all.

The morning party worked the common adjoining the station, and the first find was of larvae of *Leucoptera lotella* Staint. which was extremely common in leaves of *Lotus corniculatus* L. Larvae of *Epermenia testaceella* Hübn. were also found under slight webs on the undersides of leaves of *Pastinaca sativa* L. The weather was very warm and the morning party returned to the station about 1 p.m. for lunch which had been left in the cars. Two of the party had to leave just after lunch, and after a rest the leader suggested a trip further afield, thus the afternoon party was not contacted. Later the following captures were reported by them: *Acleris emargana* F. was disturbed from willow bushes; a single specimen of *Pammene spiniana* Dup. was netted; a single larva of *Simaethis pariana* Clerck was found on an apple leaf; and several larval cases of one of the clover-feeding species of Coleophoridae. The finding of *S. pariana* Clerk was of particular interest and was one of the micros we particularly hoped to find as a few had been found on a field meeting a few years ago.

The three members who left Ashstead about 2 p.m. went first to Whitedown, near Ranmore, where the following species were recorded: one or two *Colias croceus* Fourc. on the wing; larvae of *Cochylis flaviciliata* Westw. in seedheads of *Knautia arvensis* (L.) Coult; *Coleophora silenella* H.S. on seeds of *Silene vulgaris* (Moench.) flower buds of *Clematis vitalba* L. were collected for larvae of *Eupithecia haworthiata* Doubl.; flowers of *Inula conyzoides* DC. for larvae of *Oidematorphorus carphodactyla* Hübn.; and *Centaurium erythraea* Rafn. for larvae of *Stenoptilia zophodactyla* Dup.

Half an hour was spent on Ockham Common later when spun leaves of birch were collected for the local species *Caloptilia populetorum* Zell.

STANFORD-LE-HOPE, ESSEX—1st OCTOBER 1967

Leader: Mr. J. M. CHALMERS-HUNT

The weather forecast was not good, however it kept dry and the party of six enjoyed an interesting day on the saltings and adjacent ground.

One of the chief features of the day was the abundance of larvae of the tineoid moth *Bedelia somnulentella* Douglas. These were especially plentiful mining the leaves of *Calystegia sylvestris* (Willd.) Roem. & Schult., which grows in masses over a considerable area of waste land adjoining the marshes, and in a single instance the leader counted as many as five larvae in one leaf. A number of pupae were located, and the larvae were also found in the leaves of *Convolvulus arvensis* L., but were noticeably less common on this plant.

The main purpose of this meeting was to rediscover if possible the case-bearing moth *Coleophora vibicigerella* Zell., first discovered in Britain in this neighbourhood by Machin in 1883 (*Entomologist*, 17:87), and taken the following year in numbers by Machin and Elisha (*Entomologist*, 18:55, 246; *Young Nat.*, 6:191). Accordingly, the leader left the main party and spent some hours on the salt marshes between Thames Haven and Fobbing in the hope of finding the larva, which feeds on *Artemisia maritima* L., in a long, curved and somewhat flat black case made of silk. A very few patches of the plant were found, but

regrettably no sign of *C. vicibigerella*, only some cases of *Coleophora artemisiella* Scott.

Coleophorid cases were collected by Col. A. M. Emmet, Messrs. Wakely, Uffen and the leader from *Halimione (Atriplex) portulacoides* (L.) Aell., *Juncus gerardi* Lois., *J. maritimus* Lam., and by the leader at Thames Haven on *J. inflexus* L.; and one case was found by Mr. Uffen on *Beta vulgaris* L. s.sp. *maritima* (L.) Thell. Final determinations of all these, however, will have to wait until breeding results are obtained. The *Juncus* species were kindly determined by Dr. F. Rose.

During the morning sunshine, two *Vanessa atalanta* L. were seen on the wing, also a single female *Polyommatus icarus* Rott.

The two coleopterists present, Drs. B. J. MacNulty and J. L. Newton, reported a successful day.

A CHANGE IN THE LEPIDOPTERA OF HAMPSTEAD AFTER FOUR DECADES

By C. I. CARTER

Hampstead Heath is one of the nearest open spaces to Central London that was connected to the farmlands of Middlesex until almost the middle of the last century. Its rural past can still be visualised in places by the lines of oaks and elms which are the overgrown remains of hedgerows.

In 1913 the Hampstead Scientific Society published a book containing various specialist articles on the natural history of Hampstead Heath; the chapter on insects by O'Brien Ellison (1913), a compilation of records and observations, includes a list of macrolepidoptera. This list has been compared with the recent records below and to some extent with those from Buckingham Palace Garden by Bradley and Mere (1964). O'Brien Ellison indicated that some species were losing ground and others had not been recorded in recent years or were thought to be extinct; even at that date there was concern that Bank Holiday crowds were having a serious affect on the vegetation.

Today the heathland herb vegetation is probably reduced to quite a short list of species, and the open spaces are now dominated by coarse grasses. Deciduous trees on the other hand, are very fine and quite a number of exotic specimen trees have been planted in some parts. The semi-natural woodland areas are quite extensive and probably gained more of the open ground during the Second World War but they are largely bare of their undergrowth.

In the list below are records of Lepidoptera made between 1950 and 1958. Most of the moths were collected by attraction to lights, windows, sugaring in favourable weather and the occasional use of a mercury vapour light and sheet in a garden near the Heath. No one species could be said to be very common compared with the descriptions in O'Brien Ellison's article, which are more like those of a rural locality today; to be able to catch as many as thirty individuals in one night was exceptional. During the four decades there has therefore been a considerable drop in numbers of Lepidoptera in Hampstead, but it is unlikely that agricultural pesticides have had any influence as it is five or more miles

from the Green Belt where some of the land is still farmed. Some urban influence is more likely. The three most abundant species were *Noctua pronuba* L. (Large Yellow Underwing), *Amathes xanthographa* Schiff. (Square-spot Rustic) at the mercury light, and *Opisthoptis luteolata* L. (Brimstone Moth) which was often to be seen circling the rather weak tungsten filament street lamps. For butterflies the West Meadow near Ken Wood invariably had the greatest variety, but *Celastrina argiolus* L. (Holly Blue) was only rarely seen on the edge of the Heath at the Vale of Health where it probably bred.

O'Brien Ellison lists 149 species of macrolepidoptera occurring in Hampstead; the present author only recorded 87 species within the years 1950 to 1958; but although 99 species on the old list were not recorded again, 35 species (41 per cent) are thought to be new records and indicate a species change. There appears to be a greater similarity between the species in the present list from Hampstead and the 153 recorded recently by Bradley and Mere in Buckingham Palace Garden; 66 species being common to both lists. This species change may be an indication of a more general ecological change in London.

The greater number of species in the Palace Garden list is probably closely connected with the greater variety of plants growing there. Looking at the food plants for an explanation of the species recorded, only 30 per cent of the Palace Garden species feed on trees and shrubs compared with 38 per cent in the list below; 8 of the 21 Hampstead species not known in the Palace Garden are also tree feeders. As for the old Hampstead records, almost 42 per cent of the species are tree feeders which is surprising on account of the greater variety of herbaceous plants which were available at the time.

Appended to this list are records of seven pyralid moths, though this group was not worked extensively. *Agriphila culmella* L. was seen in large numbers each year on the East Heath, together with *A. tristella* F. of which dark forms were frequent. *Acentropus niveus* Ol. was only taken once at a light at Branch Hill, a distance of half a mile from a suitable pond where it may have bred.

The following species were recorded in Hampstead during the period 1950 to 1958. † indicates mainly tree or shrub feeding species, according to Allan (1949). † Not recorded by O'Brien Ellison in Hampstead. * Not recorded by Bradley & Mere in Buckingham Palace Garden.

Pieris brassicae L., *Pieris rapae* L., * *Pieris napi* L., * *Coenonympha pamphilus* L., *Vanessa atlanta* L., *Aglais urticae* L., † *Celastrina argiolus* L., * *Lycæna phlaeas* L., † *Mimas tiliae* L., † * † *Pheosia gnoma* F., *Spilosoma lubricipeda* L., *S. lutea* Hufn., *Callimorpha jacobaeae* L., † *Orgyia antiqua* L., *Agrotis exclamatoris* L., † *Peridroma porphyrea* Schiff., † † *Graphiphora augur* F., * *Diarsia mendica* F., * † *D. brunnea* Schiff., *Amathes c-nigrum* L., *A. xanthographa* Schiff., *Axylia putris* L., *Euschesis janthina* Schiff., *E. comes* Hübn., *Noctua pronuba* L., *Mamestra brassicae* L., † *Cerapteryx graminis* L., † *Orthosia gothica* L., † *O. stabilis* Schiff., † † *O. incerta* Hufn., *Leucania impura* Hübn., † *L. lythargyria* Esp., *Apamea monoglypha* Hufn., *A. secalis* L., † *Procus latruncula* Schiff., † *Luperina testacea* Schiff., † *Caradrina alsines* Brahm., † *C. clavipalpis* Scop., † *Hydraecia oculea* L., † *Cosmia trapezina* L., † *Cryphia perla* Schiff., * *Xylocampa areola* Esp., † * † *Apatele leporina* L., † *A. megacephala* Schiff., † *A. psi* L., † *A. runcicis* L., † † *Amphipyra tragopogonis* Clerck, † *Dypterygia scabriuscula* L., † *Catocala nupta* L., † *Hypena proboscidalis* L., * † *H. rostralis* L., * † *Hepialis humuli* L., *H. lupulina* L., * *Hemitea aestivaria* Hübn., † *Sterrhya aversata* L., † *S. aversata* ab. *remutata* L., *Xanthorhoe fluctuata* L., *Euphyia bilineata* L., † *Lygris mellinata* F., † *Dysstroma truncata* Hufn., † † *Oporinia dilutata* Schiff., † *Operophtera brumata* L., * † *Eupithecia subnotata* Hübn., * † *E. venosata* F., *E. centaureata*

Schiff., * † *E. absinthiata* Clerck, *E. vulgata* Haw., † *Gymnoscelis pumilata* Hübn. *Abraxas grossulariata* L., † *Erannis leucophaearia* Schiff., † *E. aurantiaria* Hübn., † *E. marginaria* F., † *E. defoliaria* Clerck, † *Deuteronomos alniaria* L., † *Gonodontis bidentata* Clerck, † *Colotois pennaria* L., † *Oourapteryx sambucaria* L., † *Opisthograptis luteolata* L., † *Phigalia pilosaria* Schiff., † *Lycia hirtaria* Clerck, † *Biston strataria* Hufn., † *B. betularia* L., † *Meuophra abruptaria* Thunb., † *Cleora rhomboidaria* Schiff., † *Alcis repandata* L., † *Ectropis biundularia* Borkh., † *Lithina chlorosata* Scop., † *Acentropus niveus* Ol., † *Eurrhyncha hortulata* L., † *Haritala (Sylepta) ruralis* Scop., † *Agriphila geniculea* Haw. (*Crambus geniculeus* Haw.) † *A. inquametella* Schiff., † *A. tristella* Schiff., † *A. culmella* L.,

ACKNOWLEDGEMENTS

I wish to express my thanks to Mr. G. D. Waller who helped me to collect many of the insects recorded, and to Mr. G. Haggett for checking the identifications and solving some problems in the name changes.

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6, The Ridgeway,
 Alton,
 Hants.
 1st December 1967

ARTHUR MOREL MASSEE, O.B.E., D.S.C., F.R.E.S.

1899-1967

After a serious illness in 1966 and an apparent recovery, Dr. Massee was again taken ill, and died on 14th September 1967 in hospital at Rochester.

It was in 1922 that he joined our Society, and though not actively engaged in Society's affairs at first, he did later take a keen interest in the management of our affairs; and after election to Vice-Presidency in 1960, he became President the following year, and served on the Council for a number of years subsequently. In 1966 he was appointed an Honorary Member. Until his illness he was a regular attender at our meetings; frequently exhibiting material that was of more than usual interest, with comments on the biology, which was a major aspect of his interest in entomology, and making valuable contributions to discussion.

Dr. Massee was the eldest son of George Massee, a celebrated mycologist at the Royal Botanical Gardens. He was educated at Richmond County School and studied economic entomology at the Imperial College. After obtaining his degree he was appointed to the staff of the East Malling Research Station as a Ministry of Agriculture scholar, where he remained until his retirement as head of the entomological department in 1961. The University of London conferred on him a D.Sc. in 1935.

In recognition of his valuable work on orchard pests and their control he was awarded the O.B.E. in 1951, and in 1953 received the Ridley Gold Medal of the Worshipful Company of Fruiterers.

Working all his life on orchard pests, Massee's opinion on this aspect of

entomology was always received with respect; and was often sought and freely given even after his retirement. The present writer, now living in a fruit growing area has met several fruit growers who are pleased to be able to recall the sound advice and assistance rendered by him; and as one remarked 'a very knowledgeable, sympathetic and understanding person'. His interest in entomology and conservation of nature coupled with his occupation, produced in Masee some very firm ideas on pest control and techniques, some not very popular with the growers at times—he had little patience with those who grubbed up hedges and destroyed coppices, at a time when this was almost a standard technique of agricultural and orchard management. During his career he became a specialist on mites and was often the only person at our meetings who could determine exhibited Acarina, or comment on them.

In the same year that Masee joined our Society he also joined the Royal Entomological Society; and during his life served on its Council, on its Insect Protection Committee, and also as Vice-President in 1949 and 1959. He was also an active member of the Kent County Trust and a founder member of the Kent Field Club, of which he was the first Chairman and became its first Honorary Member in 1956.

His entomological interest outside his work embraced Coleoptera and Hemiptera-Heteroptera. He was an amazingly successful field worker, combining persistence with a rare knowledge of habits, to produce results where many a lesser worker failed. Masee was particularly attracted to the Scottish Highlands and often collected in the Aviemore and Rannoch areas. This apart, he collected widely in southern England, he regarded the New Forest with great affection, and worked Kent, his home county, really hard.

The *Entomologist's Monthly Magazine* regularly published his contributions which were informative and full of interest, these included a valuable revision of Bedwell's charts of the county distribution of Heteroptera. In the 1962 volume of our Proceedings he published an account of the Hemiptera-Heteroptera of Kent, and in the previous volume appeared his Presidential Address on Apple Orchard Fauna. He also supplied important contributions to the Annual Report of the East Malling Research Station, and wrote prolifically on fruit tree pests. His book *The Pests of Fruit and Hops* was published in 1937 and ran to three editions.

Conservation was a matter of grave importance to him, and a matter to which he gave a great deal of his time. He served for a number of years on the Nature Conservancy's Council for England, and gave his services unstintingly to the Kent County Trust. One of the few things that made Masee irritable was the eroding of our ecologically important countryside by thoughtless development.

In the field he was wonderful company, always ready with information and advice; and with a fund of humorous tales, told in a dry, characteristic manner, involving many coleopterists and hemipterists that are but legends to most of us; not always complimentary tales, but never malicious.

Apart from entomology he took a deep interest in cricket. He played himself in village matches in his younger days and afterwards took to umpiring. He could tell some entertaining yarns of his experiences at the wicket—and of events afterwards in the cricketers equivalent of the nineteenth hole.

Our deepest sympathy is extended to Mrs. Masee, who was his constant companion in the field, working with him with enthusiasm and ability, and who contributed much towards the cheerful make-up of this delightful little man who we all miss, but remember with great affection.

F.D.B.

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