PROCEEDINGS AND TRANSACTIONS OF THE BRITISH ENTOMOLOGICAL & NATURAL HISTORY SOCIETY

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MEETINGS OF THE SOCIETY

are held regularly at the Society's Rooms, but the well-known ANNUAL EXHIBITION takes place this year on November 2nd in the Conversazione Room at the British Museum (Natural History). 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 British Entomological and Natural History Society

(formerly known as The South London Entomological and Natural History Society)

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PROCEEDINGS AND TRANSACTIONS OF THE BRITISH ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY

EDITORIAL

The Society, so long known as the "South London," has overwhelmingly voted to restyle itself as the "British," a description more in keeping with its already nation-wide membership and activities. Our Proceedings and Transactions, therefore, must appear in a new series.

Another change, but not of the Society's own choice, was forced on it a few weeks later, when the post of editor became vacant. The resulting delay is greatly regretted but was unavoidable. Every effort is being made to catch up, re-organise, and improve. We hope, therefore, that the delay will prove to have been a case of *reculer pour mieux sauter*. The Society is greatly indebted to Mr. F. D. Buck for his many years of able editorial work.

Thanks to the generosity of Mrs. Robin Mere, plans are being pressed forward to continue the series of colour plates with accompanying text by G. Haggett, of the larvae of the species of British Lepidoptera not illustrated in Buckler, of which the last appeared in 1962; the Proceedings, Indoor Meetings, give some further details of this important project. These plates and text will surely have a wide appeal. Other articles which we will publish may perhaps not combine, to the same degree, enduring scientific importance with the predominant current interests of our members; but it is our firm intention to maintain a balance between the two qualities. For many years members' interests and consequently our subject matter have overflowed any insular boundaries. While continuing, particularly in the Proceedings, to record our everyday, less far-flung activities, a portion of our Transactions will continue to reflect those corners of foreign fields where some of our members have pursued their studies.

The Council has decided to continue the innovation, made in 1965, of periodical parts instead of an annual, but too belated, volume. As far as possible Proceedings and Reports of Field Meetings will appear separately from original contributions of substance. A strict adherence to the production of four quarterly parts was regarded by the Council as unnecessary, and our present volume starts with what is, in fact, a double part.

We hope our new format will meet with the approval of our readers. We are confident that future issues will equal the best of the past, though perhaps less in sheer bulk. Members can assist by recruiting new members and contributing papers that will enhance the Society's reputation. Twenty-five reprints are, of course, still given to authors of articles which we publish.

PRESIDENT'S ADDRESS

Read by R. F. Bretherton, C.B., M.A., F.R.E.S.
25th January, 1968

I must mention first the heavy toll of deaths among our members. In 1967 we lost 11 members, including the last who joined us in the nineteenth century, and three ex-Presidents. The Rev. F. M. B. Carr and Mr. Robin Mere died early in January, and our loss of them was lamented by my predecessor at the last Annual General Meeting. I should like now to say a little about the others.

Col. V. R. Burkhardt also died early in the year in Hong Kong, having been a member since 1946. He was an expert on oriental butterflies, on which he published a number of notes and articles.

Mr. R. E. R. Parsons, of Ottershaw, Surrey, died suddenly in April. He, too, began as an orientalist, having made a fine collection of butterflies in Assam before he returned to England and soon joined the Society in 1949. Right up to his death he was engaged on exacting and confidential government work, but he nonetheless made time to help with the study of the Lepidoptera of north-west Surrey, to do some butterfly collecting on the Continent, and to exhibit frequently at our Annual Exhibitions. He also became a brilliant plant breeder, particularly of irises and daffodils. For the latter the Royal Horticultural Society awarded him a Banksian silver medal in 1965, and since his death it has registered under his name several of the varieties which he produced.

Mr. K. W. Self died at the age of 82 in May. He became a member in 1946. He specialised on the aberrations of British butterflies, for which he had a real flair, doing much of his collecting in Dorset and around his later home at Folkestone, among the 'blues' to which he was so much devoted.

Mr. David Wright, of Borden, Hants, was a distinguished designer and painter of posters. As a lepidopterist, he was fortunate to live on a migration route, and his moth traps yielded many of our scarce migrants, including the Oleander and Bedstraw hawk moths (*Daphnis nerii* L. and *Celerio galii* Rott.). It is an odd fact that, though I visited his house several times, I never saw the outside of it, because I entered it only for welcome refreshment in the small hours after expeditions with him to the New Forest or elsewhere.

Mr. V. H. P. Bascombe was a member for only a few months; but many members will remember his films, "The Swallow-tail Story" and "The Purple Emperor," which he showed us in April 1966, and will therefore realise how much we have lost by his death.

Sir Reginald Maxwell, G.C.I.E., K.C.S.I., of Andover, Hants, was Governor of Bombay in 1929 and was later Home Member of the Governor-General's Executive Council. He made a fine collection of Indian Lepidoptera before he joined us in 1947. In that year he exhibited a Camberwell Beauty (*Nymphalis antiopa* L.) caught in a garden at Kenley, Surrey—an experience not given to many of us.

Mr. Montague Niblett, of Wallington, Surrey, had been a member since 1930, was our President in 1936, and was appointed a Special Life

Member in 1965. He was an eminent dipterist and one of the foremost authorities on plant galls. His death deprives us of support in a field which is important but comparatively little worked.

We have also lost Professor W. A. F. Balfour-Browne, at the age of 93. He was a scientist of great distinction, having moved in a long career through botany and marine biology as well as entomology. He was professor of Entomology at Imperial College from 1925 to 1930, and thereafter was active in a great number of biological and natural history societies. His books, *Concerning the habits of insects* and *A Text-book of Practical Entomology,* are well-known. He joined the South London in 1947 and was appointed a Special Life Member in 1964.

Finally, Dr. A. M. Massee; a member since 1922, a Special Life Member since 1966, our President in 1961, and a valuable member of Council in several years. In his professional work at the East Malling Research Station on the control of orchard pests, he achieved high standing and authority, which he used in the interests of conservation to discourage the misuse of toxic sprays. Beyond that he was a man of immense vigour with his pen, tongue, feet, sweeping net and any other instrument appropriate to the purpose in hand, particularly if it was concerned with field work on Coleoptera. Members will recall the dry wit with which he used to describe his adventures in discovering a species new to him, and in finding suitable refreshment (preferably alcoholic) afterwards. We shall not see his like again, and we shall miss him greatly.

I now turn to a more cheerful, if not entirely unrelated, subject. The Society has been offered by a donor, who at present wishes to remain anonymous, the sum of £1,000 to be applied to the expenses of publishing, as a memorial to one of our past members, colour plates of the remaining larvae of British macrolepidoptera which were not figured by Buckler, in addition to those which have already appeared from time to time in our Transactions. Our member Mr. G. M. Haggett has been at work on these plates for many years, and he has a number of fresh drawings in an advanced state. The main obstacle to speedier publication has until now been finance, which this most generous offer promises to remove. It has been made subject to the condition that a substantial instalment, probably seven or eight plates and the relevant text, should be published within a year. I hope that, with the help of our hard-worked editor and of Mr. Haggett himself, we shall be able to meet this condition. A fuller announcement will be made when the arrangements have been completed. In the meantime I am sure that you will wish to express your appreciation of this large and timely offer of help to our affairs.

You have heard the reports of the Council, of the Treasurer, and of the other officers on other events during my year of office. I will not enlarge on them except to emphasise the really enormous amount of hard work, given freely and gladly to the Society, which lies behind them. Only when one serves as President does one come to realise how much we depend on all these voluntary helpers, whether they are formally officers or not, and how much we owe to them; and it is not invidious to

mention your Secretary, Dr. MacNulty, as one who carries the broadest responsibiltiy. It is he who is most cursed when things go wrong and least blessed when they go right. Fortunately, he has been able over the years to evolve a number of protective mechanisms and immunities.

For myself, I hold it a great honour to have served as President of a Society whose members are experts or enthusiasts in so many and varied directions. It has also been a most interesting personal experience, though I will not pretend I have enjoyed every minute of it. As our discussions earlier have shown, there are deep differences of view, and some discontents, among members on matters of policy. These are, of course, reflected in the discussions of your Council; it would be a poor Council if they were not. It is the President's job to see that all sides of such questions are properly aired, with reasonable, but not excessive expenditure of time and words; and yet to bring things to the point of practical decisions as soon as the Council or, where necessary, the whole Society, is ready to take them. I have found the achievement of this balance difficult, and I am not particularly proud of the results. The President also receives many personal letters from members containing complaints or suggestions, some diametrically opposed to others, some based on simple misunderstandings or on personal strains and stresses. These are indeed very welcome, because they help to keep the President and the Council in touch with the opinions of members, and particularly of country members; but the task of devising suitably reasoned replies is quite something. There is also the ever-present problem of co-ordination. As I have already said, we have to spread the work of running the Society among a large number of volunteers. I can count nearly 40 people, including the formal officers, who have undertaken some kind of executive work for us in the past year; and even so I have probably missed some. In itself this is a very good thing, because it makes the Society a living interest to far more people than it would be if, as in a large and rich society, most of the work was concentrated on a single full-time officer. It does, however, mean that some things are done better than others, and that some things are done punctually and others late or, very occasionally, not at all. Also, when it comes to staging a major operation, such as the Annual Exhibition, or even producing the Annual Programme Card, the questions of who should do what, with whom, where and when—and whether, on the day, they *will* do it—are critical. Preliminary planning, of course, comes to Council, but it cannot ever be completely tied up there. After that there is not, in fact, a great deal the President can really do about it, except to rely on the mysterious 'assembling' instinct which most of our members engaged in these operations seem to possess or immediately acquire. He must, therefore, resist the temptation to fuss, and hope that he will not acquire stomach ulcers or an anxiety complex; and, in fact, to the great credit of those concerned, nothing has ever gone disastrously wrong; but I think that our organisation does savour a little too much of Heath Robinson (an earlier complex—not the moth-trap). Fortunately, your new President, Mr. Goater, has already served a term, rather brilliantly, as Secretary, and he may be able to see more clearly

than I have done how it could be improved. I wish him every success in his year of office, and I shall do my best, as one of your Vice-Presidents, to give him all the support that I can.

It is a long-established custom that the President's address should also contain attempted words of wisdom on some subject other than the Society's own activities. I find this difficult. The occasion does not seem right for displaying a piece of specialised research, even if I had one available. Nor, as the only lepidopterist in my family, can I follow my predecessor's admirable plan of recalling the golden age (long before devaluation) with the help of his grandfather's diaries. I have therefore chosen a very ordinary subject; a review, necessarily brief, of

THE BUTTERFLIES OF BRITAIN IN RELATION TO THOSE OF THE ADJACENT PARTS OF THE CONTINENT

This subject has the advantage that almost every member knows something about it and that, at the end, any one of you may very healthily feel that he could have handled it better than I.

First, we must review the British list itself. This is to be found in a long succession of well-known publications, but there are still some ragged edges on what should be put in or left out, and on the status of particular species. From South in 1905 to E. B. Ford in 1945 the 'recognised' list stood at 68 species. Many of us hoped that the climatic improvement which seemed to have reached its peak about 1950 would encourage the settlement as residents of some additional species of butterflies, as it undoubtedly did for the moths. This did not happen. Nevertheless, it now seems right to make three additions. Berger's Clouded Yellow (*Colias australis* Verity) was separated from the Pale Clouded Yellow (*C. hyale* L.) by the Belgian lepidopterists in 1948, largely because of differences in the larvae and food-plants, though there are quite good characters in the imagines also. Its presence in Britain was conclusively demonstrated by its capture and subsequent rearing by our members, Messrs. Vallins, Dewick and Harbottle, in 1949. I may add that I noticed last year that out of 15 specimens caught by Commander G. W. Harper near the Sussex coast in 1945 at least ten appeared to be referrable to *C. australis* Verity; but apparently very few have been seen since 1950. A second addition is due to another of our members, Mr. F. V. L. Jarvis, who, working alongside the Danish entomologists, has recently shown that the North British butterfly previously treated as a univoltine form of the Brown Argus (*Aricia agestis* Schiff.), and the Scottish form *artaxerxes* F., should both be specifically separated from it and associated instead with the Continental *Aricia allous* Geyer-Hübner. (I refrain from comment on the nomenclatoral tangle which has resulted). Finally, Hunter's Painted Lady (*Vanessa virginiensis* Drury (*huntera* F.)), should now probably be promoted to the recognised list. In recent years the total number of captures of it in Britain has risen over a dozen, and it now seems reasonable to regard it as a scarce natural migrant, either direct from North America, or from its nearer base in the Canary Islands. In this it parallels on a smaller scale the movement of the famous Monarch Butterfly (*Danaus plexippus* L.).

Besides these there are the reputed British and casual species, of which the records are either doubtfully authentic or still so few as to suggest accidental introduction, for example, in tourists' luggage or with imported plants, though their arrival by natural means is also possible. Our member, Mr. I. R. P. Heslop, in his *Revised Indexed Check-list of the British Lepidoptera* and its supplements, names 79 butterfly species, including, besides those covered above, the Scarce Swallow-tail (*Iphiclides podalirius* L.), the Apollo (*Parnassius apollo* L.), the Eastern Tortoiseshell (*Nymphalis xanthomelas* Schiff.), Weaver's Fritillary (*Clossiana dia* L.), the Niobe Fritillary (*Fabriciana niobe* L.), the Arran Brown (*Erebia ligea* L.), the Purple-edged Copper (*Heodes tityrus* Poda). Even this is not exhaustive. There are three apparently authentic records of *Pararge maera* L., in 1908, 1930 and 1931, one of *Syntarucus pirithous* L. (originally mistaken for *Lampides boeticus* L.) in 1938, and the examples of that fine fritillary, *Pandoriana pandora* Schiff., found in Cornwall in 1911 and first reported in E. B. Ford's book. There are also six specimens, identified as the skipper *Pyrgus alveus* Hübn., which were caught in Norfolk in 1960; re-examination has shown these to be really *Pyrgus armoricanus* Oberth., which is a quite possible stray to Norfolk from its haunts on the Belgian coast. The investigations of our members, Mr. A. M. Morley and Mr. J. M. Chalmers-Hunt, into the British records of the Apollo, and those of Mr. E. C. Pelham-Clinton into those of the Arran Brown do not convince me that either have ever been residents or natural arrivals in Britain; nor does there seem to be any solid evidence for the natural occurrence here of the Purple-edged Copper or the Niobe Fritillary; but any or all of the other records may well represent cases of sporadic immigration which with a change of climate or other conditions might become more frequent.

The present enumeration may therefore be summarised as follows:

Species now permanently resident, 56 (though one of these, the Large Tortoiseshell, is in decline and may need reinforcement by immigrants to keep it going, and another, the Large Blue, is in a rather precarious state). These residents, of course, include several species which also certainly come here as immigrants.

Species formerly resident but now almost certainly extinct, three; the Large Copper (*Lycaena dispar* s. sp. *dispar* Haw.), the Mazarine Blue (*Cyaniris semiargus* Rott.), the Black-veined White (*Aporia crataegi* L.).

Species more or less regularly immigrant, 12; with the help of the tables compiled by Mr. C. B. Williams and continued by Mr. R. A. French, these can be put in the following order of frequency of occurrence since 1850: Red Admiral (*Vanessa atalanta* L.), Painted Lady (*Vanessa cardui* L.), Clouded Yellow (*Colias crocea* Fourc.), Pale Clouded Yellow (*C. hyale* L.) with Berger's Clouded Yellow (*C. australis* Verity), Camberwell Beauty (*Nymphalis antiopa* L.), Bath White (*Pontia daplidice* L.), Queen of Spain Fritillary (*Issoria lathonia* L.), Monarch (*Danaus plexippus* L.), Long-tailed Blue (*Lampides boeticus* L.), Short-tailed Blue (*Everes argiades* Pall.), American Painted Lady (*Vanessa virginiensis* Drury).

Total now resident or regularly immigrant, 68.

Casuals, which may have been natural immigrants, seven or eight.

How does this British list compare with those of the countries which face us across the North Sea and the English Channel? All of them have longer lists than ours. If extinct and casual species are ignored, Norway has about 95 species resident or regularly immigrant; Denmark 78; Holland 83; Belgium 116; comparison with the 240 species of the whole of France is hardly meaningful, but the ten departments which touch the sea from Dunkirk to Finisterre can claim about 100 species. On the other hand, if we look westwards across the Irish Sea, Ireland has a butterfly fauna less than half the size of ours. There are only 28 residents and three regular immigrants, with two species possibly once resident but now apparently extinct, and five casuals. It is worth noting, however, that the British list is considerably longer than those of the other European off-shore islands except Sicily, which can boast about 100 species.

The British butterflies include few specialities. The Mountain Ringlet (*Erebia epiphron* Knoch) is the only resident species which is not found in the adjacent parts of the Continent; the nearest relatives of our sub-*species mnemon* Haw. are *E. epiphron* s. sp. *mackeri* Fuchs in the Massif Central and the Vosges, and *E. epiphron* s. sp. *epiphron* Knoch in the Hartz Mountains of central Germany. Besides this, our two Atlantic visitors *Danaus plexippus* L. and *Vanessa virginiensis* Drury, have barely been recorded on the Continent. Though several of the British butterflies have been given subspecific names, the only ones which differ very markedly from Continental forms are the Scottish *Aricia artaxerxes* L. (which Jarvis has now shown to be a single-gene variant of *A. allous* G. Hb.), the Swallow-tail of the Fens and Norfolk (*Papilio machaon* L. s. sp. *britannicus* Seitz), and the Scottish Large Heath (*Coenonympha tullia* Müll. s. sp. *scotica* Staud.); the *tullia* Müll. and *philoxenus* Esp. forms of the north of England, Wales and Ireland can be fairly closely matched abroad.

Of the adjacent butterfly faunas, the one least resembling ours is that of Norway—not surprisingly in view of its northern latitude and mountainous character. Less than half of the Norwegian butterflies are now found in Britain; Norway lacks 14 which we have as ordinary residents and seven as immigrants, but possesses some 49 species which are not now resident in Britain. Among those British species which are absent from Norway are, rather surprisingly, our truly mountain butterfly, the Mountain Ringlet (*Erebia epiphron* Knoch), another, the Scotch Argus (*E. aethiops* Esp.), which has an exclusively northern range in Britain, and a third, the Marsh Fritillary (*Euphydryas aurinia* Rott.), which reaches north-western Scotland and Ireland, though it also occurs in southern England. The other absentees—Purple Emperor (*Apatura iris* L.), White Admiral (*Limenitis camilla* L.), Marbled White (*Melanargia galathea* L.), Hedge Brown (*Pyronia tithonus* L.), Black Hairstreak (*Strymonidea pruni* L.), Large, Adonis and Chalk-hill Blues (*Maculinea arion* L., *Lysandra bellargus* Rott., *L. coridon* Poda), and the Duke of Burgundy (*Hamearis*

lucina L.), and the Small and Lulworth Skippers (*Adopoea lineola* Ochs, and *Thymelicus actaeon* Rott.), are all of more or less southerly range in Britain and presumably cannot stand the rigours of the Norwegian climate. The Large Copper (*Lycaena dispar* Haw.), now extinct here, has never been found in Norway, and the Brown Argus (*Aricia agestis* Schiff.) as distinct from the northern *A. allous* G. Hb., probably does not exist there.

A large component of Norway's superiority is provided by over a score of the group of arctic and boreo-alpine species, many of these with circum-polar distribution, which is entirely unrepresented in Britain. Some of these, such as *Colias nastes* Boisd., the Fritillaries *Euphydryas iduna* Dalman, *Clossiana polaris* Boisd., *C. chariclea* von Schev., *C. improba* Butler, and the satyrids *Oeneis norna* Thunb. and *O. bore* Hübn. are practically confined to the Arctic Circle; but others of this group are also found in or near the high mountains down into southern Norway to much the same latitude as Caithness in Scotland.

Besides these specialities, Norway has a large share of the residual marsh and forest fauna of northern Europe; such insects as *Colias palaeno* L., *Proclossiana eunomia* Esp., *Boloria sifanica* Gr.-Gr., *Erebia ligea* L., *Coenonympha hero* L., *C. tullia* Müll., *Paleochrysophanus hippothoe* L., *Vacciniana optilete* Knoch, *Carterocephalus silvicola* Meig., *Parnassius mnemosyne L.*, and that magnificent white admiral *Limenitis populi* Esp. There must surely have been a similar fauna in Britain at some stage in the drying-out process after the last Ice Age, but its only representative among our butterflies today may be the Large Heath (*Coenonympha tullia* Müll). It is also noteworthy that some species which are found mainly in southern Europe have managed to adapt themselves to the rigours of the Norwegian climate and yet are not resident in Britain: e.g., *Issoria lathonia* L., *Lycaeides idas* L., *Glaucopsyche alexis* Poda, *Scolitantides orion* Pall., *Hipparchia alcyone* D. & S. For the Camberwell Beauty (*Nymphalis antiopa* L.) the adaptation has probably been the other way round; it has its headquarters in Scandinavia, but has managed to spread far to the south though not to establish itself in Britain.

In Denmark we leave the influence of any mountains and come a little south, though the southernmost tip of Denmark at 55° latitude is still only level with Newcastle in England. The butterflies are much more like ours than are those of Norway. The total of about 80 includes all but seven of our own resident species and all our extinct species; but Denmark has also about two dozen resident species which we lack. The biggest element in these is again the marsh and forest group, with the addition of *Coenonympha arcania* L., *Maculinea alcon* Schiff., *Heteropterus morpheus* Pall. There is also a rather bigger infiltration than in Norway of central and south European species such as *Araschnia levana* L., *Heodes tityrus* Poda, *Pontia daplidice* L., *Pyrgus armoricanus* Oberth. Some of these species have only recently been noticed in Denmark, and others of the southern element have extended their range there, apparently as a result of the recent climatic improvement.

Holland, despite its dense population and lack of varied terrain, has a slightly larger butterfly fauna than Denmark; about 83 species resident

or regularly immigrant. She lacks as residents nine of our species, but has 23 we do not. As in Denmark, many of these belong to the marsh/forest group, to which in Holland the two marsh blues, *Maculinea teleius* Bergstr. and *M. nausithous* Bergstr. can be added, as well as *Lycaena dispar* Haw. s. sp. *batavus* Oberth, which has supplied the stock now precariously established in Woodwalton Fen to replace our own extinct Large Copper. There are also a few more southern species, such as *Hipparchia statilinus* Hübn., *Carcharodus alceae* Esp. and our own *Melanargia galathea L.*, *Thymelicus actaeon* Rott., and, as an immigrant only, *Lysandra coridon* Poda. In Holland, as in Denmark, there has been a recent tendency for southern species to extend their range, particularly into the Limburg appendage, which is on about the same latitude as Brighton. Against this, however, several species have become extinct, or very nearly so, in Holland during this century. These include at least two, *Fabriciana adippe* Rott. and *Maculinea arion* L., which we still have.

The much larger size of the Belgian fauna (about 113 species) is partly due to the inclusion of over a dozen species found only in the hill country of the Ardennes and the Eiffel in the south-east, parts of which are very rich entomologically. The butterflies of the flatter part of Belgium, north and west of the Sambre, are very like those of Holland, but with a stronger southern element, including *Clossiana dia* L., *Strysnon spini* Schiff., *Everes argiades* Pall., *Spialis sertorius* Hoffman, and our own *Lysandra coridon* Poda, *L. bellargus* Rott., and *Hamearis lucina* L. It is also interesting that *Erebia aethiops* Esp. is reported from near Brussels and on the dunes of the Belgian coast.

Finally, there are over 100 species found in the coastal departments of France from the Nord to Finisterre, which in climate and geology most resemble southern Britain. These include all the British residents except the four northern species, *Erebia epiphron* Knoch, *E. aethiops* Esp., *Coenonympha tullia* Müll. and *Aricia allous* G.-Hb., and all our regular immigrants except the Atlantic visitors *Danaus plexippus* L. and *Vanessa virginiensis* Drury, which have each been recorded only once on the French coast. They also include our three extinct species, though the race of *Lycaena dispar* L., close to our Large Copper, which used to inhabit the Somme marshes, has died out, and the species is now represented in north-western France by the very different *L. dispar* s. sp. *carueli* le Moult. In addition there are some 40 species which we do not have at all, apart from casual or doubtful records. Some are local or rare in this part of France, but nearly a score are widespread and often common insects which, as far as climate, habitats and food-plants are concerned, could apparently equally well exist in southern Britain: e.g., *Iphiclides podalirius* L., *Pararge maera* L., *C. arcania* L., *Limenitis populi* Esp., *Araschnia levana* L., *Melitaea diamina* Lang., *Mellicta parthenoides* Kef., *Fabriciana niobe* L., *Heodes tityrus* Poda, *Carcharodus alceae* Esp., *Heteropterus morpheus* Pall. (which does occur in the Channel Islands). The same is true of several of our immigrants, *Pontia daplidice* L., *Colias australis* Verity, *Issoria lathonia* L., *Everes argiades* Pall. The last sometimes swarms among gorse on the granite moors of Brittany, which look so much like those of Cornwall.

This is a brief summary of the facts of present distribution. Its historical explanation leaves plenty of room for speculation. E. B. Ford and B. P. Beirne did pioneer work twenty years ago on the problems of how and when Britain and Ireland obtained the butterfly fauna which they do possess. Though the two authors differ about major details, they agree in concluding that some of it consists of species which have survived here since before the last Ice Age, but that most represents an influx which took place after the last ice-sheets had begun to recede, perhaps 15,000 years ago, but before the North Sea appeared and the Straits of Dover were cut about half-way through the intervening period. Ford and Beirne did not, however, try to explain why we do *not* now have so many of the butterfly species which now inhabit the adjacent Continent; and this leaves a number of questions. Did we ever have an Arctic fauna like that of present-day Norway, for which even in the last Ice Age Scottish conditions at least were probably suitable? How does one explain the absence from Britain of the north European marsh and forest species which are so well represented today in south Norway, Denmark, Holland and even, as relicts, to some extent in north-western France? They must surely have been dominant over the whole area in the early stages of the drying out after the last Ice Age, before the land bridges between Britain and the Continent had disappeared. If so, when and why did we lose them?

A possible explanation is that they became extinct in Britain as a result of some large climatic or other change *after* the land connections with the Continent had disappeared, and that, when conditions became more favourable, recolonisation was prevented by the barrier of the seas. Finally, there is the question of the more southerly Continental species which are more or less common all down the French coast and, in some cases, further north as well. The usual assumption seems to be that these reached their present stations there by spreading from the east or south only after the land connections were broken, and that further spread was stopped by the English Channel. The first part of this assumption may be correct for some of these species, but decidedly implausible for most of them in the light of their wider distribution. The second part does not explain why other species, which certainly can and do cross the Channel and the North Sea as more or less regular migrants or casuals, are not established here as they are much further north, and south, on the Continent. *Nymphalis antiopa* L., *Issoria lathonia* L., *Pontia daplidice* L., *Colias australis* Verity, *Everes argiades* Pall., and perhaps some of our casuals are obvious examples. The fact that Britain is an island does not in itself provide a full explanation of the poverty of her butterfly fauna in relation to that of the adjacent parts of the Continent. A more far-reaching comparative study, covering not only all the Lepidoptera but also other Orders of insects and the flora, might provide better clues to the answers to some of these questions.

APPENDIX

*(Note: Species which occur in Ireland are marked *)*

Rhopalocera now resident in Britain and also in:

Norway, Denmark, Holland, Belgium, N.W. Coastal France (38 species):
Papilio machaon L., **Pieris brassicae* L., **P. rapae* L., **P. napi* L., *Anthocharis cardamines* L., **Leptidea sinapis* L., **Gonepteryx rhamni* L., *Polygonia c-album* L., *Nymphalis polychloros* L., **Inachis io* L., **Aglais urticae* L., *Melitaea cinxia* L., *Mellicta athalia* Rott., **Clossiana euphrosyne* L., *C. selene* Schiff., **Mesoacidalia aglaja* L., **Argynnis paphia* L., **Pararge egeria* L., **P. megera* L., **Hipparchia semele* L., **Maniola jurtina* L., **Aphantopus hyperantus* L., **Coenonympha pamphilus* L., **Thecla quercus* L., **T. betulae* L., *Strymon w-album* Knoch, **Callophrys rubi* L., **Lycaena phlaeas* L., **Cupido minimus* Fuess., *Plebejus argus* L., **Polyommatus icarus* Rott., **Lycaenopsis argiolus* L., **Erynnis tages* L., *Pyrgus malvae* L., *Carterocephalus palaemon* Pall., *Adopoea lineola* Ochs., *Ochlodes venata* Br. & Grey, *Hesperia comma* L.

Denmark, Holland, Belgium, N.W. Coastal France:
Apatura iris L., *Limenitis camilla* L., **Euphydryas aurinia* Rott., *Aricia agestis* Schiff., *Adopoea flava* Brun.

Norway, Denmark, Belgium, N.W. Coastal France:
Fabriciana adippe Rott.

Holland, Belgium, N.W. Coastal France:
Melanargia galathea L., **Pyronia tithonus* L., *Thymelicus actaeon* Rott.

Norway, Denmark, Holland, Belgium:
**Coenonympha tullia* Müll.

Denmark, Belgium, N.W. Coastal France:
Strymon pruni, L., *Maculinea arion* L., *Hemearis lucina* L.

Belgium, N.W. Coastal France:
Lysandra coridon Poda, *L. bellargus* Rott.

Norway, Denmark:
Aricia allous Geyer-Hübner.

Belgium:
Erebia aethiops Esp.

Absent outside Britain:
Erebia epiphron Knoch.

Rhopalocera recently extinct in Britain, still resident in:

Norway, Denmark, Holland, Belgium, N.W. Coastal France:
Aporia crataegi L., *Cyaniris semiargus* Rott.

Denmark, Holland, Belgium, N.W. Coastal France:
Lycaena dispar Haw.

Rhopalocera regularly immigrant to Britain:
**Vanessa atalanta* L., *V. cardui* L., **Colias croceus* Fourc. are immigrant throughout the area; **C. hyale* L. in Denmark, Belgium, Holland and coastal France; *Lampides boeticus* L. in Holland, Belgium and coastal France; **Nymphalis antiopa* L. and *Issoria lathonia* L. are resident in all the countries, **Pontia daplidice* L. in Holland, Denmark, Belgium

and France, *Colias australis* Verity and *Everes argiades* Pall. in Holland, Belgium and France. **Danaus plexippus* L. and *Vanessa virginiensis* Drury are known on the Continent only as casuals.

Rhopalocera not resident in, or regularly immigrant to, Britain, but resident elsewhere in the area in:

All countries:
Limenitis populi L., *Melitaea diamina* Lang, *Boloria sifanica* Gr.-Gr., *Brenthis ino* Rott., *Fabriciana niobe* L., *Coenonympha hero* L., *Palaeochrysophanus hippothoe* L., *Lycaeides idas* L.

Denmark, Holland, Belgium, N.W. Coastal France:
Araschnia levana L., Coenonympha arcania L., Heodes tityrus Poda, *Strymon ilicis Esp., Maculinea alcon* Schiff., *Heteropterus morpheus* Pall.

Norway, Denmark, Belgium, N.W. Coastal France:
Heodes virgaureae L.

Norway, Denmark, Holland:
Vaccinina optilete Knoch.

Norway, Belgium, N.W. Coastal France:
Pararge maera L., *Erebia medusa* Schiff., *Pyrgus alveus* Hübn., *Glaucopsyche alexis* Poda.

Denmark, Belgium, N.W. Coastal France:
Pyrgus armoricanus Oberth.

Holland, Belgium, N.W. Coastal France:
Apatura ilia Schiff., *Clossiana dia* L., *Hipparchia statilinus* Hübn., *Carcharodus alceae* Esp., *Spialia sertorius* Hoffman.

Norway and Denmark:
Parnassius mnemosyne L., *Colias palaeno* L., *Lysandra amandus* von Schev., *Carterocephalus silvicola* Meig.

Norway and Belgium:
Proclossiana eunomia Esp., *Erebia ligea* L., *Pararge petropolitana* F., *Lycaena helle* Schiff.

Holland and Belgium:
Pararge achine Scop., *Maculinea teleius* Bergstr.

Belgium and N.W. Coastal France only:
Iphiclides podalirius L., *Melitaea didyma* Esp., *M. phoebe* Schiff., *Philotes baton* Bergstr., *Lysandra thersites* Cantener, *L. dorylas* Schiff., *Pyrgus carthami* Hübn., *P. serratulae* Rambur.

N.W. Coastal France only:
Limenitis anonyma Lewin, *Mellicta parthenoides* Kef., *Pandoriana pandora* Schiff., *Strymon acaciae* Esp., *Syntarucus pirithous* L. (immigrant).

Belgium only:
Hipparchia fagi Scop., *Coenonympha oedippus* F., *C. iphis* Schiff., *Agrodiaetus damon* Schiff.

Holland only:
Maculinea nausithous Bergstr.

Norway only:
Parnassius apollo L., *Colias nastes* Boisd., *C. hecla* Lef., *Euphydryas*

iduna Dalm., *Boloria napaea* Hoffman, *Clossiana freija* Thunb., *C. polaris* Boisd., *C. chariclea* von Schev., *C. thore* Hübn., *C. frigga* Thunb., *C. improba* Butler, *Oeneis jutta* Hübn., *O. norna* Thunb., *O. bore* Hübn., *Hipparchia alcyone* D. & S., *Erebia embla* Thunb., *E. disa* Thunb., *Scolitantides orion* Pall., *Lycaeides argyrognomen* Bergstr., *Eumedonia chiron* Rott., *Agriades glandon* de Pr., *Albulina orbitulus* de Pr., *Pyrgus centaureae* Rambur, *P. andromedae* Walleng.

COUNCIL'S REPORT 1967

The Council is able to report a successful year. The membership at 31st December was five Honorary, three Special Life, 17 Life, 254 Ordinary, 248 Country and 45 Junior members—a total of 572, compared with 579 a year ago. During the year 30 members resigned, 10 were struck off for non-payment of dues, and nine died, but we recruited 42 new members, giving us an overall decrease of seven members.

In October, 1967, your Council were pleased to appoint Mr. C. N. Hawkins, Mr. S. N. A. Jacobs, Prof. O. W. Richards, Mr. S. Wakely and Mr. F. Stanley Smith honorary members in recognition of their eminence as entomologists and their many services to the Society.

During the year the Society held twenty-one indoor meetings, which included a successful programme of exhibits, discussions and lectures. Mr. T. G. Howarth, who has arranged our indoor meetings for the past thirteen years, asked Council if he could be relieved from this post. We thank Mr. Howarth for his long and unselfish service to the Society as Indoor Meetings Secretary and congratulate him on his record of versatile, interesting and informative meetings. He was succeeded by Mr. M. P. Clifton in July. Unfortunately, in October, Mr. Clifton was himself forced to resign due to pressure of studies and Mr. D. J. Carter has been appointed in his place. We wish Mr. Carter every success in the post.

The Field Meeting Secretary, Mr. R. W. J. Uffen, arranged a varied and attractive programme of meetings which were greatly appreciated by those who attended. As always, his efforts were very much appreciated. We thank Mr. and Mrs. Loarridge, the owners of Cosford Mill, who invited the members to tea on the occasion of the meeting there, and Mr. and Mrs. Bretherton for providing tea at their home in Bramley after the field meeting at Black Heath, Surrey.

The Annual Dinner was this year held again at Fleming's Hotel on Friday, 27th October, when one of the most successful gatherings of recent years was enjoyed by 88 members and guests.

Members produced some really outstanding exhibits for the Annual Exhibition which was held on Saturday, 28th October, when about 250 members and friends attended. One exhibit of outstanding interest was The Rosy Marsh Moth *Coenophila subrosea* Steph., long extinct in its old haunts which has been rediscovered in Wales; another was photographs of *Trisateles emortualis* The Olive Crescent Moth wild larvae which had not previously been found in that state in England. Owing to the removal of the Royal Society to new premises the Society has had to find a new venue for the Annual Exhibition and we have been most fortunate in

being allowed to use the Conversazione Room at the British Museum (Nat. Hist.). Our thanks are due to the Director of the Museum for the use of this room and to his staff for their help in making the exhibition a success. We are grateful to Mr. Howarth for making the arrangements and to Mr. Carter for photographing outstanding exhibits; also to Mr. D. Stimpson and his team for their efficient running of the Exhibition.

We thank Mr. C. Threadgall for his drawing used for this year's Christmas Card which depicted a fox in the snow; and we are most grateful to Mr. W. G. Tremewan and his family, Mr. M. Shaffer, Mr. Carter and all those who have helped to sell our cards.

Members will be interested to learn that the Council have had a Society Tie made. The tie has a simple motif, a neuropteron, in silver on either a black, bottle green or maroon background. We thank Mr. Arthur Smith who designed the tie and arranged for its production and Mr. Clifton who undertook the selling in the first instance.

The serving of light refreshments before ordinary meetings has proved most popular and Mrs. Howarth, who has organised the service, has been able to donate £10 from the profits to the Library Fund. We thank Mrs. Howarth for her efforts which have produced this valuable result whilst simultaneously adding to comfort of members. Mrs. Lewis of the Alpine Club has again helped us in many ways.

The Lanternist wishes to express his gratitude to Miss Kathleen Brookes and Miss Susan Hancock for their generous and valuable help over the last year. They took on the task of re-sorting, typing complete lists and building up an index to the collection of 35 mm. colour transparencies. Copies of the list are available from the Lanternist to Society members who wish to acquaint themselves with the collection, or who wish to borrow slides. The lists, however, *must* be returned to the Lanternist after use.

Since reporting last, the available colour transparencies have increased in number only slightly and the variety they contain has hardly changed, but there has been an increase in slides of adult *Microlepidoptera* and in *Coleoptera*. Several small donations of colour transparencies have been made by various members, notably again by Mr. R. W. J. Uffen and Mr. P. A. Goddard on *Microlepidoptera*. A series of excellent *Coleoptera* slides were presented by Mr. S. A. Williams, and a short series of stick-insect slides were presented by Miss C. A. McDermott. Mr. L. Christie donated a large collection of slides of tropical butterflies. the slides are at present not labelled or determined and do not therefore appear on the available lists.

A few members have borrowed slides over the last year, but these have now been returned to the collection.

The size of the collection and the lack of the working space required to sort and catalogue the very large collection of monochrome 3 in. x 3 in. transparencies has prevented a start being made on this task. There are several thousand slides to be dealt with and the Lanternist would be grateful for suggestions as to how this can be tackled and for volunteers to carry out the work.

The Proceedings were once again issued in four parts which appeared in March, May, August and December. Part I (30 pages) contained meeting reports, four original papers and some notes. Part II (32 pages) included the President's Address, two short papers and meeting reports. Part III (32 pages) consisted of Council's Report, Treasurer's Report, reports of meetings including the Annual Exhibition, various notes, and three plates. Part IV (32 pages) contained four original papers and meeting reports.

During the year the Council have continued to try to do more for those members who find it difficult to attend meetings. After very serious consideration they decided to recommend the introduction of Postal Voting for Special Meetings and for the election of Officers and Council on occasions when such elections are required. This would allow members unable to attend such meetings to take part in the management of the Society. A Special Meeting was therefore called for 11th January, 1968, and the bye-law alterations necessary to introduce Postal Voting were proposed. The proposals were accepted and thus members may now, should they wish, record their vote at Special Meetings by Post.

At the last Annual Meeting Council were asked to reconsider the question of a new name for the Society. There have been indicaitons that the Society's present name sometimes adversely affects our interests in the matter of receipt of grants, in the recruitment of new members, in our representation on national bodies and in our ability to secure invitations to attend national meetings. On the other hand, it may be argued that our present name has long-standing historical associations which are themselves an asset, and that a new name could not alter our real status as a society which, though having a wider membership, is essentially centred upon London.

After much heart-searching and discussion the Council concluded that the future expansion and progress of the Society demands a change of name to one which will reflect our broader membership and our claim to recognition as a body of national importance.

At a Special Meeting called for 6.15 p.m. on 25th January, the members agreed that the name of the Society be changed to "The British Entomological & Natural History Society."

TREASURER'S REPORT FOR 1967

The Balance Sheet shows an excess of income over expenditure of £246 16s. 3d., thereby increasing the General Fund to £2,394 11s. 11d. Most of the excess, however, may be offset against the valuation, at cost, of unsold ties at £170, and an increase of £50 in the valuation of our stock of Christmas Cards at £150.

As a result of the re-valuation of Christmas Cards in stock, the amount shown as profit is slightly higher than the actual sales proceeds. Although this may seem wrong, the stock has been increasing without increases in stock valuation, resulting in lower transfers to the General Income and Expenditure Account. Having established fairly realistic valuations, it must be our aim to remove those provisions from the accounts

British Entomological and Natural

BALANCE SHEET—

LIABILITIES

1966 £ s. d.		£ s. d.	£ s. d.	1967 £ s. d.
	Special Funds—			
	Housing—			
428 11 3	Balance at 1st January	450 7 3		
1 16 0	*Add* Donations & Bequests	320 2 6		
20 0 0	Transfer from General Income & Expenditure Account	20 0 0		
			790 9 9	
	Centenary—			
9 19 0	Balance at 1st January	12 15 6		
2 16 6	*Add* Donations	1 7 6		
			14 3 0	
	Library—			
141 15 8	Balance at 1st January	115 6 5		
—26 9 8	*Less* Excess of Expenditure over Income for the year	19 10		
			114 6 7	
	Reserve Fund—			
170 0 0	Balance at 1st January	353 18 7		
173 18 7	*Add* Donations	10 0 0		
10 0 0	Transfer from General Income & Expenditure Account	15 0 0		
			378 18 7	
				1,297 17 11
51 1 6	Subscriptions paid in advance			50 16 7
115 0 0	Sundry Creditors			125 0 0
	General Fund—			
2,071 4 0	Balance at 1st January		2,147 15 8	
76 11 8	*Add* Excess of Income over Expenditure for the year		246 16 3	
				2,394 11 11
3,246 4 11				3,868 6 5

We certify that the above Balance Sheet and Income and Expenditure Account are in accordance with the books and vouchers presented to us.

J. L. MESSENGER,
A. G. STOUGHTON-HARRIS, F.C.A., *Chartered Accountant.*

GENERAL INCOME & EXPENDITURE ACCOUNT—

EXPENDITURE

1966 £ s. d.		1967 £ s. d.
286 0 0	Rent	286 0 0
10 18 9	Insurance	14 4 10
20 15 3	Secretarial Expenses	23 9 1
5 0 7	Editorial Expenses	5 3 9
10 19 8	Treasurer's Expenses	13 1 5
41 0 11	Stationery	47 6 5
10 10 0	Subscriptions to Societies	10 10 0
47 1 0	Lectures	10 0 0

History Society — Statement of Accounts

31st DECEMBER 1967

ASSETS

1966 £ s. d.		£ s. d.	1967 £ s. d.
	Investments at Cost—		
1,130 11 0	£1,200 5% Conversion Stock 1971	1,130 11 0	
220 13 5	£100 I.C.I. Ordinary Stock	220 13 5	
248 9 0	150 Unilever Ltd. Ordinary Shares of 5/- each ...	248 9 0	
299 5 2	400 Standard Trust Ltd. Ordinary Shares of 5/- each	299 5 2	
274 6 6	300 Premier Investment Co. Ltd. Ordinary Shares of 5/- each	274 6 6	
330 15 7	£333 17s. 0d. 5% Exchequer Stock 1967 (Redeemed) ...	0 0 0	
350 0 0	£350 National Development Bonds	350 0 0	
2,854 0 8			2,523 5 1
6 12 4	Sundry Debtors		43 6 8
100 0 0	Stock of Christmas Cards		150 0 0
0 0 0	Stock of Ties		170 0 0
	Cash at Bank—		
43 4 8	Savings Account		721 9 9
242 7 3	Current Account		260 4 11

The value of the Society's Library and Collections is not included.

3,246 4 11	3,868 6 5

24th January 1968. A. S. WHEELER, *Hon. Treasurer.*

YEAR ENDING 31st DECEMBER 1967

INCOME

1966 £ s. d.		1967 £ s. d.
1,069 8 0	Subscriptions	1,044 10 10
147 0 6	Interest on Investments	147 17 3
1 12 11	,, ,, Bank Savings Account	10 5 1
55 2 6	Christmas Cards — Profit	75 16 3
0 0 0	Ties — Profit	39 12 7

31	*7*	*0*	Annual Dinner & Exhibition								11	0 7
0	*0*	*0*	Bank Charges								0	0 0
0	*0*	*0*	Purchase of Cabinets (Hill units)						£90	0 0		
			Less Sale of Cabinet				£40	0 0				
			Donation to purchase of Hill unit				£5	0 0				
									£45	0 0		
											45	0 0
42	*10*	*0*	Miscellaneous								12	2 1
660	*9*	*1*	Publications								558	7 7
20	*0*	*0*	Housing Fund								20	0 0
10	*0*	*0*	Reserve Fund								15	0 0
76	*11*	*8*	Excess of Income over Expenditure								246	16 3
1,273	*3*	*11*									1,318	2 0

PUBLICATIONS

EXPENDITURE

1966 £	s.	d.		1967 £	s.	d.
			To Printing—			
688	*19*	*7*	Proceedings	522	6	0
0	*0*	*0*	Annual Exhibition Report 1966	7	18	11
3	*11*	*6*	List of Members—Supplement	0	0	0
0	*0*	*0*	Revised Edition	14	17	0
3	*17*	*6*	Amendments to Bye-Laws	0	0	0
22	*1*	*11*	Blocks	85	6	9
0	*0*	*0*	Plate—*Callimorpha jacobaeae* L.	20	5	0
60	*3*	*6*	Postages	29	11	2
778	*14*	*0*		680	4	10

CHRISTMAS

100	*0*	*0*	To Stock at 1st January	100	0	0
37	*10*	*0*	Printing & Envelopes	40	10	11
1	*0*	*8*	Blocks	3	3	2
3	*9*	*9*	Postages	3	14	0
55	*2*	*6*	Income & Expenditure Account—Profit	75	16	3
197	*2*	*11*		223	4	4

TIES

1966 £	s.	d.		1967 £	s.	d.
0	*0*	*0*	To Manufacture	290	6	5
0	*0*	*0*	Income & Expenditure Account—Profit	39	12	7
0	*0*	*0*		329	19	0

1,273 3 11	1,318 2 0

ACCOUNT

INCOME

1966 £ s. d.		1967 £ s. d.
	By Sales—	
45 9 11	Proceedings, etc.	33 10 3
8 6 6	Annual Exhibition Reports	18 7 0
14 8 6	Donations	0 0 0
0 0 0	Donation to Half-tone plates	20 0 0
50 0 0	Parliamentary Grant-in-aid	50 0 0
660 9 1	Income & Expenditure Account	558 7 7
778 14 0		680 4 10

CARDS ACCOUNT

97 2 11	By Sales	73 4 4
100 0 0	Stock at 31st December	150 0 0
197 2 11		223 4 4

ACCOUNT

1966 £ s. d.		1967 £ s. d.
0 0 0	By Sales	159 19 0
0 0 0	Stock at 31st December 1967	170 0 0
0 0 0		329 19 0

as soon as possible. This will be in line with the Publications Account where no provision is made for stocks of Proceedings held.

The Publications Account shows the cost of Proceedings at £522 6s. 0d. which is substantially less than the 1966 account total, but that figure included the last part and index for 1965, for which no provision was made in the 1965 balance sheet. These accounts include a provision of £125 for the forthcoming Part IV, 1967. There has been a larger outlay on blocks and plates, and I am pleased to acknowledge the receipt of a donation of £20 towards the cost of the half-tone plates. Sales have suffered a further decline and the Parliamentary Grant-in-aid remained at £50. Postages for the despatch of the Proceedings have been reduced by 50 per cent., to under £30. The net result is a charge to the General Income and Expenditure Account of £558 7s. 7d., compared with £660 9s. 1d. in 1966.

The Housing Fund benefited at the end of the year to the extent of £310 by bequests of £100 and £210 from the late Mr. R. M. Mere and Dr. A. M. Massee respectively. After adding donations and a transfer from the General Income and Expenditure Account the balance stands at £790 9s. 9d. These bequests are included in the Savings Account balance at 31st December.

The Centenary Fund has increased by £1 7s. 6d. in the year but still stands at only £14 3s. 0d.

The Library Fund remains much the same at £114 6s. 7d. This was largely due to a £10 donation from Mrs. Howarth, being profit from the sale of tea on meeting nights, which, added to the Entrance Fees, almost equalled library purchases.

The Reserve Fund was increased by a £10 donation and I have transferred £15 from the General Income and Expenditure Account. The balance now reads £378 18s. 7d.

Investments remain the same except that our holding of 5% Exchequer Stock 1967 has been redeemed and the proceeds were at 31st December in the Savings Account. The money has since been invested in G.E.C. 7¼% Unsecured Loan Stock. Dr. Massee's bequest of £210 has been invested similarly in G.E.C. and both these purchases will be shown in next year's accounts.

The purchase of three more Hill unit cabinets at £30 each is recorded, against which are offset the sale of a cabinet for £40 and a donation of £5, thereby reducing the net outlay to £45.

Expenditure on Indoor Meetings, the Annual Dinner and Exhibition and miscellaneous items have been reduced. Subscriptions have fallen by about £25. Otherwise, apart from items to which reference has already been made, the General Income and Expenditure Account is similar to the previous year.

Now, a personal word concerning my predecessor who, as Assistant Treasurer, is responsible for the collection of subscriptions. This is the most burdensome part of the office of Treasurer and I could not have remained in the post without this division of work. I am very grateful to Mr. Vallins for his further advice gained from many years of experience

in the service of the Society and additionally for assisting in the despatch of Dinner and Tea tickets at the time when I was moving house.

Finally, our thanks are again due to Mr. A. G. Stoughton-Harris and Mr. J. L. Messenger for auditing the accounts and for their opinions concerning various matters arising from them.

CURATOR'S REPORT 1967

Steady and satisfactory progress has been maintained during the past year.

The Palaearctic Rhopalocera are now arranged in two 40 drawer cabinets. The Lycaenidae were incorporated by Mr. F. T. Vallins and we are indebted to him for fulfilling this onerous task and for the presentation of many specimens from his rich collection.

Our small collection of Palaearctic Heterocera is now housed in five drawers of a Hill unit following our main collection of British Heterocera. Work is completed on transferring the Leeds Collection of Satyridae aberrations to one of the Bright Collection cabinets, a satisfactory method of dealing with formerly widely dispersed material. All the Coulson Collection of Macrolepidoptera and Hemiptera-Heterocera is now incorporated in our main collections.

Our thanks are due to Mr. P. J. Chandler and to Mr. D. M. Ackland of the Hope Department of Entomology for offering to check the material in the Andrews Collection of Diptera. Work is well advanced in carrying out critical identifications and bringing the nomenclature up to date. The many interesting discoveries will be published by Mr. Chandler in due course.

During the year the Society received two major bequests The Dr. A. M. Massee Collection of British Coleoptera was left to us with the proviso that the British Museum (Nat. Hist.) had first choice of any specimens required. This very comprehensive collection housed in some 30 storeboxes and mounted in impeccable style, will be a most valuable addition to our Coleoptera collections. A 40 drawer cabinet has been re-papered ready to accommodate the specimens when they are made available.

Although he was not a member of our Society, the Rev. R. R. Broome's collection of insects of all orders was presented to us by his widow. Well-mounted specimens of Neuroptera, Odonata, Trichoptera and Orthoptera are particularly welcome and our best thanks are due to Mrs. Broome for her generosity.

Work has continued on the larvae of Lepidoptera and a start made on incorporating and rearranging the Hemiptera-Homoptera in a re-papered 18 drawer cabinet. Two Hill units were purchased during the year, making 30 available drawers to accommodate the British Microlepidoptera when the new Kloet & Hincks check list is forthcoming.

Several specialists have borrowed material for critical research, a facility always available and which benefits all concerned. The Henderson binocular microscope is placed at members' disposal during Indoor

meetings and a new spotlight has been provided. Two binocular microscopes have been placed on loan and a number of members have taken advantage of the duplicate Lepidoptera now available.

The thanks of the Society are due to the following members for notable donations: Sir Eric Ansorge (Lepidoptera), Mr. A. E. Gardner (Coleoptera, Trichoptera and Saltatoria), Mr. B. Goater (Lepidoptera), Mr. C. MacKechnie Jarvis (Hemiptera-Heteroptera), the late Dr. A. M. Massee (Hemiptera-Heteroptera), Dr. B. J. McNulty (Coleoptera), Mr. W. H. Spreadbury (Lepidoptera), Mr. A. E. Stubbs (Diptera), Mr. R. W. J. Uffen (Lepidoptera) and Mr. S. A. Williams (Coleoptera).

Our thanks are due also to Mr. P. Goddard who presented the Society with his extensive collection of monochrome photographs of British Microlepidoptera.

Mr. L. Christie, the Assistant Curator, has rendered valuable help especially with the onerous task of re-papering cabinet drawers.

LIBRARIAN'S REPORT 1967

I am pleased to report that the binding of our journals is going ahead smoothly, despite holdups at Messrs. Fox, our binders. Enquiries have been made with other binders who would no doubt execute our orders quicker, but unfortunately their charges are much higher for work of no greater quality.

Mr. Carter, as Assistant Librarian, has finished cataloguing our Separates library and several members are now using it. I expect this important section of the library to expand rapidly in the immediate future. A record number of books were borrowed during the year. As the result of an exchange agreement, we now receive the publications of the Entomological Department of the Agricultural University of Bari.

Two further publications of the Royal Entomological Society have been purchased, Diptera Pipunculidae by R. L. Coe, and Coleoptera, Clambidae by C. Johnson.

The following books were added to the library: Ellis, E. A., *The Broads,* purchased; Klots, A. B., *Field Guide to Butterflies,* presented; Hoffmeyer, S., *De Danske Malere,* presented by S. N. A. Jacobs; Shaw Lefevre, G., *English Commons and Forests,* presented by H. G. Tunstall; Freude, Harde and Lohse, *Die Kafer Mitteleuropas,* Vols. 7 and 9, purchased; Hickin, N. E., *British Caddis Larvae,* presented by F. D. Buck. Many separates have been presented by members.

We continue to receive the usual publications. I am grateful for the help given by the Assistant Librarians, Mr. D. J. Carter and Miss C. Wagner.

PROCEEDINGS

23rd NOVEMBER, 1967

The PRESIDENT in the Chair

The following new members were declared elected: Mr. M. G. Adams, Mr. R. A. Bourne, Mr. D. C. Grange, and Mr. M. J. James.

EXHIBITS

Mr. P. N. Crow—(1) A drawer of Diptera (Syrphidae) collected during 1967 in the Reading district of Berks. (2) Two adult *Ledra aurita* (L.) (Hom., Ledridae) together with a nymph, also from the Reading district in 1967. This species hibernated in all three stages and is the host of the rare pipunculid fly whose presence indicates that the exhibited homopteron must also be present.

Mr. A. E. Gardner—Two beetles of the genus *Colon* (Silphidae): *C. brunneus* Lat., taken during evening sweeping at Aldermaston. Berks., in August 1963; and *C. serripes* Sahlb., taken tufting at Chippenham Fen, Cambs., 5th November, 1967

Mr. G. Prior—A piece of Mistletoe (*Viscum album* L.) attached to a branch of hawthorn (*Crataegus monogyna* Jacq.) cut from a tree in the centre of Rickmansworth, Herts. The hawthorn was split to show the effect of the Mistletoe.

Mr. A. E. Stubbs—A male and female *Lipsothrix nervosa* Edw. (Dipt., Tipulidae) showing marked sexual dimorphism which is unusual to such extent in this family. The female is predominantly yellow, but the male has a black dorsal thoracic stripe and a black abdomen.

Coe (1950, *Handbk. Identification Brit. Ins. 9* (2) : 49) gives only two county records, Hants. and Devon. The specimens exhibited were found in abundance in an alder wood at Thursley, Surrey, 4th June, 1967.

COMMUNICATIONS

Following a discussion on the Annual Exhibition, Mr. E. P. Wiltshire showed some coloured slides made by Capt. Hugh Ennion of Arabian Lepidoptera and larvae, which provoked some discussion.

14th DECEMBER, 1967

The President in the Chair

The following new members were declared elected: Mr. T. G. Benyon, Mr. S. Davey, Mr. C. F. Dewhurst, Mr. P. G. Farwell, Miss C. A. Herring, Dr. J. Neil-Horton, Milton Abbey Natural History Society (Corporate), Mr. A. Hepworth, Mr. P. W. Lorrimore, Sergt. M. T. Skelton and Mrs. M. H. Wakely.

The President announced the death of Sir Reginald M. Maxwell.

EXHIBITS

Mr. A. G. M. Batten—Three examples of *Biston betularia* L., taken at Woking, Surrey, 5th June, 1967; one with dark forewings and light hindwings, together with a light and a dark specimen for comparison.

Mr. A. E. Gardner—Two very local staphylinid beetles from the New Forest, Hants.: *Quedius invreae* Grid., taken from a hornet's nest, 22nd October, 1967; and *Philonthus nigrita* (Grav.), taken in sphagnum, 26th November, 1967.

Mr. A. E. Stubbs—(1) A specimen of the wood cricket *Nemobius sylvestris* (F.), taken in the New Forest, Hants., during 1967. The exhibitor recently discovered this species in Surrey (1967, *Entomologist, 100* : 284), the material being deposited in the British Museum (Nat. Hist.). (2) A provisional list of some 400 species of Lepidoptera for

Esher and Oxshott Commons. He referred to his communication of 24th November, 1966 (*antea, 1967* : 48-49) and asked members if they would check through the list and provide notes and additional species from their own records. This list is designed to record the fauna of the Commons in view of the drastic changes which are taking place there.

Mr. S. A. WILLIAMS—*Hapalaraea* (s.gen. *Phyllodrepa*) *puberula* (Bernh.) (Col., Staphylinidae) taken at the Sheppey Bone and Glue Works, Queenborough, Kent, 18th May, 1966. This is a very local beetle usually taken in old bones and rat droppings, and constitutes the third record for the County. He also showed *Atheta* (s.gen. *Tetropla*) *pilicornis* (Thompson) (Col., Staphylinidae) taken at Chippenham Fen, Cambs., 6th November, 1967, in grass tufts, another local species usually taken under bark; and *Atheta* (s. gen. *Liogluta*) *pagana* (Er.) taken at Aylesford, Kent, 1st December, 1967, in a fish trap placed in a rabbit burrow, one of the largest of the British *Atheta*.

Mr. T. G. HOWARTH—A plastic tray cloth with many species of Formosan butterflies set in it. He commented that these are now produced in great quantities.

COMMUNICATIONS

Mr. J. D. Holloway read a paper "Studies in moth behaviour in a light trap." The material on which this paper was given was published in our Proceedings, *1967* : 31-45.

28th DECEMBER, 1967

The PRESIDENT in the Chair

The following new member was declared elected: Mr. P. S. Lesha.

EXHIBITS

Mr. M. CLIFTON—(1) An aberrant example of *Blaps mucronata* Latr. (Col., Tenebrionidae) from Farnborough, Hants., together with a specimen of *B. mortisaga* for comparison. (2) a small collection of Homoptera and Coleoptera from the Pittsburg area of Pennsylvania, U.S.A., showing differences and affinitives compared with our own fauna. (3) A pair of live Chinchillas, *Chinchilla laniger*, from Chile. The exhibitor induced them to utter their warning cry, pointing out that the female had a lower pitch than the male.

Mr. B. GOATER—A wooden, glass-covered tray from Brazil, decorated with various S. American butterflies.

Dr. J. L. NEWTON—A specimen of a fern, native in the Canaries, which has now become established around the buildings of H.M. Prison, Pentonville.

COMMUNICATIONS

The *Biston betularia* L. (Lep., Geometridae) exhibited at the previous meeting by A. G. M. Batten (see p. 25) had been described by the PRESIDENT to Dr. H. B. D. Kettlewell, who said that he had not seen this form before and thought it might be a new mutation.

The President reported that he had seen *Operophtera fagata* Scharf. (Lep., Geometridae) during November and *O. brumata* L. at Christmas time.

Mr. D. Chanter gave a talk on "A Naturalist in East Africa."

SPECIAL MEETINGS

11th JANUARY, 1968

The PRESIDENT in the Chair

At a Special Meeting held in the Society's rooms on 11th January, 1968, the following amendments to the Bye Laws were on the agenda:

Para. 7 (c) Insert after first sentence "Recording of votes by post shall be permitted in accordance with Bye Law 13 (d)."

Para. 7 (e) After "those members entitled to vote" insert a full stop and delete the rest of the paragraph.
Insert at end of paragraph "The Scrutineers shall check each ballot paper against this list and any vote received from a member not on this list shall be declared void."

Para. 13, add at the end:

13 (d) At Special Meetings and for election of Officers and Council when such election is required, any member *may* vote by post on the special form provided with the notice calling such a meeting, provided that the form is signed and posted so as to reach the Secretary or other person appointed by Council, not later than 3 days before the said Special Meeting. Any postal votes not so recorded shall be null and void.

Para. 14 (c) Line 4 after "26" insert "(f)."

Para. 26 (a) Delete the words "at least seven" in line 2 and the word "clear" in line 3, and substitute the words "six weeks." Delete the word "four" in line six and insert the word "six."

Para. 26 (c) Delete. And insert "Amendments to any proposal due to be voted on at the Special Meeting in writing and signed by not less than "six" members must be given to the Secretary, or sent to him by recorded delivery post so as to reach him not later than four clear weeks prior to the date of the Special Meeting. All such amendments shall be circulated to members not later than two weeks prior to the Special Meeting except that any amendment deemed by Council merely to be a negation of the original proposal shall be deemed void and not so circulated.

Para. 26 (d) Delete from "provided that" to end of sentence.

Add

Para. 26 (e) At Special Meetings voting shall take place on similar papers to those used for postal voting. They must be signed. Any member attempting to vote by post and at the meeting shall have his vote declared void, unless he has previously withdrawn his postal vote.

Para. 26 (f) Special Meetings called under Bye Law 14 (c) shall not be subject to postal voting and shall be called in accordance with Para. 26 (g). Ballot in this case shall be secret and each member shall be checked against the scrutineers' list before voting.

Para. 26 (g) Notwithstanding Paras. (a) to (e) Council may call a Special Meeting in *serious cases of emergency* under Para. 26 (a) except that only seven clear days' notice need be given. At such a meeting postal voting shall not apply and voting may be by show of hands. Any decisions taken at such a Special Meeting (except one called under 26 (f)) shall be binding only until Council have been able to submit such decisions to a Special Meeting at which postal voting is permitted.

The following tellers were appointed: Mr. S. N. A. JACOBS and Dr. B. J. MACNULTY.

The motion was proposed by the PRESIDENT from the Chair, and on being put to the meeting, following discussion, the motion was carried, 26 votes being cast for and seven votes against.

25th JANUARY, 1968
The PRESIDENT in the Chair

At a Special Meeting held in the Society's rooms on 25th January, 1968, the following amendments to the Society's Bye Laws were on the Agenda:

Para. 1 Name. The present paragraph be deleted and the following substituted:

"The Society shall be called THE BRITISH ENTOMOLOGICAL & NATURAL HISTORY SOCIETY" and that the appropriate alterations be made in Para. 12 (b) and Appendix B.

Mr. S. N. A. JACOBS and Dr. B. J. MACNULTY were appointed scrutineers.

The PRESIDENT proposed the motion from the Chair, and after discussion the motion was carried, 146 votes being cast for and 47 votes against, including postal votes.

25th JANUARY, 1968
96th ANNUAL GENERAL MEETING
(with which was combined the Ordinary Meeting)

The PRESIDENT, Mr. R. F. BRETHERTON, C.B., M.A., in the Chair

Dr. B. P. Moore, on a visit from Australia, was welcomed to the meeting.

Mr. A. G. Stoughton-Harris was elected to serve as the Members' Auditor on a motion proposed by Mr. C. N. Hawkins and seconded by Mr. A. E. Gardner.

EXHIBITS

Mr. C. MACKECHNIE-JARVIS—Two examples of *Lathrobium* (s.g. *Tetartopeus*) *fennicum* Renk. (Col., Staphylinidae), an insect new to Britain, found in litter at the margin of the Great Pond, Tresco, Scilly Isles, in April 1967. This insect is closely related to *L. quadratum* Payk., in the same subgenus from which it may with practice be distinguished by being of less robust build, with the thorax longer and narrower in proportion to the elytra, which in turn are somewhat narrower than in *L. quadratum*. The antennae are more slender than in the latter. The

aedeagus is distinctive and there is absolutely no difficulty in separating the two species on this character, as the sketch exhibited with the specimens showed.

Mr. A. E. STUBBS—A second British specimen of *Chrysopilus laetus* (Zett.) (Dipt., Rhagionidae). A female bred from a larva found 13th May, 1967, in wet wood detritus in a beech stump in Windsor Forest, Berks. A further larva was preserved. There is only one previously known British specimen, a female bred by Mr. H. St. J. K. Donisthorpe from a pupa found in mud by a pond in Windsor Great Park, Berks., 18th June, 1938. Mr. H. Oldroyd has kindly examined the exhibited example and provisionally confirmed that it must be regarded as the same species as that bred by Donisthorpe, though the identity of these specimens must remain in some doubt since positive identification can only be made with the male. *Chrysopilus laetus* (Zett.) is a yellow species and differs markedly from the common species *C. cristatus* (F.) and *C. aureus* (Meig.), which were also exhibited for comparison, these being predominantly dark in coloration.

Mr. T. J. G. HOMER—A selection of colour photographs taken in various localities in Trinidad whilst collecting butterflies during the last two months of 1966.

Mr. A. S. WHEELER reported on the Society's finances and moved the adoption of his report; Mr. T. G. HOWARTH seconded the motion, which was carried. Attention was drawn by the President to the generous bequest of Mr. R. M. Mere of £100 and Dr. A. M. Massee of £210.

The Council's Report was read by the Secretary, Dr. B. J. MacNulty, who moved its adoption. It was seconded by Mr. T. R. EAGLES and carried.

Mr. S. A. WILLIAMS gave the Librarian's Report and moved its adoption; Mr. C. MACKECHNIE-JARVIS seconded the report, which was carried.

A report on the collections, moved by the Curator, Mr. A. E. GARDNER, was seconded by Mr. S. N. A. JACOBS and carried.

The PRESIDENT declared the following Officers and Ordinary Members of Council elected for the ensuing year: *President*, B. GOATER, B.SC., F.R.E.S.; *Vice-Presidents*, Capt. J. ELLERTON, D.S.C., R.N. and R. F. BRETHERTON, C.B., M.A., F.R.E.S.; *Treasurer*, A. S. WHEELER; *Secretary*, B. J. MACNULTY, B.SC., PH.D., F.R.I.C., F.L.S., 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*, Miss K. BROOKES, Col. A. M. EMMETT, M.B.E., T.D., M.A., Miss S. HANCOCK, G. PRIOR, Dr. J. NEWTON, M.R.C.S., L.R.C.P., F.R.E.S., A. E. STUBBS, B.SC., G. C. STUBBS, R. S. TUBBS, O.B.E., F.R.I.B.A., E. P. WILTSHIRE, C.B.E., B.A., C. G. M. DE WORMS, M.A., PH.D., F.R.I.C., F.L.S., F.R.E.S., M.B.O.U.

Under motions and questions invited under Bye Law 25 (b), Dr. C. G. M. DE WORMS asked if proper publicity would be arranged for the Society's change of name, particularly in correspondence, etc. The Secretary replied that it would. Mr. C. MACKECHNIE-JARVIS asked if the Centenary Committee would meet and the Secretary replied that an early meeting would be arranged. Mr. D. O'KEEFE asked if a report of the

Annual Exhibition was being produced and Mr. B. GOATER said that unfortunately the full report had been delayed. Mr. O'Keefe also asked how much it cost to bind journals and recommended Remploy, whom he had employed to bind his own journals, and which they did very well at relatively low cost. The President thanked him for this information.

COMMUNICATIONS

Two geometers, *Phigalia pilosaria* Schiff. (*pedaria* F.) and *Erannis leucophaearia* Schiff. were reported by Dr. C. G. M. DE WORMS, which he said had appeared because of the mild weather.

A Robin was reported by Mr. S. N. A. Jacobs to have eaten a piece of his finger which he had accidentally snipped off with secateurs while gardening, but the Robin had regurgitated it later.

The PRESIDENT then read his Address which included a comparison of the butterflies of Britain and Europe. He then called upon Mr. B. GOATER to take the Chair.

Upon taking the Chair, Mr. Goater thanked Mr. Bretherton for his help and guidance of the Society during his year of office and asked permission to publish his Address, to which Mr. Bretherton agreed.

A vote of thanks to the Vice-Presidents, Officers and Ordinary Members of Council was proposed by Mr. R. W. J. UFFEN and seconded by Mr. T. J. G. HOMER. Capt. J. ELLERTON replied on behalf of the Council.

From the Chair Mr. Goater proposed a vote of thanks to the auditors which was carried by acclamation.

8th FEBRUARY, 1968

Mr. B. GOATER, B.SC., F.R.E.S., *President*, in the Chair

EXHIBITS

Mr. E. P. WILTSHIRE—Four different forms of *Euchloe charlonia* Donz. (Lep., Pieridae). (1) *Forma typica* from Morocco; (2) s. sp. (or form) *mesopotamica* Staud. from Iraq; (3) a closely related form to *mesopotamica* from Arabia; and (4) s. sp. *transaspica* Staud. from south-west Iran. He also showed two examples of the recently described species *Euchloe lessei* Bernardi. (1) A topotype from the Elburz range in north Iran, and (2) an example from the mountains near Shiraz, from which this species has not previously been recorded. Both these examples were taken before the types captured by Mons. de Lesse in 1955, but their distinct status was not suspected because of the great range of variability exhibited by *E. charlonia*.

Mr. C. MACKECHNIE-JARVIS—A short series of the beetle *Thanatophilus dispar* Herbst (Silphidae) from Shanes Castle, Co. Antrim, Ireland. This beetle has long been on the British list, and old records exist for Scotland, a few Midland counties as well as two for East Anglia (*circa* 1830) which may be erroneous. Last century specimens were taken by E. A. Waterhouse from Loch Leven, and specimens in the Power and Bedwell collections also appear to have come from this source. More recently, most specimens seem to come from Irish localities around Lough Neagh.

Dr. M. G. MORRIS—A specimen of *Otiorrhynchus uncinatus* Germ. (Col., Curculionidae), a weevil not previously recorded in the British Isles, with a drawing of the specimen. It was taken under a stone at Killballyboy Wood, Clogheen, Co. Tipperary, Ireland, 24th May, 1967.

Mr. S. N. A. JACOBS—Five colour transparencies received from Mr. W. T. Miller of Knysner C.P. showing the male and female of the Hepialid moth *Leto venus* Stoll., also larva and pupal cases, extruded from the stump of a Kuerboom (*Virgilia oroboides*). Mr. J. S. Taylor published a note on the life of this insect (*Ent. Rec.*, **76**: 189)

COMMUNICATIONS

Referring to Mr. Wiltshire's exhibit, Dr. C. G. M. DE WORMS said that he took *Euchloe charlonia* Donz. in the spring of 1965; he asked if, in Mr. Wiltshire's experience, it flew in cornfields. Dr. de Worms also mentioned two similar species from north-west Africa, *Euchloe belemia* Esp. and *E. falloui All.* Mr. WILTSHIRE replied that he had not seen *E. charlonia* in cornfields, but that one had been taken in a desert situation. He had also taken *E. lessei* at 10,000 ft. on mountains on mountain steppe vegetation, and near Shiraz at 2,000 metres together with *Paplilio alexanor* Esp. Mr. R. F. BRETHERTON said that *E. charlonia* possibly occurred in Greece but was rare there, and added that its European habitats were not like its habitats in Morocco.

Dr. M. G. MORRIS read a paper on "Conservation of Chalk Insects."

22nd FEBRUARY, 1968

Mr. R. F. BRETHERTON, C.B., M.A., VICE-PRESIDENT, in the Chair.

EXHIBITS

Mr. A. E. STUBBS the following uncommon Diptera from Thursley Bog, Surrey, during 1966:—

Pogonota hircus Zetl., an arboreal species recently discovered in Southern England; *Knutsonia lineata* Fallen; *Micropeza lateralis* My. and four species of Tipulidae: *Erioptera neilseni* de Meyere previously recorded from Yorkshire and Dorset, *Limnophila squalens* Zetl., *Prionocera turcica* Fabr., and *Tipula melanoceros* Schum. The last three species are abundant on some Surrey heaths but are otherwise very local in Southern England.

COMMUNICATIONS

Mr. S. N. A. JACOBS referred to the colour slides he showed at the previous meeting of *Leto venus* Stoll. and said that at the Paris sale £120 had been paid for 19 of these moths which could be bred out in quantity if one collected the tree stumps in which the larvae fed.

Mr. A. E. GARDNER commented that Thursley Bog is nearer to the northern bogs as regards the Odonata that are found there, but that it does not compare with the New Forest bogs for Coleoptera. Mr. Stubbs added that he had not collected Diptera in the New Forest and was therefore unable to compare them as regards Diptera.

After the film "Malayan Bird Wings," introduced by Mr. H. H. BEAMISH, the Vice-President closed the meeting.

FIELD MEETINGS

OXSHOTT, SURREY—14th October, 1967

Leaders: Mr. T. R. Eagles and Mr. P. C. Holland

It was a joint meeting of three societies, the London Natural History Society, the South London Botanical Institute and our own Society. Over 30 members and their friends attended, about equally divided among the respective societies. It was a privilege to have Mr. and Mrs. Carter of the British Mycological Society with us.

Fungi were abundant, the most interesting being the number of Bolets. Many of these were in excellent condition and were gathered for the pot by Mr. Arthur Smith and his family. At the end of the day tea was taken at the refreshment rooms near the station and some 24 sat down for an excellent repast.

The following is a list of the species seen.

Myxomycetes: *Cribraria argillacea* (Pers.) Pers., *C. aurantiaca* Schrad., *Didymium melanospermum* (Pers.) Macbride, D. *nigripes* (Link) Fr., *Fuligo septica* (L.), Weber var. *flava* Pers., *Leocarpus fragilis* (Dickson) Rost., *Lycogala epidendrum* (L.), Fr., *Tubifera ferruginosa* (Batsch) J. F. Gmel.

Ascomycetes: *Aleuria aurantia* (Fr.), Fuckel, *Claviceps purpurea* (Fr.), Tul., on *Molinia, Coryne sarcoides* (Jacquin ex Fr.) Tul., *Peziza badia* Pers. ex Mérat, *Xylosphaera hypoxylon* (L.) Dum.. *Apiocrea chrysosperma* (Tul.) Sydow (imperfect form on decayed fungi, often called Hypomyces or Sepedonium).

Heterobasidiomycetes: *Calocera viscosa* (Pers. ex Fr.) Fr., *Dacrymyces deliquescens* (Bull.) Duby, *Melampsoridium betulinum* (Fr.) Kleb. (rust on *Betula*), *Pseudohydnum gelatinosum* Pers. ex. Scop.

Homobasidiomycetes—Aphyllophorales: *Clavaria argillacea* Pers., ex Fr., *Coltrichia* (*Polystictus*) *perennis* (Fr.) Murrill, *Coriolus* (*Polystictus*) *versicolor* (L. ex Fr.) Quél., *Heterobasidion* (*Fomes*) *annosum* (Fr.) Bref., *Merulius tremellosus* (Schrad.) Fr., *Piptoporus betulinus* (Bull. ex Fr.) Karst.. *Thelephora terrestris* (Ehrhart) Fr., *Stereum hirsutum* (Willd.) Pers., *Sparassis crispa* Fr.

Homobasidiomycetes—Agaricales: *Amanita citrina* (Scaffer) S. F. Gray, *A. fulva* (Schaeffer) Secretan, *A. muscaria* (L. ex Fr.) Hooker, *A. rubescens* (Pers.) (Fr.) S. F. Gray, *Boletus badius* Fr., *B. edulis* Bull. ex Fr., *B. luteus* L. ex Fr., *B. piperatus* Bull. ex Fr., *B. scaber* Bull. ex Fr., *B. testaceoscaber* Secr., *B. variegatus Sow.* ex Fr., *Clitocybe clavipes* (Pers. ex Fr.) Kummer, *Collybia maculata* (Alb. et Schw. ex Fr.) Kummer, *C. peronata* (Bolt. ex Fr.) Kummer, *Corintarius hemitrichus* (Pers. ex Fr.) Fr., *C. semisanguineus* (Fr.) Gillet, *C. glaucopus* (Schaeff. ex Fr.) Fr., *Galerina hypnorum* (Schrank ex Fr.) Kühn., *G. mutabilis* (Schaeffer ex Fr.) P. D. Orton, *Gamphidius roseus* (Fr.) Karst, *Gymnopilus penetrans* (Fr. ex Fr.), Murrill, *Hebeloma crustuliniforme* (Bull, ex Fr.) Quél., *Hygrophoropsis aurantiaca* ((von Wulfen) Fr.) Maire *apud* Martin-Sans, *Hypholoma fasciculare* (Huds. ex Fr.) Kummer, *Laccaria amethystea* (Bull. ex. Mérat) Murrill, *L. laccata* (Scop. ex Fr.) Cooke, *Lactarius deliciosus* (L. ex Fr.) S. F. Gray, *L. pubescens* (Fr. ex Kromb.)

Fr., *L. quietus*, Fr., *L. rufus* (Scop. ex Fr.) Fr., *L. turpis* (Weinmann), Fr., *L. vietus*, Fr., *Marasmius androsaceus* (L. ex Fr.) Fr., *Mycena epipterigia* (Scop. ex. Fr.) S.F. Gray, *Mycena galericulata* (Scop. ex Fr.) S. F. Gray, *M. galopus* (Pers. ex Fr.) Kummer, *M. leucogala* (Cooke) Sacc., *M. sanguinolenta* (Alb. et Schw. ex Fr.) Kummer, *Nolanea staurospora* Bres., *Paxillus atrotomentosus* (Batsch ex Fr.) Fr., *P. involutus* (Batsch ex Fr.) Fr., *Russula atropurpurea* (Knomb.) Britz., *R. emetica* (Schaeffer ex Fr.) S. F. Gray, *R. fragilis* (Pers. ex Fr.) Fr., *R. ochroleuca* (Pers. ex Sec.) Fr., *R. lutea* (Auds. ex Fr.) S. F. Gray, *Thicholomopsis rutilans* (Schaeffer ex Fr.) Sing.

GASTEROMYCETES: *Calvatia excipuliformis* (Pers.) Perdecke, *Scleroderma aurantium* Vaillant ex Pers.

CURRENT LITERATURE

Books and monographs reviewed under this heading will continue to receive objective and sometimes critical treatment; but in reviewing our foreign contemporaries we may adopt a more subjective attitude, and in suitable cases give our typewriter a looser rein with comment, comparisons, unpublished observations and occasional reminiscences verging on gossip.

BOOKS AND MONOGRAPHS

Evolutionary Trends in the Genus Aricia (Lep.). Further Information on Distribution, Taxonomy and Biology of A. allous G.-Hb. and A. agestis Schiff.

By OVE HOEGH-GULBERG, pp. 77, 13 text figures, 8 charts, 1 coloured plate. Aarhus, Denmark, 1968

This book may be regarded as a supplement to the author's previous work (reviewed in *Proc. S. Lond. ent. nat. Hist. Soc.* 1967, p. 29), filling many gaps in our knowledge of these insects. Their distribution in Europe is brought up-to-date by information not previously available and the results of further breeding experiments are recorded.

It is demonstrated that characters which were formerly assumed to be of specific status are not always reliable, particularly in the larvae, where much depends on the instar chosen for comparison. When ratios from different districts, such as Britain and Scandinavia, are compared, differences are sometimes found of such significance as to warrant the assumption of varying degrees of evolutionary development. On the other hand, overlapping frequently occurs in many characters, indicating how cautious one must be when making pronouncements involving specificity.

It is interesting to note that differences in imagines, though small, are discernible between specimens from colonies little over 20 miles apart, as in the case with specimens from Hammeren, in Bornholm and Sandhammaren in Sweden. Data resulting from crosses between these and other colonies suggest different degrees of relationship and a slight amount of genetic incompatability, supporting the probability of subspecific status.

Experiments are recorded on the effect of light in inducing diapause in larvae and promoting pairing and oviposition in imagines, when combined with heat.

Important changes occurred when pupae were subjected to prolonged cooling, the resultant aberrations displaying a marked similarity to those found in wild populations. The author is of the opinion that the latter are more likely due to inheritance than to similar conditions of chilling.

The author is somewhat diffident about the value of evidence from his breeding experiments when applied to the problem of distinct specificity between *A. agestis* and *A. allous* and seems to be uncertain of the validity of some of the conclusions formerly drawn. This erring towards extreme caution is most commendable, but tentative conclusions are inevitable when dealing with closely allied forms in the process of segregation. The borderline between forms in the course of transition to separate species may be so indeterminate and nebulous as to preclude anything approaching dogmatic conceptions, at the present time.

As in the earlier book, the illustrations are admirable, and there is the usual most helpful summary and 14 tables of the results of breeding experiments.

The author is to be esteemed and congratulated on his perseverance in pursuing so tenaciously the difficult problems with which he finds himself confronted. He is engaged in extremely valuable work from which many of us will benefit.

F. T. VALLINS.

OUR CONTEMPORARIES

Mitteilungen der Entomologischen Gesellschaft Basel: 18, Pt. 1 (March 1968)

The current number of this offset-printed magazine begins with an article of 18 pages in German by W. Sauter, dedicated to the memory of Dr. Henry Beuret. Its object is partly to fill the gap left by Beuret who died before he could produce Part 4 of his work on Swiss Blues (*Lycaenidae*). The article characterises the *Plebejinae* with thirty well-executed line drawings, mostly of male genitalia characters, but also some of neuration or pattern-characters, e.g., the hindwing markings of *Lysandra escheri* Hübn. and *thersites* Cant. The text provides a key to the genera, and also to the six species (*Polyommatus icarus* Rott., etc.) not in Beuret's work.

This useful article is followed by an interesting one of two pages in French by G. Varin, on the less common butterflies of the French Jura and their localities, particularly the high lakes and mosses where fly *Colias palaeno* L. ssp. *europomene* O. f. *jurassica* Vty., *Lycaena helle* Den. & Schiff., etc., and also the mountain tops where *Parnassius apollo* L. ssp. *nivatus* Fruhst., *Erebia pronoe* Esp. ssp. *pitho* Hübn., etc., are found.

Thirdly, an article of five pages in German by E. Urbahn shews that clear specific differences exist between the Geometrids *Diactinia silaceata* Schiff. and *capitata* H.S. which C. Herbulot, in his well-known 1962/3 list (*Alexanor* **2**: 150), treated as conspecific.

Fourthly, an article of four pages in French by E. V. Niculescu, on the Notion of Genus, deplores the splitting of the *Argynninae* into too many genera continuous with each other.

A fifth article of two pages, in German, lists some Lepidoptera taken in the Tessin on a week-end in September.

Sixthly comes a note of half a page by R. Rappaz, who owns and directs the Café de Paris in Sion, an establishment which the editor recommends all lepidopterists in the Valais to visit: where else in the world can one find a smart, well-frequented restaurant run by an entomologist, with well-exhibited cases of butterflies, both local and exotic, decorating the walls, and a more complete collection of local Lepidoptera tucked away in the basement? Rappaz mentions, in his note, the highest altitude (1,500 m.) at which the typical forms of *Euphydryas aurinia* Rott. flies in the canton. He questions the validity of Verity's f. *frigescens* which its author on the scantiest basis considered a transitional local form to the high Alpine subspecies *glaciegenita* Verity. Whether there are, as Rappaz thinks, no intermediates between the lowland and alpine forms of *M. aurinia* is still open to proof, and in this connection I quote from a personal letter which Vladimir Nabokov, who lives in Switzerland, wrote to me on 22nd August, 1965:—

"Just below Leukerbad, on its west side slope, in a tiny marsh at 1,350 m., in June 1963, near a steep meadow full of St. Bruno's lilies and *mnemosyne* males, I found a small colony of perfect intergrades between *Euph. aurinia* Rott. and *glaciegenita Verity* (= '*merope*')."

Journal of the Lepidopterists' Society: 22, Pt. 1 (1968)

The new number of this excellent journal deals, as usual, with the Lepidoptera of the New World. Perhaps the article of most general interest will be the two-page one by R. S. Funk on "Overwintering of monarch butterflies as a breeding colony in South-Western Arizona." The author counted larvae, pupae and fresh adults at Yuma, Arizona, between 26th December, 1965, and 6th March, 1966. He also marked ovipositing adults but did not recapture any. It was a breeding and mobile population. These observations disprove the often published generalisation that *Danaus plexippus* L. "does not breed in its southern migration resorts but awaits the return of the spring weather to trigger off a northward migration during which the females begin oviposition." This conclusion, however, does not mean that the better-known roosting habits of the butterfly in California were incorrectly reported, but rather that the insect has the capacity to breed during the winter in certain conditions and does so at certain localities. The reviewer recalls being told by a Danish entomologist active in the U.S.A. that he observed *D. plexippus* breeding through the winter in Florida also. Do the roosting hibernators, of which C. B. Williams and J. A. Downes gave valuable details (1942, *Trans. R. ent. Soc. London:* **92**: Pt. 1, pp. 160-173) belong to a distinct biological subspecies from that that pass the winter breeding further east? One hopes this question will be investigated by those on the spot.

The Essex Skipper (*Thymelicus lineola* Ochs.) became established in North America in 1910. Its history is not unlike that of other palaearctic Lepidoptera introduced by man at an earlier date, such as *Pieris rapae* L., namely, one of westward expansion from the East. A short note by E. M.

Shull and a longer article by R. R. Irwin, give details of how *T. lineola* has now reached Indiana and Illinois.

Other articles deal with *Papilio* life histories with good illustrations: one on *P. indra martini* Emmel & E. by J. F. & T. C. Emmel, and the other on *P. oregonius* Edw. by S. F. & E. M. Perkins and F. S. Shinninger. There is also an important taxonomic article by O. H. H. Mielke describing new genera, species and subspecies of *Hesperiidae* from the Central Brazil Plateau.

A description of the male moth of *Lithophane gausapata* Grote 1883 by J. S. Buchet reveals a curious state of affairs:—During the eighty years since this species was described (it inhabits California and Oregon) few if any males have been taken and none described. Such a sexual discrepancy in captures leaves the author unable to suggest an explanation. One notes, from the data given, that females have frequently been taken in the months of November and between February and June, but males only in May (3 exs. only).

Finally, mention must be made of a paper by G. W. Rawson which introduces a new technique in a field pioneered by our Dr. E. A. Cockayne (1924) and E. B. Ford (1941). It is entitled: "Studies of fluorescent pigments in Lepidoptera by means of paper partition chromatography."

THE MILLIPEDE, POLYXENUS LAGURUS (L.) IN ABERDEENSHIRE

By Guy D. Morison

According to J. G. Blower, 1958, *British Millipedes* (*Diplopoda*) Synopsis No. 11, Linn. Soc. Lon., *Polyxenus lagurus* has not been recorded north of the Forth, and he referred to *The Scottish Naturalist* for 1939, p. 132, where Waterston recorded a specimen found under thyme on rocks by the sea at Dunure, Ayrshire, and mentioned the records of Gibson-Carmichael for Perthshire and Evans for North Berwick, Haddingtonshire. Cloudsley-Thomson, 1958, *Spiders, Scorpions, Centipedes and Mites,* London, wrote a little on the ecology and natural history of the millipede and its frequent association with ants. On 6th May, 1951, I found a specimen 3 mm. long (which I am unable to sex) and a larva 1.4 mm. long amongst moss and dead leaves in a birch and pine wood at a place called locally Torphantrick, in the loop of the River Dee opposite Cambus O'May, near Ballater, Aberdeenshire. Several large nests of the ant, *Formica aquilonia* Yarrow lay in the vicinity of the finding place; and the ants were numerous on trees favoured by aphids and along their own paths over the soil. Mixed with other matter, apparently chiefly vegetable, in the alimentary canal of the larger animal were nine pollen grains of birch and a few fungal spores; and in the gut of the larva, vegetable matter and 52 birch pollen grains. The two slides bearing the specimens have been deposited in the Royal Scottish Museum, Edinburgh.

During 1920-23 I was familiar with the millipede's appearance and varied habitats, including shelter under dead bark of birch, pine and hawthorn at Richmond Park, Oxshott and Bagshot, Surrey, and at Burnham Beeches, Bucks.

The millipede is probably very scarce in the northern half of Scotland, because I have not found it again in and around the original locality, nor whilst searching its types of habitat for small Arthropoda on hundreds of occasions in many counties during the last 45 years.

Where it occurred may have been a small relict pine wood reminiscent of the old Caledonian Forest, cf. Steven and Carlisle, 1959, particularly p. 94, *The Native Pine Woods of Scotland,* Edinburgh. Most of the pines, which were very scarce, were blown down along with some of the birch in the gale of 31st January, 1953. The remaining birch were selectively felled in 1956 and 1958 and the area was planted in three stages in 1956, 1958 and 1959 with conifers.

Felling, and the machines of felling and transportation of timber, and the burning of unwanted branches, altered the ecological suitability of the site for the millipede and the ants, which seemed exterminated by 29th March, 1959. Though the ants occur in Scots pine woods of the neighbourhood they are not likely to establish themselves in the area planted with Douglas Fir, *Pseudotsuga menziesii* (Mirb.) Franco.

I thank his Lordship, Lord Glentanar of Glentanar, Aberdeenshire, for his practical help and for his kindness in allowing me to search for ticks and insects on his estate on many occasions during several past years. My thanks are also given to Mr. Duncan Ross, head forester, who gave me the details of the planting programme and informed me that the name Torphantrick used to be Polphantrick, meaning the "black wood" in Gaelic.

4 Granville Place,
Aberdeen AB1 6NZ,
Scotland.
29th February, 1968.

SOME RECORDS OF DIPTERA PREDATORS AND THEIR PREY

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

Besides having names that are often changed, and a distribution often altered by man, insects have interesting habits. These habits form part of the complex of life of the wayside and woodland, and in their feeding habits have an influence, sometimes direct but mostly indirect, on man's health. Observations on their habits are easy where larvae of some moths and butterflies are concerned but the small size of active flies makes their behaviour less noticeable. Sir Edward Poulton (1907) gathered together from Britain and abroad, 303 records of adult flies and their prey (226 Asilidae, 65 Empidae, one Dolichopodidae, one Muscidae, ten Scatophagidae). Since then Dr. B. M. Hobby, of the Hope Department, Oxford University, and others, have helped to record the prey taken by predatory flies in this country.

This aspect of the biology of flies can be studied by making a special watch on a selected species but also by noting the odd capture by a fly when we are carrying out other field work. The first method is fascinating and probably more valuable as the observations are likely to be confined to a particular habitat. On two occasions I was fortunate to find popula-

tions of a predatory fly: an Asilid, *Machimus atricapillus* Fall. (Parmenter, 1942), and an Empid, *Rhamphomyia sulcata* Fall.

Below are given details of flies captured with prey by various friends who have given me specimens or allowed me to inspect their captures, or by myself. These are additional to records already published (1937, 1941). Captures and determinations, unless otherwise indicated, are by myself. Prey are Diptera except where stated.

Nomenclature is that of *A Check List of British Insects*, G. S. Kloet and W. D. Hincks, 1945, except where amended by later revisions.

Sex is noted where possible: male as M if captor or ♂ if prey, female as F if captor or ♀ if prey. This has importance, for example, in Bibionidae males are the victims in most cases because of their swarming habits. In Empidae, males capture prey and pass this to the female, when pairing. Where a coupled pair was taken the female held the prey, and this must be inferred where pairs as captors are shown as MF.

My thanks are extended to all those who have helped by collaborating or identifying specimens for me.

ASILIDAE

Dioctria atricapilla Meig. F: ? sex *Pteronidea bipartita* (Lepeletier) (Hym., Tenthredinidae) det. P. W. E. Currie, Rickmansworth, Herts., 29.v.49.

Dioctria baumhaueri Meig. 2F; 1♂, 1♀ *Themira putris* (L.) (Sepsidae), Mitcham Common, Surrey, 7.vii.46.

Dioctria rufipes (Deg.) F; ♀ *Themira putris* (L.), Mitcham Common, Surrey, 11.vii.46. F ♀ *Pachyprotasis rapae* L. (Hym. Tenthredinidae) det. P. W. E. Currie, Rickmansworth, Herts., 29.v.49.

Epitriptus cingulatus (F.). M: ♀ *Sciara carbonaria* Meig. (*Mycetophilidae*), Mitcham Common, Surrey, 29.viii.48.

Lasiopogon cinctus (F.). M: ♂ *Sarcophaga carnaria* (L.) var. *vulgaris* Rohd. (Calliphoridae), Chobham Common, Surrey, 24.v.59.

Machimus atricapillus (Fall.). F. ♀ *Calliphora erythrocephala* (Meig.) (Calliphoridae), Whitchurch, Oxon., 6.viii.50. F; ♂ *Erioischia brassicae* (Bouché) (Anthomyiidae), Whitchurch, Oxon, 6.viii.50. F; ♀ *Hydrotaea irritans* (Fall.) (Muscidae), Aberdovey, Mer., 1.ix.51, J. M. Nelson. F. ♂ *Musca autumnalis* Deg. (Muscidae), Whitchurch, Oxon., 6.viii.50. F; ♀ *Platypalpus fasciatus* (Meig.) (Empidae), Boxhill, Surrey, 20.vii.55. F; ? sex *Proscna siberita* F. (Tachinidae), Coates Common, Sussex, vii.53, I. S. Menzies. M; ♀ *Pseudomorellia albolineata* (Fall.) (Muscidae), Coulsdon, Surrey, 23.vii.46. F; ♀ *Syrphus auricollis* Meig. var. *maculicornis* Zett. (Syrphidae), Coulsdon, Surrey, 23.vii.46.

Neoitamus cyanurus (Loew). M: ? sex *Phyllobius maculicornis* Germ. (Col., Curculionidae) det. K. C. Side, Epping Forest, Essex, 14.vi.43, J. F. Shillito.

Philonicus albiceps (Meig.). F; ♀ *Calliphora erythrocephala* (Meig.) (Calliphoridae), Hayle, Corn., 18.viii.47. F; ♂ *Sarcophaga teretirostris* Pand. (Calliphoridae), Hayle, Corn., 23.viii.47. F; ? sex *Chorthippus parallelus* (Zett.) (Orth., Acrididae), Saunton, Devon, viii.55, P. W. E. Currie.

EMPIDIDAE

Empis digramma Meig. F; ♀ *Empis punctata* Meig. (Empididae), Teesdale, Derby. (at 1,200 ft.), 13.vi.46, C. L. Collenette.

Empis femorata F. M; ♂ *Bibio johannis* (L.) (Bibionidae), Darenth Wood, Kent, 15.iv.49. M; ♂ *Bibio nigriventris* Hal. (Bibionidae), Coulsdon, Surrey, 24.v.47. MF; ♂ *Botanophila discreta* Meig. (Anthomyiidae) Coulsdon, Surrey, 13.v.50. MF; ♂ *Delia cilicrura* Rondani (Anthomyiidae), Coulsdon, Surrey, 13.v.50. F; ♂ *Delia trichodactyla* (Rondani) (Anthomyiidae), Coulsdon, Surrey, 19.v.54. MF; ♂ *Dilophus febrilis* (L.) (Bibionidae), Coulsdon, 10.v.46; two MF; two ♂ Minster, Isle of Sheppey, Kent, 18.v.47: three M; three ♂ Coulsdon, Surrey, 24.v.47: four M; four ♂ Darenth Wood. Kent, 15.iv.49: M; ♂ Mitcham Common, Surrey, 22.v.49: M; ♂ Coulsdon. Surrey, 31.v.58. MF; ♂ *Dilophus femoratus* (Meig.) (Bibionidae), Kettering, Northants., 13.v.40. J. F. Shillito: two M; two ♂, Coulsdon, Surrey, 31.v.58. M; ♂ *Fannia rondanii* Strobl (*aerea* (Meig.) (Muscidae), Langford Moor, Som., 11.v.45, O. M. White. M; ♂ *Fannia serena* (Zett.) (Muscidae), Coulsdon, Surrey, 24.v.47. Two M; two ♂ *Fannia sociella* (Zett.) (Muscidae), Coulsdon, Surrey, 24.v.47: M; ♂ Langford Moor, Som., 11.v.45, O. M. White. MF; ♂ *Hydrotaea occulta* (Meig.) (Muscidae), Norwich, Norf., 5.vi.57, J. F. Shillito. M; ♂ *Nupedia dissecta* (Meig.) (Anthomyiidae) Coulsdon, Surrey, 24.v.47. M; ♂ *Pegohylemyia fugax* (Meig.) (Anthomyiidae), Darenth Wood, Kent, 15.v.49. M; ♂ *Pegomya esuriens* (Meig.) (Anthomyiidae), Langford Moor, Som., 11.v.45, O. M. White.

Empis livida L. MF; ♀ *Chironomus* sp. indet. (Chironomidae), Haverfordwest, Pemb., 31.vii.48. M; ♀ *Empis aestiva* Loew (Empididae), Malden, Surrey, vi.52, W. H. Spreadbury. M; ? sex Homoptera sp. indet., Wytham Woods, Berks., 23.vii.57.

Empis tessellata F. M; ♂ *Bibio leucopterus* (Meig.) (Bibionidae), Bookham Common, Surrey, 25.v.53. M; ♂ *Bibio marci* (L.), Bookham Common, Surrey, 17.v.42: MF; ♂ Coulsdon, Surrey, 10.v.46: four M; four ♂, Coulsdon, Surrey, 10.v.46: M; ♂, Minster, Isle of Sheppey, Kent, 18.v.47: eight M; eight ♂. Stone Marshes, Kent, 22.v.47: MF; ♂, Kettering, Northants., 15.v.40: 21 M; 21 ♂, Watford, Herts., 20.v.56. F; ♂ *Bibio nigriventris* Hal. Blean Woods, Kent, 4.vi.64. One M and one F, two ♂ *Bibio pomonae* (F.), Dartmoor, Devon, 12.vi.48, P. W. E. Currie. M; ♂ *Cheilosia albitarsis* Meig. (Syrphidae), Ranmore, Surrey, 30.v.48: M; ♂, Hindhead, Surrey, 30.v.54. M; ♂ *Diophus febrilis* (L.) (Bibionidae), Swanscombe Marshes, Kent, 22.v.47. MF; ♀ *Dorycera graminum* (F.) (Otitidae), Ashford Kent, 9.vi.46, G. Waller. MF; ♂ *Erioischia brassicae* (Bouché) (Anthomyiidae), Bookham Common, Surrey, 24.v.47, P. W. E. Currie. F; ♂ *Hydrotaea ciliata* (F.) (Muscidae), Croydon, Surrey, 30.v.55. M; ♀ *Lonchaea chorea* (F.) (Lonchaeidae), Beddington sewage farm, Croydon, Surrey, 8.vi.41. M; ♂ *Melanostoma mellinum* (L.) (Syrphidae), Mitcham Common, Surrey, 22.v.49: MF; ♂ Kettering, Northants., 24.v.40, J. F. Shillito. M; ♀ *Morellia* sp. indet. (Muscidae), Blean Woods, Kent, 13.vi.67. M; ♀ *Nemorilla floralis* (Fall.) (Tachinidae), Mitcham Common, Surrey, 22.v.49. M; ♂ *Phorocera obscura* Fall. (Tachinidae), Bookham Common, Surrey,

12.vi.41: MF; ♀ Bookham Common, Surrey, 24.v.47, P. W. E. Currie. MF; ♀ *Phryno vetula* (Meig.) (Tachinidae), Bookham Common, Surrey, 9.vi.46. M; ♀ *Platycheirus tarsalis* (Schummel) (Syrphidae), Bookham Common, Surrey, 25.v.53. M; ♂ *Ptiolina obscura* (Fall.) (Rhagionidae), Blean Woods, Kent, 12.vi.67. M; ♀ *Rhagio scolopacea* (L.) (Rhagionidae), Bookham Common, Surrey, 12.vi.41: M; ♂ Bookham, Surrey, 9.vi.46. M; ♂ *Rhamphomyia nigripes* (F.) (Empididae), Bookham Common, Surrey, 24.v.47, P. W. E. Currie. M; ♂ *Syritta pipiens* (L.) (Syrphidae), Coulsdon, Surrey, 31.v.48. M; ♂ *Tipula vernalis* Meig. (Tipulidae), Coulsdon, Surrey, 24.v.47: M; ♀ Coulsdon, Surrey, 23.v.53. M; ♂ *Xanthogramma citrofasciatum* (Deg.) (Syrphidae), Coulsdon, Surrey, 7.vi.53.

Rhamphomyia atra Meig. MF; ♀ *Sciara* sp. indet (Sciaridae), Coulsdon, Surrey, 10.v.46.

Rhamphomyia nigripes (F.). MF; ♀ *Empis scutellata* Curt. (Empididae), Stapleford, Lincs., 17.v.45, O. M. White. MF; ♀ *Hilara quadrivittata* Meig. (Empididae), Stapleford, Lincs., 17.v.45, O. M. White.

Rhamphomyia sulcata (Meig.). MF; ♂ *Bibio johannis* (L.) (Bibionidae), Wooler, Northumb., 4.v.43.

Rhamphomyia tarsata Meig. MF; ♂ *Ormosia nodulosa* (Macquart) (Tipulidae), Blean Wood, Kent, 15.vi.67.

Rhamphomyia variabilis (Fall.). M; ♀ *Scatophaga stercoraria* (Scatophagidae), Dale, Pemb., 8.viii.48.

SCATOPHAGIDAE

Ceratinostoma ostiorum (Hal.). M; ♀ *Hydrophorus oceanus* Meig (Dolichopodidae), Hayle, Corn., 28.vii.41.

Scatophaga litorea Fall. F; ♂ *Machaerium maritima* Hal. (Dolichopodidae), Hayle, Corn., 9.viii.41.

Scatophaga lutaria F. var. *maculipes* Zett. F; ♀ *Hebecnema umbratica* (Meig.) (Muscidae), Broxbourne, Herts., 7.v.50. F; ♂ *Dilophus febrilis* (L.) (Bibionidae), Bayford, Herts., 16.v.54.

Scatophaga stercoraria L. M; ? sex *Apotomis pruniana* Hübn. (Lep., Euscosmidae) det. J. M. Chalmers-Hunt, Port Erin, I.O.M., 9.vii.67, J. M. Chalmers-Hunt. M; ♀ *Coelomyia mollissima* Hal. (Muscidae), Coulsdon, Surrey, 4.v.54. M; ♂ *Dilophus febrilis* (L.) (Bibionidae), Glendalough, Wick., Ireland, 28.iv.57. M; ♀ *Fannia serena* (Fall.) (Muscidae), Hayle, Corn., 4.ix.46. F; ♂ *Madiza glabra* Fall. (Milichiidae), Cripplegate, City of London, 26.iv.47. F; ♀ *Pycnoglossa flavidipennis* (Fall.) (Anthomyiidae), Bookham Common, Surrey, 15.v.46. M; ♂ *Sarcophaga nigriventris* Meig. (Calliphoridae). Stone Marshes, Kent, 22.v.47. M; ♂ *Syrphus ribesii* L. (Syrphidae), Lelant, Corn., 2.viii.41.

MUSCIDAE

Coenosia tigrina F. F; ♂ *Collinellula limosa* (Fall.) (Sphaeroceridae), Thornton Heath, Surrey, 29.vi.49. F; ♂ *Delia trichodactyla* (Rondani) (Anthomyiidae), Hayle, Corn., 17.viii.47. F; ♂ *Dilophus febrilis* (L.) (Bibionidae), Dale, Pemb., 10.viii.48. F; ♂ *Oscinella frit* (L.) (Chloropodae), Dale, Pemb., 10.viii.48.

SUMMARY

1. The prey of four families of Diptera is listed: Asilidae eight species; Empidae nine species; Scatophagidae four species; Muscidae one species.
2. The prey consists of Lepidoptera (Eucosmidae) one species; Hymenoptera (Tenthredinidae) two species; Coleoptera (Curculionidae) one species; Orthoptera (Acrididae) one species; Diptera, 64 species in the families Tipulidae two, Chironomidae one, Bibionidae seven, Mycetophilidae two, Rhagionidae two, Empididae seven, Dolichopodidae two, Syrphidae seven, Otitidae one, Lonchaeidae one, Sepsidae one, Sphaeroceridae one, Milichiidae one, Chloropidae one, Scatophagidae one, Tachinidae four, Calliphoridae four, Muscidae 11, Anthomyiidae eight.
3. The largest number of one species taken by another is *Bibio marci* L., 39, taken by *Empis tessellata* F.
4. The largest number of species preying on one species is five: *Empis femorata* F., *E. tessellata* F., *Scatophaga stercoraria* L. and *Coenosia tigrina* F., all taking *Dilophus febrilis* L., of which 16 were taken.

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Woodside,
Pinewood,
Ferndown, Dorset.
4th February, 1968.

A LIST OF BERKSHIRE PSOCOPTERA

By T. R. New

There are very few published records of Psocoptera from Berkshire. Richards and Waloff (1958) gave brief notes on the species found during their survey of insects on broom at Silwood Park, Ascot, Berkshire, but there are no other published lists. Most of the species recorded by Kimmins (1941) from other southern counties are likely to occur in Berkshire, and prolonged, intensive collecting would probably reveal nearly all the species that have been recorded from vegetation in Britain. The paucity of published records of Psocoptera reflects the lack of interest of collectors in this group rather than the scarcity of insects.

The present list is based on two years collecting at Silwood Park. Psocids were sampled from vegetation by beating and sweeping from April to November in 1966 and 1967, and ground litter was sampled by Tullgren funnels throughout the two years. The few psocids from other habitats result from casual collecting: these have not been specially searched for.

Earlier records of Silwood Psocoptera were available from the broom survey, and many of these specimens were identified by Dr. E. Broadhead. I wish to thank Prof. O. W. Richards and Dr. N. Waloff for allowing me to include records of their captures in this list. Dr. E. Broadhead kindly provided records from his own collection, and Prof. G. C. Varley allowed me to examine the collection of British Psocoptera in the Hope Department of Entomology, Oxford. I am grateful to Professor Varley and Mr. G. R. Gradwell for permission to record psocids found casually during their work at Wytham Woods. Through the courtesy of Mr. D. E. Kimmins, I have examined the British Psocoptera in the British Museum (Natural History).

A total of 44 species is recorded below. Kimmins (1941) recorded 49 from Surrey, 33 from Kent, and 32 from Sussex, and many species are now recorded from all four counties. The list indicates only the general type of habitat frequented by each species, and whether each was found commonly or rarely. Where no particular date is given, comments refer to an extended period of one or two seasons. The nomenclature and familiar classification follow Broadhead (1964).

TROGIIDAE

Lepinotus inquilinus Heyden. 1966, Silwood Park, several females and nymphs in outbuildings. Probably widely distributed.

L. patruelis Pearman. 1966-67, Silwood Park, abundant in outbuildings.

L. reticulatus Enderlin. 12/7/1966, Ascot, one female in house. Probably rarer than the other two *Lepinotus* species.

Trogium pulsatorium (L.). 12/7/1966, Ascot, several in house.
18/8/1967, Windsor Great Park, one female from oak litter.

Cerobasis guestfalica (Kolbe.). 1957-67, Silwood Park—(1957, one female, Richards and Waloff, 1958). Common especially on conifers.
4/7/1961, Wytham Woods, common on *Larix*, E. Broadhead.
23/8/1967, Wokingham, several on *Taxus*.
Apparently very common on conifers throughout Berkshire

LEPIDOPSOCIDAE

Pteroxanium kelloggi (Ribaga). 1/10/1949, Wytham Woods, several from oak log, C. Elton (det. E. Broadhead).
1967, Silwood Park, several extracted from *Cupressus* litter, from June to September.
23/8/1967, Wokingham, several adults from *Buxus*.
Probably widely distributed in small numbers.

PSYLLIPSOCIDAE

Psyllipsocus ramburii Sélys. 15/9/1967, Ascot, one female in house.

LIPOSCELIDAE

Embidopsocus enderleini (Ribaga). 18/7/1967, Silwood Park, two females under *Acer* bark.
Probably widely distributed.

Liposcelis subfuscus Broadhead. 6/5/1955, Kennington, ten females in old wasps nest, P. I. Osborne (det. E. Broadhead).
August 1967, Ascot, in pearl barley, numerous.

L. simulans Broadhead. 1966-67, Silwood Park, common in insect cultures.

L. bostrychophilus Badonnel. 1967, Silwood Park, several in insectary.

L. terricolis Badonnel. 24/8/1967, Silwood Park, one female under bark of dead oak log.

All these species of *Liposcelis*, and others, are likely to be far more widely distributed than these records imply.

EPIPSOCIDAE

Epipsocus lucifugus (Rambur). 1962 Wytham Woods, one female, C. A Elbown (det. E. Broadhead).
1966-67, Silwood Park, many kinds of ground litter. Very common.

PSOCIDAE

Amphigerontia bifasciata (Latr. *in* Coq.).
1955-67, Silwood Park—(1956-57, Richards and Waloff, 1958). Many trees and shrubs. Common.
1966-67, Windsor Great Park, *Crataegus*, common.
23/8/1967, Wokingham, two females on *Taxus*.

Loensia fasciata (F.). 4/7/1961, Wytham Woods, one female from larch litter, E. Broadhead.

1966-67, Silwood Park, several from *Quercus* and *Fagus*. Rare.
1967, Windsor Great Park, few on *Quercus*.
August 1967, Maidenhead, one male on *Quercus*.
Probably widely distributed in small numbers.

L. variegata (Latr. *in* Coq.). 1967, Silwood Park, on *Quercus and Crataegus*, rare.
1967, Windsor Great Park, few on *Quercus*.

Trichadenotecnum sexpunctatum (L.). 1966-67, Silwood Park, *Ilex*, *Quercus*. Rare.
1966-67, Windsor Great Park, *Quercus*. Rare.

Metylophorus nebulosus (Stephens). 28/9/1953, 27/9/1954. Wytham Woods oak survey, Varley and Gradwell.
1956, Silwood Park, one female on *Sarothamnus* (Richards and Waloff, 1958).
1967, Silwood Park, *Quercus*. Rare.
18/8/1967, Windsor Great Park, one male from *Quercus*.

Psococerastis gibbosa (Sulzer). 4/7/1904, Bagley Wood, W. Holland. Hope Department.
7/8/1926, Tubney, J. J. Walker. Hope Department.
10/8/1950, 4/8/1954. Wytham Woods oak survey, Varley and Gradwell.
23/8/1967, Silwood Park, one male from *Quercus*.

The latter three species all appear to be rare in the county. They are probably widely distributed in small numbers.

MESOPSOCIDAE

Philotarsus picicornis (F.). 7/8/1943, Maidenhead, mixed sloe, *Crataegus*, *Ulmus*. E. Broadhead.
19/10/1954-11/9/1959, Wytham Woods oak survey, several. Varley and Gradwell.
4/7/1961, Wytham Woods, one female, *Larix*. E. Broadhead.
1956-67, Silwood Park (1956-57, Richards and Waloff, 1958). Many trees and shrubs. Common.
1966-67, Windsor Great Park, *Crataegus*. Common.
23/8/1967, Wokingham, *Taxus*, several.
A common and widely distributed species.

Cuneopalpus cyanops (Rostock). 1966-67, Silwood Park. *Pinus*. Fairly common.

Elipsocus hyalinus (Stephens). 5/5/1954, 26/10/1954. Wytham Woods oak survey, Varley and Gradwell.
4/7/1961, Wytham Woods, common. E. Broadhead.
1962, Wytham Woods, oak log. P. A. Larkin (det. E. Broadhead).
1956-67, Silwood Park. (1956-57, Richards and Waloff, 1958).
Many kinds of vegetation. Common.

E. mclachlani Kimmins. 1964-67, Silwood Park. Many kinds of trees, but not common.
1967, Windsor Great Park, *Crataegus*. Rare.

E. westwoodi McLachlan. 1954-67, Silwood Park (31/5/1954, Broom, O. W. Richards, det. D. E. Kimmins; 1956-57, Richards and Waloff, 1958). Many kinds of shrubs and trees. Fairly common.
4/7/1961, Wytham Woods, few from *Larix*, E. Broadhead.
1966-67, Windsor Great Park, *Crataegus* and *Quercus*. Rare.

Pseudopsocus rostocki Kolbe. 2/11/1942, Youlbury Wood, one female, L. W. Grensted (det. E. Broadhead).
13/3/1943, one female, E. Broadhead.
1962, Wytham Woods, three females, oak log. P. A. Larkin (det. E Broadhead).

Mesopsocus immunis (Stephens). 1957-67, Silwood Park (1957, one male—Richards and Waloff, 1958). Most common on *Crataegus*, but also found on other trees.
4/7/1961, Wytham Woods, *Larix* and *Ilex*, several. E. Broadhead.
1966-67, Windsor Great Park, *Crataegus*. Fairly common.

M. unipunctatus (Müller). 1966-67, Silwood Park. Widely distributed on different shrubs and trees. Fairly common.
1966-67, Windsor Great Park, *Crataegus* and *Quercus*. Fairly common.
23/8/1967, Wokingham, *Taxus*, several.

M. (Holoneura) laticeps Kolbe. 1957, Silwood Park, one male, *Sarothamnus* (Richards and Waloff, 1958).
1967, Silwood Park, *Crataegus*. Rare.
A rare species, but probably overlooked.

PSEUDOCAECILIIDAE

Trichopsocus dalii (McLachlan). 4/7/1961, Wytham Woods, *Ilex*—abundant, E. Broadhead.
1966-67, Silwood Park, *Crataegus, Ilex, Quercus*. Fairly common.
1966-67, Windsor Great Park, *Crataegus*. Fairly common.

Reuterella helvimacula (Enderlein). 21/7/1944, Windsor, large numbers on fences and in elm bark. E. Broadhead.
3/9/1964, Silwood Park, one male. O. W. Richards.
1967, Windsor Great Park, *Crataegus*. Rare.

Peripsocus alboguttatus (Dalman). 1956-67, Silwood Park (1956-57, *Sarothamnus*, Richards and Waloff, 1958). Found on many kinds of low vegetation and *Quercus*. Always rare.
1967, Windsor Great Park, *Crataegus*. Rare.

P. didymus Roesler. 1966-67 Silwood Park, *Crataegus*. Rare.

P. phaeopterus (Stephens). 1956-67, Silwood Park (1956-57, *Sarothamnus*, Richards and Waloff, 1958). Rare on most vegetation, more common on *Crataegus*.
1966-67, Windsor Great Park, *Crataegus* and *Quercus*. Fairly common.

P. subfasciatus (Rambur). 1956-67, Silwood Park (1956-57, *Sarothamnus*, Richards and Waloff, 1958). Found on many shrubs and trees Sometimes fairly common.
4/7/1961, Wytham Woods, two females from *Larix*, E. Broadhead.
1966-67, Windsor Great Park, *Crataegus*. Rare.

Lachesilla pedicularia (L.). 1956-67, Silwood Park (1956-57, *Sarothamnus*, Richards and Waloff, 1958). Numerous in suction-trap catches.
1967, Windsor Great Park, *Quercus*. Rare.

Ectopsocus briggsi McLachlan. 7/8/1943, Maidenhead, on dead leaves on ground. E. Broadhead.
17/2/1950. Wytham Woods oak survey. Varley and Gradwell.
1962, Wytham Woods, two females and one male from oak log. P. A. Larkin (det. E. Broadhead).
1957-67, Silwood Park (1957, *Sarothamnus*, Richards and Waloff, 1958). Found on most kinds of vegetation and ground litter. Very common.
1966-67, Windsor Great Park, *Crataegus* and *Quercus*. Very common.
23/8/1967, Wokingham, various trees. common.

POLYPSOCIDAE

Stenopsocus immaculatus (Stephens). 15/9/1953-1/9/1957, Wytham Woods oak survey. several. Varley and Gradwell.
4/7/1961. Wytham Woods, two from *Ilex*, E. Broadhead.
1956-67, Silwood Park, 1956-57, *Sarothamnus*, Richards and Waloff. 1958). Found on many kinds of shrubs and trees. Common.
1966-67, Windsor Great Park, *Crataegus* and *Quercus*. Common.
23/8/1967, Wokingham. Common.

S. stigmaticus (Imhoff and Labram). 1966-67, Silwood Park, *Crataegus*. Common.
1966-67, Windsor Great Park, *Crataegus*. Common.

Graphopsocus cruciatus (L.). 7/8/1943, Maidenhead, E. Broadhead.
1949-57, Wytham Woods oak survey. Varley and Gradwell.
1958-67, Silwood Park, many shrubs and trees. Fairly common.
1966-67, Windsor Great Park, *Crataegus* and *Quercus*. Common.

Kolbia quisquiliarum Bertkau. 23/8/1961, Silwood Park, one female in nest of *Lasius flavus* (L.) N. Waloff (det. E. Broadhead).

Caecilius burmeisteri Brauer. 1958-67, Silwood Park. Fairly common on conifers. Rarely on other trees and shrubs.
23/8/1967, Wokingham, *Taxus*. Common.

C. flavidus (Stephens). 7/8/1943, Maidenhead, mixed sloe, *Crataegus*, *Ulmus*. E. Broadhead.
1949-54, Wytham Woods oak survey, Varley and Gradwell.
1956-67, Silwood Park (1956-57, *Sarothamnus*, Richards and Waloff, 1958) Many kinds of vegetation. Very common on broadleaved trees.
1966-67, Windsor Great Park, *Crataegus* and *Quercus*. Very common.
August 1967, Wokingham, *Fagus and Buxus*. Common.

C. fuscopterus (Latr *in* Coq.). 11/7/1936, Tubney, E. W. Aubrook. (Hope Department).
1966-67, Silwood Park, *Quercus* and *Crataegus*. Rare.
1966-67, Windsor Great Park, *Crataegus*. Fairly common.

C. kolbei Tetens. 1956-67, Silwood Park (1956-67, *Sarothamnus*, Richards and Waloff, 1958), many shrubs and trees. Fairly common.
1966-67, Windsor Great Park, *Crataegus*. Fairly common.
23/8/1967, Wokingham, *Fagus*. Fairly common.

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STUDIES IN THE GEOGRAPHY OF LEPIDOPTERA, VIII
NOTES ON THE ECOLOGY AND DISTRIBUTION OF ZYGAENIDAE IN THE MIDDLE EAST

By E. P. Wiltshire, C.B.E., F R.E.S.

(With 1 Map)

Despite much detailed publication about the family Zygaenidae in the Middle East, little information has appeared regarding their ecology. My own personal observations of the conditions in which these insects can live, made between 1932 and 1963 in Arabia north of the Tropic, Bahrain, Cyprus, Egypt, Iran, Iraq and the Lebanon, enable tentative conclusions regarding their history to be drawn from their rather peculiar distribution. The omission of other parts of the area, particularly Turkey which I have never visited entomologically, and which is fairly rich in members of this family, will hardly affect the general conclusions. I follow Alberti (1954) for the subdivision of the family, and Reiss & Tremewan (1967) for that of the genus *Zygaena F.*

The area is inhabited by the genus *Zygaena* of the subfamily Zygaeninae, and by three genera of the subfamily Procridinae, namely, *Procris* F., *Rhagades* Wallng., and *Theresimima* Strand. A list of the species observed by the author is given in an appendix and shews their localities. If Tropical Arabia were included in the survey, a second genus of the Zygaeninae would have to be added (*Reissita simonyi* Rebel originally described as a *Zygaena*).

Except for the Lebanon and Turkey, the Middle East is far from rich in this family. Over vast tracts inhabited by other families of Lepidoptera, notably the Noctuidae and the Pyralidae, not a single representative of the Zygaenidae is to be found. The dayflying habits and bright colouring of *Zygaena* make it improbable that its absence here is due to overlooking. But the Procridinae, though diurnal, are smaller and less conspicuous.

To summarise the distribution of the two subfamilies, one can say:—

(1) In Arabia and Bahrain neither is represented.

(2) Only the Procridinae are represented in Cyprus and Egypt; and in the latter, only in the north.

(3) Both Zygaeninae and Procridinae are represented in Iran, Iraq and the Lebanon, but only in the last can representatives be found with an ease comparable to that in most parts of Europe. In Iran and Iraq it is necessary to penetrate into lofty and rather inaccessible mountains to find representatives of the genus *Zygaena*. The case for the Procridinae is little better though these can be found at lower elevations, in rather limited numbers. The total absence of *Zygaena* from Cyprus, which has rainfall and mountains comparable with those of the Lebanon, and of Turkey, is noteworthy.

(4) All these moths are non-migrant, being closely tied to their specific habitats.

How far do the vegetation and rainfall therefore explain the above facts of distribution?

In the Lebanon, the genus *Zygaena* has only one representative occurring down to sea-level, namely, *Z. graslini* Led. It is the most widespread and common species in that country. Five other species of *Zygaena* inhabit the Lebanon range but are confined to high altitudes, where the rainfall is heavier, and winters are longer, with snowfalls. Virtually no rain falls in the Lebanon between May and September; the dry summers oblige most Lepidoptera to aestivate in one or another stage, and by reaching sea-level *Z. graslini* shew a greater ability to aestivate than its congeners. At least two *Procris* species fly at sea-level on the Lebanese coast and the same two occur at sea-level in North Cyprus. It may be that the low-level populations of *Z. graslini* survive there only due to constant reinforcements from a centre situated at middle heights; but this is not the case with *Procris* inhabiting this area.

Both in Cyprus and the Lebanon the costal biotope is a dwarf shrub garigue (*Poterietum spinosi*), capable, if left alone, of developing into a maquis (*Pistacietum lentiscae, Crataegetum azarolae, Calycotometum villosae*, and *Quercetum cocciferae*). At greater heights the tree species become richer, but the tree limit is reached at about 2,000 m. (6,000 ft.) above which is a herbetum of various thorn-cushion bushes, thistles and Umbelliferae. The flora and fauna of Cyprus are generally less rich than that of the Lebanon; the island contains several interesting endemisms, but not in the Zygaenidae.

The biotope in Egypt is very different. Apart from the central, north-south running, narrow river-oasis, broadening in the north at the delta, most of the country is pure desert (*Zygophylletum, Zilletum spinosae*) with an average rainfall of 75 mm. But the north coastal strip is mostly Mediterranean dunes and steppe desert with rainfall about 250 mm. No *Zygaena* fly here but two *Procris* spp. inhabit the northern coast, and the drier north-eastern desert near Cairo.

Eastwards of Egypt and south-eastwards of the Lebanon coastal chain, stretches a vast expanse of steppe or desert, some of it more arid than the Egyptian desert and even hotter in summer, and all quite treeless, except in oases. One does not find the Zygaenidae in the Middle East oases and for this, centuries of intense human cultivation may be responsible. Only in the north of Iraq does a better-watered and hillier

terrain provide better conditions. In Iraqi Kurdistan (localities: Amadia and Rayat) a rainfall of about 1,000 mm. at altitudes over 1,000 m., creates a zone where scrub forest may survive, if not deforested (*Quercetum lusitanicae, Crataegetum azarolae, Pistacietum muticae*, etc.); and this zone extends south-eastwards down the Zagros chain into South-west Iran where, near Shiraz, it is 500 m. higher than in Kurdistan; but here, south of Shiraz, the rainfall becomes too low for oak trees to survive, and the scrub zone is characterised, as it continues southwards and then eastwards south of Kerman, by various species of *Amygdalus* (wild almond) and *Pistacia*. The summers here are even drier than in the Lebanon. Around Shiraz, for instance, the first rains are usually delayed until November. The Zagros scrub zone quite lacks the *Poterietum* that characterises the Mediterranean coast and foothills; if one is to select a shrub to typify the low vegetation around Shiraz, it might well be *Artemisia herba-alba, Astragalus fasciculifolius* or the edible thistle *Gundelia tournefortii*. This sort of vegetation merges into the thorn-cushion stands and other associations of the highest peaks at 3,000-4,000 m. In the Zagros range the genus *Zygaena* is absolutely confined to great heights: sometimes very local species fly in great numbers on favourable mountain slopes with regular winter snow-cover, e.g., *Z. saadii* Reiss at Sineh Safid (c. 2,000 m.) and *Z. haematina* Koll. on Barm-i-Firuz (c. 3,000 m.). More often individuals are fewer and farther between, often only single specimens being taken over a wide area of high mountains (e.g., *Z. seitzi* Reiss at 2,500 m. near Shiraz) or in slightly greater numbers very locally (e.g., *Z cambysea haxs* Reiss west of Shiraz at about the same height).

A drier salient separates this mountain scrub zone from the Elburz range in North Iran, where very different biotopes are found on the northern and southern slopes. On the north, up to 2,000 m. and bordering the Caspian Sea, good rainfall is distributed all the year round and consequently a thick forest (*Fagetum orientalis, Quercetum persicae*) is found. Here, in scenery recalling European or South-east Asian biotopes, one may find, on deforested slopes or bare patches, such species as *Z. loti suleimanica* Reiss, often in good number of individuals. At greater heights on this range, a narrower zone of drier scrub and then the peak biotope with thorn-cushions, etc., are found; and these habitats are the home of various characteristic Iranian and Central Asian species, some of which differ racially from those of the S. Zagros heights (e.g., *Z. cambysea* Led.), while others are endemic (e.g., *Z. brandti* Reiss). These species may equally well occur in favoured sectors of the southward slopes, too.

Such are the Middle East biotopes where I have taken, and observed, the living conditions of fourteen different *Zygaena* species and seven species of Procridinae. I have only observed the early stages of three species of *Zygaena*, all feeding on mountain Umbelliferae, and two species of Procridinae (the details were published as follows: of *Z. cuvieri libani* Z. in Wiltshire 1935, of *Z. seitzi* Reiss in Wiltshire 1952, of *Z. placida* Bang-H. in Wiltshire 1957, and of *R. brandti* Reiss, feeding on *Prunus* in Wiltshire 1952). There is much still to be discovered about the

biology of the two sub-genera in the Middle East. All seem to require a wild, uncultivated habitat, with the exception of *Theresimima ampelophaga* Beyle, whose name shews its vine-feeding habits have been well-known even as far back as its original description, and whose larva I found in Lebanese gardens. Further east, however, in Iraq, Iran and Arabia there are plenty of vineyards and gardens; but these have a drier and hotter climate and one does not find *T. ampelophaga*. Similarly, there are vast stretches of unspoilt steppe vegetation, but without Zygaenidae. It would appear that a higher humidity is a requisite of these insects; their survival is probably rendered impossible over these tracts by the long, dry summers. Where great heights mitigate the adverse effect of these summers and winter snows lie for some weeks, survival has occurred, but the mere presence of vegetation of a suitable family is not enough.

As for the habits of the adults in the Middle East, they are mainly diurnal fliers, as in Europe, but I have three times attracted species of *Zygaena* to light after dark, which seems unusual enough to merit mention. Up to six examples in an hour were so taken, on successive nights, more than might have been obtained by day in the sunlight in the vicinity. The species concerned were *Z. cuvieri libani* (at Bsherre), *Z. cuvieri* (at Haj Omran) and *Z. haematina* (at Barm-i-Firuz, a couple *in cop.* at night!).

The ecological requirements and consequent distribution of the two Zygaenid subfamilies in the Middle East differ in a rather surprising way. The representatives of the Zygaeninae are more local and more numerous than those of the Procridinae. While no *Zygaena* species has been found common to both the Lebanon range and the south-eastern half of the Zagros range (that is, the sector in Fars) there is at least one *Procris* species so found, namely, *P. obscura Z.* Both Cyprus and Egypt lack *Zygaena* representatives but contain those of *Procris;* the absence of *Zygaena* from Egypt can doubtless be explained by the arid climate, but a different cause must be sought for its absence from Cyprus. Most islands have a poorer flora and fauna than the adjacent mainland, and this may be due to their recent emergence combined with the barrier of the encircling sea; but this is not the case with Cyprus, where it is probably the result of progressive impoverishment due to prolonged isolation during periods of climatic change. It seems unlikely that when the genus *Zygaena* spread so widely around the shores of the Mediterranean no species ever reached Cyprus. More probably, some did when the many other genera of Lepidoptera shared by Cyprus and the adjacent mainland entered Cyprus by some land connection; and if this is so, their extinction may well be due to prolonged isolation. It contrasts with the continued survival of the genus in Crete, Rhodes and other Greek islands.

Whether any Procridinae inhabit Arabia is doubtful, and the most likely spot for them to do so would be the mountains of the north-west, where conditions like those of N. Egypt may exist. But exploration of the mountains of Sinai have not revealed any Zygaenids of either sub-

family. As for the high mountains of south-west Arabia, these are Tropical. In the material received by me from this area there has been no Procridinae; the Zygaeninae, however, are represented by *Reissita simonyi yemenicola* Tremewan, of which the typical subspecies was described from Ras Fartak (Qara Mts., Dhofar, S. coast of Arabia). The genus *Zygaena* is, in fact, not Tropical, though related genera such as *Reissita* exist in the high mountains of Africa and South Arabia. Their ecological requirements are clearly quite different from those of the many *Zygaena* species of the Palaearctic Region from which vast scorching desert tracts separate them. Yet this same desert zone may have played an important role in the development of the subfamily when its climate was more favourable. The generic distinction of the Tropical representatives may well show that the desert barrier has existed for long geological ages. Neither *Zygaena* nor any of the Procridinae are among the small band of Palaearctic Lepidoptera (e.g., *Papilio machaon* L. and *Heodes phlaeas* L.) which have somehow succeeded in reaching the high mountains of Tropical Arabia and persisted there to the present day. One can say that the latitude—26° north—is the southward limit both for *Zygaena* and the Procridinae in the Middle East.

Let us now turn to the question of east-west extension in the ranges of these insects. We will look in vain for examples of maximum east-west range in Zygaenidae, inhabiting the Middle East. In other families of Lepidoptera the following examples may be cited:—

Papilio machaon L. (Holarctic range.)

Zephyrus quercus L. (Euroriental range: British Isles to Fars.)

Polymixis canescens Dup. (Mediterranean range: Portugal to Fars.)

Euchloe charlonia Donz. (Pan-Eremic range: N.W. Africa to Central Asia.)

Acrobyla kneuckeri Rebel (Saharan-Sindian range: N.W. Africa to Karachi.)

The nearest ranges to match these are those of two European *Zygaena species* (*Z. carniolica* Scop. and *filipendulae* L.) which reach no further east than the Lebanon and one (*Z. loti* D. & Schiff.) present in N. Iran but not in the Lebanon or S. Iran. The ranges of *Procris* are less than these, though, as already noted, one or two species cover more of the Middle East than any single species of *Zygaena*. *P. graeca* Jord. and *obscura* Z. are perhaps those with the widest east-west range, the former stretching from Hungary to Iran, and the latter from Macedonia to Egypt and Fars (see the Appendix for a note on the identity of the two Egyptian species).

According to Andres (Andres-Seitz 1923) who described the biology of one of these two, its adult seldom if ever flies but remains settled on the foodplant, *Echinops spinosus* L., or recte *Echinops spinosissimus* Turra. This is exceptional and if it is a fact the species may have been overlooked in some other sectors of the N. African and perhaps N.W. Arabian deserts.

The Zygaenid genera shew a certain oligophagy: *Z.* subg. *Mesembrynus* Hübn. larvae feed on plants of the families Umbelliferae, Compositae and Labiatae, while those of the subgenera *Agrumenia* Hübn. and

Zygaena Fab. feed on Papilionaceae. Similarly in the Procridinae, *Theresimima* Strand feeds only on *Vitis* (vine), *Rhagades* Walleng. only on *Prunus* and perhaps also related Rosaceae bushes, while *Procris* Fab. species, as far as is known, feed on various families of herbs. It cannot evidently be a lack of suitable foodplant which prevents representatives from inhabiting steppes and deserts where there is abundant growth of herbs and dwarf shrubs. The heat and aridity remain the only explanation. As to the quantity of rain necessary to permit their existence, at least 375 mm. annually seems required for *Zygaena*, though, as we have seen, e.g., in Cyprus, sufficient rainfall of itself does not invariably produce a representative. As for *Procris*, the fact that several species occur at lower altitudes than *Zygaena* and that one species has certainly been found breeding in the eastern desert near Cairo where the average annual rainfall is less than 100 m., indicates that the genus is more xerophilous, even if this case is rather exceptional.

The evident inability of *Zygaena* to cope with aridity so well as *Procris*, may explain why its species are more local in the Middle East, though more widespread outside this, on the whole, dry region. In the Middle East, mesophilous biotopes have through the ages been repeatedly isolated and diminished by encroaching deserts. In the last fifty thousand years, especially, vast expanses of ground in this area have been desiccated. The process probably stimulated speciation. The biocoenoses of the mountain peaks are especially isolated at the present time and contain relict species of doubtful antiquity.

APPENDIX

List of species mentioned or considered in the above article; all were taken by the author at the localities indicated except one or two in parentheses. However, most species, occurring in the Middle East but not taken by the author, have been omitted here.

SUBFAMILY: ZYGAENINAE

Zygaena subg. *Mesembrynus* Hübn.

cambysea Led. subsp. *rosacea* Roman. IRAQ, Kurdistan, 2,000 m.
cambysea Led. subsp. *hafis* Reiss. IRAN, Fars, 2,300 m.
seitzi Reiss. IRAN, Fars, 2,000 m.
tamara Christ. subsp. *placida* B.-H. IRAQ, Kurdistan, 3,000 m.
manlia Led. subsp.(?) *araxis* Koch. IRAQ, Kurdistan, 2,000 m.
cuvieri Boisd. IRAQ, Kurdistan, 2,000 m.
cuvieri subsp. *libani* Burg. LEBANON, Bsherre, 2,000 m.
corycia Staudinger subsp. *staudingeriana* Reiss. LEBANON, Bsherre, 2,000 m.
corycia subsp. *wiltshirei* Byt. LEBANON, Kineseh, 2,000 m.

Z. subg. *Agrumenia* Hübn.

saadii Reiss. IRAN, Fars, 2,000 m.
(*brandti* Reiss. IRAN, Elburz, 2,000 m.)
chirazica Reiss. IRAN, Fars, 2,000 m.
olivieri Boisd. LEBANON, 2,000 m.
carniolica Scop. subsp. *illiterata* Koch. LEBANON, 2,000 m.
haematina Koll. IRAN, Fars, 3,000 m.

loti D. & Schiff. subsp. *suleimanica* Reiss. IRAN, nr. Chalus, 4,000 ft.

Z. subg. *Zygaena* Fabr.

graslini Led. LEBANON, sea-level to 2,000 m.

filipendulae subsp. *syriaca* Zerny. LEBANON, 2,000 m.

SUBFAMILY: PROCRIDINAE

Theresimima Strand.

ampelophaga Beyle. LEBANON, sea-level to 1,500 m.

Rhagades Walleng.

brandti Alberti. IRAN, Fars, 1,000-2,300 m.

Procris subg. *Lucasia* Alberti

subsolana Staudinger. IRAQ, Kurdistan, 1,000-2,000 m.

Procris subg. *Jordanita* Agenjo

graeca Jordan subsp. *sultana* Alberti. IRAQ, Kurdistan, 700-1,000 m.

Procris subg. *Roccia* Alberti

ambigua Staudinger. IRAQ, Kurdistan, 3,000 m.

Procris subg. *Praviela* Alberti

anatolica Nauf. CYPRUS, Kyrenia, sea-level. LEBANON, sea-level to 1,300 m. EGYPT, desert s.e. of Cairo: recorded in Andres-Seitz 1923 and Wiltshire 1949 as *P. orana* Aust., erroneously determined.

Procris subg. *Procris* Fabr.

obscura Zell. LEBANON, sea-level, and mountains. EGYPT, Damietta, det. Alberti 1937. IRAN, Fars, 2,000 m.

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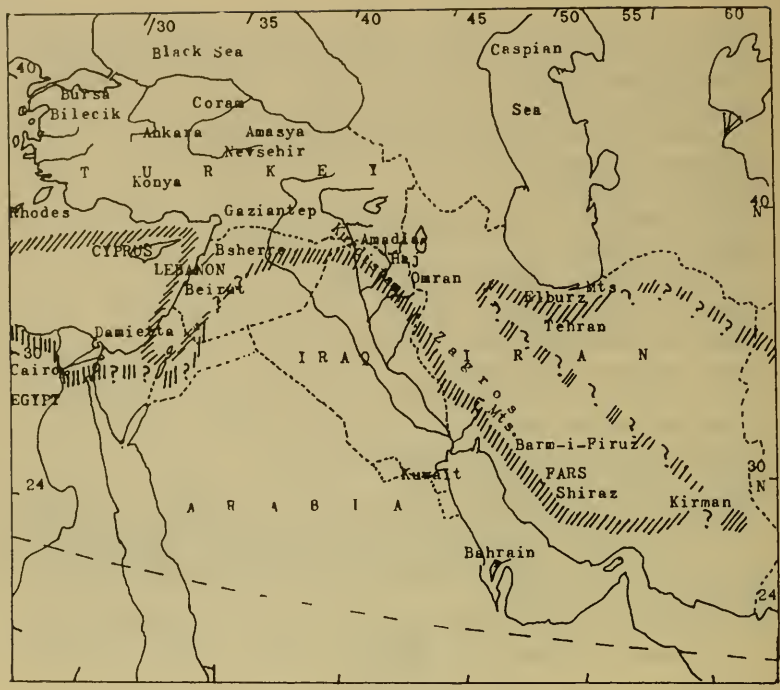

MAP ILLUSTRATING DISTRIBUTION OF ZIGAENIDAE IN MIDDLE EAST
(to illustrate articles of W.G.Tremewan & E.P.Wiltshire.)

southern boundary of Zygaeninae

ditto of Procridinae where different from above

political frontiers.

Tropic of Cancer

ON A COLLECTION OF ZYGAENA FABRICIUS (LEP., ZYGAENIDAE) FROM TURKEY

By W. G. Tremewan

The following notes are based on a small collection of *Zygaena* Fabricius collected by Messrs. Douglas and David Cottrill in Turkey in 1967. Records of some of the localities are new and of great interest; therefore, the purpose of these notes is to record the localities and to supplement the excellent zoogeographical work of Holik & Sheljuzhko (1953 et seq.).

Zygaena punctum anatoliensis Reiss [(*Zygaena punctum anatoliensis* Reiss, 1929, *Int. ent. Z.*, **23**: 148.)]

Ankara: Beynam, 1 ♀, 25.vi.1967; 1 ♀, 12.vii.1967.

Ankara: Konya-Ankara road (ca 50 miles from Ankara), 1 ♂, 12.vii.1967.

These specimens are referable to ssp. *anatoliensis* Reiss, described from Ak-Schehir, 1,000-1,500 m.

Zygaena punctum Ochsenheimer ssp.
BURSA: Bursa, 1 ♂ (worn), 16.vii.1967.
BILECIK: Bilecik, 1 ♀, 18.vii.1967.

The fresh female differs from ssp. *anatoliensis* Reiss in the more thinly scaled wings and colder red colouration of the forewing streaks and hindwings. The female is also larger (27 mm. wingspan) compared with the Ankara specimens (22-25 mm. wingspan). The male from Bursa is very worn and approximately 23 mm. in wingspan.

Zyngaena araratensis lycaonica Reiss [(*Zygaena araratensis lycaonica* Reiss, 1935, *Int. ent. Z.*, **29**: 141, 232, figs.)]
ANKARA: Beynam, 1 ♂, 2 ♀♀, 25.vi.1967.

The three specimens captured at Beynam are provisionally placed under ssp. *lycaonica* Reiss, described from Bulghar-Maden, north-west of Adana. It is worth noting that the male is in fresh condition and rather large (26.5 mm. wingspan) compared with the two worn females (24 mm. wingspan).

Zygaena diaphana Staudinger ssp.
ANKARA: Beynam, 2 ♂♂, 25.vi.1967; 1♂, 6♀♀, 14.vii.1967.

This new subspecies differs from the nominate subspecies, which was described from Hadjin, Taurus, 2,000 m. in the dense scaling and the stronger and brighter red colouration of the forewing streaks and hindwings. In the male, the ground colour of the forewings is blue-black with a slight sheen, in the female the ground colour is black, dusted with yellowish scaling. The forewing streaks are broad and confluent. The hindwing border is only present at the apex in the male and absent in the female.

Of the nine specimens captured, six are worn; the description of this new subspecies awaits further material.

Zygaena purpuralis barthai Reiss [(*Zygaena purpuralis barthai* Reiss, 1929, *Int. ent. Z.*, **23**: 148.)]
ANKARA: Beynam, 2 ♂♂, 25.vi.1967.

This subspecies was described from Sultan Dagh near Ak-Schehir, 2,000 m. The two specimens from Beynam are here referred to ssp. *barthai* Reiss, although the latter is somewhat smaller (forewing length 11 mm. compared with 13 mm. in the Beynam specimens).

Zygaena purpuralis Brünnich ssp.
ANKARA: Ankara, 1 ♀ (worn), 2.vii.1967.

Zygaena ganymedes sultana Reiss & Schulte [(*Zygaena ganymedes sultana* Reiss & Schulte, 1968. *Entomologist's Rec. J. Var*, **80**: 1, pl. 1, figs 1, 2.)]
ANKARA: Beynam, 2 ♂♂, 2 ♀♀, 14.vii.1967.

This subspecies was described from Sultan Dagh, Ak-Schehir. The species was only recently recorded from the central region of Turkey.

Zygaena carniolica taurica Staudinger [(*Zygaena carniolica taurica* Staudinger, 1879, *Horae Soc. ent. Ross.*, **14**: 326.)]
GAZIANTEP: Gaziantep, 1 ♂, 2 ♀♀, 6.vii.1967.

This subspecies was described from near Gülek, Taurus. The three specimens from Gaziantep do not differ greatly from ssp. *taurica* Staudinger but the red abdominal belt is two segments broad and present

only on the dorsal surface. On the forewings, spots 3 and 4 are confluent, spot 6 is narrow but well represented.

Zygaena carniolica amasina Staudinger [(*Zygaena carniolica amasina* Staudinger, 1879, *Horae Soc. ent. Ross.*, **14**: 326.)]

ANKARA: Beynam, 7 ♂♂, 1 ♀, 14.vii.1967.

Only in one male and the female are the forewing spots broadly edged with cream. However, the specimens from Beynam are provisionally placed under ssp. *amasina* Staudinger, which was described from Amasia [Amasya].

Zygaena loti pontica Holik & Sheljuzhko [(*Zygaena achilleae pontica* Holik & Sheljuzhko, 1955, *Mitt. münch. ent. Ges.*, **44/45**: 143.)]

AMASYA: Amasya, 1 ♂, 30.vi.1967.

CORUM: Corum, 2 ♂♂, 1 ♀, 1.vii.1967.

ANKARA: Beynam, 9 ♂♂, 1 ♀, 25.vi.1967.

This subspecies was described from Amasia. Although the locality Beynam is situated in the "Central Zone," according to Holik & Sheljuzhko (1953 : 115), the specimens from this area do not differ appreciably from those from Amasya and Corum and are provisionally referred to ssp. *pontica* Holik & Sheljuzhko.

Zygaena filipendulae anodolitia Reiss [(*Zygaena filipendulae anodolitia* Reiss, 1929, *Int. ent. Z.*, **23**: 152.)]

ANKARA: Beynam, 3 ♂♂, 1 ♀, 25.vii.1967; 2 ♀♀, 14.vii.1967.

NEVSEHIR: Urgup, 1 ♂, 4.vii.1967.

The specimens captured at Beynam are referrable to ssp. *anodolitia* Reiss,, described from Ak-Schehir. Two males and two females from Beynam have the forewing spots confluent in pairs. One male has the forewing spots separate while the remaining female, which is an aberration, has the forewing spots widely separated and with spot 6 reduced. In this female the hindwing borders are rather broad compared with the other specimens.

The single male captured at Urgup differs from the Beynam specimens in the stronger and brighter red coloration of the forewing spots and hindwings. The forewing spots are almost confluent in pairs. The specimen from Urgup is provisionally placed under ssp. *anodolitia* Reiss.

Zygaena filipendulae Linné ssp.

BILECIK: Bilecik, 2 ♀♀, 18.vii.1967.

One female has the forewing spots separate, the remaining female has spots 5 and 6 confluent. The red colouration of the forewing spots and hindwings is a strong, bright crimson. The hindwing borders are narrow.

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INDEX FOR 1968

It does not follow that because a page is referred to once only that there is not more than one entry

EXHIBITORS AND CONTRIBUTORS

Batten, A. G. M., 25
Beamish, H. H., 31
Bradford, E. S., 125
Bretherton, R. F., 4, 31, 123, 128
Brewer, G. F., 128
Chanter, D., 26
Chatelain, R. G., 126
Clarke, C. A., 126
Clifton, M., 26, 124, 125, 126
Crow, P. N., 25
Dewhurst, C. F., 127
Eagles, T. R., 32, 126
Gardner, A. E., 25, 31, 125, 126, 127
Goater, B., 26, 123, 124, 125
Greenwood, J. A. C., 124, 126, 127
Haggett, G. M., 57
Hammond, C. O., 125, 126, 127
Holland, P. C., 32
Holloway, J. D., 26
Homer, T. J. G., 29
Howarth, T. G., 26, 112
Jacobs, S. N. A., 30, 31
MacKechnie Jarvis, C., 28, 30
Morison, G. D., 36
Morris, M. G., 31
New, T. R., 42
Newton, J. L., 26
O'Keefe, D., 126
Parmenter, L., 37
Prior, G., 25, 124
Roche, P. J. L., 126
Rydon, A. H. B., 125
Skinner, B. F., 126
Spreadbury, W. H., 112
Stubbs, A. E., 25, 29, 31
Tremewan, W. G., 54
Uffen, R. W. J., 125
Vallins, F. T., 33
Williams, S. A., 26, 124, 125, 127
Wiltshire, E. P., 25, 30, 31, 47, 125
Worms, C. G. M. de, 30, 31, 113, 123, 124, 127, 128

BIRDS

Avocet, 125
Cuckoo, 125
Little Swift, 125
Nightingale, 125
Robin, 30
Swallow, 125

COLEOPTERA

anthracinus, Pterostichus, 126
brunneus, Colon, 25
clarki, Bembidion, 126
collaris, Stenichnus, 127
dispar, Thanatophilus, 30
exilis, Stenichnus, 127
fennicum, Lathrobium (Tetartopeus), 28
fumigatum, Bembidion, 126
godarti, Stenichnus, 127
helopiodes, Codes, 126
maculicornis, Phyllobius, 38
mortisaga, Blaps, 26
mucronata, Blaps, 26
nana, Gyrophaena, 124
pagana, Atheta (Liogluta), 26
pilicornis, Atheta (Tetropla), 26
pseudonana, Gyrophaena, 124
puberula, Hapolanea (Phyllodrepa), 26
quadratum, Lathrobium, 28
serripes, Colon, 25
unicinatus, Otiorrhynchus, 31

DICTYOPTERA

Praying Mantis, 127
tessellata, Acanthops, 127

DIPTERA

aestiva, Empis, 39
albiceps, Philonicus, 38
albitarsis, Cheilosia, 39
albolineata, Pseudomorellia, 38
Asilidae, 37, 38, 41
atra, Rhamphomyia, 40
atricapilla, Dioctria, 38
atricapillus, Machimus, 38
aureus, Chrysopilus, 29
auricollis, Syrphus, 38
autumnalis, Musca, 38
baumhaueri, Dioctria, 38
berberina, Criorhina, 127
brassicae, Erioischia, 38, 39
carbonaria, Sciara, 38
carnaria, Sarcophaga, 38
cautum, Chrysotoxum, 127
Chironomus, 39
chorea, Lonchaea, 39
ciliata, Hydrotaenia, 39
cilicrura, Delia, 39
cinctus, Lasiopogon, 38
cingulatus, Epitriptus, 38
citrofasciatum, Xanthogramma, 40
cristatus, Chrysopilus, 29
cyanurus, Neoitamus, 38
digramma, Empis, 39
discolor, Bombylius, 126
discreta, Botamophila, 39
dissecta, Nupedia, 39
Dolichopodidae, 37
Empidae, 37, 39, 41
erythrocephala, Calliphora, 38
esuriens, Pegomyia, 39
fasciata, Platypalpus, 38
febrilis, Dilophus, 39, 40, 41
femorata, Empis, 39, 41
femoratus, Dilophus, 39
flavidipennis, Pycnoglossa, 40
floralis, Nemorella, 39

FLOWERING PLANTS

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HEMIPTERA

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