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# Proceedings and Transactions of The British Entomological and Natural History Society

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THE DISTRIBUTION OF SNAIL-KILLING FLIES  
(DIPTERA: SCIOMYZIDAE)  
IN IRELAND

By P. J. CHANDLER

A paper has recently appeared (Stephenson & Knutson, 1970) dealing with the distribution of snail-killing flies (Dipt., Sciomyzidae) in the British Isles. In that paper a table is included which illustrates graphically the known distribution by counties of 63 species of this family in these islands. It is at once apparent that the lack of records from certain regions prevents a completely accurate representation of their distribution. The greatest number of records are from south-east England, coinciding with the greatest density of collectors; thus the suggestion made by these authors that Sciomyzidae are more abundant in the lime-rich areas south of a line joining the Severn and Humber estuaries than in the generally acidic oligotrophic areas north of this line may not be entirely borne out when more intensive collecting has been done, e.g.: in the limestone areas in the northern and western districts. This possibility is also suggested by the 42 species recorded by them from Glamorgan.

One significant feature of the distribution patterns presented by these authors is the paucity of records shown for Ireland. They record 26 species from ten Irish counties, providing a total of 44 county records. The statement is made that '*most species occur in the north-east (County Down, 13 species) and the south-west (Co. Kerry, 12 species; Co. Cork, 8). Six of the 13 from Down are unknown in Kerry or Cork and nine of the 15 from the latter area are unknown in Down*'. This suggestion that Sciomyzidae are localised in two areas of Ireland and virtually absent elsewhere in the country is rather misleading, since the Irish records they utilised were drawn from two published papers only (Haliday, 1833; Yerbury, 1902), which contained faunal lists for Down and for Cork and Kerry respectively; the few records they incorporated for other areas were from material collected by the late Mr. R. L. Coe of the British Museum (Nat. Hist.).

I have made several collecting visits to Ireland during the last three years and it has been my general experience that Sciomyzidae are not at all infrequent there. During these visits many groups of Diptera were collected and the Sciomyzidae taken were only incidental; no special search was made for them. As investigation of my Irish material proceeded it became apparent that our knowledge of the Irish dipterous fauna is very incomplete and consists mainly of scattered records in a very wide variety of publications. Since I felt that a good knowledge of the Irish fauna, in view of the geographical position of Ireland, would in future be essential to any work on European insect distribution, I began compiling a card index of all published and unpublished records of Irish Diptera that I could discover.

The study of Irish Diptera, including Sciomyzidae, was commenced by Alexander Henry Haliday and his outstanding contribution on the Diptera occurring about Holywood in County Down with some references to other regions (Haliday, 1833) formed the basis for all later work on the Irish Diptera. There are only a few references to this family in some of Haliday's subsequent papers (Haliday, 1838; Hogan & Haliday, 1855), but several of his manuscripts fortunately survive in the National Museum, Dublin, where his collections are now housed. These include an important manuscript list of Irish insects of all orders, prepared *circa* 1855 and this has proved useful in elucidating what he meant by some of the names he used in the 1833 list. I am indebted to Dr. C. E. O'Riordan, Keeper of Zoology at the National Museum in Dublin, for enabling

me to obtain photo-copies of Haliday's manuscripts and to fully examine the collections in his charge, including those of Haliday and of several more recent workers who have donated material to the Museum, principally J. N. Halbert but including A. W. Stelfox, E. O'Mahony, J. W. Yerbury, P. H. Grimshaw, Rev. W. F. Johnson, R. F. Scharff, R. Welch and W. Ruttledge. Although Mr. A. W. Stelfox deposited some of his Diptera in the Dublin Museum, a large part of his Diptera were donated, together with his much more extensive Hymenoptera collections, to the United States National Museum in Washington; Dr. L. V. Knutson has kindly communicated the data of a few Sciomyzidae included in the Stelfox collection to me for incorporation in this paper.

I have also utilised the Irish records of Sciomyzidae from the British Diptera collection in the British Museum (Nat. Hist.), mainly collected by J. W. Yerbury but also including a few specimens taken by J. J. F. X. King, K. G. V. Smith, B. P. Beirne and D. J. Carter. My thanks are also due to Mr. B. H. Cogan for enabling me to examine some material collected by Mr. R. I. Vane-Wright of the British Museum and by Mr. C. E. Dyte during recent visits to Ireland, and to Dr. M. C. D. Speight for letting me examine those Sciomyzidae he has collected in Ireland during 1971. Mr. E. C. Pelham-Clinton has kindly informed me of the details of some Irish Sciomyzidae in the Royal Scottish Museum, Edinburgh, including material collected by P. H. Grimshaw, J. J. F. X. King and by himself.

Many of the specimens recorded in published accounts of Irish Diptera were in the collections referred to above, notably those of Haliday (1833), Yerbury (1902) and Grimshaw (1912). The authenticity of these records has therefore been assessed. Grimshaw's paper was a list of the Diptera of Clare Island, Co. Mayo and the adjacent mainland and included a good number of Sciomyzid records of material collected by himself, Halbert and Johnson. Andrews (1914) records the results of several holidays he had spent in counties Cork, Kerry and Waterford, providing further interesting records. His collection is in the possession of the British Entomological & Natural History Society and I have been able to check the material dealt with and have also made use of several unpublished records from his collection, including some taken by him during the same period and others collected by B. P. Beirne. A few other records are furnished by Foot (1871), whose specimens were determined by G. H. Verrall, and by Carpenter (1895), Grimshaw (1907), Beirne (1943, 1951), Smith (1952), Richards (1961) and Lansbury (1965). Collin (1910) and Halbert (1915) merely referred to Yerbury's record of *Tetanocera robusta* and are cited only for the sake of completeness.

The accompanying table (Table 1) is an attempt to correlate the published and unpublished lists of Haliday with the material still existing in his collection. This fullness of treatment is considered to be necessary in view of the acceptance by Stephenson & Knutson (*op. cit.*) of some but not all of the species included in his 1833 list. It will be seen that the collection contained specimens labelled 'Ireland' of 13 of the 22 distinct species recorded from Ireland by him, while unlabelled or British specimens were present of a further three of these species. Of the remaining six species recorded by Haliday, four have been confirmed by subsequent records. The type specimen of *Sciomyza virgata* is unfortunately lost but this may be the species more recently described as *Pherbellia knutsoni* Verbeke from British and Irish specimens. There were no specimens of *Tetanocera silvatica* in Haliday's collection, but it did contain some *Tetanocera hyalipennis* and *T. unicolor* from Ireland and these may include those determined as *T. silvatica* by Haliday. His records of *Sciomyza nigrimana* and *Tetanocera arrogans* have in each case been shown to comprise specimens of two related species. Haliday's collection also contained Irish specimens of three other species not

recorded by him, i.e.: *Pherbellia dubia*, *P. griseescens*, and *Renocera striata*. The specimen of *Elgiva rufa* which was labelled 'haeffneri' and included in the series of *Sepedon spinipes* may be Irish but there are no more recent records of this species, whose occurrence in Ireland therefore requires confirmation. Neglecting *S. virgata*, *T. sylvatica* and *E. rufa* the records provided by Haliday's collection and manuscripts total 27 species of which 21 are mentioned in his publications. Five of these species, i.e.: *Salpicella fasciata*, *Pherbellia griseescens*, *Pteromicra glabricula*, *Antichaeta analis* and *Tetanocera arrogans* have not been collected in Ireland more recently.

The 13 species for which Haliday's Down records were accepted by Stephenson & Knutson (*op. cit.*) have thus been confirmed with the exception of *Euthycera fumigata*. Their record of this fly was based on his *Tetanocera rufifrons*, an accepted synonym of *fumigata*; his *rufifrons* was, however, *Limnia unguicornis*.

Yerbury (1902) was the first to publish records of *Tetanocera hyalipennis*, *T. ferruginea*, *T. robusta*, *T. unicolor* and *Renocera pallida*. Then Grimshaw (1912) added *Colobaea bifasciella* and *Renocera striata*. Andrews (1914) added *Tetanura pallidiventris*. *Pherbellia knutsoni* was first recorded by Smith (1952) under the name of *virgata* Haliday; he stated that it was new to Ireland, evidently overlooking that this species had been described from Irish types. The occurrence of *Tetanocera phyllophora* in Ireland was first indicated by Stephenson & Knutson (*op. cit.*), while I have recently dealt with records of both this and *T. freyi* from Ireland (Chandler, 1961).

Another eight species are recorded here for the first time, i.e.: *Pherbellia griseescens*, *P. dubia*, *P. ventralis*, *P. pallidiventris*, *P. scutellaris*, *P. brunnipes*, *Elgiva cucularia* and *Tetanocera punctifrons*, bringing the list of species of which authentic Irish material has been examined to 40. No doubt more intensive study of the Irish Diptera will add further species.

The following notes are therefore an attempt to summarise the known distribution of the Sciomyzidae in Ireland to date, i.e.: of the 40 species whose presence there I have been able to authenticate. I have established 158 county records additional to the 43 indicated in their distribution table by Stephenson & Knutson (*op. cit.*). A similar table based on the latter but for Ireland only is provided here (Table 2), with the addition of County Westmeath, which they evidently omitted by an oversight, and of the vice-comital divisions where applicable. From this table it can be seen that there are still no records for seven of the 32 Irish counties (or for 11 of the vice-counties), i.e.: South Tipperary, Limerick, Leix, Offaly, Longford, Mid Cork, East Cork, Fermanagh, West Donegal, Tyrone and Derry, while for two other counties and two vice-counties, i.e.: Kilkenny, Carlow, South Galway and East Mayo, there is but one species recorded in each. If future collecting is concentrated in these unworked areas many further new county and vice-county records will no doubt be added. It is also hoped that fresh material will soon be discovered of some of the species not found since Haliday's time. There is clearly much scope for future work; during my own visits to Ireland, I have collected 23 species of the family without directing any great effort towards this group and have added three species (*Pherbellia brunnipes*, *P. ventralis* and *P. scutellaris*) to the Irish list. I have also established 44 new county and vice-county records from my own collecting.

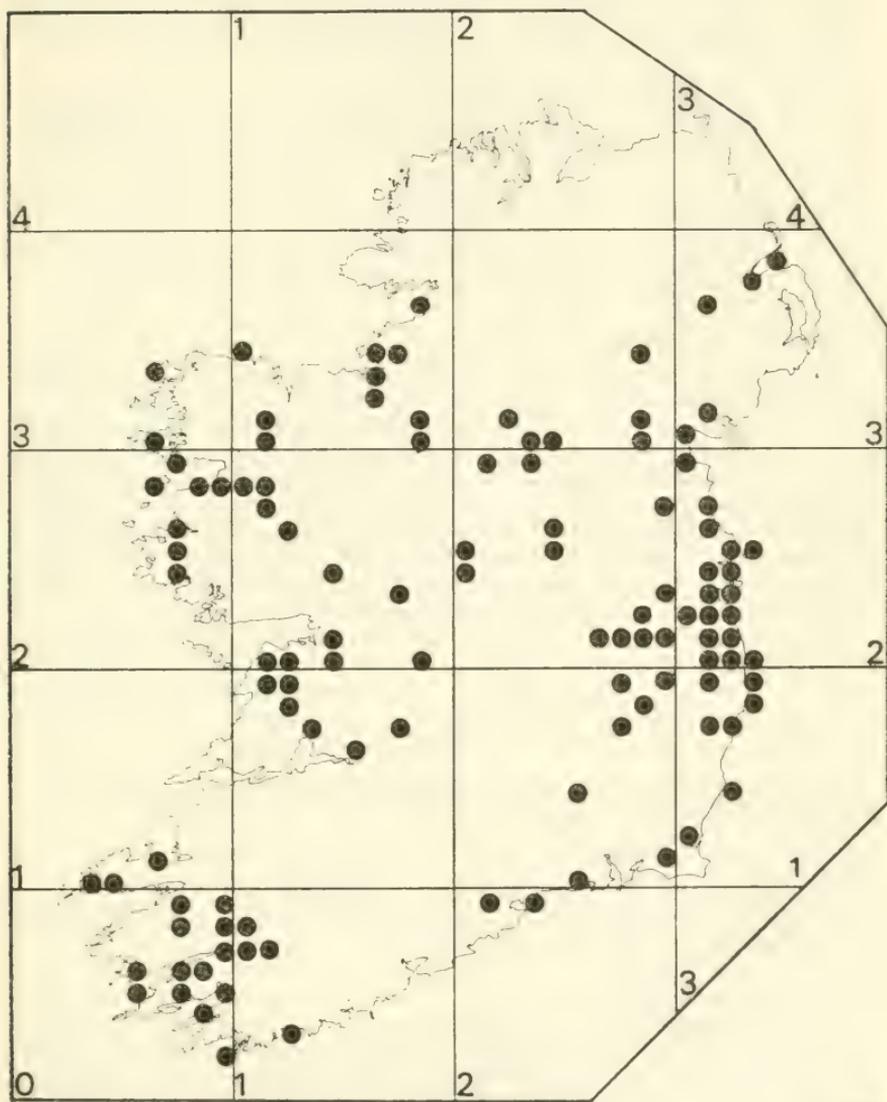
The accompanying map depicts the 10 km squares on the Irish National Grid from which Sciomyzidae have been collected. This shows up even more strikingly than the county distribution table how collecting has been mainly localised in certain districts, notably the Dublin-Wicklow area and the west coast. Haliday's Down records are from one square only and his contribution is therefore not

TABLE 1—AN ANALYSIS OF HALIDAY'S PUBLICATIONS, MANUSCRIPTS AND COLLECTION OF SCIOMYZIDAE

Haliday (1833) (all from Holywood, Co. Down except <i>Lutina</i> )	Haliday (1838) Annotations to Curtis' List of British Insects	Haliday (c.1855) Manuscript List of Irish Insects (all orders)	Haliday Collection (in National Museum, Dublin)	Records which may be accepted (modern nomenclature)
<i>Lutina fasciata</i> (Portmarnock)	<i>L. fasciata</i>	<i>L. fasciata</i> (Portmarnock)	Four labelled 'PtMk' Two labelled 'Ireland'	<i>Salicicella fasciata</i>
<i>Sciomyza albocostata</i>	<i>S. albocostata</i>	<i>S. albocostata</i>	One labelled 'Ireland'	<i>Pherbellia dubia</i>
<i>S. cinerella</i>	<i>S. cinerella</i>	<i>P. cinerella</i>	One labelled 'Ireland'	<i>P. albocostata</i>
<i>S. griseola</i>	<i>S. griseola</i>	<i>S. griseola</i>	Two labelled 'Ireland'	<i>P. cinerella</i>
<i>S. nana</i>	<i>S. nana</i>	<i>P. nana</i>	Three, one of them labelled 'Ireland'	<i>P. griseola</i>
<i>S. monilis</i>	<i>S. monilis</i>	<i>P. monilis</i>	Only one, labelled 'British'	<i>P. nana</i>
			Two labelled 'Ireland'	<i>P. schoenherri</i>
		<i>Melina virgata</i> (described as <i>Sciomyza</i> <i>virgata</i> Hal. by Haliday (1838), 'south of Ireland')	One labelled 'Portmore' (Co. Antrim)	<i>P. griseocens</i>
		<i>S. glabricula</i>	No specimens Type evidently lost	No recognised ? = <i>P. knutsoni</i> Verbeke
<i>S. nigrimana</i>	<i>S. glabricula</i>		Two females of <i>Ptero-</i> <i>micra angustipennis</i> (= <i>glabricula</i> auctt.), one of them labelled 'Ireland'	<i>Pteromicra</i> <i>angustipennis</i>
			One female of <i>Ptero-</i> <i>micra glabricula</i> (= <i>nigrimana</i> auctt.), labelled 'Ireland'	<i>Pteromicra</i> <i>glabricula</i>
<i>Tetanocera vittata</i> sp.n. <i>T. media</i> (listed separately)	<i>T. vittata</i> Curtis, with <i>T. media</i> Haliday as a synonym	<i>Sciomyza (Antichaeta)</i> <i>vittata</i>	One labelled 'Holywood' (labelled as Type of <i>vittata</i> by J. E. Collin)	<i>Antichaeta</i> <i>analis</i>

<i>T. marginata</i>	<i>T. marginata</i>	<i>Limnia marginata</i>	Two, one of them labelled 'Ireland'	<i>Coremacera marginata</i>
<i>T. obliterata</i>	<i>T. reticulata</i>	<i>Pherbina reticulata</i>	No specimens	<i>P. coryleri</i>
<i>T. umbrarum</i>	<i>T. umbrarum</i>	<i>P. umbrarum</i>	One labelled 'Ireland'	<i>Dietya umbrarum</i>
			One labelled 'haeffneri' but not 'Ireland' (see <i>Sepedon spinipes</i> )	<i>Elgiva rufa</i>
<i>T. dorsalis</i>	<i>T. dorsalis</i>	<i>Hydromiya dorsalis</i>	One labelled 'Ireland'	<i>H. dorsalis</i>
<i>T. aratoria</i>	<i>T. aratoria</i>	<i>H. aratoria</i>	Two, one of them labelled 'Ireland'	<i>Knutsonia albiseta</i>
<i>T. lineata</i>	<i>T. lineata</i>	<i>Ilione lineata</i>	One labelled 'lineata' without country of origin	<i>K. lineata</i>
<i>T. rufifrons</i>	<i>T. rufifrons</i>	<i>Limnia rufifrons</i>	Two labelled 'Ireland' and one labelled 'Limnia marginata' on public display	<i>Limnia unguicornis</i> (not <i>Euthycera fumigata</i> )
			Two labelled 'Ireland'	<i>Renocera striata</i>
<i>T. arrogans</i>	<i>T. arrogans</i>	<i>T. arrogans</i>	Three labelled 'Ireland'	<i>T. arrogans</i>
			One of them <i>arrogans</i> , the other two <i>robusta</i>	<i>T. robusta</i>
<i>T. silvatica</i>	<i>T. silvatica</i>	<i>T. silvatica</i>	No specimens of either species present	<i>T. hyalipennis</i>
<i>T. elata</i>	<i>T. elata</i>	<i>T. elata</i>	But one <i>hyalipennis</i> labelled 'Ireland' and two of <i>unicolor</i> labelled 'Ireland'	<i>T. unicolor</i>
			No specimens	<i>Trypetoptera punctulata</i>
<i>T. hieracii</i>	<i>T. hieracii</i>	<i>Pherbina hieracii</i>	One on public display	<i>S. sphegea</i>
<i>Sepedon sphegeus</i>	<i>S. sphegeus</i>	<i>S. sphegeus</i>	One unlabelled example of <i>spinipes</i> , but another labelled 'haeffneri' was <i>Elgiva rufa</i> (q.v.)	<i>S. spinipes</i>
<i>S. haeffneri</i>	<i>S. haeffneri</i>	<i>S. haeffneri</i>		





significant in this respect. In the following accounts of the individual species the 10 km square is indicated for each locality from which material has been collected; this approach was considered advisable in view of the present concentration on this method of biological recording and the recent adoption of the Irish Grid for these purposes by the Biological Records Centre at Monks Wood Experimental Station (Perring, 1970). The names of collectors and museums which appear frequently have been abbreviated as follows:

HWA	H. W. Andrews	WFJ	Rev. W. F. Johnson	MCS	M. C. D. Speight
BPB	B. P. Beirne	JXK	J. J. F. X. King	AWS	A. W. Stelfox
PJC	P. J. Chandler	EOM	E. O'Mahony	RVW	R. I. Vane-Wright
RLC	R. L. Coe	CM	C. Morley	RW	R. Welch
CED	C. E. Dyte	ECP	E. C. Pelham-Clinton	JWY	J. W. Yerbury
PG	P. H. Grimshaw	WR	W. Ruttledge	BM	British Museum (Nat. Hist.)
JNH	J. N. Halbert	RFS	R. F. Scharff	DM	Dublin Museum
AHH	A. H. Haliday	KG	K. G. V. Smith		

### *Salpicella fasciata* Meigen

This rather large distinctive Sciomyzid is a local species of dry habitats and in their recent account of the biology of this interesting fly, Knutson, Stephenson & Berg (1970) commented on its unique distribution. It occurs chiefly on the Mediterranean and western European coasts, extending inland along major river valleys in southern Europe but becoming increasingly maritime in the northern parts of its range as do its host snails of the genus *Helicella*. There are no continental records more northerly than the north coast of France and in the British Isles it is confined to coastal sand dunes in South Wales, south-western and eastern England where it is scarce. The single Irish record is at the northern limit of its range and it has not been found there since Haliday's time.

Haliday took *S. fasciata* on the sand dunes at Portmarnock, Co. Dublin (Haliday, 1833). Haliday later sought this fly at Ferriter's Cove, Co. Kerry (Hogan & Haliday, 1855) but was not successful. Carpenter (1908) referred to Haliday's discovery of this 'handsome South European species', the only reference to a Sciomyzid in his account of the Diptera of the Dublin district.

**Dublin:** Portmarnock, 024 (6 specimens in AHH coll., DM; Haliday, 1833) (Knutson, Stephenson & Berg, 1970; indicated on map).

### *Colobaea bifasciella* Fallén

An attractive little fly with banded wings, but rarely taken.

**W. Mayo:** Castlebar Lough, M18, 31.vii.11 (PG, DM; Grimshaw, 1912). **Wexford:** Cahore, T24, 25.vi.70, maritime zone (RVW, BM).

### *Pherbellia brunnipes* Meigen

There is a specimen in the Haliday collection, named by J. E. Collin, but without the country of origin marked. This might well be Irish as I was able to add the species to the Irish list from a single female taken by sweeping marginal vegetation by one of the lagoons at the edge of Lough Leane, Co. Kerry. This fly had the anal vein abbreviated and not reaching the wing margin and so would run to the genus *Colobaea* in the key by Knutson & Lyneborg (1965); I found the series of *brunnipes* in the collection of the British Museum (Nat. Hist.) to vary in this respect, some having the anal vein faintly reaching the margin.

**N. Kerry:** Killarney, Ross Island, V98, 30.vi.69 (PJC).

*Pherbellia dubia* Fallén

This is a common species in Britain and I have found it to be of general occurrence in Ireland. Several older records have come to notice but it has apparently never been placed on the Irish List. It is the only Sciomyzid which has yet been reared in Ireland (details below).

Ireland (AHH, DM). **Armagh:** Newry Forest, J11, 15.vii.71 (PJC). **Dublin:** Glencullen, 012, 1922, mounted with a snail's shell and labelled 'hatched from cocoon in *Helix rotundata*' (AWS, DM). **Antrim:** Belfast, J37, 1897, with empty snail's shell bearing the same data, probably the same species as the above snail (JNH, DM). **Meath:** near Hays, N. bank of River Boyne, N97, 16.vii.71 (PJC). **Carlow:** Carlow, S77, 1902 (RW, DM). **Waterford:** Stradbally, X39, 27.vi.07 (HWA). **S. Kerry:** Dingle, Q40, 31.v.94 (JNH, DM). **N. Kerry:** Killarney, by Dinis Road, V98, 2.vii.69 (2, PJC). **Wicklow:** Baltinglass, below Rathcoran, S88, 10.vii.69 (PJC). **Kildare:** Lullybeg, N71, 4.vi.70, rank vegetation by dykes, 250' (RVW, BM); Ardscull Mote, S79, 11.vii.71 (PJC). **Roscommon:** Lough Meelagh, by St. Lasair's Well, G81, 15.v.70; Lough Key National Forest Park, G80, 11.v.70 (PJC). **Leitrim:** Glencar Waterfall, G74, 15.v.70 (PJC). **Sligo:** Lissadell, G64, 15.v.70 (PJC). **S. Galway:** woods north of Gort, M40, 16.v.70; beech woods at Claringbridge, M41, 21.v.70 (PJC). **Clare:** Cratloe Wood, high canopy oak wood, R56, 18.v.70; footpath to Killone Abbey, R37, 20.v.70; Sliabh Elva, in hazel scrub, M10, 22.v.70; Lisdoonvarna, alderwood, R19, 22.v.70 (PJC).

*Pherbellia albocostata* Fallén

Another species which is probably common in various habitats in all parts of Ireland although only a few scattered records are as yet available.

Ireland (AHH, DM) (Walker, 1853). **Dublin:** Portmarnock, wood above dunes, 024, 17.vii.71 (PJC). **Down:** Holywood, J48, (Haliday, 1833). **Wicklow:** Woodenbridge, T17, 23.v.20 (JNH, DM); Glendalough, by Green Road, T19, 9.vii.69 (PJC). **W. Cork:** Glangariff, V95, 12-18.vi.01 (Yerbury, 1902; JWY, DM & BM). **S. Kerry:** Waterville, V56, 3.viii.01 (Yerbury, 1902; JWY, BM); Kenmare, V97, 2.vii.07 (HWA). **N. Kerry:** Killarney, Ross Bay, V98, 30.vi.69 (PJC).

*Pherbellia cinerella* Fallén

A very common species, especially in dry grassland but occurring also in marshy ground. Always in open situations.

Ireland (Walker, 1853; Verbeke & Knutson, 1967; 2, AHH, DM). **Down:** Holywood, J48 (Haliday, 1833; Bratt, Knutson, Foote & Berg, 1969, indicated on distribution map). **Wicklow:** Killoughter, T39, 15.viii.51, marshy sea coast (Smith, 1952); Arklow, T27, viii.40, as *Ditaena pallipes* Muller (Beirne, 1951); Kilcoole, grassland above beach, 030, 18.ix.68 (PJC). Buckronev, T27, 28.ix.49 (AWS; Washington Museum). **Dublin:** Lambay Island, 035, 1905-6 (JNH; Grimshaw, 1907), vi.06 (2, JNH, DM); Bull Island, 023, dunes, 14.ii.71, 27.v.71 (MCS), 12.vii.71 (MCS & PJC). **Dublin,** 013, 18.viii.95; Malahide, 024, 2.viii.15 & one without date; Raheny, 023, 1894 (JNH, DM). Killiney Bay, 022, 31.vii.70 (CED). Killiney, 022, 26.v.71, undercliff, short grass above beach (MCS). **Louth:** Braganstown, 009, 1895 (2, JNH, DM). **Wexford:** Tinnacree, T14, 14.x.68, grassland above beach (PJC). Wexford, T02, 27.vi.02 (JNK, Roy. Scot. Mus). **Kildare:** Lullybeg, N71, 4.vi.70, rank vegetation by dykes (RVW, BM). **Roscommon:** Lough Ree, N05, 14.v.70, by spring on shore (PJC). **Waterford:** Stradbally, X39, 22.viii.08 (3, HWA; Andrews, 1914). **W. Mayo:** Curraun district, L79, vi.09 (RFS, DM; Grimshaw, 1912); Cross Lough, F63, 30.v.71 (MCS); Clare Island, L68 (PG; Grimshaw, 1912). **Clare:** The Burren, R29, 5-7.vii.60 (RLC, BM); Burren, Kilnaboy, R29, no date (RLC, BM) (Bratt, Knutson, Foote & Berg, 1969; indicated these Clare localities on their distribution map). Ballyvaughan, Caher River, M20, 4.ix.63; Newtown Castle, M20, 10.ix.63 (FCP, Roy. Scot. Mus.). **S. Kerry:** Kenmare, V97, 27.vi.01 (JWY, DM; Yerbury, 1902); Darrynane, V55, 31.vii.01 (JWY, DM & BM; Yerbury, 1902); Waterville, V56, 27.vii.01 (JWY, BM; Yerbury, 1902).

*Pherbellia knutsoni* Verbeke

This is a scarce coastal species found as yet only in Britain and Ireland. It has only recently (Verbeke, 1967) been distinguished but may be the same as the species which Haliday described as *Sciomyza virgata* (Haliday, 1838). The type material of *virgata* was collected in the south of Ireland but is unfortunately lost.

**Wicklow:** Killoughter, T39, 15.viii.51, marshy sea coast (KGS, BM; Smith, 1952, as *P. virgata* Hal; this record was referred to *knutsoni* by Bratt, Knutson, Foote & Berg, 1969).

*Pherbellia griseola* Fallén

This fly will probably prove to be common in Ireland although only a few records are available. It seems to occur chiefly in marshes, either on the sea coast or on the shores of lakes.

Ireland (AHH, DM). **Down:** Holywood, J48 (Haliday, 1833). **Wicklow:** Killoughter, T39, 15.viii.51, marshy sea-coast (KGS; Smith, 1952). **Roscommon:** Lough Ree, near Lecarrow, N05, 14.v.70, by spring on shore (PJC). **W. Mayo:** Louisburgh, L88 (CM; Grimshaw, 1912, erroneously said to be new to Ireland). **Clare:** The Burren, Ballyvaughan, M20, & Lough Rask M20 (RLC, BM), **Donegal:** Rossnowlough, near Ballintra, G86, 2.vii.71 (MCS).

*Pherbellia nana* Fallén

This rather small species is probably of frequent occurrence in similar localities to *P. griseola*, although again few records have come to light; perhaps it has been overlooked because of its small size.

Ireland, 'not common' (Walker, 1853). **Down:** Holywood, J48 (Haliday, 1833) (Bratt, Knutson, Foote & Berg, 1969). **W. Mayo:** Ballin & Cool Barren Loughs, M08, 1.viii.11 (one, PG, DM; Grimshaw, 1912). Castlebar Lough, M18, 31.vii.11 (one, PG, Roy. Scot. Mus.; Grimshaw, 1912). **Roscommon:** Lough Ree, near Lecarrow, N05, 14.v.70, one by spring on shore (PJC).

*Pherbellia ventralis* Fallén

I have found this species, previously unrecorded from Ireland, in two Irish localities and several specimens were found in each. It is of an undistinguished appearance and will probably be found to be generally distributed on marshy ground.

**Leitrim:** Lough Rinn, N19, 10.v.70, two females on shore and one of each sex elsewhere on estate (PJC). **Roscommon:** Lough Ree, near Lecarrow, N05, 14.v.70, a male and two females by spring on shore (PJC).

*Pherbellia schoenherri* Fallén

A rather distinctive little fly which is common in marshes both on the coast and inland.

Ireland (2, AHH, DM) (Verbeke & Knutson, 1967). **Down:** Holywood, J48 (Haliday, 1833). **Louth:** Braganstown, 009, 1895 (JNH, DM). **Sligo:** Ballysadare Bay, G62, 13.v.70, in saltmarsh (PJC). **Westmeath:** shore of Lough Derravaragh, N46, 14.v.70 (PJC). **Clare:** Ballyvaughan, Lough near Mullagh Mor, M20, 14.viii.69 (ECP, Roy. Scot. Mus). **N. Kerry:** Killarney, Cahernane, V98, 6.viii.40 (BPB, det. HWA and in latter's collection; Beirne, 1943). **S. Kerry:** Glencar, V78, 16.viii.01 (JWY, BM; Yerbury, 1902). Loo Bridge, V97, 28.viii.01 (JWY, BM & DM; Yerbury, 1902). **Donegal:** Rossnowlough, G86, 2.vii.71 (MCS). **Roscommon:** Lough Ree, Lecarrow, N05, 14.v.70, one by spring on shore (PJC).

*Pherbellia griseascens* Meigen

One specimen in the Haliday collection provides the only record for this species.

**Antrim:** Portmore, J16, probably near Lough, one female (AHH, DM; det. J. E. Collin).

*Pherbellia pallidiventr*s Fallén

I am able to add this species to the Irish List from a specimen taken by Mr. R. I. Vane-Wright during 1970.

**S. Kerry:** Lough Naparka, Dingle Peninsula, Q61, 11.vi.70 (RVW, BM).

*Pherbellia scutellaris* von Röser

This rather large pale *Pherbellia* is usually found in more or less dry woodland and seems to be common in southern England. Suitable situations are not numerous in Ireland and the only Irish specimens known to me are those I have taken during 1969 and 1971, upon which I am adding it to the Irish List. All specimens were swept in mixed high woodland.

**Armagh:** Newry Forest, J11, 15.vii.71 (PJC). **Dublin:** Howth, 023, woods on slope below golf course, 17.vii.71, one male and four females (PJC). **N. Kerry:** Killarney, by Dinis Road, V98, 2.vii.69 (PJC).

*Pteromicra angustipennis* Staeger (= *glabricula* of authors)

There are two females in the Haliday collection, one labelled 'Ireland' by Haliday and '*glabricula*' by Collin; the other labelled '*glabricula*' by Haliday. One further specimen has been taken in Ireland by Mr. R. L. Coe and another by Mr. A. W. Stelfox.

Ireland (AHH, DM), **Cavan:** Ballyconnell, Annagh Lake, H21, 6.vi.53 (RLC, BM; Rozkošný & Knutson, 1970; given in list of material examined and indicated on distribution map). **Kildare:** Rye Water, N93, 19.x.47 (AWS, Washington Museum).

*Pteromicra glabricula* Fallén

This is the name now accepted for the species recorded as *nigrimana* by Haliday (1833). The *P. glabricula* of most British authors is *P. angustipennis* Staeger (*q.v.*).

Ireland (AHH, DM; Verbeke & Knutson, 1967, indicated probable occurrence there). **Down:** Holywood, J48 (Haliday, 1833).

*Tetanura pallidiventr*s Fallén

This rather atypical Sciomyzid is almost confined to mature deciduous woods, especially beech but also sometimes more mixed woods and is thus of necessity rather local in Ireland. It has a curious distribution on the continent, illustrated by a map in the recent account of its biology and immature stages by Knutson (1970a). All records are either from Scandinavia and the Baltic States or from the Alps. Although known from many localities in southern England it is apparently absent from France, the Low Countries and most of Germany.

In Ireland *T. pallidiventr*s was only known from Andrews' Stradbally record until I found it in five localities, all in the south, during 1969. At Monk's Wood, Killarney, it was very numerous and large numbers of adults were seen at rest or running about on the broad leaves of Japanese Knotweed (*Polygonum cuspidatum* Sieb. & Zucc.) and Hart's Tongue Fern (*Phyllitis scolopendrium* (L.) Newm.), which were the most conspicuous elements of the ground flora, and on the many old logs on which snails including *Discus rotundatus* (Muller), one of the recorded hosts, were abundant. A similar aggregation of *T. pallidiventr*s in a mixed wood in Finland was recorded by Knutson (*op. cit.*). At Killarney, several individuals were present on each leaf of *P. cuspidatum* and frequent wing waving and courtship were observed, copulating pairs being numerous; a detailed account of the courtship behaviour, which is unique among Sciomyzids, as observed in the

laboratory, was given by Knutson (*op. cit.*). The fly has a curiously modified ovipositor and Knutson demonstrated its adaptation to oviposition within the shell of the host snail.

**Waterford:** Stradbally, X39, 25.vi.07 (9, HWA; Andrews, 1914). **N. Kerry:** Killarney, Monk's Wood, V98, 30.vi.69, very numerous in beech woods, 18 taken (PJC). **Wicklow:** Glendalough, T19, mixed woods below the Poll an Easa waterfall, 8.vii.69, 10.vii.71; Poulaphouca, N91, beech woods above river, 11.vii.69; Glen of the Downs, 021, mixed woods, 11.vii.69 (PJC). **Kildare:** Ardscull Mote, S79, beech woods, 10.vii.69 (PJC).

### *Antichaeta analis* Meigen

Haliday (1833) described this species under the name *Tetanocera vittata* Hal. and later (1838) founded the genus *Antichaeta* for his *vittata*. The type of *vittata* in the Dublin Museum (labelled as such by Mr. J. E. Collin) is *A. analis*. There are no more recent Irish records.

**Down:** Holywood, J48 (AHH, DM; Haliday, 1833) (Verbeke & Knutson, 1967; Knutson, 1966).

### *Pherbina coryleti* Scopoli

This is a very common fly in coastal marshes and similar situations on the shore of inland lakes in Britain and will probably be found to be so throughout Ireland also.

Ireland (Verbeke & Knutson, 1967). **Down:** Holywood, J48 (Haliday, 1833, as *Tetanocera obliterata*). **Dublin:** Howth, 023, 1910; Dublin, 013, 9.vi.95, two, 18.viii.98; Raheny, 023, viii.93 (JNH, DM). **Wexford:** Cahore, T24, 25.vi.70, two, maritime zone (RVW, BM). **Tipperary:** Hayes Island, M80, 11.vi.21 (JNH, DM). **W. Mayo:** Knappagh, M08, 3.viii.11 (PG, DM). Achill Island, F60, 14.vi.09; Westport, L98, 18.vi.09 (? collector, DM). Clogher, M17; Lough near Westport, M08; Clare Island, L68 (PG) (all W. Mayo records quoted by Grimshaw, 1912). **N. Galway:** Belclare, M44, vii.10 (JNH, DM; Grimshaw, 1912). **N. Kerry:** Cahernane, V98, 20.vii.42 (BPB, in H. W. Andrews coll.). **S. Kerry:** Kenmare, V97, 26.vii.08 (BPB, in HWA coll.); 2.vii.01 (JWY, 3 in DM; Yerbury, 1902). Loo Bridge, V97, 29.vi.01; Parknasilla, V76, 14.vii.01; Waterville, V56, 30.vii. 3.viii.01; Caragh Lake, V79, 14.viii.01; Glencar, V78, 16.viii.01 (JWY, Glencar specimen in DM, other material in BM; Yerbury, 1902). **Monaghan:** Lough Muckno, H81, 15.vii.71, marsh by lake (PJC).

### *Coremacera marginata* Fabricius

This is one of the species more usually found on drier, especially calcareous, ground and is no doubt widespread in limestone districts in Ireland.

Ireland (AHH, DM). **Down:** Holywood, J48, (Haliday, 1833). **Dublin:** Rush, 025, ix.94 (JNH, DM). Tymon Castle, near Tallaght, 002, 19.viii.51, disused gravel pit (Smith, 1952). Kilbarrack, 023, 7.viii.26 (EOM, DM). **Louth:** Braganstown, 009, 1895, 2 (JNH, DM). **Wicklow:** Kilcoole, 030, 9.ix.22; Webb's Glen, Arklow, T27, 21.vii.27 (AWS, DM). **Meath:** Meath Coast, 016 or 017, 6.x.26 (AWS, DM). **Clare:** Lisdoonvarna, Poolsallagh, R19, 14.viii.69 (ECP, one in Roy. Scot. Mus.).

### *Dietya umbrarum* Linné

This little brown fly with spotted wings is rather uncommon in the British Isles but has been collected in several parts of Ireland and is evidently widely distributed in at least the western sea-board counties.

Ireland (Walker, 1853; Verbeke & Knutson, 1967; AHH, DM). **Down:** Holywood, J48 (Haliday, 1833). **W. Mayo:** Clare Island, L68, 11.vi.09, 2 females (JNH, DM), one female (PG) (Grimshaw, 1912). **Clare:** Cratloe, R56, 13.ii.95 (JNH, DM). **S. Kerry:** Ventry, Q30, 31.vi.94 (JNH, DM). Kenmare, V97, 2.vii.01. JWY, BM; Yerbury, 1902); 5.vii.07 (HWA; Andrews, 1914). Parknasilla, V76, 17.vii.01 (HWY, BM & DM); Waterville,

V56, 13.viii.01 (Yerbury, 1902). **W. Cork:** Ardroom, V75, 20.vii.01 (JWY, BM & DM; Yerbury, 1902).

*Elgiva cucularia* Linné

This species, frequent in Britain, occurs in both damp and dry localities but always on open ground. It has not been recorded from Ireland previously but the records which have come to light during the preparation of this account suggest that it is generally distributed in the eastern counties and probably other areas too.

**Wexford:** Forth Hills, S91, 1900 (? coll., DM). Cahore, T24, 25. vi.70, 2 (RVW, BM). **Wicklow:** Glendalough, T19, 8.vii.69, earth pit behind St. Mary's Church (PJC). **Kildare:** Clogheen, N61, 5.vi.70, boggy pasture (RVW, BM). **Cavan:** Cavan, H40, viii.10 (? coll., DM). **N. Kerry:** Cahernane, V98, 20.vii.43, 3 (BPB, HWA coll.).

[*Elgiva rufa* Panzer

This species cannot definitely be admitted as Irish but a specimen from the Haliday collection in the Dublin Museum, which I found labelled '*haeffneri*' and included in the series of *Sepedon spinipes* Scop. is *E. rufa* and may be Irish. Haliday (1833) recorded *S. spinipes* from Holywood under the name *haeffneri*.]

*Knutsonia albiseta* Scopoli

One of the commonest Sciomyzids in the British Isles and can no doubt be found in suitably marshy localities throughout Ireland. A favourite habitat is amongst *Phragmites* at lake margins.

Ireland (Walker, 1853, as *Tetanocera aratoria*; Foot, 1871, in *Elgiva*; Verbeke & Knutson, 1967; AHH, DM). **Cork:** **Kerry** (Knutson & Berg, 1967; indicated on distribution map). **Down:** Holywood, J48 (Haliday, 1833, as *T. aratoria*). **Wicklow:** Killoughter, T39, 15.viii.51, marshy sea coast (Smith, 1952). **Wexford:** Cahore, T24, 25.vi.70, maritime zone (RVW, BM). **N. Galway:** Belclare, M44, vii.1910 (JNH, DM). **W. Mayo:** Castlebar Lough, M18, 21.vii.11 (PG, Roy. Scot. Mus. & DM); Westport, L98, on riverside; Clogher, M17, 7.viii.11; Ballin & Cool barren loughs, M08, 1.viii.11; Knappagh, M08, 3.viii.11 (PG, Roy. Scot. Mus.). (N. Galway and Mayo records; Grimshaw, 1912). **W. Galway:** Lettergesh, L76, 12.vii.67 (CED, BM). **Cavan:** Lough Oughter, H30, 9.x.93 (JNH, DM). **Dublin:** Donabate, 024, x.94 (JNH, DM). **N. Kerry:** Cahernane, V98, 19.vii.43, 2 (BPB, HWA coll.). Killarney, V98, 30.vi.69, 2 taken on *Phragmites* by Ross Bay (PJC). Muckross, V98, 1905 (JNH, DM). **S. Kerry:** Kenmare, V97, vi-viii.01 (JWY, DM & BM); Loo Bridge, V97, vi-viii.01; Parknasilla, V76, vii.01; Glencar, V78, viii.01 (JWY, BM); Waterville, V56, vii-viii.01 (JWY, BM & DM). ('common and generally distributed', all above S. Kerry records; Yerbury, 1902). Lough Naparka, Dingle Peninsula, Q61, 11.vi.70 (RVW, BM). Ventry, Q30, 31.v.94, 2 (JNH, DM). Ballynagall, Q30, 1.vii.69, field by sea; Lough Caragh, V79, 3.vii.69 (PJC). **W. Cork:** Glengarriff, V95, vi.01 (JWY, BM & DM; Yerbury, 1902). **Monaghan:** Lough Muckno, H81, lakeside marsh, 15.vii.71 (PJC). **Donegal:** Rossnowlagh, G86, 2.vii.71 (MCS). **Clare:** Ballyvaughan, Lough near Mullagh Mor, M20, 14.viii.69 (ECP, Roy. Scot. Mus.).

*Knutsonia lineata* Fallén

This species is rather local in Britain and usually confined to bogs. In Ireland it is apparently quite common, especially in the west and has been collected in habitats other than bogs, including woodland, but is probably confined to acid soils.

Ireland (Walker, 1853; Verbeke & Knutson, 1967; Knutson & Berg 1967, indicated on distribution map from **Kerry, Down, Wicklow** and **Cavan**), **Down:** Holywood, J48 (Haliday, 1833). **Wicklow:** Arklow, T27, viii.40 (BPB, BM). The Murrough, T39, 25.viii.53, one male (AWS, Washington Museum). **Wexford:** Cahore, T24, 25.vi.70, maritime zone, 2 (RVW, BM). **N. Galway:** Belclare, M44, 5.viii.11 (PG, DM; Grimshaw, 1912). **W. Mayo:** Knappagh, M08, 3.viii.11 (PG, DM); Louisburgh, L88, (CM) (Grimshaw, 1912). **W. Galway:** Lough Muck, L76, 27.vii.67, peat bog; Kylemore Abbey

woods, L75, 16.vii.67 (CED, BM). **N. Kerry:** Glenflesk, W08, 29.vi.69; Killarney, V98, wood behind Muckross Abbey, 2.vii.69 and by Dinis Road, 2.vii.69, 2 (PJC). Killarney, V99, viii.40, 2 (BPB, BM). **S. Kerry:** Parknasilla, V76, 12-24.vii.01; Glencar, V78, 16.viii.01; Waterville, V56, 28.vii.01 (JWY, BM & DM). Kenmare, V97, 2.vii.01; Cloonee, V86, 3.vii.01 (JWY, BM) (all S. Kerry records; Yerbury, 1902, 'common and generally distributed'). **W. Cork:** Glengarriff State Forest, V95, 4.vii.69, 2 taken in oakwoods (PJC). **Donegal:** Rossnowlagh, G86, 2.vii.71 (MCS).

### *Hydromya dorsalis* Fabricius

Another fly which is common in marshy situations and probably generally distributed in Ireland.

Ireland (AHH, DM; Verbeke & Knutson, 1967; Knutson & Berg, 1963, indicated from **Cork** and **Kerry** on distribution map). **Down:** Holywood, J48 (Haliday, 1833). **Waterford:** Stradbally, X39, 22.vii.08 (HWA). **Roscommon:** Lough Ree, near Lecarrow, N05, 14.v.70, by spring on shore (PJC). **W. Mayo:** Clare Island, L68, vii.10, one female (PG, DM); one male (CM) (Grimshaw, 1912). Lough Conn, G10, 30.v.71 (MCS). **W. Galway:** Ballynahinch, L74, 1896 (JNH, DM). **Clare:** Ballyvaughan, Lough Rask, M20, 3-8.vii.50 (RLC, BM). **N. Kerry:** Killarney, V99, vii.43 (BPB, BM). Cahernane, V98, 19.vii.43 (BPB, HWA coll.). **S. Kerry:** Kenmare, V97, 30.vi. & 2.vii.01 (JWY, BM & DM; 'rare', 'a male taken at Kenmare. June 30, had three immature ticks attached to the thorax near the base of the wings'; Yerbury, 1902); 27.vii.08 (HWA; Andrews, 1914). **W. Cork:** Glengarriff, V95, 13, and 20.vi.01 (JWY, BM & DM; Yerbury, 1902, 'rare'); 4.viii.24 (JNH, DM). **Dublin:** Dublin, 013, 18.viii.95 (2, JNH; DM).

### *Limnia unguicornis* Scopoli

Flies of the genus *Limnia*, in Britain, are very common in all types of open habitats from marsh to limestone grassland and may also be found, though less frequently, in woodland situations. There are many Irish records but I have not taken any there myself. There has been some speculation in recent literature (Collin, 1966 & 1967; Kidd, 1967) regarding the existence of a second species of the genus, *L. paludicola* Elberg, in Britain. Mr. L. N. Kidd, who has advocated the distinctness of *paludicola*, examined some males from my own and the H. W. Andrews collections some time ago and identified one of the latter, taken by B. P. Beirne at the Glen of the Downs in Co. Wicklow, 8.vi.40, a wooded locality, as *L. paludicola*, while the only other Irish specimen among them, taken by Beirne near Killarney, was typical *unguicornis*. Mr. J. E. Collin (*op. cit.*) was not convinced of the existence of *paludicola* and the matter has not yet been fully resolved in print, although Dr. L. V. Knutson tells me (*in litt.*, 19.vii.71) that he finds the genitalic differences upon which these species were based are consistent, although very slight, and he had seen no intermediates. He believes it would be best to recognise the species as distinct. As the other materials on which the Irish records are based has not yet been critically re-examined from this view-point, I have listed all *Limnia* records together under *unguicornis* until such time as the specimens, which are all in either the National Museum, Dublin or the British Museum (N.H.), can be confidently assigned to one or the other of these possible species of the genus.

Ireland (AHH, 2, one labelled '*rufifrons*', DM); Verbeke & Knutson, 1967, both *paludicola* and *unguicornis* indicated as probably occurring in Ireland). **Down:** Holywood, J48 (Haliday, 1833, as *Tetanocera rufifrons*). **Meath:** Laytown, 017 (no date or collector, DM). **Cavan:** Drumcarban, N39, 7.vi.53 (RLC, BM). **Wicklow:** Arklow, T27, viii.40 (BPB, BM). Glen of the Downs, 021, 8.vi.40 (BPB, in HWA coll.; Beirne, 1943; one male det. *L. unguicornis* by H. W. Andrews and *L. paludicola* by L. N. Kidd). **Kildare:** Lullybeg, N71, 4.vi.70, 2, rank vegetation by dykes (RVW, BM). **W. Mayo:** Achill Island, F60, vi.09 (? JNH, DM) (Grimshaw, 1912). **N. Galway:** Clonbrock, M73, 1896 (? JNH, DM). **Clare:** The Burren, Kilnaboy, R29, no date (RLC, BM); Fanore,

M10, 7.vi.70, 4, at sea-level (rvw, BM). **N. Kerry:** Killarney, Flesk, W08, 2.viii.40 (BPB, in HWA coll.; Beirne, 1943; one male det. *L. unguicornis* by both H. W. Andrews and L. N. Kidd). **S. Kerry:** Cloonee, V86, 3.vii.01; Loo Bridge, V98, 29.vi.01 (JWY, BM). Kenmare, V97, 30.vi./7.vii./23.viii.01 (JWY, in BM & DM; Yerbury, 1902, 'not common'); 1-5.vii.07, 26.vii.-1.viii.08 (Andrews, 1914). **W. Cork:** Glengariff, V95, 14./15.vi.01 (JWY, in BM & DM; Yerbury, 1902, 'not common'). **Donegal:** Rosstown, G86, 2.vii.71 (MCS).

### *Renocera pallida* Fallén

This fly, locally common in England, is addicted to shady situations and is often taken by sweeping ground vegetation in woods. It is easily overlooked and my captures suggest that it is widespread in Ireland and it is probably not uncommon in suitable localities.

**S. Kerry:** Parknasilla, V76, 24.vii.01; Kenmare, V97, 1.ix.01 (JWY, latter in DM; Yerbury, 1902, 'rare'). **Wicklow:** Arklow, T27, viii.40 (BPB, BM). Glendalough, T19, 8.vii.69, above the Poll an Easa waterfall in deciduous woodland (PJC). **Clare:** above Lough Inchiquin, R28, 20.v.70, two in hedge-bank (PJC). **Sligo:** Glen of Knocknarea, G63, 13.v.70, wooded limestone gorge (PJC).

### *Renocera striata* Meigen

This is a rather scarce species, added to the British List in 1910 on Scottish specimens. Grimshaw (1912) recorded it as new to Ireland on a pair, now in the Dublin Museum, but that collection also included two specimens of *striata* taken in Ireland by Haliday, which have been determined by Mr. J. E. Collin.

Ireland (AHH, 2 males, DM). **W. Mayo:** Ballin & Cool Barren Loughs, M08 (one of each sex; PG, DM; Grimshaw, 1912, locality given as 'Lough near Westport').

### [*Euthycera fumigata* Scopoli

This fly is not uncommon on calcareous ground, including beechwoods, and chalk scrub and grassland, in southern England. Stephenson & Knutson (1970) indicated its occurrence in Co. Down. This record was, however, based on Haliday's (1833) reference to *Tetanocera rufifrons* and I found his specimens of *rufifrons* to be *Limnia unguicornis* (q.v.). *E. fumigata* should, therefore, be deleted from the Irish list until fresh material is discovered in Ireland.]

### *Tetanocera arrogans* Meigen

Haliday took this species in Ireland but it has apparently not been found there more recently. The species of *Tetanocera* are all of very similar appearance in the field and the less common members of the genus are easily overlooked. The absence of *arrogans* from the extensive material of the genus which has now been collected in Ireland does, however, suggest that it is genuinely scarce or local there.

Ireland (AHH, DM; one male under *elata*; the one specimen labelled *arrogans* on which the published record may be based was *robusta* (q.v.)). **Down:** Holywood, J48 (Haliday, 1833).

### *Tetanocera punctifrons* Rondani

One female in the Dublin Museum collection apparently belongs to this species, not previously recorded from Ireland, but the acquisition of other material, including males, would be desirable as confirmatory evidence of its occurrence there.

**Clare:** Cratloe, R56, 1895, one female (JNH, DM).

*Tetanocera robusta* Loew

This, the largest of British *Tetanocera*, is probably widely distributed and not uncommon on open marshy ground in Ireland, but in the older literature it is much confused with *T. ferruginea*. Yerbury (1902) and Grimshaw (1912) recorded both species but examination of their specimens has shown that both misidentified specimens of *T. ferruginea* as *T. robusta*, although Yerbury's published records of *robusta* were correct. Of the W. Mayo records given by Grimshaw for *robusta*, however, the Knappagh and 'Lough near Westport' specimens are in the Dublin Museum and are *ferruginea*. It has not been possible to re-examine the Louisburgh, Westport, Castlebar Lough and Clogher specimens and these records must therefore be regarded as dubious at present.

Ireland (AHH, 2 one, labelled 'arrogans'; DM) (Verbeke & Knutson, 1967). ? **Dublin**: River Corrib, ?, 10.xii.03 (JNH, DM). **Dublin**: Santry, 013, 24.v.93 (JNH, DM). **Wexford**: Cahore, T24, 25.vi.70, maritime zone (RVW, BM). [**W. Mayo**: Louisburgh, L88, one female (CM); Westport, L98, one female on riverside; Castlebar Lough, M18, one female; Clogher, M17, one male and three females (PG) (Grimshaw, 1912)] **W. Galway**: Lettergesh, L76, 19.vii.67 (CED, BM). **S. Kerry**: Loo Bridge, V97, 6.vii.01 (JWY, BM; Yerbury, 1902, 'rare'). **W. Cork**: Glengariff, V95, 12.vi.01, one of each sex (JWY, DM; Yerbury, 1902, 'rare'). (Collin, 1910, and Halbert, 1915, referred to Yerbury's captures of *T. robusta*). **Donegal**: Rossnowlagh, G86, 2.vii.71, two males and a female (MCS).

*Tetanocera ferruginea* Fallén

Although Yerbury (1902) referred to this fly as 'apparently uncommon' the records which have accumulated, particularly from the Dublin Museum collection, suggest that it will be found as common and widespread in marshy localities in Ireland as it is in Britain, only *T. hyalipennis* v. Röser perhaps exceeding it in numbers in some districts. It is curious that Haliday did not record *ferruginea* and there is no material of it surviving in his collection.

Ireland (Walker, 1853; Verbeke & Knutson, 1967). **Dublin**: Dublin, 013, 9.vi.95, two (JNH, DM). **Wicklow**: Roundwood, 010, 1909 (JNH, DM). **Louth**: Dundalk, J00, 8.vii.93 (JNH, DM). **Westmeath**: Athlone district, N04, 1899. (? JNH, DM). **Kildare**: Clogheen, N61, 5.vi.70, boggy pasture, 250' (RVW, BM). **W. Mayo**: Knappagh, M08, 3.viii.11, 2; Ballin and Cool Barren Loughs, M08, 1.viii.11 (PG, DM; the latter and one of the Knappagh specimens were labelled '*robusta*' and recorded as such by Grimshaw, 1912; he recorded the other Knappagh specimen as *ferruginea*). Louisburgh, L88, one male (CM; Grimshaw, 1912). Crossmolina, G11, 30.v.71; Glen Glassra, G04, 29.v.71; Lough Conn, G10, 30.v.71 (MCS). **Clare**: Cratloe, R56, 1895; Killaloe, R77, 1895 (? JNH, DM). **Tipperary**: Hayes Island, M80, 11.vi.21 (JNH, DM). **S. Kerry**: Ventry, Q30, 21.v.94 (JNH, DM). Loo Bridge, V97, 29.vi.01; Waterville, V56, 26.vii.01 (JWY, BM; the latter labelled '*robusta*'; Yerbury, 1902). Caragh Lake, V79, 13.viii.01 (JWY, DM; Yerbury, 1902). Glencar, V78, 16.viii.01 (Yerbury, 1902). Kenmare, V97, 29.vi.01 (JWY, DM & BM, latter labelled '*robusta*'). **W. Cork**: Ardroom, V75, 20.vii.01 (JWY, BM; Yerbury, 1902). **Monaghan**: Lough Muckno, H81, 15.vii.71 (PJC).

*Tetanocera silvatica* Meigen

Recorded by Haliday (1833) from Holywood, Co. Down, included in all his subsequent manuscript lists and quoted from Ireland, on his authority, by Walker (1853). As there are, however, no specimens in Haliday's collection and the correct recognition of *silvatica* depends on the examination of the male genitalia, it must at present be deleted from the Irish list. *T. silvatica* is superficially similar to *T. freyi* which I have recently added to the Irish List and future collecting may well turn it up in Ireland.]

*Tetanocera freyi* Stackelberg

This species, only recently added to the British List by Dr. M. C. D. Speight, was taken in Ireland by me during 1969 and a full account of my captures has already been published (Chandler, 1971). A female collected at Glen Glassra, Co. Mayo, on 29.v.71 by Dr. M. C. D. Speight belongs to the *silvatica-freyi* group and may be this species. Dr. L. V. Knutson tells me (*in litt.*, 19.vii.71) that he has recently regarded *freyi* as not specifically distinct from *silvatica* and it was not recognised in the account of the British Sciomyzidae by Stephenson & Knutson (1970) for that reason. He has now, however, re-examined many specimens of the complex and has found the genitalic differences to be consistent, having seen no intermediates and now believes it would be best to recognise these species.

**N. Kerry:** Killarney, Ross Bay, V98, 30.vi.69, one of each sex on *Phragmites* by lake shore (PJC). **S. Kerry:** Lough Caragh, V79, 3.vii.69, one female of *silvatica* or *freyi* group in marshy field (PJC). **W. Mayo:** Glen Glassra, G04, 29.v.71, one female of *silvatica-freyi* group (MCS).

*Tetanocera unicolor* Loew

A few specimens of this rather small *Tetanocera* of undistinguished appearance were found in Ireland by earlier collectors, the most recent capture being in 1911. All records with definite locations are from the western sea-board counties. The fly is rather uncommon and local in Britain.

Ireland (AHH, 2 in DM, both det. by J. E. Collin (Verbeke & Knutson, 1967). **W. Mayo:** Clare Island, L68, vii.10, one male; Clogher, M17, 7.viii.11, one female (PG, DM). Ballin and Cool Barren Loughs, M08, 1.viii.11, one male (PG, Roy. Scot. Mus.). Louisburgh, L88, one female (CM) (Grimshaw, 1912, all Mayo records). **S. Kerry** Cloonee, V86, 3.vii.01 (JWY, DM; Yerbury, 1902, 'only specimen'). **W. Cork:** Glengariff, V95, vi.01 (JWY, BM; labelled '*elata*').

*Tetanocera hyalipennis* v. Röser

This is one of the commonest marshland *Tetanocera* in the British Isles and will no doubt prove to be equally common in Ireland.

Ireland (AHH, DM) (Verbeke & Knutson, 1967). **Dublin:** Lambay Island, 035, vi.05, two; Howth, 023, 1909 (JNH, DM). **Wicklow:** Arklow, T27, viii.40 (BPB, BM). **Wexford:** Cahore, T24, 4.vi.70, maritime zone (RVW, BM). **Kildare:** Lullybeg, N71, 4.vi.70, rank vegetation by dykes (RVW, BM). **Waterford:** Stradbally, X39, 22-30.vi.07 (Andrews, 1914, as *T. laevifrons*). Tramore, S50, 7.vii.18 (RES, DM). **W. Mayo:** Clare Island, L68, 11.vi.09 (JNH, DM). Louisburgh, L88 (CM) (both records; Grimshaw, 1912, as *T. laevifrons*). **N. Kerry:** Killarney, Ross Island, V98, 30.vi.69 (PJC). **S. Kerry:** Parknasilla, V76, 13./17.vii.01 (JWY, BM & DM; Yerbury, 1902, as *T. laevifrons*). Kenmare, V97, 1901 (JWY, DM). **W. Cork:** Glengariff, V95, 12-21.vi.01 (JWY, BM & DM; Yerbury, 1902, 'very common'; as *T. laevifrons*). **Donegal:** Rossnowlagh, G86, 2.vii.71 (MCS).

*Tetanocera elata* Fabricius

This and the next species occur in drier situations than the other members of the genus. They are only separable from each other by reference to the male genitalia, although they differ widely in their biology, the larvae of *T. elata* being confined to parasitism followed by predation of slugs (Knutson, Stephenson & Berg, 1965) while *T. phyllophora* larvae attack various species of snails.

As *T. phyllophora* was only recognised recently as a distinct British species, the earlier authors confused the two species under the name *elata*. The specimens recorded by Yerbury (1902) and Andrews (1914) as *T. elata* have been found in both cases to include *phyllophora*. Some other published records (e.g.: Haliday,

1833; Foot, 1871; Beirne, 1943; and some of those given by Yerbury, 1902 and Grimshaw, 1912) either refer to females or the specimens have not been seen and they must consequently remain doubtful. *T. elata* is much the commonest species in Britain, occurring chiefly on open ground, and is probably very common throughout Ireland; for this reason I have included all records here unless proved to belong to *T. phyllophora*. Records requiring confirmation are italicised in square brackets.

[Ireland (AHH, DM, one female) (Foot, 1871). **Down:** *Holywood*, J48 (Haliday, 1833). **Wicklow:** *Glenart*, T27, 25.vii.40 (BPB, det. H. W. Andrews; Beirne, 1943). *Glencree*, 011, 7.vii.09, by river below barracks, one female (PJC).] Arndown,?, 25.vii.50, one male (AWS; Washington Museum) Bray, 021, v.-vii.40; Enniskerry, 021, vii.40, 3 (this record was responsible for the Wexford record indicated by Knutson & Stephenson, 1970; the locality was in Co. Wicklow and the Wexford record must be deleted until authentic material of *elata* has been collected in that county); Mizen Head, T37 viii.43 (BPB, BM). **Waterford:** *Stradbally*, X39, 8.viii.06, male (HWA; Andrews, 1914). **W. Mayo:** Westport, riverside, L98, 28.vii.11, one male (PG, DM). [*Westport, in garden*, L98, one male (PG); *Ballin and Cool Barren Loughs*, M08, one female. (PG, DM).] **N. Kerry:** Killarney, V99, vii.48 (BPB, DM). **S. Kerry:** [*Kenmare*, V97, 27.vi.01; *Parknasilla*, V76, 12.vii.01 (Yerbury, 1902).] Waterville, V56, 28.vii.01 (JWY, BM; Yerbury, 1902, 'common'). Lough Caragh, V79 3.vii.69, in field near lake, one male (PJC). **W. Cork:** Ardgroom, V75, 20.vii.01 (JWY, BM; Yerbury, 1902). Glengarriff, V95, 4.viii.24, one male (JNH, DM); [12, 14 & 15.vi.01 (Yerbury, 1902; male in BM was *phyllophora* but also female in DM).] **Dublin:** Santry, 013, 5.viii.1893, one male (JNH, DM).

#### *Tetanocera phyllophora* Melander

I discussed the occurrence of this species in Ireland in my recent account of *T. freyi* (Chandler, 1971). Four males and a female taken *in copula* with one of them are the only definite Irish material to date. It is a parasite of terrestrial snails and is more of a woodland species than *T. elata* (Knutson, 1970b).

**S. Kerry:** Kenmare, V97, 1.vii.07, pair *in copula* and one other male (HWA; Andrews, 1914, as *T. elata*). Rossacroonalloo Wood, W07, 29.vi.69, one male (PJC). **W. Cork:** Glengarriff, V95, vi.01 (JWY, BM; Yerbury, 1902, as *T. elata*).

#### *Sepedon spegea* Fabricius

This striking black fly with red legs is not uncommon in coastal and inland marshes and is probably generally distributed in Ireland.

Ireland (Walker, 1853) (Verbeke & Knutson, 1967). **Down:** *Holywood*, J48 (Haliday, 1833). **Dublin:** Portmarnock, 024, viii.93 (JNH, DM). **Wicklow:** The Murrrough, T39, 19.ix.26, 2 (AWS, DM). **Kildare:** Naas, N81, 4.vi.53 (RLC, BM; Neff & Berg, 1966, indicated on distribution map). **Kilkenny:** Thomastown, S54, 1901 (JNH, DM). **Westmeath:** Mullingar, N45, 1901 (JNH, DM). **Monaghan:** Lough Muckno, H81, lakeside marsh, 15.vii.71 (PJC). **Roscommon:** Lough Key National Forest Park, G80, 11.v.70 (PJC). **Leitrim:** Lough Rinn, N19, 10.v.70, on shore of Lough (PJC). **Armagh:** Armagh, H84, 7.viii.89 (WFL, DM). **W. Mayo:** Clogher, M17, 7.viii.11, one female (PG, DM; Grimshaw, 1912). **W. Cork:** Glandore, W23, 7.vi.00 (JNH, DM). Cape Clear Island, V92, 22.vii.63 (D. J. Carter, BM). **Wexford:** Curraclloe, T02, 17.vii.37, one male; Ballinesker, T02, 25. vii. 37, one female (AWS; Washington Museum).

#### *Sepedon spinipes* Scopoli

This species is almost equally common with *S. spegea* in southern England and it seems extraordinary that so few specimens have as yet been taken in Ireland.

Ireland (Walker, 1853, as *S. haeffneri*). **Down:** *Holywood*, J48 (Haliday, 1833, as *S. haeffneri*, but of 2 specimens in Haliday's coll. one unlabelled specimen was *spinipes* but the other, labelled *haeffneri*, was *Elgiva rufa* (q.v.); neither had any indication of the

country of origin). **Dublin:** Raheny, 023, vi. 194 (JNH, DM). **Waterford:** Cappelquin, X19, 5.viii.02 (JNH, BM).

### *Trypetoptera punctulata* Scopoli

This rather prettily marked fly is sufficiently striking to be often collected by entomologists other than dipterists, so that the records detailed below probably give a false impression of its abundance relative to some of the less frequently collected species of the family, such as those of *Tetanocera*. It prefers calcareous habitats but is not confined to them and it seems to be generally distributed in Ireland.

Ireland (Walker, 1853, as *Tetanocera hieracii*). **Down:** Holywood, J48 (Haliday, 1833, as *T. hieracii*). **Dublin:** Dublin, 013, 28.vii.95, 3; Howth, 023, 1910; Santry, 013, 14.vi.93 (JNH, DM). **Wicklow:** Dunran, 020, 1.v.42 (BPB, det. H. W. Andrews; Beirne, 1943). Mizen Head sandhills, T37, 17.viii.43 (BPB, HWA coll.). Buckronev, T27, 24.vi.48; Glen Imaal, S99, 2.vii.50, one female (AWS; Washington Museum). Glenart, T27, viii.43, 2 (BPB, BM). Poulaphouca, N91, 11.vii.69 (PJC). **Kildare:** Ardsull Mote, S79, 10.vii.69, 11.vii.71, beechwoods (PJC). Landenstown, N82, 16.v.48; Grand Canal, N82, 14.vi.42 (AWS; Washington Museum). **Wexford:** near Wexford, T02, 1900 (JNH, DM). **W. Mayo:** Westport, L98, 18.vi.09 (? JNH, DM; Grimshaw, 1912). **E. Mayo:** Hollymount, M26, 27.ix.22 (WR, DM). **Clare:** Ballyvaughan, M20, 11-17.vii.95 (G. H. Carpenter, DM; Carpenter, 1895), near Ballyvaughan, Newtown Castle, M20, 5-7.vii.60 (RLC, BM). Ballyvaughan, Caher River, M20, 2.ix.63 (ECP, Roy. Scot. Mus.). Roughan House, R29, 15-29.ix.60 (Lansbury, 1965). Burren, M10, 27-29.viii.59, male and female at bases of *Hieracium* on limestone pavement (Richards, 1961). **S. Kerry:** Kenmare, V97, 28.vi.01 (JWY, BM & DM); Parknasilla, V76, 12.vii.01 (JWY, BM) (Yerbury, 1902; 'uncommon'). **W. Cork:** Glengarriff, V95, 19.vi.01 (JWY, BM; Yerbury, 1902); 16.vii.24 (JNH, DM). Shot Head to Trafrask, V84, 17-18.vi.70 (RVW, BM). **Monaghan:** small wood near Lough Fea, H80, 15.vii.71 (PJC).

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## PROCEEDINGS

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### ANNUAL EXHIBITION

30th October 1971

The Annual Exhibition was again held in the Conversazione Room at the British Museum (Nat. Hist.). There were fewer exhibitors (about 70) than last year; but the attendance seemed to be higher and the display was generally thought to be a good one. The standard of presentation continues to rise, with more pertinent labelling, better indications of points of interest and in some cases skilful use of photographs and maps. But a minority of exhibits still consist of serried rows of insects about which the only visible information is something like 'taken or bred by Mr. X in 1971'. These may have some aesthetic interest, but little else. Good notes for the record are also desirable. Some of those provided were very slight, and half-a-dozen exhibitors failed to hand in any at all. If their exhibits are ignored or misdescribed, in this account, they have only themselves to thank.

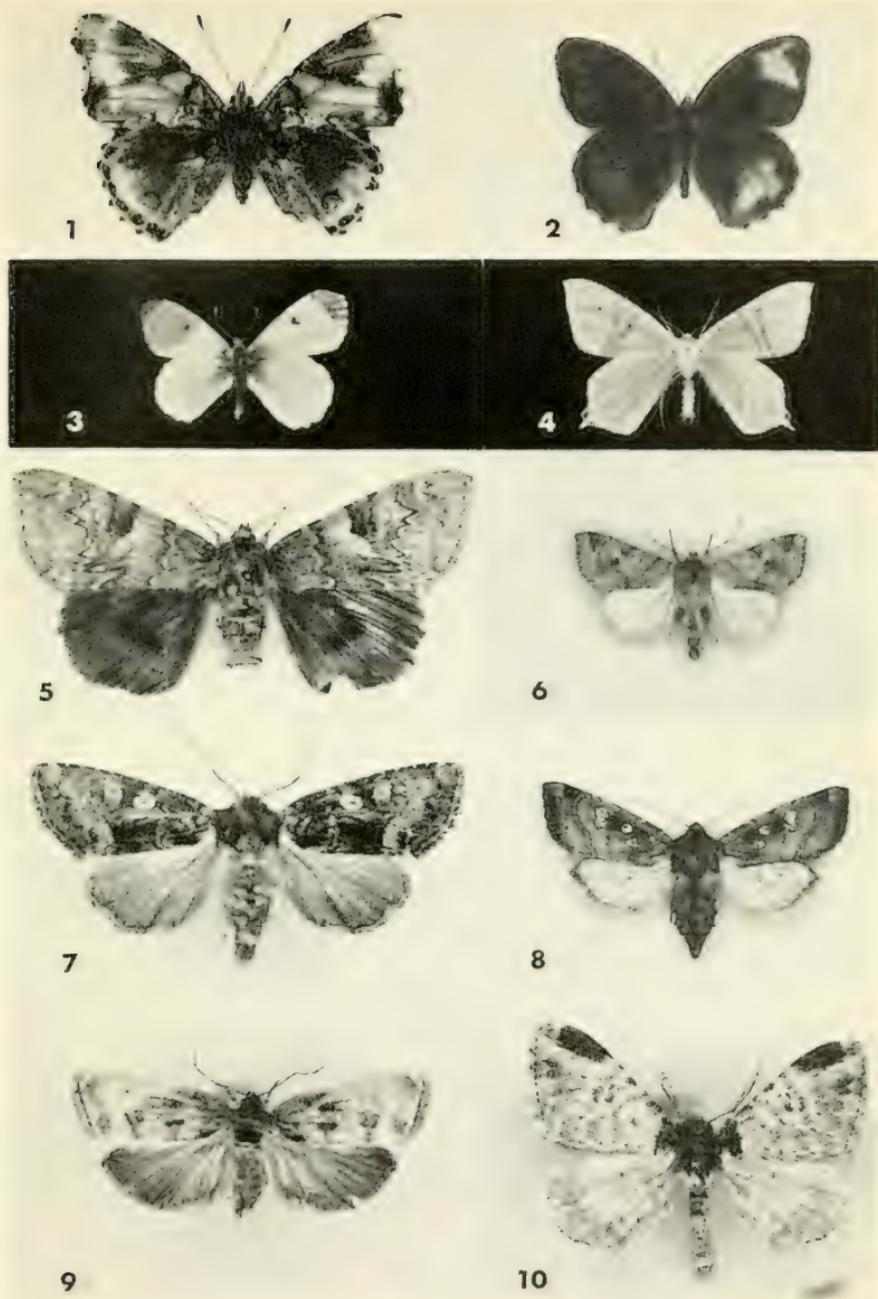
Among the macrolepidoptera the highlight was provided by two species only recently discovered as residents in Britain—the green 'pug' *Chloroclystis chloerata* Mab. and the noctuid *Gortyna borelii* Pierret (Pl. I, fig. 8). Of the first Mr. E. C. Pelham-Clinton showed a pair which he had bred from larvae obtained while beating blackthorn in Surrey, 16.iv.71; a skilful as well as fortunate achievement, since he suspected the identity of the larvae before the adults emerged. Of the second, whose presence in Britain was announced in February last, Messrs. J. M. Chalmers-Hunt and G. M. Haggett, and also Mr. B. F. Skinner, exhibited series bred from wild larvae, and Mr. Austin Richardson showed 16 examples which had been caught as adults. An interesting feature was the greater average size of the bred specimens. Such differences can only be observed from series of some length. Many members felt, however, that too many examples had been taken, by these and other collectors together, of a species whose only known foodplant is extremely local. Great restraint should certainly be used in any further collecting of this species, at least until more localities have been found.

The rarer immigrants have been conspicuously few in 1971. The only ones shown were a fine *Celerio galii* Rott. taken by Mr. B. F. Skinner at Sandwich, Kent, 21.vii.71, and a *Herse convolvuli* L. by Mr. T. W. Harman at Pwllheli, Caern., 25.viii.71. Mr. W. G. Kittle showed long series of *Cosymbia pupillaria* Hübn. which he had bred in several generations from eggs laid by an immigrant taken in 1969; and Dr. M. W. Harper a mottled *Enargia paleacea* Esp., very different from the native form, caught at Ledbury, Herefordshire, in 1968 (Pl. I, fig. 6).

Selections of macrolepidoptera mainly from particular places in the British Isles were exhibited by Mr. R. F. Bretherton (Badenoch, Inverness-shire), Mr. R. G. Chatelain (the Highlands), Mr. H. E. Chipperfield (Suffolk and the Isle of Mull), Mr. G. R. Else (Hampshire), Dr. M. Harper (Herefordshire), Mr. R. J. Revell (Cams., Merioneth and the Lake District), Brig. E. C. L. Simson (Zygaenidae from Wiltshire) and Dr. C. G. M. de Worms (Orkney). Among these were several probable new county records: *Plusia jota* L. from Badenoch, *Euphyia luctuata* Schiff. for Cams., *Deilephila ribeata* Clerck from the Lake District, *Hadena suasa* Schiff. and *Ectropis consonaria* Hübn. for Merioneth. Mr. and Mrs. Greenwood also showed a remarkable dark *Rhyacia simulans* Hufn. taken at Pyrford, 26.viii.71, which is certainly new to western Surrey. Mr. B. Goater and Mr. R. I. Lorimer gave a fine illustration of geographical variation in comparative series of *Hadena confusa* Hufn. (*conspersa* Schiff. & Denis) from Shetland, Orkney, Rathlin Island, the Chilterns and Dungeness.

Notable aberrations, mostly of Rhopalocera, were shown by more than 20 exhibitors; only a few can be individually mentioned. The most spectacular were perhaps a *Vanessa atalanta* L. ab. *klemsiewezy* Schille caught by Mr. R. M. Craske in Sussex, 29.vii.71 (Pl. I, fig. 1), and a very rare *Catocala nupta* L. with brown hindwings taken by Mr. P. A. Sokoloff at Orpington, Kent, 21.viii.71 (Pl. I, fig. 5). A complete gynandromorph *Anthocharis cardamines* L. shown by Mr. B. W. Weddell on behalf of Mr. Michael Hale (Pl. I, fig. 3), a *Comibaena pustulata* Hufn. thinly covered with reddish scales, by Mr. F. S. Reeves, and a pale brown male *Maniola jurtina* L. by Mr. P. C. N. Dean, were also very striking. Selected aberrations were also shown by Messrs. A. D. A. Russwurm and H. G. M. Middleton, including a remarkable series of *Erebia aethiops* Esp. from Westmorland, by Mr. K. E. J. Bailey, a visitor, by Mr. F. W. Smith, by Major A. E. Collier, by Mr. L. W. Siggs, by Mr. J. H. Payne and by Maj.-Gen. C. G. Lipscombe. An extreme suffused form of *Xanthorhoe fluctuata* L. was exhibited by Mr. T. W. Harman on behalf of Mr. B. Statham from Matlock (Pl. I, fig. 10); and Mr. A. S. Wheeler, a nice straw-coloured *Polygonia c-album* L. and a *Limenitis camilla* L. ab. *seminigrina* Tutt. There were also several illustrations of the possibilities of selective breeding. Mr. and Mrs. R. Watson, among many other good things, continued the saga of the red forms of *Callimorpha jacobaeae* L.; Dr. M. W. Harper showed fine series of bred *Alcis repandata* L. f. *conversaria* Hübn. and f. *mendeli* Williams from Kinlochewe, also an aberration of *Ourapteryx sambucasia* L. (Pl. I, fig. 4). There were several drawers of various forms of *Abraxas grossulariata* L. from the British Museum (Nat. Hist.). Among the material shown by Mr. R. J. Revell was an interesting example of *Origia versicolor* (Pl. I, fig. 7). Mr. C. R. Haxby illustrated the differences between adults of *Lasiocampa callunae* Palmer whose larvae had been fed respectively on *Calluna* and on *Salix caprea* L. Mr. S. R. Bowden showed a startling, probably static, form of *Pieris napi* L. derived from crossing hybrid *oleracea* Harris from the U.S.A. with European *P. napi* L.; it is shortly to be described by Dr. Lorkovic. Mr. R. Tubbs showed a distinctive univoltine race of *Polyommatus icarus* Rott. bred from eggs sent in 1970 from Orkney. Apart from these special results, the beauty of bred specimens was well shown in a large exhibit by Mr. D. O'Keefe.

More than a dozen exhibits were wholly or partly of non-British macrolepidoptera. They ranged geographically from a magnificent show of nearly all the special Arctic butterflies of Sweden and Norway, including the elusive *Clossiana chariclea* Schneider and *Oeneis bore* Schneider, by Mr. Mark Shaw; to Hesperidae from the British Virgin Islands, by Mr. and Mrs. Greenwood; a selection



ANNUAL EXHIBITION, 30th October 1971

1. *Vanessa atalanta* L. ab. *klemsiewezy* Schill., Mr. R. M. Craske; 2. *Maniola jurtina* L., Mr. J. A. C. Greenwood; 3. *Anthocharis cardamines* L. gynandromorph, Mr. M. Hale; 4. *Ourapteryx sambucaria* L., Dr. M. W. Harper; 5. *Catocala nupta* L., Mr. P. A. Sokoloff; 6. *Enargia paleacea* Esp., Dr. M. W. Harper; 7. *Oligia versicolor* Borkh., Mr. R. J. Revell; 8. *Gortyna borelii*, B. Skinner; 9. *Hedya nubiferana* Haw., Col. A. M. Emmet; 10. *Xanthorhoe fluctuata* L., Mr. B. Statham.



of Sphingidae from Jamaica and Colombia by Mr. T. J. D. Homer; and butterflies from Bolivia and Peru by Mr. P. W. Cribb. In between, Mr. W. G. Tremewan showed *Zygaena* species from Iran, including *Z. escalerai* Pujade, which had not been seen since its original discovery in 1899. From the Greek Peloponnese, Mr. R. F. Bretherton and Dr. C. G. M. de Worms showed examples of the lycaenid *Agro diaetus coelestina* Eversman, previously known only from the Russian steppes, the Caucasus and Iran, and also of the rare *Philotes bavius* Eversman and of *Cyaniris helena* Staud., which is peculiar to the Peloponnese. Mr. Bretherton also showed series of *Maniola telmessia ornata* Turatt from Rhodes, *M. cypricola* Graves from Cyprus, and *M. jurtina* L. from Crete; and Dr. de Worms and Maj.-Gen. Sir George Johnson showed big selections of Rhopalocera from the Eastern Alps, including local species such as *Leptidea morsei* Penton, *Mellicta asteris* Frr., *Neptis sappho* Pall., *Erebia styx* Frr. f. *trentae* Lork., *Pyrgus sifanicus* Gr. Grsh. From France Mr. E. N. Archer and Miss Marie Louise Archer showed, among other species, interesting second-brood specimens of *Lycaena dispar* Haw. ssp. *carueli* Le Moul. Though there was this year nothing from Spain, Mr. C. D. Warren-Smith had some Rhopalocera from Andorra. An unusual aberration of *Maniola jurtina* L. with large white patches on the right fore- and hindwings (Pl. I, fig. 2) was shown by Mr. J. A. C. Greenwood.

Photographs and paintings were much in evidence. Mr. P. Calderara had some fine photographs of the larvae of *Charaxes jasius* L. Mr. R. Revels supported his exhibit of aberrations with colour prints, especially of *Lysandra coridon* Poda and *Aphantopus hyperantus* L.; a photograph of the latter was also shown by Mr. J. H. C. Phillips. Mr. E. A. Sadler skilfully interspersed his exhibit of Lepidoptera from the Burren, Co. Clare, with colour prints showing the terrain on which they were found. Mr. F. D. Buck produced some of the original proofs of the colour plates in Frohawk's *Natural History of British Butterflies*. Mr. C. Threadgall and Mr. B. Hargreaves showed, respectively, paintings of the larvae of British burnets and of the adults of some British Tortricidae which they had made for forthcoming publications. Finally, as in previous years, Mr. J. Heath presented an elaborate display of maps and documents to show the progress made by the Biological Records Unit's survey of British macrolepidoptera and by the parallel enterprise in Belgium.

It was pleasing to see that the microlepidoptera are yearly gaining more attention. There were at least 12 exhibits that contained micros, or some reference to them.

A number of interesting things originated from Kent, *Ethmia bipunctella* F. being one of them. Bred specimens of this striking insect from Dungeness and Lydd were shown by Mr. W. G. Kittle and Col. A. M. Emmet, who also exhibited the rarely seen *Ethmia terminella* Fletch. from Lydd, and bred specimens of *Cosmopteryx eximia* Haw. from Bexley. Mr. J. M. Chalmers-Hunt showed *Phtheochroa rugosana* Hübn. bred from berries of *Bryonia dioica* Jacq. taken at Dartford, *Bucculatrix crataegi* Zell. bred from larvae on hawthorn collected at Dartford Heath and a specimen of *Etainia decentella* H.-S. taken in a mercury-vapour trap at West Wickham; an uncommon neptidulid, and apparently difficult to come by. Specimens of *Pyrausta funebris* Stroem., taken on the field meeting at East Blean in May, were shown by Mr. J. Roche. Two *Coleophora* species exhibited by Mr. E. S. Bradford were collected as larvae in 1969 and emerged in 1971, taking two years to complete their life cycle. They were *Coleophora virgaureae* Staint. from Ham Street, and *C. glaucicolella* J.H.W., bred from *Juncus articulatus* L., taken at Dungeness. Mr. Bradford also showed

several specimens of *Blastobasis decolorella* Woll. bred from moss growing on a wall at Folkestone, perhaps the first specimens bred from larvae taken in the wild.

From Surrey, Mr. S. Wakely exhibited specimens of *Coleophora wockeella* Zell. from Dunsfold. *C. wockeella* was rediscovered in Surrey in 1968 after a lapse of many years. Also from this area came specimens of *Tischeria dodonaea* Heyd. shown by Col. Emmet. Several members collected oak leaves containing larvae of this moth, but few were bred as it proved to be heavily parasitised. Mr. R. F. Bretherton bred or captured specimens from Bramley included *Acleris comariana* Zell., *Phalonia cnicana* Westm. and *Ptycholomoides aeriferana* H.-S., a moth that has spread in recent years, since its discovery in Kent in 1952 by Dr. Scott. Col. Emmet showed the interesting *Elachista unifasciella* Dup.; the moths were bred and came from Featherbed Lane, Addington, Surrey. Mr. Roche and Col. Emmet both exhibited Chobham specimens of *Xenolechia aethiops* Westw. and Mr. Bradford a bred specimen of *Dioryctria abietella* Schiff., also from Chobham. *Coleophora palliatella* Zinck. and the large black pistol cases from which they emerged were displayed by Mr. J. M. Chalmers-Hunt, and were discovered at Holmwood, near Dorking.

Specimens from Essex included *Dechtiria spinosella* Joan. This species is new to Britain and the moths shown were bred from larvae mining the leaves of blackthorn taken at Benfleet by Col. Emmet, who also showed *Stigmella ulmivora* Fol. from Saffron Walden with a note on three other species on elm, which, in Col. Emmet's opinion are conspecific with *S. ulmivora*. Mr. Bradford exhibited several *Scrobipalpa atripicella* F.R. taken at Stanford-le-Hope on the field meeting in July.

A number of interesting things exhibited came from Norfolk and Suffolk. Col. Emmet's *Coleophora clypeiferella* Hofm. from Icklingham was first recorded as British in 1954 and is very local, as is *Coleophora laripennella* Zett. from the same locality. *Laspeyresia zebeana* Ratz. shown by Mr. Chalmers-Hunt and Col. Emmet were bred from galls on larch, taking two years to reach maturity, and came from Elveden. *Grapholita internana* Guen. from Thompson, Norfolk, and a bred specimen of *Thiodia citrana* Hübn. from Tuddenham were exhibited by Mr. Bradford. Mr. H. E. Chipperfield showed amongst other things *Apomyelois neophanes* Durr., *Pediasia aridella* Thunb. and *Lozopera beatricella* Wals., all from Walberswick and all very local species, plus *Adela croesella* Scop. from Icklingham. Perhaps the most interesting exhibit was of *Coleophora tricolor* Wals. from East Wretham, Norfolk. Mr. Chalmers-Hunt exhibited specimens bred 9-12.vii.71. from larvae on *Acinos arvensis* (Lam.) Dandy taken 12.vii.70, together with the pre-hibernation cases (in *Acinos arvensis* seedheads) and post-hibernation cases (formed of a piece of *Dactylis glomerata* L. leaf). The specimens shown were the first (and only) examples so far bred.

Cambridgeshire produced some very good species including *Caloptilia rufipennella* Hübn. which is new to Britain and was bred by Col. Emmet from larvae in cone-shaped spinings on sycamore. Col. Emmet also showed the fourth and fifth British examples of *Stigmella paradoxa* Frey., first recorded as British in 1969. *Laspeyresia leguminana* Zell. from Wicken Fen were exhibited by Mr. Chalmers-Hunt, Col. Emmet and Mr. Bradford. The moth had not been seen or taken for many years. Other interesting species shown by Col. Emmet were *Adela croesella* Scop. which has not been observed in the Fen for a hundred years, and a moth that remained a puzzle until late in the day eventually proved to be an unusual form of *Hedya nubiferana* Haw. (Pl. I, fig. 9). Another noted capture of which little seems to be known, very few having been taken, was

*Pammene obscurana* Steph. From nearby Chippenham Fen. Col. Emmet exhibited *Phyllocnistis saligna* Zell., a moth locally common on willows but seldom seen in recent years.

Hertfordshire was represented by Mr. Bradford who exhibited *Infurcitinea argentimaculella* Staint. A well-established colony was found amongst lichen and moss in the Elstree area and is a new species to Herts. Specimens of *Herculia glaucinalis* L. and *Brachmia gervonella* Zell. came from Boreham Wood and from Hatfield; and he showed *Endothenia marginana* Haw.

Among the interesting species from Derbyshire shown by Mr. Roche were *Coleophora vitisella* Gregs., which has a two-year life cycle, feeding on *Vaccinium vitis-idea* L. and *Olethreutes mygindana* Schiff., *Rhopobota ustomaculana* Curt. and *Lithocolletis junioniella* Zell., also *Vaccinium* feeders. From Lancashire he exhibited the local *Glyphipterix haworthiana* Steph.

Three members exhibited species from Wales, Mr. H. N. Michaelis showed a number of *Acleris hastiana* L. bred from larvae in spun shoots of *Salix aurita* L. taken at an altitude of 900 feet in Snowdonia; and specimens of *Batia lambdella* Don., a moth local among gorse, also from Snowdonia. Two possible new records were of *Olethreutes bifasciana* Haw. taken in the Conway Valley and *Catoptria margaritellus* Hübn. from Anglesea. Other species of note were *Elachista magnificella* Tengst. from the Conway Valley, the mines being plentiful in leaves of *Luzula sylvatica* (Huds.) Gaud., and *Coleophora adpersella* Ben., originating from north Wales. Mr. Bretherton's exhibit came from Badenoch and included *Philedone gerningana* Schiff., *Olethreutes palustrana* Zell. and *Acleris maccana* Treits., the last bred from spun leaves of *Myrica gale* L. *Ochsenheimeria mediopectinatella* Haw., an interesting moth to breed, was shown by Mr. Chalmers-Hunt, who also exhibited two *Salebriopsis albicilla* H.-S. taken at St. Arvans, Mon., and a specimen of *Tubuliferola flavifrontella* Hübn. taken at mercury vapour light in June, also at St. Arvans.

From Tentamuir, Fife, Mr. Bretherton showed specimens of *Cnephasia octomaculana* Curt., *Zeiraphera ratzburgiana* Sax. and *Z. diniana* Guen.

Ireland was once again well represented. The Burren produced the fourth British specimen of *Trifurcula griseella* Wollf and was taken by Mr. Pelham-Clinton plus a bred specimen of the rare *Leucoptera orobi* Staint. Other specialities from this fascinating locality exhibited by Col. Emmet were *Nepticula dryadella* Hofm., *Coleophora ramosella* Zell., *C. pappiferella* Hofm., *Scrobipalpa murinella* H.-S., *Hypercallia citrinalis* Scop. and *Stenoptilia saxifragae* Fletch. Mr. Sadler also exhibited bred specimens of *S. saxifragae* as well as the local *Eana colquhounana* Barr. and *Notocelia incarnatana* Hübn. from the Burren.

Mr. S. N. A. Jacobs exhibited ink drawings of the interesting larval cases and feeding sites of *Coleophora salicorniae* Wocke and *C. tricolor* Wals. on show at the exhibition and Mr. Bradford presented several water-colour drawings of specimens of the Gelichiidae and Nepticuloidea.

Living material is always of special interest and this year the Zoological Society of London showed their usual varied and interesting selection of tropical spiders, centipedes, stick-insects and praying mantids. A rather striking exhibit was provided by Mr. G. L. Heath. This was of a number of living examples of praying mantids from Africa, Asia and South America.

Mr. G. R. Else exhibited an interesting case of Aculeate Hymenoptera taken in Hampshire during 1970-1. Of special note were examples of *Hedychridium integrum* (Dahl.), a parasite of *Astata stigma* (Klug) from Hayling Island; *Prosopis spilota* (Foerst.), Hayling Island; *Podalonia affinis* (Kirby), Hayling Island; and from the Breckland, *Macropis labiata* (F.).

The Hymenoptera Formicidae were exhibited by Mr. P. Boswell who showed *Myrmecina graminicola* (Lat.), *Leptothorax tuberum* (F.), *L. nylanderi* (Foerst.) and *Lasius brunneus* (L.).

Mr. A. Stubbs showed various methods of mounting Diptera and Mr. S. A. Williams the novel exhibit of drawings and photographs of his 'Autocatcher', a highly successful method of catching Coleoptera and other small insects in flight by means of a large net mounted on top of his car.

The pattern of previous years repeated itself as far as the Coleoptera were concerned; once again they were very sparsely represented. Mr. D. M. Appleton had a fine exhibit of 27 species which included four examples of the rare *Velleius dilatatus* F. (Staphylinidae) usually found in and around hornets' nests, but these occurred under the bark of oaks attacked by the moth *Cossus cossus* L. in the New Forest, Hants, 27-31.vii.71. There was also *Zyras haworthi* Steph. (Staphylinidae), also taken in the New Forest in flood refuse, though the normal situation for this beetle is in the nests of the ant, *Lasius fuliginosus* (Lat.), but flood refuse produces much that occurs in other habitats than refuse. This insect is probably new to Hants. Another interesting staphylinid was *Acylophorus glaberrimus* Herbst, taken in numbers and also shown by Mr. A. E. Gardner, only recently discovered by Dr. A. M. Morris whose capture is believed to be the first this century. *Oxytaenus variolosus* (Dufts.) was another rarity shown, taken on oak logs in the Bere Forest.

Another excellent and substantial exhibit was prepared by Mr. A. E. Gardner in which, among other species, he showed: *Trichoblemus micros* (Herbst) (Carabidae) from flood refuse in the New Forest, 24.iv.71; *Quedius auricomus* Kies. (Staphylinidae) in moss under waterfalls on Brecon Beacon in S. Wales at 2,800 feet on 30.viii.71; *Ptenomerus fuliginosus* Er. under beech bark near Epping, Essex, 13.vi.71; *Leptura sexguttata* F. (Cerambycidae) from blossom in the New Forest, 4.vii.71; and *Baris scolopacea* Germ. (Curculionidae) swept from West Wittering, Sussex, 2.vii.71.

Dr. J. Newton showed larvae of *Chrysolina menthastris* (Suff.) (Chrysomelidae), the progeny of a female released on to a bed of *Mentha rotundifolia* (L.) Huds. in early September. With them were set imagines.

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9th DECEMBER 1971

The President, Col. A. M. EMMET, in the Chair

The President welcomed to the meeting Herr Jäckh and Dr. Kuruko.

#### EXHIBITS

Col. A. M. EMMET—Microlepidoptera of the genus *Caloptilia* (Lithocolletidae). He said it was well-known by some people that Continental workers interested in this genus thought that *C. alchemiella* Scop. might prove to be two species. Herr Jäckh had made what he believed to be the separation and the exhibit was made up to illustrate this. The exhibitor gave details of the differences and asked microlepidopterists to examine their series for the second species and get in touch with Herr Jäckh.

Mr. C. O. HAMMOND—A male *Lestes dryas* Kirby (Od., Lestidae), a rare damselfly taken at Benfleet, Essex, 1.viii.71. This insect prefers well-reeded ditches with plenty of cover, or rushy pools fringed with long grass.

Mr. L. K. EVANS on behalf of Mr. L. H. EVANS—Two examples of the beetle *Trichius fasciatus* (L.) (Scarabaeidae) and a single example of the bee *Bombus muscorum* (L.) (Apidae), the latter being determined by Mr. P. N. Crow, all of which came from Hundred House, Radnorshire, 17. vii. 71. All were taken in flight in hot sunshine at 750 ft. about midday.

Attention was drawn to the close similarity of many features of both insects, particularly the pubescence on the thorax and abdomen and the distribution of black and yellow areas. Both species have darkened since the date of capture and the exhibitor noted that in the field the resemblance of the two in both appearance and behaviour was very striking. The first beetle was, in fact, mistaken for a second example of the bee (though slightly smaller). Even on examination in the net: it even buzzed appropriately when scrutinised more closely.

*Trichius fasciatus* is known in some quarters as the 'bee beetle', but the exhibitor is not aware of any work indicating whether this is a case of mimicry or merely one of convergence arising from the habit of visiting flowers which is common to both species.

Mr. E. H. WILD—(1) *Colotois pennaria* L. (Lep., Geometridae), a form heavily dusted with black scales, the transverse lines thick and very close together, from Charmouth, Dorset. For comparison, the form most usual in the exhibitor's trap in Surrey, was included. (2) *Luperina testacea* Schiff. (Lep., Noctuidae), a black aberration from Winsford Dorset. (3) *Rhizedra lutosa* Hübn. (Lep., Noctuidae), two examples from Charmouth. The representatives of this local race are almost all very large. Their main breeding area in the dry reed swamp near the mouth of the river Char has been almost destroyed by filling in and the construction of a car park. The destruction of the remaining portion is already under way.

Mr. P. A. BOSWELL—Adults, nymphs and eggs of the human head louse, *Pediculus humanus* L. var. *capitatus* Deg. (Anop., Pediculidae). For comparison, the adults of the human body louse *P. humanus* var. *corporis* Deg., and the pubic or crab louse, *Phthirus pubis* (L.) (Anop., Phthitidae), were also shown.

Mr. A. E. STUBBS—*Trichocera maculipennis* Meig. (Dipt., Trichoceridae), a cave dwelling winter gnat, from a cave near Minera, Denbigh., 24.x.71. The temperature of the cave, he said, remained constant throughout the year at 50°F. He conjectured the food supply consisted of organic nutrients washed down through the cracks of the limestone. Dead flies were found on the walls, mostly trapped in bundles of threads which he thought could be fungal hyphae, or perhaps traps made by other invertebrates which were not found.

#### COMMUNICATIONS

Col. A. M. EMMET drew attention to a new nepticulid moth to the British list, *Nepticula svensoni* Johanson. Mr. Johanson has been revising the oak-feeding Nepticulidae and in the course of his work had examined all Col Emmet's material. It was among Col. Emmet's insects that the new British species was found, being taken at Maddingly, Cambs. Col. Emmet said we now had five oak-feeding *Nepticula* species: *roborella* Johanson, *samiatella* Zell., *atricapitella* Haw. and *ruficapitella* Haw. being the other four. The last two had black heads, *ruficapitella* had either a red or black head, and the other two had red heads.

Referring to Mr. Hammond's exhibit, Mr. WILKINSON said he had found an example of *Lestes dryas* Kirby at Shorne Woods near Gravesend, Kent, about the same time and in the same type of habitat.

*Nonagria algae* Esp. (Lep. Noctuidae) was reported by the Rev. D. Agassiz from Southampton, Hants, in a cemetery.

Mr. T. G. HOWARTH gave a talk on 'The Conservation of the Large Blue in West Devon and Cornwall' which he supported with numerous coloured transparencies and some photographs. The talk was followed by a lengthy and lively discussion.

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## FIELD MEETINGS

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HACKHURST DOWNS, SURREY—11th July 1971

*Leader:* Mr. L. J. D. WAKELY

Though the advertised train turned out to be a figment, five members managed to converge, in sunny weather, in this comparatively secluded area on the south face of the North Downs. The four lepidopterists met with the following butterflies: *Pieris rapae* L.; *Gonepteryx rhamni* L., a male and female seen separately, both very worn; *Coenonympha pamphilus* L., *Pararge aegeria* L.; *Maniola jurtina* L.; *Aphantopus hyperantus* L., *Mesoacidalia charlotta* Haw. (*Argynnis aglaia* L.), the males apparently just emerging; *Callophrys rubi* L., one worn survivor; *Aricia agestis* Schiff.; *Lysandra coridon* Poda, fresh males; *Thymelicus sylvestris* Poda.; *Ochlodes venata* Br. & Grey.

*Zygaena filipendulae* L. was also on the wing, together with an undetermined five-spotted burnet. Odd specimens of *Ectypa glyphica* and *Sterrhia dimidiata* Hfn. broke from cover. No other interesting insects of other Orders were reported.

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DUNGENESS, KENT—18th–19th September 1971

*Leader:* Mr. B. GOATER

Though planned officially for the Sunday, this meeting really began on Saturday, when members and friends met to spend the day birdwatching and the night with sugar and lamps. On the following day, a total of 15 naturalists were present, and devoted most of their time to entomology.

Both days were hot and sunny, glorious autumn days, but the night was clear and cold, and very little of interest was recorded.

Many common migrant birds were about. Rarities occurred in the area both before and after our meeting, and it was rather disappointing that none should be forthcoming on the weekend chosen for the Society's excursion. Lesser White-throats were particularly common; Common Whitethroats, Sedge Warblers, Chiffchaffs and Willow Warblers were present in fair numbers; single Pied Flycatcher, Garden Warbler and Goldcrest were seen, while there was a fairly strong diurnal migration of hirundines, moving west. A party of Little Gulls were present on the pools, and were the most interesting species seen, while one Black Tern was seen over the 'patch'—the turbulent outflow of warm water from the power station.

Night operations produced small numbers of ten common species of moth at sugar, all of which might have been taken in one's own backyard, and the only interesting species at light was a single small *Cynaeda dentalis* Schiff., evidently a second-brood example.

On the Sunday, several larvae and cocoons of *Calophasia lunula* Hufn. were found, the latter attached to the old railway posts or to the woody bases of dead vegetation. Most of the *Senecio viscosus* L. (Sticky Groundsel) was parched, but a few living plants were found from which larvae of *Heliolithis peltigera* Schiff. were collected. Old heads of *Achillea millefolium* L. (Yarrow) produced larvae of *Eupithecia millifoliata* Rössl. and other *Eupithecia* larvae were beaten from *Senecio jacobaea* L. (Ragwort). One of the better finds was a lot of larvae of *Ethmia bipunctella* F. on *Echium*. The larvae, and the perforated leaves caused by their activities, were very conspicuous. Several larvae usually occurred together, but not all the plants by any means were infested. A few late butterflies were seen, including *Vanessa atalanta* L. and several *Lycaena phlaeas* L.

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#### CHIPPENHAM and WICKEN FENS, CAMBS.—3rd October 1971

Leader: Col. A. M. EMMET

This meeting had originally been arranged by Dr. K. A. Spencer as a joint operation for dipterists and microlepidopterists interested in leaf-miners; but unfortunately Dr. Spencer had to be overseas and in the event only lepidopterists attended, 11 strong including Dr. Kuroko, a Japanese entomologist engaged in research work at the British Museum (Nat. Hist.).

The morning was spent at Chippenham Fen, where interest centred on the mines of the very local *Phyllocnistis saligna* Zell. which were plentiful enough on young trees of *Salix fragilis* L.; unfortunately we were too late for them and nearly all the moths had emerged. Old feedings also provided a second focus of attention, for it was still possible to find the three-month-old cones spun in the lobes of sycamore leaves by the larvae of *Caloptilia rufipennella* Hübn., a species added only this summer to the British list. Relatively few live larvae were found other than common species such as *Stigmella alnetella* Staint.; *Bucculatrix cidarella* Zell.; some surprisingly late *Caloptilia elongella* L. on alder; *B. frangulella* Goeze on *Rhamnus catharticus* L.; *Stigmella oxyacanthella* Staint.; *S. regiella* H.-S.; *Nepticula pygmaecella* Haw. and *Ectoedemia (Dectiria) atricollis* Staint. on hawthorn; and *Tischeria complanella* Hübn. on oak; the last being of special interest to Dr. Kuroko who is studying that group.

The party moved to Wicken Fen for the afternoon. There the mines of *Ectoedemia (Dectiria) turbidella* Zell. were inspected in the leaves of *Populus canescens* (Ait.) Sm., but not taken as the larvae were too small. Among the tenanted mines which were found were *Acrocercops imperialella* Zell., *Cosmopterix druwella* F. (*druwella* Zell.), *C. heringella* Lien. & Zell., *Nepticula assimilella* Zell. and *Stigmella catharticella* Staint. A few cases of *Coleophora potentillae* Elisha were found with the larvae still feeding, on *Rubus caesius* L. and *Filipendula ulmaria*

(L.) Maxim. Imagines taken on the wing included *Epermenia chaerophylllella* Goeze, a new species to the fen, and *Calybites phasianipennella* Hübn.

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MADINGLEY and WICKEN FEN, CAMBS.

31st October and 7th November 1971

Leader: Col. A. M. EMMET

The meeting was intended for Sunday, 31st October, the day following the Annual Exhibition, but was erroneously advertised on the fixture card for Sunday, 7th November; so it took place on both dates, on each occasion starting at Madingley and finishing at Wicken.

The main objective at Madingley was to find the mines of *Ectoedemia* (*Dec-tiria*) *quinquella* Bed. in oak leaves. These were scarce on the first day, but common enough on the second, when the 'green islands' made by larvae were conspicuous in fallen leaves. Several other oak-feeding nepticulids were also taken, including the common *E. (D.) subbimaculella* Haw. and (on the second date only) the newly discovered *E. (D.) quercifoliae* Toll, easily separated from *subbimaculella* both by the mine and the larva; the former lacking the slit in the cuticle of the leaf, and the latter having a much lighter-coloured head. A few gallery mines which were still tenanted are likely to produce another newly recognised species, *Stigmella svenssoni* Johansson, which has been bred from this locality in 1969 and 1971 from mines taken the previous November. *Phyllo-norycter* mines in oak leaves were collected because the local *P. saportella* Dup. (*hortella* F.) is known to occur at Madingley.

Other species found include *E. (D.) angulifasciella* Staint. which was common on the first visit in leaves of rose, and two species of *Elachista* in *Brachypodium sylvaticum* (Huds.) Beauv.; *E. megerlella* Hübn. in the form of young larvae, and *E. gangabella* Zell. (*taeniatella* Staint.) already full-fed. It is believed that the latter is a new record for Cambridgeshire. Several *Diurnea phryganella* Hübn. were noted on the wing.

The afternoon on each occasion was spent at Wicken Fen, with leaf-miners still the principal quarry. Among the nepticulids taken were *E. (D.) turbidella* Zell., common on a single tree of *Populus canescens* (Ait.) Sm.; *E. (D.) intimella* Zell.; *E. (D.) argyropeza* Zell.; a few late *E. (D.) atricollis* Staint.; and *E. (D.) rubivora* Wocke; the last were feeding on *Rubus caesius* L. on which tenanted mines of *Nepticula splendidissima* H.-S. were plentiful. Most of the hawthorn-feeding species were over, with the exception of *Stigmella regiella* H.-S. Though there are only one or two scattered oaks on the fen, they were found to support *E. (D.) quercifoliae* Toll as well as *E. (D.) subbimaculella* Haw.

It was a surprise to find a few late larvae of *Cosmopterix drurella* F. (*druryella* Zell.) still feeding in the leaves of *Phalaris*; its close relative, *C. lienigiella* Lien. & Zell., was also found, but very sparingly, in *Phragmites*. As was to be expected, the mines of *Acrocercops imperialella* Zell. were all vacated, but larvae of the common miner *Serobipalpa acuminatella* Sirc. were locally common in the lower leaves of *Cirsium* spp. A few common imagines such as *Caloptilia stigmatella* F. and *Emmelina monodactyla* L. were seen on the wing, but only during the first meeting. In all about 50 species were recorded, 22 of which were Nepticulidae.





Air Marshal Sir Robert Saundby, K.C.B., K.B.E.,  
M.C., D.F.C., A.F.C., D.L., F.R.E.S.

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## OBITUARY

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**Air Marshal Sir Robert Saundby, K.C.B., K.B.E., M.C., D.F.C., A.F.C.,  
D.L., F.R.E.S.**

(1896–1971)

When, on 25th September 1971, Sir Robert Saundby died at the age of 75, this country lost one of its most distinguished servicemen; this Society lost a much respected past President; and the writer lost one of the very best of friends.

Robert Henry Magnus Spencer Saundby was born on 26th April 1896, son of Dr. Robert Saundby, professor of medicine at Birmingham University for over 40 years. Leaving King Edward VI School, Birmingham, in 1913, he entered the traffic department of the London and North Western Railway as a probationer. In June 1914 he obtained a commission in the 5th Battalion, Royal Warwickshire Regiment (Territorial Force), but in January 1916 he was seconded to The Royal Flying Corps.

Following the news of Sir Robert's death, appreciations of his service achievements were given prominence in the national press, and we now realise that it was due to the foresight and dogged determination of his work whilst at the Air Ministry before September 1939 that the Royal Air Force was in a state of preparedness when war finally came upon us. The foundations of a force had been laid, which acted as he had foreseen, to the lasting benefit of his countrymen.

Sir Robert was Deputy A.O.C.-in-C. Bomber Command from 1943 to 1945, but this was the culmination of an Air Force career that spanned 30 years.

At the Memorial Service in St. Clement Danes on 10th November 1971, Marshal of the Royal Air Force Sir Arthur Harris gave the Address in which he summarised Sir Robert's achievements during the 30 years following 1916 up to the time that he was invalided from the Service in 1946.

In that same year Sir Robert joined the 'South London' and he was now able to renew with enthusiasm his deep interest in natural history. Within entomology he was especially interested in the macrolepidoptera and, having in his care the collection in the Newbury Borough Museum, he made 'Local Museums and Local Lists' the subject of his Presidential Address delivered in January 1951.

In the Transactions of the Newbury District Field Club for 1967 we can read how thoroughly Sir Robert came to know the macros of his own district; his paper to the above club contains records of 44 butterflies and 501 moths and reading through the pages evokes many happy memories of field excursions spent in his company. For example, on 15th May 1954 we had spent several hours at Pamber Forest hoping to beat the larva of *Apatura iris* L. We drew a blank and departed homewards. Sir Robert had been breeding *Orthosia advena* Schiff. and as the larvae needed attention that evening he picked a spray of willow from a bush in his garden. On the spray was an *iris* larva!—a second example being discovered after a leaf by leaf examination of the bush.

Over the years the Burghclere light trap brought forth some notable records including *Acherontia atropos* L., several *Celerio lineata* F., and single examples of *Lithomoia solidaginis* Hübn., *Cosymbia puppillaria* Hübn., and *Plusia acuta* Walker, the latter, taken on the night of 5–6th November 1955, tied with Dr. de

Worms's specimen as joint-second British example. He also took a remarkably pale yellow form, previously undescribed, of *Phlogophora meticulosa* L. which he exhibited at our 1962 Annual Exhibition. His note on '*P. meticulosa* L. ab. *flavescens* ab. nov.' appeared in the *Entomologists' Record*, Vol. 75, No. 3.

In his earlier years with the South London he often attended our field excursions, but with decreased mobility resulting from the effects of an injury sustained in a crash in Belgium during the First World War he became unable to participate in lengthy walks. He did, however, much enjoy a series of yearly autumnal field trips which several of our members will well recall and on which the time spent in talking over past experiences often exceeded that devoted to serious collecting. Good records were, however, made during these trips and we recall his immense pleasure when, on a misty October night in 1962, he recorded the first *Lithophane leautieri* Boisd. from Brownsea Island, Dorset.

From time to time when on field excursions away from our own district Sir Robert would let drop a remark indicative of events of earlier years when he would have been engaged on activities more arduous than the quest for insects. For instance, I recall an occasion when motoring near Worthy Down, Hampshire, where a particular line of trees would remind him of 'the night I spun my wheels on the top of those'.

His fine collection, which has been presented to the National Collection at South Kensington, had few species unrepresented; it was a model of good arrangement and documentation.

Sir Robert was also an expert fisherman and had been a member of the Fly Fishers Club since 1927. He fished all the local rivers and his book *A Fly-Rod on Many Waters* was published in 1961.

His feelings for 'all things natural' were perhaps best expressed in his untiring work for B.B.O.N.T. As its first President, from the time of the Trust's inception in 1959 and continuing until this year, Sir Robert guided us in all our affairs. With three counties to cover, meetings were often lengthy and numerous but, no matter how late the hour, he would be at the head of the table and all would be resolved.

To Lady Saundby, Peter, Mary and Anne we record our deepest sympathy. We shall always remember the wise counsel he gave; his kindness and great good humour. It was indeed good to have known Robert Saundby.

B.R.B.

# The Society's Publications

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### MEETINGS OF THE SOCIETY

are held regularly at the Society's Rooms, but the well-known ANNUAL EXHIBITION takes place in the autumn 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.

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T. R. E. Southwood, B.SC., PH.D., A.R.C.S., M.I.BIOL., F.R.E.S.

R. W. J. Uffen, F.R.E.S.

## PROCEEDINGS

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13th JANUARY 1972

The President, Col. A. M. EMMET, in the Chair

A welcome was extended to Professor Larthwaite of the Imperial College who had been working on the attraction of moths by radio waves.

The following new members were declared elected: Miss Angela Stevens and Mr. M. Schuyt.

### EXHIBITS

Col. A. M. EMMET—Mines of *Stigmella aceris* Frey. (Lep., Nepticulidae) from Lullingstone Park, Kent, 28.x.71; the second record for the British Isles.

Mr. J. A. C. GREENWOOD—Two examples of a tortricid moth from Canada, part of a swarm occurring in Toronto during the weekend 9 & 10.vii.71. The exhibitor also showed two newspaper cuttings reporting the swarm.

Mr. R. J. DIXON—*Ypsolophus radiatellus* Don. (*ustellus* (Clerck)) (Lep., Plutellidae) taken from squirrels' dreys in the New Forest, Hants, 1.i.72.

On behalf of Mr. D. M. APPLETON, Mr. Dixon also showed five examples of *Philonthus subuliformis* (Grav.) (*fuscus* Grav. *nee* Gmel.) (Col., Staphylinidae) from a squirrel's drey in an oak in the New Forest, Hants, 1.i.72.

### COMMUNICATIONS

Reporting on current Lepidoptera appearances, Mr. R. F. Bretherton had seen an example of *Phigalia pilosaria* Schiff. (Geometridae) on 27.xii.71; Mr. G. Prior, a freshly emerged *Phlogophora meticulosa* L. (Noctuidae) on a local fence on 18.xii.71; and Mr. S. N. A. Jacobs drew attention to a report he had received of *Gonepteryx rhamni* L. (Pieridae) on the wing on 7.xii.71.

Commenting on Mr. Dixon's exhibit, Mr. Bretherton observed that the species was predominantly grey, but that one of those exhibited was spotted.

The following members exhibited slides: Mrs. F. Murphy, Dr. C. G. M. de Worms and Messrs M. W. F. Tweedie, R. F. Bretherton, C. O. Hammond and R. W. J. Uffen.

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27th JANUARY 1972

100th ANNUAL GENERAL MEETING  
(with which was combined the ordinary meeting)

The President, Col. A. M. EMMET, in the Chair

The following new members were declared elected: Miss Jean Matthews and Messrs T. W. Gladwin, G. S. Pacey and S. E. Whitbread.

### EXHIBITS

Mr. G. R. ELSE—A selection of rare and local Hampshire Aculeate Hymenoptera taken in 1970 and 1971 (and including two chrysid wasps taken by Mr. D. Appleton in 1970): *Hedychridium ardens* (Lat.) (Chrysididae), a single example

from Sinah Common, Hayling Island, 17.vii.71; *Omalus puncticollis* (Mocsary) (Chrysididae), two examples taken in Denny Wood, New Forest, 11.vii.70 (D. Appleton); *Ammophila (Podalonia) affinis* Kirby (Sphecidae), females from Sinah Common, 9 & 17.vii.71; *Hylaeus spilota* (Förster) (Colletidae), a male, 9.vii.71 and a female 3.vii.71, both from Sinah Common; *Macropis labiata* (F.) (Melittidae), a male and female swept after dark by D. Appleton and the exhibitor at Browndown near Lee-on-Solent, 23.vii.71; *Eucera tuberculata* (F.) (Melittidae), a male from the undercliff, Isle of Wight, east of Old Park, 20.vi.70. Also shown were two examples of parasitic aculeate relationships: *Astata pinguis* (Dahl.) (Sphecoidea) a male and female from Sinah Common, 17.vi.71 and its special chrysid parasite *Hedychridium integrum* (Dahl.) (Chrysididae) taken at the same time; *Megachile maritima* (Kirby) (Megachilidae), a male from Portsdown Hill near Portchester, 11.vii.71 and a female from Sinah Common, 17.vii.71. The last species has not previously been recorded from Portsdown Hill.

Mr. A. E. STUBBS—Two of the three British species of Acroceridae (Dipt.): *Acrocer globulus* Panz., Fetcham Downs, Surrey, 1966 and *Oncodes gibbosus* L., Dunsfold Common, Surrey, July 1963. These are rare internal parasites of spiders.

Mr. A. E. GARDNER—Three species of local Coleoptera taken in the Heddon Valley at Hunters Inn, north Devon, 26.xii.71: *Catops nigrita* Er. (Silphidae); *Ocalea rivularis* Miller; and a series of *Ancyrophorus aureus* Fauv. (Staphylinidae). The two last species were taken from flood rubbish and moss on the river bank and are new to the Ilfracombe list.

The Treasurer, Mr. R. F. Bretherton, presented his report and accounts and moved their adoption. These were seconded by Mr. E. H. Wild and carried.

The Council's Report was read by Mr. P. Baker who moved its adoption, Prof. H. E. Hinton seconded the report which was also carried.

The Librarian's Report was presented and moved by Mr. S. A. Williams and seconded by Mr. G. Prior; the Editor's Report by Mr. F. D. Buck and seconded by Mr. M. Kirby; the Curator's Report by Mr. A. E. Gardner and seconded by Mr. J. M. Chalmers-Hunt; and the Hering Memorial Trust Report by Mr. R. F. Bretherton and seconded by Dr. C. G. M. de Worms. All were carried.

The President announced the following Officers and ordinary members of council, as circulated, elected: *President*: Prof. H. E. Hinton, PH.D., B.SC., F.R.S., F.R.E.S.; *Vice-Presidents*: Col. A. M. Emmet, M.B.E., T.D., M.A., J. M. Chalmers-Hunt, F.R.E.S.; *Treasurer*: R. F. Bretherton, C.B., M.A.; *Secretary*: P. J. Baker; *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, F.R.E.S.; *Lanternist*: M. Shaffer; *Ordinary Members of Council*: E. S. Bradford, G. E. Cross, K. G. W. Evans, Comdr. W. L. R. E. Gilchrist, R.N., D. C. Grange, M. A. Kirby, B. J. MacNulty, B.SC., PH.D., F.R.I.C., F.L.S., F.R.E.S., J. Roche, L. J. D. Wakely, C.M.G., O.B.E., M.A.

It was pointed out by the President that Mr. G. E. Cross was added under Bye-law 7(b).

Motions and questions under Bye-law 25(b) were invited and the Secretary read a suggestion submitted by post by Mr. C. I. Rutherford. This was that small, local natural history societies might like to affiliate to our Society by charging their members our full ordinary membership subscription and remitting to us the country membership subscription. In return these affiliated members would receive full membership benefits. Mr. Baker thought this might be considered by Council and the meeting agreed.

Attention was drawn to the new lighting installed by Mr. B. F. Skinner in the library and collection room.

## COMMUNICATIONS

Mr. C. O. Hammond, referring to Mr. Stubbs' exhibit, said that he had once seen a swarm of *Acrocera globulus* Panz. hovering, but moving up and down. Mr. S. N. A. Jacobs drew attention to a paper by Mr. A. Sich in which he suggested that in flight in this manner they were dropping their eggs onto the spiders; but Mr. Stubbs said that the first instar larvae of these insects were very active, presumably to enable them to make contact with the spiders after emerging from the eggs.

Col. A. M. Emmet then read his Presidential Address which took as its subject Wicken Fen. He afterwards inducted Prof. Hinton into the Chair. Prof. Hinton thanked Col. Emmet for his past services and asked permission to have his Address published. Col. Emmet agreed.

A vote of thanks to the Officers and Council was moved by Mr. T. G. Howarth, seconded by Dr. J. D. Bradley and carried; and a vote of thanks to the auditors was moved by Mr. S. N. A. Jacobs, seconded by Mr. B. Goater and carried.

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**COUNCIL'S REPORT FOR 1971**

The year 1971 was a generally satisfactory one for the Society. Council, as well as overseeing the details concerned with the day-to-day running of the Society, were especially involved with the advance planning of the events to take place in 1972; our centenary year.

The Society's Bye-laws permit a maximum of ten Honorary Members at any one time, who may be appointed by Council either for their contribution to the Society or their eminence as naturalists. At the end of 1971 the Society had five vacancies for Honorary Members and, to mark centenary year, Council decided to fill three of these five vacancies by electing as Honorary Members of the Society Mr. R. F. Bretherton, Mr. A. E. Gardner and Mr. F. T. Vallins. In addition, you will be glad to hear that Mr. T. H. Court, Mr. C. Crauford and Dr. G. D. Morison, who have been members of the Society for 50 years, have now been elected Special Life Members.

In 1971, in spite of the loss of 28 members through death, resignation or cancellation of membership, the Society has shown a slight increase in numbers, from 585 at the end of 1970 to 607 at the end of 1971, when the membership was made up as follows: 2 Corporate, 5 Honorary, 5 Special Life, 17 Life, 254 Ordinary, 274 Country and 50 Junior Members. It is particularly satisfying to note an increase in the number of Junior Members, these representing the future strength of the Society.

A wide range of subjects was covered by the ordinary meetings, organised by Mr. D. J. Carter and the attendance at these has been generally high. Our gratitude is once more due to Mr. & Mrs. T. G. Howarth who, with the help of other members and Mrs. Lewis of the Alpine Club, have regularly provided light refreshments before and after these meetings. The provision of these refreshments has been much appreciated by members and has resulted in a useful financial return to the Society.

The field meetings, organised by Mr. G. Prior, were greatly appreciated by those who attended. There was a tendency to hold meetings further afield with definite objectives in mind. The two night meetings were enjoyed by those who

attended in spite of the unfavourable weather conditions experienced on both occasions. It is thought that field meetings might be increased in popularity if reduced in number and spread more widely over the country, with possibly a longer stay at each venue. A circular was issued detailing such ideas and Mr. Prior is still interested in hearing from members who have any views on the subject.

As previously reported, in 1970 the Society made one award from the Professor Hering Memorial Research Fund, to Dr. H. Andersson of Lund, Sweden. Unfortunately Dr. Andersson has not been able to take advantage of this award for personal reasons. In 1971 grants from the Fund were made to Mr. P. R. Cobb, for work on the gall wasp *Andricus quercusecalicis* Bergs., and to Miss J. M. Ruse, for work on leaf miners on *Sorbus aucuparia* L. Further applications for awards can still be considered.

The Annual Dinner which was held at the Connaught Rooms was enjoyed by those who attended and a recommendation that these rooms may be used again in the future has been noted.

The Annual Exhibition was once more held in the Conversazione Room at the British Museum (Nat. Hist.) and the Council wish to express their appreciation to the Trustees of the museum for making this possible.

The Christmas card for 1971, featuring a burnet moth, proved to be successful and good sales of this, and Society ties, were reported from the Annual Exhibition.

The postal strike, early in 1971, caused unavoidable delays in the printing and distribution of the first part of the Proceedings and the programme card. Further difficulties delayed the distribution of subsequent parts of the Proceedings and the Council appreciates all the efforts made by the Editor to maintain publication schedules.

One of the deaths recorded in 1971 was that of a distinguished Honorary Member, Mr. T. R. Eagles. The Society's gratitude is due to the family of the late Mr. Eagles for the generous gift of his natural history effects. These included a valuable library and a collection of insects, which are now being incorporated into the Society's library and collection.

In the earlier part of the year the Council for Nature asked the BENHS to submit a list of names of members of the Society who would be prepared to give lectures, on a wide range of natural history subjects, to other societies throughout the country. Mr. Prior and Mr. Carter discussed this with various members and prepared a list which has now been passed to the Council for Nature. Council is grateful to those members who have agreed to represent the Society in this way.

In conclusion, Council wishes to give a sincere vote of thanks to those members and friends of the Society who, though not on Council, give so much of their time to ensure the smooth running of our activities. Ordinary and field meetings, the Annual Dinner and Exhibition, preparation of the Christmas card and a host of other items rely, to a greater or lesser extent, on the active support of these people, to whom the Society is greatly indebted.

#### TREASURER'S REPORT

The accounts for 1971 have been approved by our auditors, Mr. A. G. Stoughton-Harris and Mr. J. L. Messenger, and will be published in the Proceedings (see pp. 37-9). A copy is available for inspection now if desired.

Taking the Balance Sheet first, our investments at cost have risen to £6,050.

# British Entomological and Natural History Society Statement of Accounts

## BALANCE SHEET—31st DECEMBER, 1971

LIABILITIES		ASSETS	
1970	1971	1970	1971
£ P.	£ P.	£ P.	£ P.
<b>Special Funds—</b>			
<i>Housing</i>			
896 24	1046 24	1130 55	Investment at cost—
100 00	—	220 67	£1200 5% Conversion Stock (redeemed)
50 00	61 00	248 45	£100 I.C.I. Ordinary Stock
	1107 24	299 26	150 Unilever Ltd. Ordinary Shares of 25p.
		702 41	400 Standard Trust Ltd. Ordinary Shares of 25p.
		350 00	1010 Premier Investment Trust Ordinary Shares of 25p.
		541 58	£350 National Development Bonds
272 45	438 00	500 35	£455 Gen. Electric Co. 7½% Conv. Stock 1987-92
147 05	78 12	—	£580 Gt. London Council 7½% Stock 1977
18 50	21 00	—	£740 Gt. London Council 6½% Stock 1977
	537 12	291 97	£300 Gt. London Council 9½% Stock 1980-82 (Hering Trust)
		302 66	£350 Gt. London Council 7½% Stock 1977 (Hering Trust)
125 97	113 27	298 65	£360 Gt. London Council 6½% Stock 1977 (Hering Trust)
12 70	46 05	303 81	240 Distillers Ltd. Ordinary Shares of 50p. (Hering Trust)
	67 22	294 04	75 Shell Transport Co. Ordinary Shares of 25p. (Hering Trust)
		300 01	85 Midland Bank £1 shares (Hering Trust)
	1948 41	5784 43	
		176 63	Sundry Debtors
		30 00	Stock of Christmas Cards printed before 1968
		15 00	Stock of Ties bought before 1968
		1208 97	Cash at Bank—
		70 26	Savings Account
			Current Account
	769 66		
	64 01		
	248 70		
	2831 50		
	69 45		
	3118 19		
	217 24		
	7860 55		
		7285 30	
		6049 91	
		150 45	
		13 50	
		6 00	
		1465 46	
		175 23	
		7860 55	

The value of the Society's Library, Collections, Stock of publications, and stocks of Christmas cards and ties bought after 1967, is not included

# British Entomological and Natural History Society Statement of Accounts

## PUBLICATIONS ACCOUNT

	1970	1971	1970	1971	
	£	p.	£	p.	
621 00			158 65		By Sales of 'Proceedings', etc. . . . .
102 97			145 86		Donations (transfer from Reserve Fund) . . . . .
33 58			75 00		Grant from the Royal Society . . . . .
13 54			27 97		Unused Provision . . . . .
771 09			363 61		Grant from Income and Expenditure Account . . . . .
			771 09		
			756 64		756 64

## CHRISTMAS CARDS ACCOUNT

56 00			101 33		By Sales . . . . .
7 05			30 00		Stock at 31st December . . . . .
3 02					Stocks of cards printed after 1967 have been excluded from the valuation.
131 33			131 33		
			135 61		135 61

## TIES ACCOUNT

32 50			21 30		By Sales . . . . .
3 75			6 25		Outstanding . . . . .
127 00			15 00		Stock at 31st December . . . . .
			120 70		Income and Expenditure Account—charge . . . . .
					Stocks of ties purchased after 1967 have been excluded from the valuation.
163 25			163 25		
			28 15		28 15

British Entomological and Natural History Society Statement of Accounts

GENERAL INCOME AND EXPENDITURE ACCOUNT

EXPENDITURE		1971		1970		1971		
	£	p.	£	p.	£	p.	£	
Rent	286	00	286	00	1080	24	1083	75
Insurance	12	02	11	13	293	76	366	61
Secretarial Expenses	50	90	32	44	72	82	52	54
Editorial Expenses	3	60	2	37	100	00	—	—
Treasurer's and Assistant Treasurer's Expenses	16	52	18	41	1	42	14	80
Stationery	56	14	49	65	3	02	40	30
Subscriptions to Societies	16	50	19	05	—	—	6	90
Lectures and Exhibitions	19	55	3	20	—	—	—	—
Cabinets and Collections	46	07	4	16	—	—	—	—
Conservation Year Expenditure	59	00	—	—	—	—	—	—
Miscellaneous Expenditure	34	50	—	—	—	—	—	—
Publications Account—charge	363	61	675	59	—	—	—	—
Ties Account—charge	120	70	—	—	—	—	—	—
Bank charges	51	—	—	—	—	—	—	—
Housing Fund: interest transferred, and bequest	150	00	—	—	—	—	—	—
Reserve Fund: interest transferred	41	59	61	00	—	—	—	—
Centenary Fund: interest transferred	18	50	40	00	—	—	—	—
Hering Memorial Research Fund: interest transferred	82	03	21	00	—	—	—	—
	1377	75	1347	66	—	—	—	—
Excess of Income over Expenditure	173	52	217	24	1551	27	1564	90

We certify that the Balance Sheet and General 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.

R. F. BRETHERTON, Hon. Treasurer.

The rise results from the reinvestment of the proceeds of the redemption of our holding of 5% Conversion Stock 1971, on which we made a profit of £69, and of a further £200 from balances. Their total market value is about 30% above cost. Cash at bank, on current and savings account together, has also risen by £360 to £1,641; but sundry debtors are a little down, and the five-year process of writing off the value of our pre-1968 stocks of Christmas Cards and Ties is nearly complete, though some physical stocks remain. The whole capital position is very strong.

On the liabilities side, the Housing Fund and the Reserve Fund have been increased by interest earned during the year, and now stand at £1,107 and £770 respectively. The Centenary Fund, too, has grown during the year from £438 to £538, partly by donations, partly by interest. But I must say that, in the four years since the Fund was opened, contributions to it—and they have been generous ones—have come from only about 80 people: about one in seven of our members. We are now in Centenary Year, and no doubt we could merrily use more than the £538 we already have. The Fund is still open! Of the other Special Funds, the balance of the Hering Memorial Fund has risen to £1,948, for reasons which will be explained in the report of its Management Committee. For the Library Fund the only regular income is from entrance fees and life subscriptions. Last year its balance was reduced to £67 by some purchases of expensive books, which are both useful now and probably a good investment for the future. Subscriptions paid in advance are up by £15. This reflects a bumper crop of new members elected after 30th September: their subscriptions cover them for 1972 as well as for the end of 1971. Sundry creditors, at £249, represents mainly provision for the cost of part 4 and the index to the Proceedings for 1971, which have not yet been published. Finally, the balance of the General Fund has been increased by the profit on redemption of 5% Conversion Stock, and by a surplus on the General Income & Expenditure account of no less than £217 for the year.

This surplus of £217 on General Income and Expenditure Account is, of course, the highlight, and a surprising one. It is bigger than that of last year, and very much bigger than the £60 for which I budgeted last March. On the income side, it is due largely to a really remarkable profit of £40 on sale of Christmas Cards, mainly coming from the activity of Miss Kathleen Brookes. (We must now remember to call her Mrs. Smiles, but I am sure that this will not diminish her vigour on the Society's behalf: indeed, with an obedient husband, it should be doubled!) Most of the increase of £52 in income from interest went out again to the Special Funds, and subscriptions at £1,084 showed only a small rise; but we charged rather too much for the Annual Dinner, and so had a profit of £15, and the Ties Account also showed a small profit. On the expenditure side, the grant to the Publications Account is up from £364 to £676. This is mainly because printing costs have risen and, on the income side, we did not in 1971 draw on Mrs. Margaret Mere's gift for larva plates and text, nor did we receive any Royal Society grant; also, because the 1971 Proceedings are not yet complete, there have been no receipts from outside sales of them. I should, however, record that sales of no less than 39 copies of the *Guide to the Smaller British Lepidoptera* brought in a useful sum.

The higher grant to the Publications Account was, however, nearly off-set by the absence in 1971 of miscellaneous expenditure—on cabinets, ties, legal expenses, conservation year—which was heavy in 1970. Some miscellaneous expenditure has to be met in most years: for example, already in 1972 we have spent £55 on

improving the lighting in the Collections Room and Library: this was budgeted for last year, but not spent.

The big surplus of 1971 is not, I am afraid, a safe guide to the future. Our unit costs—postal rates, stationery, printing—all went up in 1971, though the Editor managed to keep the latter to a minimum. This rise will certainly go on and may speed up. Sooner or later it must catch up with us. When it does, we shall have to put up the subscription rates. Decisions about this have to be taken well in advance. But I hope that we shall not have to take such a decision during 1972.

In conclusion, I want to thank Mr. F. T. Vallins for his great help as Assistant Treasurer in charge of subscriptions and in other ways; also the auditors, and Messrs S. N. A. Jacobs, J. L. Messenger, J. A. C. Greenwood and A. S. Wheeler, on whose advice I have relied in their capacities as Trustees or as members of the Finance Committee. They are all not only experts in their own fields, but also sources of general wisdom on which it is a pleasure to draw.

### EDITOR'S REPORT

We have to date issued 3 parts of our Proceedings, totalling 102 pages plus four plates. These were issued in February, July and October. The fourth part, planned for 32 pages and a coloured plate of Mr. Watson's *Callimorpha jacobaeae* L. aberrations drawn by Mr. Russwurm, is in the press.

Without doubt we would have completed the year's publishing programme by this meeting except for one thing—lack of contributions. Without these there can be no Proceedings. Even field meeting reports involve a quite unnecessary amount of concern and correspondence; and to be waiting in January (after having once written) for the report of a field meeting that took place in May is quite discouraging. It is to be hoped we can do better in our Centenary Year; but I hold out little hope; since I have been unable to fill and publish part 4, 1971, yet, it must be obvious to anyone that you cannot hope for part 1, 1972, in February.

Our Treasurer is concerned about costs, and quite rightly. He would like me to meet certain dates to coincide with other distributions, and again quite rightly; but I cannot think of forward planning while I am working from hand to mouth in this manner.

All I ask is a few more papers, a few collecting notes (which in the past have been mainly written by myself) and a responsible approach to the field meeting reports by the leaders. I cannot accept the hoary old excuse that we have to wait for breeding results and members to communicate their captures, etc. If reports are got in they can always be added to prior to proof stage; and even afterwards anything worth publishing can be published as a subsequent note.

Apart from the Presidential Address, we shall have published five papers of more than a page by the time part 4 appears; one was submitted by a non-member and one member contributed two. Not what I would call a healthy sign.

### LIBRARIAN'S REPORT

I can report another satisfactory year for the library, in which a record number of books were borrowed and many new titles added to the shelves. During the year we received a notable bequest from the late T. R. Eagles with additions made by his family, including the standard works on Coleoptera by Joy and Fowler together with Buckler's volumes on larvae of the Lepidoptera, Kloet and Hincks Check List and Hinton's Beetles of Stored Products. Nearly all the books were already represented in the library but duplicates of such books are always

most welcome as the originals are very seldom to be found on the shelf when needed. A large number of periodicals were again borrowed by the Maidstone Museum to assist in the preparation of the Kent list of Coleoptera. Arrangements were made by members working on definite projects to borrow some of our more valuable books on special loan agreements. Thanks to the generous efforts of Mr. Cross, our large stock of foreign periodicals are now placed in proper order on shelves behind a plastic blind, where they can be quickly found. This has taken many hours of work and I am pleased to say that Mr. Cross is now turning his attentions to the vast number of unsorted back numbers of our Proceedings in an effort to get them into cupboards where they will be kept clean and catalogue them at the same time. Mrs. Carter the assistant librarian is busily engaged on a card index of our more valuable books, with a view to ensuring their proper conservation. Work has begun on the sorting and labelling of our collection of diaries and this will proceed through 1972, as time permits. All the new books have now been catalogued and placed in the bookcases, this leaves little space for further new books which we hope will arrive and it is expected that more shelf space behind plastic blinds will have to be provided, so that we can transfer bound periodicals to make bookcase space for new arrivals. I would like to thank the assistant librarian Mrs. B. Carter and also Mr. Cross, for their assistance. Additions to the library during 1970:

Tubbs, C., *The New Forest*, purchased; Higgins, L. C. and Riley, N. D., *A Field Guide to the Butterflies of Britain and Europe*, purchased; Razowski, *Microlepidoptera Palearctica* (3) *Cochylidae*, purchased; Manley, W. B. and Riley, N. D., *A Field Guide to the Butterflies and Burnets of Spain*, presented by E. W. Classey and S. N. A. Jacobs; Barcant, M., *The Butterflies of Trinidad and Tobago*, presented by the author and a second copy by S. N. A. Jacobs; Poey, P., *Centurie de Lépidoptères de l'Ile de Cuba*, reprint presented by E. W. Classey; Laidlaw, W. B. R., *The Butterflies of New Zealand*, presented by E. W. Classey and a second copy by S. N. A. Jacobs; Oldroyd, H., *Handbooks for the Identification of British Insects Diptera*, Introduction and Key to Families, purchased; Freude, H., Harde, K. W. and Lohse, G. A., *Die Käfer Mitteleuropas* Vol. 8, purchased; Perring, F., *The Flora of a Changing Britain*, presented by S. N. A. Jacobs; Grote, A. R., *The Noctuidae of America*, reprint presented by E. W. Classey and a second copy by S. N. A. Jacobs.

The late T. R. Eagles and family donated the following: Fowler, W. W., *The Coleoptera of the British Islands*, 6 vols.; Joy, N. H., *A Practical Handbook of British Beetles*, 2 Vols.; Buckler, W., *Larvae of the British Butterflies and Moths*, 9 vols.; Dibb, J. R., *Field Book of Beetles*; Henderson, I. F., *Dictionary of Biological Terms*; Kloet, G. S. and Hincks, W. D., *A Check List of British Insects*; Lucas, W. J., *British Dragonflies*; Lucas, W. J., *The Aquatic (Naiad) Stage of the British Dragonflies*; Lucas, W. J., *A Monograph of the British Orthoptera*; Lundbeck, W., *Diptera Danica*, 2 parts; Donisthorpe, H. St. J. K., *Guests of British Ants*; Edwards, F. W., Oldroyd, H. and Smart, J., *British Bloodsucking Flies*; Allan, P. B. M., *A Moth Hunter's Gossip*; Allan, P. B. M., *Talking of Moths*; Allan, P. B. M., *Moths and Memories*; Tutt, J. W., *Practical Hints for the Field Lepidopterist*; 3 vols.; Dibb, J. R. and Walsh, G. B., *A Coleopterist's Handbook*; Hinton, H. E., *A Monograph of the Beetles Associated with Stored Products*; Locket, G. H. and Millidge, A. F., *British Spiders*, 2 vols.; Clegg, J., *The Fresh-water Life of the British Isles*; Ragge, D. R., *Grasshoppers, Crickets and Cockroaches of the British Isles*; Colyer, C. N. and Hammond, C. O., *Flies of the British Isles*. Also many separates.

## CURATOR'S REPORT

Work has been completed on rearranging the British Hemiptera-Homoptera and incorporating the F. J. Coulson material. From one drawer the collection has been expanded to 13 and is well represented.

Work has also continued on the Dr. A. M. Masee collection of British Coleoptera and on incorporating the residue of Capt. R. A. Jackson's British Lepidoptera into our general collection.

During the year Mr. S. A. Williams has checked the identifications of some obscure groups of staphylinid Coleoptera, and Mr. P. J. Chandler the Diptera.

One major bequest came through the kindness of the Eagles family, this consisting of the late Mr. T. R. Eagles's collection of British Lepidoptera and other Orders. Included was the E. A. Bowles collection, rich in aberrations and with valuable series of the Sphingidae and Sesiidae; and also included a pair of the Large Copper Butterfly, *Lycaena dispar dispar* (Haw.). The Society is also grateful to Mr. A. Wright for donating a number of Palaearctic Rhopalocera including new and rare *Erebia* species.

Two small cabinets have been sold and one microscope continues to be on loan.

The thanks of the Society are due to the following members for notable accessions: Sir Eric Anson (Lepidoptera), Mr. A. E. Gardner (Coleoptera), Mr. B. Goater (Lepidoptera), Dr. B. J. MacNulty (Hemiptera-Heteroptera), and Dr. J. L. Newton (Saltatoria).

Mr. E. S. Bradford, the assistant curator, has rendered valuable service and we are particularly grateful for his printing labels for the cabinets in various colours to denote the different Orders.

REPORT ON THE PROFESSOR HERING MEMORIAL  
RESEARCH FUND, 1971

The Management Committee for the year consisted of the President (Col. A. M. Emmet), the Hon. Treasurer (Mr. R. F. Bretherton), *ex officio*, and Capt. J. Ellerton, Dr. K. A. Spencer and Prof. T. R. E. Southwood, appointed by Council.

The Committee regrets that Mr. Hugo Andersson, who had accepted an award of £100 in 1970, was unable for domestic reasons to take this up. The Committee decided to hold the money so saved as an income balance, rather than adding it to the capital of the Fund.

In reply to advertisements in the leading entomological journals, four applications for awards for 1971/2 were received by 30th September. The Committee felt that two of these were too far removed from the main objectives of the Fund to qualify; but on 7th October it offered awards of £25 each to Miss J. M. Ruse, of the Department of Zoology, University of Manchester, and to Mr. Paul Cobb, Editor of the Proceedings of the Heacham and West Norfolk Natural History Society, to assist travelling expenses in connection with their researches, respectively, on the biology of leaf-miners and their parasites on *Sorbus aucuparia* L. (Rowan), and on the life-cycle and distribution in Britain of the gall-wasp *Andricus quercuscalicis* Burgs. The Committee wishes them every success and looks forward to seeing their findings in due course.

Applications for further awards have been advertised, to be received before 31st March 1972, at the beginning of the collecting season.

## PRESIDENTIAL ADDRESS

Col. A. M. EMMET

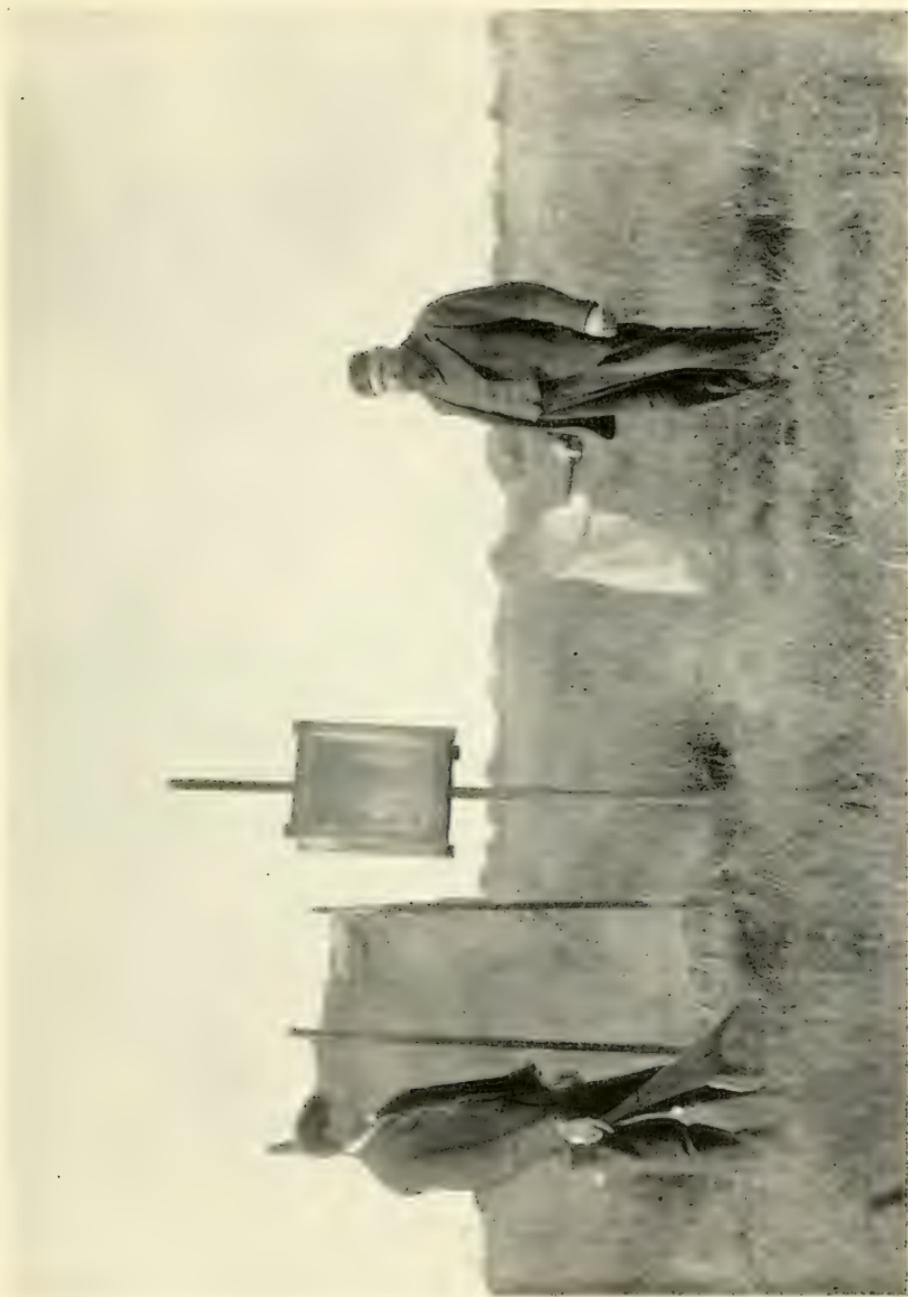
Nineteen seventy-two—our Centenary year, and an important milestone on the road our society is travelling. The event has been marked by a signal honour; His Royal Highness the Duke of Edinburgh has consented to become one of our Honorary Life Members. The Duke's interest in conservation is well known and it is largely because of the increasingly important part our society will play in this work that your Council felt justified in extending to him their invitation.

We have many plans for the fit observance of our Centenary. At this stage I shall only outline them to you: fuller details will be circulated in due season. Our first special fixture will be a sherry party to be held here in April when our invited guests will be the presidents and secretaries of the leading natural history societies in Britain. Our dinner will be held in Imperial College, where many of us met last March for the Verrall Supper. This venue has been chosen because it affords ample accommodation for the many members and guests we are confidently expecting. We have also sought more spacious quarters for our Exhibition which will be held at Holland Park School so successfully used in recent years by the Amateur Entomologists' Society. May I remind you that we are expecting well annotated exhibits of high quality; start to prepare them early.

Our field meetings programme will have a new look. There will be fewer meetings but these, we hope, will prove of greater interest. Pre-eminent among them is a week-end in Oxford in conjunction with the Ashmolean Society, the oldest natural history society in Britain. Plans are still going forward for a week-end trip to France under the leadership of Mr. E. P. Wiltshire and, if possible, for more extended entomological holidays in Scotland and on the continent. I can assure you, too, of an exceptionally interesting programme of indoor meetings. During the year we hope to publish a history of the Society. An appeal is being launched, directed to industry, to sponsor an annual prize for field-work, the sphere of entomology in which our Society, with its predominantly amateur membership, can contribute most to the advancement of that science. I should like to take this opportunity to thank Dr. B. J. MacNulty who, as chairman of the Centenary Committee, has been the principal architect of this exciting programme.

It is appropriate that during our Centenary year a 'Code for Collectors' will be published by the Joint Committee for the Conservation of British Insects, for it comes at a time when we as a society are becoming increasingly aware of the need for conservation. Entomologists soon find that conservation is a pleasure and not a bore, for it calls for a study of the behaviour and needs of the insect population in a new and interesting way. I draw your attention to the title—'A Code for Collectors': in other words it accepts that little serious work can be done in the field of entomology without some measure of collecting. The aim is to direct that collecting along sensible lines which will pose the minimum threat to the survival of our rarer insects. I earnestly ask all our members to accept and comply with this code and not to indulge in the hypocrisy of lip-service to it in public and cynical disregard of its precepts in practice. The restrictions it imposes are few, simple and patently sensible; it is no Draconian system designed to destroy our pleasure in collecting. Your Council has given it their unanimous approval.

The Annual General Meeting is a time when we take stock of the present, look forward to the future and reflect on the past. As I look back over my year of office I am filled with a sense of gratitude to Council and the officers of the Society for their loyal help and support; for the hours they have devoted to ordering our



(With permission of the Editor of *The Entomologist's Record*)

Mr. Albert Houghton (right) and companion at an 'Eddystone Lighthouse' circa 1894



affairs and the promotion of our interests. Our Society is like a great athlete in action; to the onlooker his loose and graceful movements seem effortless, but this perfection masks an intensive output of energy and stems from long hours of rigorous training. In the same way the unruffled flow of our affairs is the product of the unsparing labours and generous sacrifice of leisure made by our officers. I am glad that Council has recognised the services rendered by some of these officers by appointing them Honorary Life Members.

I must now ask you to direct your thoughts backwards in another and more solemn context. Once more death has taken its toll and in the past year we have lost six of our members, three of them past presidents.

Mr. T. R. Eagles died in September after a long illness. He was one of our most senior Honorary Life Members and was our president in 1934. He also held in the past the onerous offices of treasurer and editor; until a few months before his death he was active in his role as an assistant editor. He was a great all-round naturalist and on many a field meeting he would give a gravelled lepidopterist the name of a larval foodplant. His daughters have most generously presented his collection, his cabinets and many of his books to our Society—one of the most handsome bequests we have ever received. In order to commemorate his memory, Council has decided that each year one of our principal field meetings shall be called 'The T. R. Eagles Field Meeting'.

Air Marshal Sir Robert Saundby was a man of many parts. He achieved fame as a young man when in 1917 he took off in his aeroplane without orders and shot down a Zeppelin. As you well know, he reached high rank and shouldered heavy responsibilities during the second world war; the staff work of our bomber offensive against Germany was in his able hands. On retirement after the war he devoted himself to his great interests of fly-fishing and natural history. He was President of the Berkshire, Buckinghamshire and Oxfordshire Naturalists' Trust and was interested in conservation as well as collecting. In the latter field he specialised in geographical variation in the Lepidoptera and his fine collection has been bequeathed to the British Museum (Nat. Hist.). He was our president in 1950.

Only two years ago to this day Captain John Ellerton was standing at this spot to deliver his presidential address. A relatively late comer to entomology, he did not start collecting till almost the end of his distinguished naval career, but once bitten he threw himself into his new hobby with infectious zest. He was the most delightful companion in the field and a wise and practical counsellor at the conference table. His generous personality brought out the best in those around him. His presidential address on newly discovered species of microlepidoptera is an important work of reference to all interested in that field of entomology. His family has presented his valuable collection of microlepidoptera to this Society.

Mr. A. J. Wightman who was tragically drowned last January was a leading authority on the British Noctuidae, so many of which he had bred successfully. He had been a member of our Society for 50 years.

Mr. Percy Cue was already an old man when he joined the 'South London', as we were then called, in 1954. His interest centred on the Lepidoptera and on the 'Pugs' in particular, about which he was very knowledgeable.

Lastly, the death occurred only ten days ago of Mr. A. H. Sperring of Warblington, Hants. He was interested in Lepidoptera and captured a number of notable migrants in the days before mercury vapour had debased this accomplishment. I cannot recollect any major contribution to the literature of entomology from

his pen, but he wrote many useful and scholarly notes on the occurrence of rare species in Hampshire. He was a member of our Society for 25 years, but lived too far from London to attend many of our meetings.

### WICKEN FEN, WITH SPECIAL REFERENCE TO ITS MICROLEPIDOPTERA

Collecting at Wicken, we are told by W. Farren Jnr., began about 1820, but there is no doubt that the district had previously been visited for many a year by butterfly hunters in search of *Papilio machaon* L. These earlier entomologists left us no records of their captures and it was Frederick Bond, who lived near Cambridge and collected at Wicken Fen about 1850, who furnished the earliest lists. And even these were for the most part compiled in later years from memory and the specimens in his cabinet and one sometimes suspects inaccuracies.

Through the work of Bond and his contemporaries the fame of the locality grew steadily, and soon entomologists began to flock to Wicken in search of its well-known rarities. Entomology became a local industry, some of the village natives setting up as professional collectors while their wives and neighbours were landladies to a constant stream of visiting naturalists.

Let us imagine that it is the late nineteenth century and that you and I, the pair of us, are planning an entomological holiday to Wicken around midsummer. First we must decide where to stay. Some of our friends recommend the Lord Nelson at Upware, well known for a landlord, Mr. William Denson, who is friendly to entomologists. The inn has an attractive sign for which it is far-famed; it bears the caption 'No hurry—five miles from anywhere!'. If we stay in Upware, we must approach the fen from a different angle, past the ash trees on whose trunks Mr. Bond used to take *Apatele strigosa* (D. & G.). Our guide will be the landlord's son, Gaston, but he, alas, is no entomologist. Though Upware has its points, we decide in favour of Wicken village so as to be close to the local professionals and in a position to reap the benefit of their experience and help. So now we must choose whether to stay at the Red Lion or the Maid's Head, which is reputed to be outrageously expensive, or to take lodgings with the Marshalls at the old post office, Mrs. Phillips at 'The Sycamores', Mrs. Bullman who understands entomological appetites or the Asplands who keep the new post office. We decide in favour of the last of these hosts, because Mr. Isaac Aspland owns a slice of the fen and, if approached in a tactful manner, he makes it available to collectors free of charge; for we have heard a most outrageous rumour that some of the Wicken commoners who own plots in the fen are demanding sixpence a night from entomologists for the privilege of collecting on their ground—a preposterous imposition!

Another advantage of staying in Wicken is that the station at Soham is more handy, and a letter to Mr. John Bailey will ensure that he is there with his cart to meet us. Had we chosen Upware, Waterbeach would have been our railhead and the five-mile drive to our inn would have taken a tedious hour.

We have another letter to write before we travel, and that is to enlist the aid of one of the professional collectors. They have a real love of nature and are excellent entomologists; they are also renowned for their devoted service to visitors which is quite untainted by mercenary considerations. They include the cheery Mr. Solomon Bailey, Mr. Tom Rowlinson, Mr. John Clark of the Black Horse Inn and Mr. Albert Houghton, the local bootmaker, who is credited with the capture of the last specimen of *Laelia coenosa* (Hübner). It is a hard decision, for

we will be in good hands whichever we select. Our choice falls on Mr. Bailey.

Now we are all set for our journey. We have to change at Ely, where we pick up a slow train which delivers us at Soham in mid-afternoon. John Bailey and his horse await us, and soon we are jogging at a steady trot along the Wicken road. On our arrival we find our driver's brother Solomon there to greet us and we eagerly ask him for news of the season. It has been a mixture of good and bad, we hear. Cold east winds have prevailed and for this reason light on the fen has yielded disappointing results. However, our mentor shows us a prize, captured only the previous night; it is a fine specimen of *Hydrillula palustris* (Hübner), the first to be taken on the fen for two years. A coin is passed and the moth is ours. Are we tired after our journey, or would we like to collect on the fen that night? Of course we want to go out collecting and we are told that all we need do is to present ourselves with our nets and pill-boxes at the beginning of the lane leading to the fen at 9 o'clock. Mr. Bailey will do the rest. Oh! there is one more thing: do we smoke? We do, and we are advised to bring our pipes and a plentiful supply of tobacco and matches, for the midges of Wicken are a hungry breed.

Off goes Mr. Bailey to make his preparations and we unpack our gear. The dinner hour arrives and we sample Mrs. Aspland's cooking, finding it much to our liking. We have brought some bottles with us in our luggage, but we resist the temptation to linger long in gossip over our port and hasten down to the fen for our rendezvous with Mr. Bailey. 'I've sugared you a round,' he says, 'and it starts here on these elms; but light is the best thing for catching these beasties on a good night like this.'

As we enter the fen, we pass some thatched cottages close to the brick workings. A figure standing in the doorway of one of these houses greets us as we pass. 'Good hunting!' he calls. 'That is Mr. Farren,' says Solomon; 'he has rented the cottage and he or his son is out collecting every night. "Catch-'em 'all" he calls his house; quite small houses hereabouts are called halls.'

As we advance up the main drove, we see wooden posts with bark attached to them driven into the ground at intervals; they are coated with sugar and some of them are 'ours', we are told. These are an innovation and they are gradually superseding the old-fashioned 'knots' tied in the sedges. But we see some of these too, stickily anointed to add to the evening's sport.

Dusk is now falling and we gaze with wonder, for the fen is lighting up. At intervals along the drove no fewer than five beacons blaze forth, and we look curiously at the one which is to be the centre of our own activity. Driven into the ground is a stout pole and attached to it, about five feet up, is a kind of aquarium. Three sides are of glass and the fourth is of metal, lined with a mirror. Inside the aquarium are four paraffin lamps shining brightly in the gathering darkness. An 'Eddystone Lighthouse', says Solomon Bailey; 'it was invented by Mr. Abbott.' Two or three yards away upwind is a vertical sheet stretched between two poles, and the mirror of our lighthouse is adjusted to throw its brightest light on to this sheet. Mr. Bailey explains how we operate. Some of the moths come and settle on the sheet or run up and down it, but the main idea is to create a chamber of light in which we can use our nets to catch the moths blundering around in the beams.

It is a warm, moist, windless night with none of those low mists which are so fatal to success, and soon the moths begin to arrive. As their numbers increase, so does our respect for the wisdom of Solomon. For he recognises each species by its flight or the way it runs or sits on the sheet, and he is as ready with their scientific names as any university scholar. But it is not only the moths that come to our light: the mosquitoes are attracted too. So, mindful of the advice we were

given, we light our pipes and blow tobacco smoke over each other's faces like friendly horses indulging in mutual tail-whisking.

At first only common moths appear, and leaving the sheet we take up a lantern to make the first round of our sugar, marching to the music of the long-drawn reel of wakeful grasshopper warblers. Not much has yet come, but to our satisfaction we box a few *Apamea unanimitis* (Hübner.), *Polia nitens* (Haw.), and some nice forms of *Celaena leucostigma* (Hübner.), all in good condition.

On our return to our 'Eddystone Lighthouse' we find that the pace is quickening and we take some of the typical fenland insects such as *Phragmataecia castaneae* (Hübner.), *Meliana flammea* (Curt.), *Chilodes maritima* (Tausch.), and *Simyra venosa* (Borkh.). As the night progresses, we find that many of the insects have their exact moment for putting in an appearance, and Mr. Bailey can tell the time to within half an hour by the species of moth coming to the sheet. Still there is no sign of *palustris* but Solomon tells us to be patient, as it is a late flier. His words prove correct, and it is not until three in the morning that a solitary specimen appears. This puts an end to all thoughts of bed, but our optimism is disappointed and no more *palustris* come to our lamp.

By now dawn is beginning to break, heralded by corncrakes in the sedge, and we notice that the other collectors' lights have been dowsed. Knowing that we are interested in microlepidoptera too, Bailey tells us to keep a good look out, for some of the rarest gelechiids do not fly until daybreak, and suddenly we find the pretty little geometer *Sterrha muricata* (Hufner.) disporting itself in the dew all about our feet as we struggle to keep *Monochroa divisella* (Doug.) from damage in our sodden nets.

But by now we are wet and cold and sated with our captures and it is indeed time to depart. We offer to help Mr. Bailey carry the collecting gear home, but there is no need; he packs it all up in a tarpaulin and stows it under a convenient bush where it stays handy for a future foray.

And so to bed by daylight, happily exhausted and sleepily wondering how we shall ever find time to do all our setting.

On the next day we make a late start. The fen is reputed to be a poor place for collecting by day except for *machaon*, which is now past its best. So we turn our eyes elsewhere and as it is a bright afternoon we send a message to John Bailey to ask if his cart is available. It is, and we book it for the short excursion to Chippenham Fen, only five miles away, to look for *Eustrotia bankiana* (Fb.). The trip is a success, and we net *E. uncula* (Clerck) as well. The good weather looks like holding, and on our return journey we engage our driver for the whole of the next day for an expedition to Tuddenham in the Breck country. Our proposed venture involves a full ten-mile journey each way, so an early start is called for. Accordingly, we decline Solomon's offer of another night on the fen and make up for lost sleep instead.

The morrow brings another red-letter day. We while away the tedious two-hour drive with entomological gossip and alternately gloomy and hopeful prognostications about the day's prospects, while John Bailey regales us with tales of the other entomologists he has transported, such as the great Lord Walsingham himself, or a young undergraduate called Mr. Meyrick who licked all his seniors with his knowledge and skill in discovery: the smaller the moth, the better he liked it.

When we reach the ground, we find that our driver knows all the most favoured spots, and as the day advances our nets in due turn envelop *Lithostege griseata* (D. & S.), *Scopula rubiginata* (Hufner.), *Heliothis dipsacea* (L.), *Acontia luctuosa*

(D. & S.) and *Emmelia trabealis* (Scop.), which we prefer to call by its more familiar name of *sulphuralis* (L.). A rare little plume is there, too, which we refer to as *laetus*. We search clumps of *Silene otites* L. (Wibel) for *Anepia irregularis* (Hufn.), but we are too early for the larvae and we fail to detect the moths in their daytime hide-outs.

The return journey seems long and tedious, and conversation flags. In contented drowsiness we think the same thoughts over and over again, picturing to ourselves the new look our cabinets will assume and the jealous gasps of admiration from our less fortunate friends. No, we will not collect on the fen that night.

And so our week proceeds, with excursions by day and busy nights around our 'Eddystone Lighthouse' or going the rounds of our sugared posts and knots. On some nights sugar beats light; on others, light beats sugar; on others again, when the wind is chill or low mist blankets the fen, our labours are in vain and almost with relief we return to our lodgings for an early bed.

In spite of warnings that our time will be wasted, we do after all spend one day on the fen, for we are anxious to see the Montagu's harriers and short-eared owls that are nesting there. To save us the tedious walk home at midday, children bring us down a tasty lunch fresh from our hostess's kitchen. On the whole, our advisers were right, and apart from a few larvae and micros swept from the edges of the droves, our daylight visit is a failure. One thing surprises us though and that is to see *machaon* in all stages—imagines worn and fresh, larvae large and small, and even ova and pupae. Solomon Bailey explains that there seem to be two races, the one single- and the other double-brooded. The double-brooded butterflies emerge early in the year and their offspring follow them later in the same season, whereas the single-brooded race flies while its cousins are larvae.

All too soon our holiday—our what? How can a week like this ever be called a holiday?—our sojourn is over, and with farewells to our village friends and promises to return next year we embark for the last time in John Bailey's cart for our sad drive to the station.

This picture of a bygone era has been culled from many sources, and I believe it to be authentic in its details. The villagers I have named were real people. You can see a photograph of one of them in a recent number of *The Entomologist's Record*, put there by our newly-elected vice-president. It shows Albert Houghton and an unknown companion standing beside an 'Eddystone Lighthouse'. Houghton is a stout, burly man with a luxuriant beard—whiskers that once caught alight in an affray with his lamp, as Farren tells us with a chuckle. Some of Solomon's specimens, beautifully set, are still to be seen in collections. The use of scientific names is not entirely forgotten by the villagers. Recently, as I was leaving the fen, I was asked by one whose memories may well extend back to the last century whether I had taken *palustris*. I disclaimed that distinction, but sensing that there was a story at the tip of his tongue, I asked the purpose of his question. 'We all know *palustris*,' he told me, 'since that night when we were woken up at three in the morning by Baron de Worms running up from the fen and shouting at the top of his voice "I've got *palustris*! I've got *palustris*!"' I expect Dr. de Worms will tell us that the tale is apocryphal, and I expect that nevertheless we shall believe it implicitly.

The old-fashioned lights which were used on the fen may seem primitive to inhabitants of the mercury vapour age, but they were remarkably effective. Farren tells that in two nights' work J. W. Tutt collected over 800 specimens. Our society's past president would hardly be popular if he were alive today and were responsible for such a holocaust of entomological slaughter, and the zeal which

aroused Farren's admiration would surely provoke obloquy amongst contemporary entomologists.

I do not know how many moths a light trap would attract today, for light traps are forbidden on the fen. There are wise regulations, too, restricting the use of mercury vapour lamps. But I do not think that the numbers of insects have declined very much, and if some of those for which the fen was famed have vanished, other good things have moved in to take their place. If you are hoping that I can tell you why the swallowtail has gone, you will be disappointed. Having survived massive depredations in the past, it went at the end of the war when it was protected and collecting was at a low ebb, and I do not think the blame can be laid on the collector's doorstep. Perhaps the draining of Burwell Fen and its wartime use for agriculture causing a significant shrinkage in the size of the reserve, may have played its part. Recent attempts to reintroduce *machaon* have failed, for the butterflies no longer like the fen and disperse in what is probably a fruitless search for a more congenial habitat. None was released in 1971, so the two or three which were sighted last summer must have been the offspring of the previous year's liberations; a tiny ray of hope.

*Papilio machaon* is not the only species we have lost. Others have gone too, or appear to have done so. I shall deal only with a few of the micros. As I have said, I have a list of over 180 species which have been recorded from Wicken in days gone by, but for which I can trace no recent record. Of these, about half are probably still there and will turn up again in due course; only a year ago the list stood at well over 200. Several may have been recorded in error and are intruders to the list. Others again may have been captured not in the fen but in the village or neighbourhood, for the earlier collectors were not very precise in their records; yet vagrants from such species may well have found their way to the lights on the fen from time to time. But some indeed are true fenland insects which have gone with *machaon* and I shall say a few words about some of the more notable absentees.

It is many a day since *Olethreutes doubledayana* (Barr.) was taken at Wicken. Mr. Bond used to catch it over a hundred years ago, and I know of no subsequent records. The authors of the list in the Victoria County History for Cambridgeshire and the Isle of Ely give the enigmatic dateless 'Wicken' for this species, which seems to imply that it still occurs; but I know of no evidence to support their implication.

On the case of *Olethreutes olivana* (Treits.) (*micana* auct.) they are more precise but nonetheless inaccurate, for they say it was recorded only in the *Fenland Past and Present* list, whereas in fact J. T. Carrington claims to have caught it in 1880. That was a long time ago, and it seems that this species, too, is a 'goner'.

There is more hope for *Hysterosia schreibersiana* (Fröl.). Records for it have been erratic and it was last taken by W. G. Sheldon in the lane leading to the fen in 1920. This is a tree-top species which needs a downpour of rain to bring it to human level, and it is seldom that a microlepidopterist, a deluge and *schreibersiana* synchronise their appearances.

All the older entomologists recorded the fen form of *Phalonidia vectisana* (H. & W.), but the present generation is silent. Farren says it used to occur freely in the main drove, the thoroughfare still traversed by every visitor to the fen. Were it there today, it would surely have been noted. Perhaps it still lurks in some out of the way retreat.

The tineids have had their casualties too. *Opostega auritella* (Hübner) was taken by Bond and later by the Farrens. There are no recent records, but I am full of

hope that it will turn up again in due course. *Leucoptera orobi* (Staint.) is much more doubtful. It was recorded from Wicken only by G. I. Crawford about 1930, though F. Jenkinson had previously claimed its capture from somewhere near Cambridge. The foodplant, *Lathyrus montanus* Bernh., does not grow in Cambridgeshire and I would like more positive proof that the record is authentic. *Leucoptera* species are hard to determine.

The gelechiids are well-recorded from Wicken, which is the home of several notable species, some of which are confined to the locality. Among those which have not been seen, as far as I know, since Farren's day are *Aristotelia arundinella* (Staint.), *Monochroa quaestionella* (H.-S.), *M. divisella* (Doug.), *M. subdecurtella* (Staint.) and *Epitheatis tetrapunctella* (Thunb.) (*lathyr* Staint.). The last was considered a common species, but most of the others were always rare and seldom to be encountered except during the dawn flight—an event rarely witnessed by the modern entomologist. I expect most of these gelechiids are still there, with the possible exception of *quaestionella*, for its foodplant is *Lotus*, and though *L. uliginosus* Schkuhr is reported from the fen, I have yet to locate a single plant.

Changes of course must occur, for the fen is changing too. Farren's cottage has gone, with its turf-shed harbouring pyralids and tineids and the thatched roof haunted by hibernating *Depressaria* and *Mompha*. It has gone, and not a brick remains. On the site grows the grey poplar which supports *Dechtiria turbidella* (Zell.), one of the new specialities of the fen. Of Farren's orchard, only one venerable tree still stands. Decay and regeneration; loss and gain; 'the old order changeth, yielding place to new'.

If you look at the photograph of Albert Houghton to which I have referred, you will see wide acres of unbroken sedge in the background; Carrington, in 1880, described the fen as looking like a brown, overgrown meadow. Today, dense carr of sallow, the buckthorns, hawthorn and guelder rose dominates the landscape, leaving only small patches of sedge islanded between the thickets. How has this come about?

Until the end of the last century the fen was commercially valuable land. It bore two sources of wealth, the sedge, *Cladium mariscus* (L.) Pohl, and peat. The land had many owners, each one possessing a small holding. The owner kept his crop weeded, and this meant that he quashed the carr bushes which were ever ready to invade his allotment. The sedge was harvested every four years, when it was used as litter for animals or as a cheap form of thatch. Different owners cropped their sedge in different years, so there were always patches of first, second, third and fourth year growth, and the attendant marsh vegetation, which included many lepidopterous foodplants, could always find tracts well suited to its requirements.

The peat was dug mainly in the surrounding fens, such as Adventurers' Fen, and this, Dr. E. A. R. Ennion tells us in his fascinating little book about that fen, in part explains why Wicken Fen stands on a low tableland some six to eight feet above the circumambient plain. A more significant reason is that the land around is fenland drained for agriculture, and when the watertable is lowered, the surface contracts and sinks. But William Farren the third, whose father and grandfather were the entomologists, contends that Wicken Fen was always higher and drier than the surrounding countryside.

At the end of the nineteenth century the demand for both the Wicken crops, turf and sedge, began to decline and owners in consequence neglected their holdings. At this time naturalists started to purchase slices of fen, pre-eminent

among whom was G. H. Verrall, whom entomologists commemorate annually at the supper bearing his name. At first the policy was to let nature have her way, the new owners thinking thereby to promote the most favourable conditions for insect life. But this did not work. 'Naturam expellas furca, tamen usque recurret', and once the fenman's becket was laid aside nature in the form of carr romped back with a vengeance. The folly of *laissez-faire* has been appreciated by the National Trust which has progressively taken over the fen in the present century, but much of the harm was already done and a shortage of funds and labour meant that the fen committee was fighting a rearguard action. In recent years under the wise wardenship of Colonel Mitchell, the clearing of scrub is going ahead, but at the present rate of progress he estimates that it will be a generation before he achieves his aim of a fen which is one third sedge, one third carr and one third woodland.

Nor is it only the fen which has altered: there have been human changes too. New modes of transport have resulted in new routines for the collector. First we read of a pedal cycle taking the place of John Bailey's cart for the trip to Tuddenham without which no visit to Wicken Fen was complete; then it was a motorcycle and lastly a motor-car. Solomon Bailey successfully introduced *Eustrotia bankiana* to Wicken, rendering the trip to Chippenham superfluous. With his greater mobility, the collector no longer needed to stay in the village, and the trade of the landladies dwindled. There was less demand on the services of the professional entomologists, and the National Trust, alarmed at the over-collecting of *machaon*, prohibited the villagers from entering the fen. Permits were needed by the collector, and he paid fewer and more fleeting visits, seldom staying to see the dawn break. The entomological conscience was educated, and the taking of long series was no longer countenanced: the naturalist became more concerned with conserving than destroying the life he studied. 'The old order changeth, yielding place to new.' We need have no regrets; the new order is a better order.

'Wicken Fen is perhaps the most famous collecting area known.' So wrote Mr. B. O. C. Gardiner in 1961. As a reserve it was inaugurated by entomologists for entomologists and today entomologists play a large part in its administration: a large, but not an exclusive part, for we share the reserve happily with botanists, ornithologists and the general public. But historically it is *our* reserve.

If my list of its microlepidoptera, which I now present to the Society, is of service to my fellow entomologists, my labours will not have been in vain.

## APPENDIX

### THE MICROLEPIDOPTERA OF WICKEN FEN

#### INTRODUCTION

The list which follows attempts to summarise all that is known of the microlepidoptera of Wicken Fen up to the end of 1971.

#### *Abbreviations and Authorities*

In the interests of brevity, abbreviations are used both for the names of recorders and for certain recurring words and phrases. These are given below together with some account of the authorities represented.

- B Bond, F. (1826-1889). 'Captures of Lepidoptera at Hornsey, Wicken and Burwell Fen', June 8-July 1, 1850. *Zoologist* 3011-3012 (1851); a brief list including some microlepidoptera. Many of his records are also

included in the list in *The Fenland Past and Present*; it is believed that these were communicated direct to the author (J. Balding) about 1878.

- C Crawford, G. I. Records made between 1929 and 1931 in the possession of the Cambridge Natural History Society and incorporated into the *Victoria County History* list. I have reason to doubt one or two of Crawford's determinations, but in general he was a very sound and active entomologist and his work covers a period when other records are sparse.
- Car Carrington, J. T. 'Wicken.' *Entomologist*, 13:167-71. Though his account is concerned mainly with the larger moths, he mentions a few microlepidoptera.
- C-H Chalmers-Hunt, J. M. Records made mainly between 1965 and 1971 and communicated *in lit.* to the author.
- E Emmet, A. M. Records made mainly between 1965 and 1971 and published for the first time. For reasons of brevity (not vanity) the abbreviation 'E' is sometimes used to cover records made simultaneously by the author and others who have collected with him.
- EM Meyrick, E. Meyrick collected at Wicken Fen when he was up at Cambridge between 1874 and 1876. A few of his records are included in the list in *The Fenland Past and Present*, but the main source is a manuscript list in the possession of the Cambridge Natural History Society. This was extensively used by the authors of the *Victoria County History* list.
- ff ffennell, D. W. H. Records made in 1971 communicated *in lit.* to the author.
- Fj Farren, W., junior. The chief authority. He lived with his father in a cottage on the edge of the fen in 1885 and 1886 expressly for the purpose of collecting, and continued his visits until 1905. His records are included in three chapters he contributed to *The Natural History of Wicken Fen*, ed. J. S. Gardiner and A. G. Tansley, published in parts, 1923-1932.
- (a) *The Lepidoptera of Cambridgeshire* (1923). This is based on a similar chapter he contributed to *The British Association Handbook* in 1904; this booklet was compiled to mark the occasion of the meeting of the Association in Cambridge. It gives some useful Wicken records but tends to be too generalised for present purposes.
- (b) *Memories of Wicken* (1926). Full of anecdote and interesting information. Several species of microlepidoptera find incidental mention.
- (c) *A List of the Lepidoptera of Wicken and the neighbouring Fens* (1926). A list of names without comment based on a manuscript list prepared by himself about 1905. As far as is known, he incorporated no new material in 1926; indeed, he complains elsewhere that the microlepidoptera have been neglected since his collecting days. He appears not to have consulted the literature.
- FPP A chapter entitled 'Lepidoptera' by J. Balding included in *The Fenland Past and Present*, ed. S. H. Miller and S. B. J. Skertchly, 1878. The appendix to the chapter consists of a carefully compiled list giving records by F. Bond, A. B. Farn, W. Farren, D. and H. F. Fryer, E. Meyrick, A. H. Ruston, S. B. J. Skertchly, Lord Walsingham and others. Covering the whole of the fenland, the list is to some extent generalised and localities are not named for the commoner moths.

- Fr Fryer—records kept by the Fryer family, viz. J. Fryer, H. F. Fryer and Sir John Fryer, 1865–1930. These are reproduced without dates in the *Victoria County History* list of which Sir John was part author.
- Fs Farren, W., senior—father of W. Farren, junior. He published two very useful lists: (a) ‘Tineina taken near Cambridge’; (b) ‘Tortrices taken near Cambridge’, *Entomologist* **19**:78–93 and 107–110 (1886, though the captures were made in 1885). Farren is not precise regarding localities, and potential records have been rejected because of doubt over whether the captures were made at Wicken or elsewhere.
- G Gardiner, B. O. C. ‘The Pyraloidea of Cambridgeshire and Huntingdonshire’, *Entomologist’s Gaz.* **12**:173–192 (1961). This list contains few new records for Wicken. This is not the fault of the author: the blame rests with the visiting entomologists who either neglected the pyrales or failed to publish their records.
- J James, R. E. Accounts of captures including pyrales made on three widely separated visits to Wicken.  
 (a) 1898. ‘Collecting in the Fens.’ *Entomologist* **31**:253–257.  
 (b) 1908. ‘Wicken Revisited—the Lepidoptera of Wicken Fen, etc.’ *Ent. Rec.* **20**:294–300.  
 (c) 1923. ‘Old Haunts Revisited—Wicken and Deal Sandhills’. *Ent. Rec.* **35**:149–153.
- JE Ellerton, Captain J., R.N. Records of several visits 1967–1970 communicated to the author.
- l larva (or larvae).
- l\* larva from which the imago was reared.
- m larval mine.
- m\* Tenanted larval mine from which the imago was reared.
- Meek Meek, E. G. 1881. ‘An afternoon at Wicken Fen’ [26 June]. *Entomologist* **14**:185.
- NRR No recent record. When used by the author this means that there has been no record since 1926, the year of the publication of Farren’s list. It is also used in quotation from other sources (NRR(G); NRR(V)); the authors in question are likely to have had a different interpretation.
- O Omnes, i.e. all, or nearly all, authorities.
- P Porritt, G. T. who collected intermittently at Wicken Fen from about 1878 till 1910. Some of his early records are included in the Fenland list; others are in the following papers:  
 (a) 1878. ‘Lepidoptera at Wicken’. *Ent. mon. Mag.* **15**:110–111.  
 (b) 1878. ‘A Fortnight in the Fens’. *Naturalist* **4**:116–120, 129–133.  
 (c) 1892. ‘Wicken Fen and District’, 1891. *British Nat.* **2**:1–7.
- P-C Pelham-Clinton, E. C.  
 (a) Records of pyrales taken mainly in 1949 incorporated in the list by B. O. C. Gardiner.  
 (b) Records communicated *in lit.* to the author.

- R Ruston, A. H. 1878–1928. Records from a diary extracted by the authors of the list in the Victoria County History.
- R-S Rait-Smith, W., who checked the list in the Victoria County History and added some of his own records without dates.
- S Sheldon, W. G. who checked the list in the Victoria County History and added some of his own records of tortrices, generally with dates. I have also added records from his collection of tortrices in the British Museum (Nat. Hist.). He collected at Wicken in 1915, 1917, 1918, 1925 and 1930.
- T Tutt, J. W., who gives an account of two collecting visits to Wicken. He is one of the few entomologists who covered the microlepidoptera fully.  
 (a) 'Notes on the Season, 1891—Wicken Fen.' *Ent. Rec.* 2:176–179.  
 (b) 'Notes on the Season, 1892—Wicken Fen.' *Ent. Rec.* 3:196–202.
- V A list of Lepidoptera compiled by J. C. F. Fryer and H. M. Edelsten in *The Victoria County History of Cambridgeshire and the Isle of Ely*. Since the list covers the whole county, generalisation is inevitable, and localities are not mentioned for common species.
- W Wickham, A. P. 'A Visit to Wicken, June 14th to 26th, 1920.' *Entomologist* 53:211. Of the microlepidoptera, only the pyrales are recorded.

#### *Comparison between the main lists*

The first was compiled by Mr. James Balding and published in *The Fenland, Past and Present*, which appeared in 1878. This included 243 species of microlepidoptera stated to occur at Wicken, while a number of others are described as 'common throughout the district'; of these a goodly proportion may be assumed to have been found in the fen.

The second list was composed by W. Farren junior and is included in *The Natural History of Wicken Fen* which was published in parts between 1923 and 1932. It is based, however, almost entirely on records made 20 years or more earlier. It expands the list of recorded microlepidoptera to 346.

*The Victoria County History* contains 33 species not recorded by Farren, and gives additional records for many of the known species.

Gardiner's list of pyrales and plumes adds five species to the list.

The present list contains 555 names, over double the number in the *Fenland* list, and over 200 more than were listed by Farren. A few of the additions have been culled from the literature, but most are new records. The majority of these species have probably long been present on the fen, but were missed by the Farrens and their contemporaries because they were chiefly interested in the species which could be attracted by light. Almost half of the new-comers are leaf-miners of the Nepticulidae, Heliozelidae and Gracillariidae which must be sought as larvae; their imagines are diurnal or crepuscular and are seldom still on the wing when the lamps are lit. On the other hand, the bulk of the species for which there are no recent records belong to the Gelechiidae, Tortricidae and Pyralidae, night- or dawn-flying moths which I have missed through my neglect of light as a means of collecting.

The following table shows how the list has grown. I have given the number of added species and not totals for the lists made by Gardiner and the authors of the *Victoria County History*, because these are generalised lists naming localities only

in the case of the less common species; consequently the number of species they attribute to Wicken Fen is smaller than that given by their predecessors.

*Number of species recorded from Wicken Fen in the main lists*

	FPP 1878	Fj 1926	V 1938	G 1961	E 1971	NRR 1971
Micropterigidae	1	2	—	—	3	1
Eriocranidae	0	0	—	—	1	—
Nepticulidae	1	2	+1	—	43	—
Opostegidae	2	3	—	—	3	1
Tischeriidae	0	0	—	—	1	—
Incurvariidae	5	7	+2	—	13	5
Heliozelidae	0	0	+1	—	4	—
Psychidae	0	0	+1	—	3	—
Tineidae	3	6	+1	—	13	8
Lyonetiidae	5	6	+1	—	13	3
Gracillariidae	6	8	+3	—	27	3
Phyllocnistidae	0	2	—	—	2	1
Glyphipterigidae	3	5	+3	—	9	4
Yponomeutidae	6	15	—	—	27	8
Epermeniidae	3	3	—	—	4	1
Schreckensteiniidae	1	1	—	—	1	—
Coleophoridae	16	20	—	—	29	6
Elachistidae	5	9	+1	—	19	9
Oecophoridae	14	25	+4	—	32	12
Ethmiidae	1	1	—	—	1	—
Gelechiidae	29	35	+2	—	44	29
Momphidae	3	4	+1	—	7	2
Cosmopterigidae	4	4	—	—	7	1
Tortricidae	71	97	+8	—	141	47
Cochylidae	17	19	+2	—	25	11
Alucitidae	0	1	—	—	1	1
Pyralidae	42	63	+1	+5	73	26
Pterophoridae	5	8	+1	—	10	3
Totals	243	346	+33	+5	555	182

*The definition of Wicken Fen for recording purposes*

It is not possible to say exactly what boundaries the older entomologists envisaged when they made their Wicken records. There is no doubt that many of them included specimens taken in the village and in a greater or lesser proportion of the environment. Recorded moths which are obviously foreign to a fen habitat are the 'domestic' pyrales and tineids. Some of these were avowedly taken in the village barns and stables. But cottages formerly stood at the edge of the fen near the brick-workings and we know from W. Farren senior, who rented one of them, that many of these insects occurred in his turf-shed. Again, Farren had an orchard, the remnants of which still stand in the fen, while a cherry tree, doubtless set there by man, grows at the entrance to the main drove. These support alien insects. The *Fenland* list includes several ericaceous species, and heather, still common hard by in the Breck, used to grow even nearer to the fen. In short, the fen is surrounded by varied habitats supporting insects which have been recorded

in the lists. It is impossible to say whether these insects strayed on to the fen or the recording entomologists strayed on to their habitats. The records must therefore be accepted, improbable though they may seem.

For the purposes of modern records, Wicken Fen is understood to include all the National Trust property on Wicken Pools' Fen, St. Edmund Fen, Adventurers' Fen and Burwell Fen, with one small addition. This is the lane, known as Breed Fen Drove, leading north-west from the keeper's cottage to its junction with the main drove (Sedge Fen Drove). This is what I understand to have been meant by 'the lane leading to the fen', which is the site of a number of interesting records, both past and present.

#### *Future work*

It is idle to speculate on the number of new species awaiting discovery or of lost species liable to rediscovery. The point to be made is that the list is still far from complete. In my sixth year of recording (1971) I registered 26 hitherto unrecorded species, including two in my latest visit in mid-November; in the same year I confirmed the presence of 20 for which there had been no recent records. Each future year should see further additions, but obviously in diminishing proportions. The important thing is for records to be kept and for visiting entomologists to rid their minds of the misconception, too often expressed, that Wicken Fen is so well worked that everything has been recorded from it already. My own intermittent researches resulted in the addition of three species to the British list: there may be more.

#### *Nomenclature*

The nomenclature used is that of the forthcoming edition of the *Kloet and Hincks Check List*, which I have seen in proof form through the kindness of Dr. J. D. Bradley.

#### *Acknowledgements*

My thanks are due to many persons. Dr. J. Smart, the secretary of the Wicken Fen Committee, has given me permission to collect, and has proffered help in a number of ways; for instance, when I was unable to obtain a copy of the *Fenland* list, he provided me with a photostat copy. Colonel C. E. Mitchell, the Warden of Wicken Fen, has always made me welcome in his domain. Mr. J. M. Chalmers-Hunt furnished me with a very useful Wicken bibliography. A number of contemporary entomologists have kindly transcribed their records for my use. Dr. J. D. Bradley has helped with many of the identifications, often by dissection of the genitalia. Jane Goater has most generously prepared the typescript, a most difficult and laborious task, performed faultlessly. Lastly, I wish to thank Mr. and Mrs. Barnes, the keeper and his wife, for their cheerful friendliness which makes it a pleasure and not a duty to sign the book at their cottage before each visit to the fen.

#### MICROPTERIGIDAE

*Micropterix mansuetella* (Zell.) Fj. NRR.

*M. aruncella* (Scop.) Common, 1966 (C-H; E).

*M. calthella* (L.) FPP; Fj; 1949 (P-C); fairly common (E).

#### ERIOCRANIIDAE

*Eriocrania* sp. M, most probably of *E. semipurpurella* Steph. are becoming increasingly common in leaves of *Betula* (E).

## NEPTICULIDAE

- Stigmella basiguttella* (Hein.) Single vacated m on *Quercus* in 1970 and 1971 (E).
- S. ruficapitella* (Haw.) Several vacated m on *Quercus* in 1970 and 1971. The determination is provisional as this group has recently undergone revision, and three new species have been added to the British list. (E)
- S. paradoxa* (Frey) (*nitidella* Hein.) Recorded as new to Britain from tenanted m, 11.vii.69. M since recorded annually. One imago bred, 1970; two wild imagines, 1970; two, 1971 (E).
- S. aenella* (Hein.) Tenanted and vacated m on *Malus*, 1970, 1971 (E).
- S. oxyacanthella* (Staint.) M not rare on *Crataegus*, 1971 (E).
- S. viscerella* (Staint.) M\* not rare on *Ulmus*, 1970–1971 (E).
- S. alnetella* (Staint.) M scarce on *Alnus* (E).
- S. betulicola* (Staint.) M\* scarce on *Betula*, 1970–1971 (E).
- S. luteella* (Staint.) Vacated m on *Betula*, 1970–1971 (E).
- S. catharticella* (Staint.) EM; Fj; m\* common on *Rhamnus catharticus* (E).
- S. ulmivora* (Fol.) (*ulmifoliae* Her.; *ulmicola* Her.) M on *Ulmus* in the Hering herbarium taken by an unnamed collector on 12.vii.64—an unusually early date. M of the three forms represented by the synonymy 1970–1971 (E).
- S. hybnerella* (Hübner) (*gratiosella* Dup.). Tenanted and vacated m on *Crataegus* (E).
- S. crataegella* (Klim.) M common on *Crataegus* (E).
- S. malella* (Staint.) M\* common on *Malus*, 1970–1971 (E).
- S. regiella* (H.-S.) M not rare on *Crataegus* (E).
- S. anomalella* (Goeze.) M\* common on *Rosa* spp. (E).
- S. centifoliella* (Zell.) M\* on *Rosa* sp., 1970 (E).
- Nepticula pygmaeella* (Haw.) M not rare on *Crataegus*, 1970–1971 (E).
- N. obliquella* Hein. M scarce in two generations on *Salix alba* and other willows, 1970–1901 (E).
- N. salicis* Staint. M common on *Salix* spp. (E).
- N. assimilella* Zell. M fairly common on *Populus tremula* L., 1970–1971 (E).
- N. trimaculella* (Haw.) Vacated m on *Populus nigra* L., 1970 (E).
- N. ulmariae* Wocke. Tenanted and vacated m in two generations on *Filipendula ulmaria* (L.) Maxim. 1968–1971 (E); three ♀♀, 25.v.54, possibly of this species (P-C).
- N. plagicolella* Staint. FPP; m common on *Prunus*, 1970–1971 (E).
- N. aurella* (F.) Fj; mines common on *Rubus* (E).
- N. splendidissimella* H.-S. M\* locally common on *Rubus caesius* L. (E).
- N. marginicolella* Staint. (*fulvomacula* Skala). M\* of both forms common on *Ulmus* (E).
- N. continuella* Staint. M\* fairly common on *Betula* (E).
- N. ignobilella* Staint. M fairly common on *Crataegus* (E).
- N. lapponica* Wocke. M fairly common on *Betula* in June (E).
- N. confusella* Wood. M fairly common on *Betula* in July (E).
- Ectoedaemia* (*Dechtiria*) *angulifasciella* (Staint.) M locally on *Rosa* spp., 1970–1971 (E).
- E. (D.) atricollis* (Staint.) Vacated m on *Crataegus*, 1970–1971 (E).
- E. (D.) rubivora* (Wocke.) M common on *Rubus caesius* L. (E).
- E. (D.) argentipedella* (Zell.) M fairly common on *Betula* (E).
- E. (D.) albifasciella* (Hein.) Single vacated mine on *Quercus*, ix.70 (E).
- E. (D.) quercifoliae* (Toll) Several m on *Quercus*, xi.71 (E).
- E. (D.) intimella* (Zell.) M\* locally common on *Salix* spp. (E).

- E. (D.) turbidella* (H.-S.) Imagines plentiful on tree trunks in late May, 1969–1970; m\* plentiful on *Populus canescens* (Sit.) Sm., 1969–1971 (E).  
*E. (D.) subbimaculella* (Haw.) M\* not rare on *Quercus* (E).  
*E. (D.) argyropeza* (Zell.) M\* rather scarce on *Populus tremula* L., 1970–1971 (E).  
*E. (D.) pulverosella* (Staint.) M fairly common on *Malus*, 1970–1971 (E).  
*Fomoria septembrella* (Staint.) Vacated m on *Hypericum*, 1971; the foodplant seems scarce (E).

## OPOSTEGIDAE

- Opostega saliciella* (Treits.) One, 1885 (Fs); erratic in numbers (Fj); one, 1967 (E); two, 1967 (C-H).  
*O. auritella* (Hüb.) Mr. Bond (FPP); Fj; NRR.  
*O. crepusculella* Zell. FPP; EM; T; Fj; common at light (E).

## TISCHERIIDAE

- Tischeria marginata* (Haw.) M scarce on *Rubus fruticosus* agg., 1970 (E).

## INCURVARIIDAE

- Phylloporia bistrigella* (Haw.) M not rare on *Betula*, 1971 (E).  
*Incurvaria masculella* (Schiff.) Several, 1971 (ff).  
*Lampronia oehlmanniella* (Treits.) One, 1967 (E).  
*L. rubiella* (Bjerk.) Mr. Bond (FPP); Fs; Fj; one, 1971 (P-C).  
*Nematopogon panzerella* (F.) (*schwarziella* Zell.) FPP; NRR.  
*N. metaxella* (Hüb.) FPP; Fs; Fj; fairly common (E).  
*Nemophora fasciella* (F.) Fj. The foodplant does not grow on the fen: NRR.  
*N. minimella* (D. & S.) H. C. Hayward, 1928 (V).  
*N. cupriacella* (Hüb.) Fj. NRR.  
*N. degeerella* (L.) Locally common (E).  
*Adela reamurella* (L.) (*viridella* Scop.) FPP; NRR.  
*A. croesella* (Scop.) FPP; several, 1971 (E).  
*A. rufimetrella* (Scop.) Fr. (V). NRR.

## HELIOZELIDAE

- Heliozela stammeella* (F.-R.) Vacated m on *Quercus*, 1970, 1971 (E).  
*H. respicella* (Staint.) M not rare on *Alnus* (E).  
*H. betulae* (Staint.) Vacated m scarce on *Betula*, 1971 (E).  
*Antispila pfeiferella* (Hüb.) C (V). The foodplant is not recorded from the fen.

## PSYCHIDAE

- Narycia monolifera* (Geoff.) L\* in cases on trunks of *Populus alba* L., 1969 (E).  
*Luffia ferchaultella* (Steph.) L\* in cases on trunks, 1971 (ff); very numerous cases on trunks of *Crataegus* in 1970, then regarded as *monolifera* were more probably of this species (E).  
*Psyche casta* (Pallas.) Two, one at sunset and one at sunrise; this species is new to the fen, 1885 (Fs); Fr doubtfully (V); 1\*, 1968, 1969 (E); 1, 1954 and 1971 (P-C).

## TINEIDAE

- Haplotinea insectella* (F.) (*misella* Zell.) Fj; NRR.  
*Nemapogon cloacella* (Haw.) FPP; one, 1971 (E).  
*Nemaxera corticella* (Curt.) One, 1969 (E).

- Monopis inella* (Hübner) FPP; NRR.  
*Trichophaga tapetzella* (L.) Fj; NRR.  
*Tineola biselliella* (Humm.) 'Too many' in his cottage on the fen, 1885 (Fs); NRR.  
*Niditinea fuscipunctella* (Haw.) FPP; cottage on the fen, 1885 (Fs); NRR.  
*N. piercella* (Bent) One, 1970 (C-H).  
*Tinea pelliionella* (L.) One, 1885 (Fs); C (V); one, 1970 (E).  
*T. flavescenscella* Haw. Fs.; NRR.  
*T. pallescentella* Staint. Cottage on the fen, 1885 (Fs); NRR.  
*T. semifilva* Haw. Single specimens, 1968, 1971 (E).  
*T. trinotella* Thunb. (*lapella* sensu auct.) Fj; NRR.

## LYONETIIDAE

- Leucoptera laburnella* (Staint.) Fj. The foodplant does not grow in the fen: NRR.  
*L. orobi* (Staint.) C (V). The foodplant does not grow on the fen or in Cambridge-shire and *Leucoptera* spp. are difficult to determine. NRR.  
*L. lotella* (Staint.) Lord Walsingham (FPP); NRR.  
*L. scitella* (Zell.) M\* fairly common on *Malus* and *Crataegus*, 1970-1971 (E).  
*Lyonetia clerkella* (L.) Mr. Farn (FPP); m\* on *Betula*, *Malus* and *Cerasus*, 1970-1971 (E).  
*Bedellia somnulentella* (Zell.) M\* on *Convolvulus*, 1969 (E).  
*Bucculatrix cristatella* Zell. Mr. Warren (FPP); NRR.  
*B. nigricomella* Zell. Several around *Chrysanthemum*, 1971 (E).  
*B. frangulella* (Goeze.) Mr. Farn (FPP); 1881 (Meek); Fs; Fj; abundant (E).  
*B. albedinella* Zell. (*boyerella* Dup.) Lord Walsingham (FPP); several, and vacated m on *Ulmus*, 1970-1971 (E).  
*B. cidarella* Zell. One, 1969 (E. S. Bradford); vacated m on *Ahnus*, 1970-1971 (E).  
*B. ulmella* Zell. Vacated m on *Quercus*, 1970-1971 (E).  
*B. crataegi* Zell. Vacated m and l on *Crataegus*, 1970-1971 (E).

## GRACILLARIIDAE

- Caloptilia elongella* (L.) Mr. Farn (FPP). This record could refer to *C. betulicola* (Her.), since the two species had not then been separated. In 1970 I found a *Caloptilia* cocoon spun on a leaf of *Betula*, which produced a parasite. This could, however, have belonged to *C. stigmatella* (F.), as *Salix* grew close by; so, NRR.  
*C. stigmatella* (F.) FPP; C (V); 1\* common on *Salix* spp. and *Populus alba* (E).  
*C. syringella* (F.) FPP; Fj; l on *Ligustrum* (E).  
*Aspilapteryx tringipennella* (Zell.) C (V).  
*Calybates phasianipennella* (Hübner) Not rare, 1966-1971; 1\* on *Polygonum*, 1968 (E).  
*C. auroguttella* (Zell.) One, 1885 (Fs); Fj; NRR.  
*Parornix anglicella* (Staint.) Fj; 1954 (P-C); 1\* common on *Crataegus* (E).  
*P. betulae* (Staint.) l on *Betula*, 1971 (E).  
*P. torquillella* (Zell.) One, 1971; l common on *Prunus* (E).  
*Callisto denticulella* (Thunb.) (*guttea* Haw.) Fj; l on *Malus*, 1970-1971 (E); one, 1971 (ff).  
*Acrocercops imperialella* (Zell.) FPP; 1885 (Fs); EM (V); Fj; m\* locally common on *Symphytum* (E).  
*Phyllonorycter (Lithocolletis) quercifoliella* (Zell.) M\* fairly common on *Quercus* (E).  
*P. (L.) messaniella* (Zell.) M\* on *Quercus*, 1970 (E).

- P. (L.) oxyacanthae* (Frey) Several, 1970; m common on *Crataegus* (E).  
*P. (L.) blancardella* (F.) M\* on *Malus*, 1970–1971 (E).  
*P. (L.) pomonella* (Zell.) (*spinicolella* Zell.) C (V); m on *Prunus*, 1970–1971 (E).  
*P. (L.) cerasicolella* (H.-S.) M on *Cerasus*, 1970–1971 (E).  
*P. (L.) corylifoliella* (Hübner) M\* common on *Crataegus* and *Malus* (E).  
*P. (L.) viminiella* (Staint.) M\* on *Salix fragilis* L. and *S. alba* L., 1970–1971 (E).  
*P. (L.) salicicolella* (Sirc.) M\* common on *Salix* (E).  
*P. (L.) dubitella* (H.-S.) One, 1971 (ff). This is an aberrant specimen, but the determination was made after dissection of the genitalia by Dr. J. D. Bradley.  
*P. (L.) spinolletta* (Dup.) FPP; NRR.  
*P. (L.) alnifoliella* (Hübner) M\* common on *Alnus* (E).  
*P. (L.) quinqueguttella* (Staint.) FPP; EM (V); Fj; m\* not common on *Salix repens* L. (E).  
*P. (L.) schreberella* (F.) M\* common on *Ulmus* (E).  
*P. (L.) ulmifoliella* (Hübner) M\* rather scarce on *Betula* (E).  
*P. (L.) stettinensis* (Nic.) M\* common on *Alnus* (E).

## PHYLLOCNISTIDAE

- Phyllocnistis saligna* (Zell.) Fj. NRR, but still occurs in the district.  
*P. unipunctella* (Steph.) (*suffusella* Zell.) Fj; m\* on *Populus nigra* L., 1970–1971 (E).

## GLYPHIPTERIGIDAE

- Anthophila fabriciana* (L.) Fj; abundant (E).  
*Choreutis punctosa* (Haw.) One, 1965 (JE); several, 1965, 1971 (E).  
*C. myllerana* (F.) (*scintilulana* Hübner) FPP; Fj; NRR. These records may refer to the previous species, since the two had not been differentiated when the records were made.  
*Eutromula pariana* (Clerck.) C (V).  
*Glyphipterix simplicella* (Steph.) (*fischeriella* Zell.) 1885 (Fs); Fj; 1949 (P-C); 1971 (E).  
*G. schoenicolella* (Boyd.) FPP; NRR.  
*G. forsterella* F. One only in the fen (Fs); Fj; NRR.  
*G. fuscoviridella* (Haw.) Fj; NRR.  
*G. thrasonella* (Scop.) (*cladiella* Staint.) Rev. L. Jenyns, 1815–1849 (V); FPP; among rushes (Fs); Fj; fairly common (E).

## YPONOMEUTIDAE

- Argyresthia brockeella* (Hübner) Common around *Betula* (E).  
*A. goedartella* (L.) Common around *Betula* (E).  
*A. pygmaeella* (Hübner) EM (V); Fj; 1\* on *Salix*, common (E).  
*A. cornella* (F.) Several around *Malus*, 1971 (E).  
*A. retinella* Zell. Common around *Betula* (JE; E).  
*A. mendica* (Haw.) Fj; fairly common (E).  
*A. semifusca* (Haw.) Three, 1969 (E and JE).  
*A. pruniella* (Clerck) (*ephippella* F.) Several around *Cerasus*, 1970 (E).  
*A. curvella* (L.) (*nitidella* F.) FPP; Fj; fairly common (E).  
*A. albistria* (Haw.) Fj; one, 1967 (JE); one, 1970 (E).  
*Yponomeuta evonymella* (L.) FPP; Fj; NRR.  
*Y. padella* (L.) Fj; 1 on *Crataegus*, 1949 (P-C); several (E).

- Y. malinellus* Zell. Possibly a form of the preceding species. Fairly common at light, even at a distance from *Malus* (E).
- Y. plumbella* (D. & S.) Fj; NRR.
- Y. vigintipunctata* (Retz.) One at light, in the heart of the fen, 1969 (E). The foodplant does not grow on the fen, but there is *Sedum* in a cottage garden near the entrance.
- Swammerdamia caesiella* (Hübner) (*heroldella* Hübner.) L common on *Betula* (E).
- S. pyrella* (Vill.) Fj; around *Crataegus* and 1 on *Malus* (E).
- Poraswammerdamia spiniella* (Hübner) (*caesiella* Hübner.) Fj; NRR.
- P. lutarea* (Haw.) L\* on *Crataegus*, 1971 (E).
- Prays fraxinella* (Bjerk.) (*curtisellus* Don.) FPP; Fj; NRR.
- Scythropia crataegella* (L.) Mr. Bond, (FPP); Fj; NRR.
- Ypsolophus dentella* (F.) (*harpella* D. & S., *xylostella* sensu auct.) Fj; NRR.
- Y. scabrella* (L.) One, 1966 (JE); several, 1\* on *Crataegus* (E).
- Y. vitella* (L.) FPP; Fj; NRR.
- Plutella xylostella* (L.) (*maculipennis* Curt.) FPP; a large ochreous brown variety occurs on the fen (Fs); T; Fj; 1949 (P-C); often abundant (E).
- Orthotaelia sparganella* (Thunb.) 1878 (P); at light, 1885 (Fs); Fj; NRR.
- Acrolepia pygmaeana* (Haw.) L\* common on *Solanum dulcamara*, 1965, 1971 (E).

## EPERMENIIDAE

- Phaulernis dentella* (Zell.) Not rare about Buckthorn, Mr. Bond (FPP); NRR.
- P. fulviguttella* (Zell.) Lord Walsingham (FPP); common (Fj); 1\* on seeds of *Angelica* (E).
- Epermenia illigerella* (Hübner.) Common (O).
- E. chaerophyllella* (Goeze) Two, 1971 (Dr. J. D. Bradley).

## SCHRECKENSTEINIIDAE

- Schreckensteinia festaliella* (Hübner.) Lord Walsingham, (FPP); Fj; one each, 1969 (E and JE).

## COLEOPHORIDAE

- Coleophora lutipennella* (Zell.) FPP; two beaten from elm (Fs); Fj; These records could refer, wholly or in part, to *C. flavipennella* Dup.
- C. gryphipennella* (Hübner.) L not rare on *Rosa* (E).
- C. cerasivorella* Packard (*nigricella* sensu P. & M.) Fj; 1\* common on *Crataegus* and *Malus* (E).
- C. serratella* (L.) (*fusedinella* Zell.) Fj; 1\* common on *Betula* (E).
- C. badipennella* (Dup.) Common, Mr. Bond (FPP); one beaten from elm, 1885 (Fs); Fj; several, 1970, 1971, and 1 on *Prunus* and *Ulmus* (E).
- C. siccifolia* Staint. L on *Crataegus* and *Malus*, 1971 (E).
- C. viminatella* Zell. FPP; EM (V); Fj; 1 common on *Salix* (E).
- C. hornigi* Toll (*paripennella* sensu P. & M.) L on *Alnus* and *Cerasus*, 1970 (E).
- C. binderella* (Koll.) L on *Betula*, x.70; not bred (E).
- C. potentillae* Elisha. L\* common, chiefly on *Filipendula ulmaria* (L.) Maxim. and *Rubus caesius* L. (E).
- C. albitarsella* Zell. Mr. Bond (FPP); common (Fs); Fj; 1 on *Glechoma*, 1970 (E).
- C. trifolii* (Curt.) (*frischella* sensu auct.) Mr. Farn (FPP); rare (Fs); one at light, 1966 (E); one at light, 1970 (JE).
- C. paripennella* Zell. (*alcyoinpennella* sensu P. & M.) Mr. Bond (FPP); Fj; NRR.
- C. spissicornis* (Haw.) (*fabriciella* Vill. nec Swed.) Fj; one at light, 1969 (E).

- C. lineolea* Haw. (*crocogramma* Zell.) EM, H.D. Edelsten (V); Fj; l on *Ballota nigra* L., 1971 (C-H).
- C. albidella* H.-S. Common at light (E); l\* on *Salix*, 1970 (JE, E. S. Bradford).
- C. anatipennella* (Hüb.) FPP; 1881 (Meek); beaten from willows, rare (Fs). Stainton (*Nat. Hist. Tineina* 4:170) states that he cannot differentiate *albidella* and *anatipennella*. These records probably refer to *albidella*, but as the food plant (*Prunus*) of *anatipennella* is common, and the moth occurs freely in the district, it probably also does so at Wicken. NRR.
- C. ibipennella* Zell. Mr. Farn (FPP). This species, too, was confused with its near relatives, so this earlier record is suspect. L\* on *Betula*, x.1970; reared 1971 (E).
- C. palliatella* (Zinc.) Lord Walsingham (FPP). NRR.
- C. striatipennella* Tengst. Mr. Bond (FPP); at light, 1885 (Fs); Fj; one, 1971 (B. Goater).
- C. troglodytella* (Dup.) Common (FPP); 1881 (Meek); on *Eupatorium*, seems rare (Fs); Fj; NRR. Most probably all these records refer to the following species.
- C. trochilella* (Dup.) L\* not rare on *Eupatorium* (E).
- C. peribenanderi* (Toll) Three, 1967, 1969; l on *Carduus* (E).
- C. therinella* Tengst. Lord Walsingham (FPP); NRR. This record probably refers to the preceding species.
- C. argentula* (Steph.) Lord Walsingham (FPP); NRR.
- C. laripennella* (Zett.) (*annulatella* sensu Meyr.) FPP; EM (V); two at light, 1885 (Fs); Fj; NRR. These records, in whole or in part, very probably refer to one of the commoner related species, since *laripennella* is very local and seems to be confined to the Breckland.
- C. murinipennella* (Dup.) FPP; taken freely at light (Fs); Fj; NRR. The foodplant does not occur on the fen, and the records almost certainly refer to the following species. The two were formerly confused. Stainton's illustration purporting to be of the larval case of *murinipennella* in fact depicts *taeniipennella* (*Nat. Hist. Tin.* 5: Plate X). See Wood (1892) *Ent. mon. Mag.* 28: 121 and Waters (1925) *Ent. mon. Mag.* 61:88.
- C. taeniipennella* H.-S. Abundant. The main foodplant is *Juncus subnodulosus* Schrank (E).
- C. alticolella* Zell. (*caespitiella* sensu auct.) Abundant (O); except that Fs considered it rather scarce in 1885.

## ELACHISTIDAE

- Elachista argentella* (Clerck) (*cygnipennella* Hüb.) FPP; Fj; 1966 (C-H).
- E. triatomea* (Haw.) Fj; NRR. A downland species unlikely to occur on the fen except as a vagrant.
- E. cerusella* (Hüb.) Common (O).
- E. eleochariella* Staint. Mr. Bond (FPP); NRR.
- E. padulum* Frey Lord Walsingham (FPP); NRR.
- E. albidella* Tengst. (*rhynchosporella* Staint.) Common (FPP); EM (V); rare, 1885 (Fs); Fj; common (E).
- E. cinereopunctella* (Haw.) Taken sparingly in and about the fen (Fs); NRR.
- E. bisulcella* (Dup.) (*zonariella* Tengst.) H. C. Hayward, 1928 (V); several, 1970, 1971; l\* on *Deschampsia*, 1970 (E).
- E. megerlella* (Hüb.) One, 1971 (B. Goater).
- E. bedella* (Sirc.) Taken sparsely in and about the fen (Fs); NRR.

- E. rufocinerea* (Haw.) Fj; several, 1954 (P-C); one, 1969 (E); probably commoner than these records suggest.
- E. pulchella* (Haw.) (*obscura* Staint.) Taken sparsely in and about the fen (Fs); NRR.
- E. humilis* Zell. (*perplexella* Staint.) L\* on *Deschampsia*; more common in 1970 than in 1971 (E).
- Elachista* sp. of the *atricomella* group, still to be described. One, 10.viii.65 (E); several, 30.vii.67 (E and CH). Mr. E. C. Pelham-Clinton will in due course name and describe this species, which he has himself taken in Norfolk.
- E. atricomella* Staint. One, 1965 (C-H).
- E. luticomella* Zell. The lane approaching the fen (Fs); Fj; NRR.
- E. apicipunctella* Staint. One, 1969 (E).
- E. subnigrella* Doug. Fj; NRR.
- Cosmoites freyerella* (Hüb.) (*nigrella* Hübn. nec F.) Taken sparsely in and about the fen (Fs); NRR.

## OECOPHORIDAE

- Schiffermuelleria angustella* (Hüb.) One on an elm trunk in the lane leading to the fen, 1971 (P-C).
- Batia lunaris* (Haw.) Fairly common (E).
- B. unitella* (Hüb.) May be beaten from thatch (Fj); common, 1969-1971 (E).
- Borkhausenia fuscescens* (Haw.) 1885 (Fs); Fj; two, 1965 (E).
- B. minutella* (L.) FPP; turf-shed of the cottage on the fen (Fs); may be beaten from thatch (Fj); NRR.
- Telychrysis tripuncta* (Haw.) Fr. (V); one each, 1971 (C-H and E).
- Endrosia sarcitrella* (L.) (*lactella* D. & S.) Everywhere, indoors and out (Fs.); Fj; a few (E).
- Carcina quercana* (F.) 1892 (T); Fj; a few (E).
- Diurnea fagella* (D. & S.) L on *Populus tremula* L., 1971 (E).
- Cheimophila salicella* (Hüb.) R (V); l\* on *Filipendula spiraea* (L.) Maxim. 1966, 1971 (E).
- Hoffmannophila pseudospretella* (Staint.) 1885 (Fs); Fj; E.
- Enicostoma lobella* (D. & S.) FPP; Fr (V); NRR.
- Depressaria ultimella* Staint. EM (V); Fj; NRR.
- D. pastinacella* (Dup.) (*heracliana* sensu auct.) FPP; Fj; l common on *Heracleum* (E).
- D. weirella* Staint. Fj; NRR.
- D. albipunctella* (Hüb.) FPP; Fj; NRR.
- D. chaerophylli* Zell. FPP; NRR.
- Agonopterix heracliana* (L.) (*aplana* F.) Common (P; Fj; E).
- A. ciliella* (Staint.) FPP; Fj; common (V); a few (E).
- A. purpurea* (Haw.) Fj; NRR.
- A. subpropinquella* (Staint.) Lord Walsingham (FPP); 1878 (P) Fj; NRR.
- A. alstroemeriana* (Clerck.) Fj; fairly common (E).
- A. propinquella* (Treits.) FPP; Fj; NRR.
- A. arenella* (D. & S.) 1878 (P); Fj; 1949 (P-C); a few (E).
- A. liturella* (D. & S.) Lord Walsingham (FPP); 1878 (P); bred 1885 (Fs); Fj; 1949 (P-C).
- A. pallorella* (Zell.) Lord Walsingham (FPP); NRR.
- A. ocellana* (F.) FPP; Fj; Fr (V); 1964 (P-C); l\* on *Salix* (E).
- A. carduella* (Hüb.) 1878 (P). NRR; this record is suspect, since it could have arisen from a misidentification of *A. angelicella* Hübn.

- A. huebneri* Brad. (*hypericella* sensu auct.) One, 1949 (P-C).  
*A. conterminella* (Zell.) Common (FPP); 1878 (P); EM (V); Fj; NRR.  
*A. angelicella* (Hüb.) Six at sugar, 1850 (B); FPP; 1878 (P); EM; Fr (V); Fj; fairly common (E).  
*A. yeatiana* (F.) FPP; 1878 (P); 1 on *Peucedanum palustre* (Fs); Fj; C (V).

## ETHMIIDAE

- Ethmia funerella* (F.) 1850 (B); common (O).

## GELECHIIDAE

- Metzneria lapella* (L.) Mr. Farn (FPP); Fj; NRR.  
*M. metzneriella* (Staint.) FPP; EM (V); Fj; NRR.  
*Apodia bifractella* (Dup.) L\* on *Pulicaria dysenterica*; common, 1971 (E).  
*Eulamprotes atrella* (D. & S.) Lord Walsingham (FPP); Fs; Fj; occasional at light (E).  
*Monochroa lucidella* (Steph.) Mr. Bond (FPP); NRR.  
*M. palustrella* (Doug.) FPP; Fj; NRR.  
*M. morosa* (Mühl.) First taken at Wicken in 1868 and 1869 by Lord Walsingham (FPP); bred and taken freely at light one night, 1885 (Fs); 1891-1892 (T); common (Fj); l\* fairly common on *Lysimachia* (E etc.).  
*M. quaestionella* (H.-S.) 1891-1892 (T); Fj. NRR.  
*M. suffusella* (Doug.) (*oblitel* Doug.) Mr. Bond, 1850, and Lord Walsingham, 1878-1879 (FPP); EM (V); three at light and one bred, 1885 [foodplant not recorded] (Fs); 1891-1892 (T); common (Fj); H. C. Hayward, 1928 (V); several at light (E).  
*M. lutulentella* (Zell.) New to the fen, 1885 (Fs); rare (Fj); fairly common at light, 1967-1971 (E).  
*M. arundinatella* (Staint.) Mr. Bond (FPP); Fj; NRR.  
*M. divisella* (Doug.) Rare (FPP); EM (V); 1891 (T); rare (Fj); NRR.  
*Microsetia hermannella* (F.) FPP; common (including l\*) around *Atriplex* near the entrance to the main drove, 1970 (E).  
*M. sexguttella* (Thunb.) (*stipella* sensu Hüb.) FPP; R (V); NRR.  
*Aristotelia subdecurtella* (Staint.) Mr. Bond, 1958; Lord Walsingham, 1868-1869; and Mr. Meyrick, 1877 (FPP); Fs; not common (Fj); NRR.  
*Exoteleia dodecella* (L.) Two or three in the fen where there is not the ghost of a fir: these are rather larger than those from fir, 1885 (Fs): NRR. This is probably a misidentification, but there is a well-grown Scotch fir in Adventurers' Fen, which looks old enough to have been there in Farren's day.  
*Rhynchopacha tetrapunctella* (Thunb.) (*lathyri* Staint.) Mr. Brown (FPP); EM (V); 1881 (Meek); 1885 (Fs); 1891 (T); common (Fj); NRR.  
*Teleoides vulgella* (Hüb.) Fj; NRR.  
*T. notatella* (Hüb.) Mr. Warren (FPP); EM (V); Fj; a few (E).  
*T. paripunctella* (Thunb.) (*triparella* Zell.) Common, Mr. Bond (FPP): NRR.  
*Bryotropha basaltinella* (Zell.) Fj; NRR.  
*B. umbrosella* (Zell.) Fj; NRR. A sandhill species: probably a misidentification.  
*B. affinis* (Haw.) Fj; NRR.  
*B. senectella* (Zell.) FPP; EM (V); Fj; common (E).  
*B. desertella* (Doug.) Rare on the fen banks (Fs); NRR.  
*B. terella* (D. & S.) Common on the fen banks (Fs); Fj; NRR.  
*B. politella* (Staint.) One only on the fen banks, 1885 (Fs). NRR.  
*Chionodes fumatella* (Doug.) Mr. Bond (FPP); NRR.

- C. distinctella* (Zell.) Fj; NRR.  
*Mirificarma mulinella* (Zell.) FPP; NRR. The foodplants do not grow on the fen.  
*Gelechia rhombella* (D. & S.) Mr. Warren (FPP); NRR.  
*G. sororculella* (Hübner.) Lord Walsingham (FPP); EM (V); one, 1885 (Fs); Fj; NRR.  
*G. muscosella* Zell. Lord Walsingham, 1869 (FPP); 1891 (T); rare (Fj.); NRR.  
*G. turpella* (D. & S.) (*pinguinella* Treits.) One at light, 1885 (Fs); NRR, but a gelechiid which eluded capture by scuttling up a poplar trunk may have been of this species, 1971 (E).  
*Scrobipalpa acuminatella* (Sirc.) FPP; 1885 (Fs); Fj; l\* common on *Cirsium*, 1970–1971 (E).  
*Caryocolum fraternella* (Doug.) 'Wicken (F)' (V); but Farren j's record refers to the fens in general and not necessarily to Wicken. NRR.  
*Reuttia subocellea* (Steph.) Lord Walsingham (FPP); common, 1892 (T). NRR. The recognised foodplant (*Origanum*) does not grow on the fen, but Ford (*Guide to the Smaller British Lepidoptera*, 1949) says, 'I have taken the moth on damp ground where there is no *Origanum*.'  
*Approaerema anthyllidella* (Hübner.) FPP; Fs doubtfully; NRR.  
*Anocampsis populella* (Clerck.) FPP; Fj; common (E).  
*Acompsia cinerella* (Clerck.) Mr. Bond has bred it from larva taken at Wicken, where he has also caught the imago (FPP); NRR.  
*Brachmia gerronella* (Zell.) Lord Walsingham (FPP); EM (V); Fs; Fj; C-H; JE; erratically common (E).  
*B. inornatella* (Doug.) FPP; EM (V); scarce, 1881 (Meek); Fs; 1892 (T); common (Fj); Fr (V); not rare (E).  
*B. rufescens* (Haw.) FPP; 1881 (Meek); Fj; l common on grasses (E).  
*Oegoconia deauratella* (H.-S.) One, 1971 (E).

## MOMPHIDAE

- Batrachedra praeangusta* (Haw.) 1885 (Fs); R-S. (V); common (E).  
*Mompha raschkiella* (Zell.) L\* on *Chamaenerion angustifolium* (L.) Scop., 1970 (E).  
*M. miscella* (D. & S.) Fj; NRR; the foodplant does not grow on the fen.  
*M. ochraceella* (Curt.) Lord Walsingham (FPP); a few at light, 1970 (E).  
*M. lacteella* (Steph.) Lord Walsingham in 1868 and 1869 (FPP); NRR.  
*M. divisella* H.-S. (*decorella* sensu Steph.) One, 1949 (P-C).  
*M. fulvescens* (Haw.) Lord Walsingham (FPP); Fj; one, 1954 (P-C); several, 1970–1971 and l\* on *Epilobium hirsutum* L. (E).

## COSMOPTERIGIDAE

- Cosmopterix zieglerella* (Hübner.) (*eximia* Haw., *drurella* sensu Staint.) Fj, who subsequently admitted that his record was probably a mistake for *C. 'druryella* F?'.  
*C. drurella* (F.) (*druryella* Zell., *orichalcea* Staint.). Several times (FPP); EM (V); amongst *Festuca pratensis* Huds., 1880 (Car); 1881 (Meek); Fj; l\* locally common, mainly on *Phalaris* (E).  
*C. lienigiella* (Lien. & Zell.) Wicken, where it was first discovered by Mr. E. Shepherd (FPP); 1881 (Meek); Fj; occasionally at light and l\* on *Phragmites* (E).  
*Limnaecia phragmitella* Staint. Mr. Farn (FPP); 1880 (Car); not rare at light (E).  
*Spuleria flavicaput* (Haw.) (*aurifrontella* Hübner.) Vacated larval workings on *Crataegus*, 1971; scarce (E).  
*Sorhagenia rhanniella* (Zell.) Mr. Warren (FPP); 1885 (Fs); Fj; these records may

refer wholly or in part to the following species, the two then not having been differentiated. Very common, 1965, this being the first confirmed record of the true *rhanniella* from Britain, and in subsequent years; 1\* on *Frangula alnus* Mill., 1968 (E).

*S. lophyrella* (Doug.) L\* common on *Rhamnus catharticus* L., 1954 (P-C), 1966, 1969 (E). (See previous species.)

## TORTRICIDAE

*Dichrorampha petiverella* (L.) FPP; 1878 (P); Fj; NRR.

*D. alpinana* (Treits.) Locally common round *Chrysanthemum*, 1971 (E).

*D. sequana* (Hüb.) 1878 (P); one, 1915 (S). NRR.

*D. acuminatana* (Lien & Zell.) Rare on fen banks (Fs); common round *Chrysanthemum*, 1971 (E).

*D. consortana* Steph. Fj; NRR.

*D. simpliciana* (Haw.) Ten, 1917 (S.); NRR.

*D. gueneana* Obr. (*politana* sensu Guen.) 1878 (P); four, 1917 (S). NRR.

*D. plumbana* (Scop.) Fj; common round *Chrysanthemum*, 1971 (E).

*D. sedatana* Busck. (*saturnana* auct.) Rare on fen banks (Fs); NRR.

*Cydia succedana* (D. & S.) (*ulicetana* Haw.) Fj; NRR. Of the recorded foodplants, only *Lotus uliginosus* Schkuhr is found in the fen, and even this is very scarce.

*C. servillana* (Dup.) FPP; Fs; Fj; S (V); fairly common (E).

*C. nigricana* (F.) FPP; borders of the fen (Fs); 1915, 1918 (S); Fj; fairly common (E).

*C. pomonella* (L.) Fj; 1 in apples, 1971 (E).

*C. leguminana* (Lien & Zell.) Around elms in the lane leading to the fen, 1869, Lord Walsingham (FPP); same spot in some numbers, 1915, 1917, 1918, 1921 (S); same spot, still in some numbers, 1970-1971 (E).

*C. gallicana* (Guen.) (*rufillana* Doubl.) Lord Walsingham (FPP). NRR.

*C. aurana* (F.) 1918 (S); C (V); 1970 (JE); 1971 (E).

*C. janthinana* (Dup.) C (V); not rare around *Crataegus* (E).

*C. tenebrosana* (Dup.) (*roseticolana* Zell.) Several, 1915, 1918 (S). NRR.

*C. funebrana* (Treits.) Lord Walsingham (FPP); 1 common, 1892 (T); Fj; NRR.

*C. jungiella* (Clerck) (*perlepidana* Haw.) FPP; NRR.

*C. orobana* (Treits.) Locally common (O).

*C. compositella* (F.) FPP; six, 1917 (S). NRR.

*Pammene obscurana* (Steph.) Lord Walsingham (FPP); one taken by Mr. L. K. Evans and given to the author, 1971 (E).

*P. argyrana* (Hüb.) FPP; NRR.

*P. populana* (F.) FPP; 1878 (P); bred from *Salix repens* L. prior to 1901 (Thurnall, *Entomologist* 35: 188); Fj; NRR.

*P. regiana* (Zell.) FPP; NRR; there are no sycamores on the fen.

*P. rhediella* (Clerck.) One, 1949 (P-C).

*Enarmonia formosana* (Scop.) (*woeberiana* D. & S.) FPP; 1878 (P); one, 1917 (S); NRR.

*Spilonota ocellana* (D. & S.) L\*, foodplant uncertain, 1969 (E).

*Eucosma hohenwartiana* (D. & S.) FPP; 1878 (P); 1892 (T); 1914 (S); Fj; 1971 (ff, E).

*E. fulvana* (Steph.) Rare in the fen (Fs); NRR.

*E. cana* (Haw.) 1925 (S); one, 1949 (P-C); common (E).

*E. adumbrata* (Lien. & Zell.) (*expallidana* Haw.) FPP; rare in the fen (Fs); 1891-1892 (T); occurs in small numbers (Fj); 1925, 1930 (S).

- E. campoliliana* (D. & S.) (*nigromaculana* Haw.) FPP; Fj; not rare (E).  
*Epiblema foenella* (L.) FPP; NRR; the foodplant does not grow on the fen.  
*E. scutulana* (D. & S.) (*pflugiana* Haw.) FPP; 1878 (P); Fj; NRR.  
*E. cirsiana* (Zell.) A few, 1892 (T); one, 1949 (P-C); not rare (E).  
*E. costipunctana* (Haw.) (*trigeminana* Steph.) FPP; locally common (E).  
*E. cynosbatella* (L.) (*tripunctana* D. & S.) FPP; 1\* on *Rosa* (E).  
*E. uddmanniana* (L.) Common (O).  
*E. trimaculana* (Haw.) (*suffusana* Dup.) One, 1971 (E).  
*E. rosaecolana* (Doubl.) 1892 (T); several (E).  
*E. roborana* (D. & S.) (*aquana* Hübn.) Several; 1\* on *Rosa* (E).  
*Gibbifera simplana* (F.v.R.) Mr. J. A. Skertchly (FPP); NRR.  
*Gypsonoma aceriana* (Dup.) Locally common; 1\* on *Populus nigra* L. (E).  
*G. dealbana* (Fröl.) One, 1885 (Fs); several (E).  
*G. oppressana* (Treits.) Three, 1896, S. Bailey (in coll. S); Fj; larval feeding on *Populus alba* L., 1969–1971 (E).  
*G. minutana* (Hübner.) One, 1969 (E).  
*Zeiraphera insertana* (F.) (*corticana* Hübn.) FPP; NRR.  
*Rhopobota unipunctana* (Haw.) (*naevana* Hübn.) FPP; Fj; a few, 1971 (E).  
*Epinotia caprana* (F.) (*semifuscana* Steph.) FPP; Fj; fairly common (V); one, 1971 (E).  
*E. brunnichana* (L.) Fj; 1915, 1917, 1930 (S).  
*E. solandriana* (L.) FPP; a few, 1892 (T); Fj; NRR.  
*E. trimaculana* (Don.) 1930 (S); not rare around the elms at the entrance to the main drove (E).  
*E. subocellana* (Don.) Two, 1895 (Fs); Fr (V); common, 1\* on *Salix* (E).  
*E. bilunana* (Haw.) One, 1970 (JE).  
*E. ramella* (L.) (*paykulliana* F.) Common, 1970–1971 (E).  
*E. immundana* (F.v.R.) C (V); locally common, 1\* on *Alnus* (E).  
*E. tetraquetra* (Haw.) Three, 1969 (E).  
*E. nisella* (Clerck.) FPP; fairly common (E).  
*E. tenerana* (D. & S.) (*penkleriana* sensu auct.) Fairly common (E).  
*E. cruciana* (L.) Common (O).  
*Ancylis achatana* (D. & S.) Two, 1930 (S); one, 1971 (E).  
*A. unguicella* (L.) Mr. Farn (FPP); NRR; the foodplant does not grow on the fen.  
*A. uncella* (D. & S.) (*uncana* Haw.) FPP; NRR; the habitat is unsuitable.  
*A. diminutana* (Haw.) FPP; Fj; a few (E).  
*A. geminana* (Don.) (*biarcuana* Steph.) FPP; a few (Fs); Fj; NRR.  
*A. subarcuana* (Doug.) (*inornatana* H.-S.) FPP; 1881 (Meek); 1892 (T); Fj; NRR.  
*A. unculana* (Haw.) (*derasana* Hübn.) FPP; NRR.  
*A. badiana* (D. & S.) (*lundana* F.) FPP; Fj; common (E).  
*A. paludana* (Barr.) Common (O); 1\* on *Lathyrus palustris* L. (Fs, E).  
*A. apicella* (D. & S.) (*siculana* Hübn.) Very common (O); 1\* on *Frangula alnus* Mill. (E).  
*Eudemis profundana* (D. & S.) FPP; NRR.  
*Bactra lancealana* (Hübner.) (*lanceolana* missp.) 1892 (T); Fj; abundant (E).  
*Lobesia abscissana* (Doubl.) (*fuligana* sensu Haw.) FPP; Fj; common (E).  
*Endothenia gentianaeana* (Hübner.) FPP; NRR.  
*E. oblongana* (Haw.) Fj; NRR.  
*E. sellana* (Fröl.) Lord Walsingham (FPP); scarce (Fj); NRR.  
*E. marginana* (Haw.) (*oblongana* sensu auct.) FPP; Fj; NRR. *E. oblongana*,  
*E. sellana* and *E. marginana* may comprise only two rather than three species.

- E. fuligana* (D. & S.) (*carbonana* sensu Barr.) One, 1971 (ff, teste P-C, who now has the specimen). There has been much confusion over *Endothenia* spp. and some of the records ascribed to the following species may be referable here.
- E. ustulana* (Haw.) (*carbonana* Doubl., *fuligana* sensu Barr.) Reared by Lord Walsingham from 1 found on *Stachys* (FPP); ditto, 1885 (Fs, A. Thurnall); 1878 (P); not rare, 1881 (Meek); occasionally comes to light, and then only for a short period, 1891, 1892 (T); it has become more scarce at Wicken (Fj); the classic locality for this very local species (V); one, 1969; two, 1971 (E).
- E. nigrocostana* (Haw.) Rare on fen banks, formerly in swarms (Fs); 1918 (S); a few, 1971 (ff, E).
- E. ericetana* (H. & W.) Rare, 1892 (T); Fj; 1917, 1930 (S); fairly common (E).
- E. quadrimaculana* (Haw.) (*antiquana* Hübn.) Common (O).
- Apotomis semifasciana* (Haw.) One, 1885 (Fs); sparingly at sugar, 1892 (T); 1917, 1920, 1925 (S); common, 1925-1928, R (V); one, 1949 (P-C); one, 1966 (C-H); two, 1969 (E).
- A. lineana* (D. & S.) (*hartmanniana* L. nec Clerck) Rare (Fs); common, 1917, 1925 (V); NRR.
- A. betuletana* (Haw.) A few annually (E).
- A. capreana* (Hübn.) One, 1928, R (V); one, 1970 (E).
- Orthotaenia undulana* (D. & S.) (*urticana* Hübn.) FPP; NRR.
- Hedya pruinana* (Hübn.) Fj; common (E).
- H. nubiferana* (Haw.) (*variegana* Hübn.) Two, 1971, one of them coloured biscuit-brown with reduced dark markings (E).
- H. ochroleucana* (Fröhl.) FPP; a few, 1969 (E).
- H. salicella* (L.) 1915, 1917, 1930 (S); one, 1971 (E).
- Olethreutes doubledayana* (Barr.) Mr. Bond (FPP); 'Wicken' (V); NRR.
- O. olivana* (Treits.) (*micana* sensu Hübn.) FPP; 1880 (Car). NRR (V).
- O. lacumana* (D. & S.) abundant (O).
- O. rivulana* (Scop.) Mr. J. A. Skertchly (FPP); Fj; NRR.
- Celypha striana* (D. & S.) FPP; Fj; NRR.
- C. rosaceana* (Schlög.) (*purpurana* Haw. nec Thunb.) FPP; rare (Fs); R (V); 1918; sixteen, 1930 (S); one, 1949 (P-C); one, 1969 (E).
- Pandemis corylana* (F.) Common (FPP); NRR.
- P. cerasana* (Hübn.) (*ribeana* Hübn.) Common (Fs); 1892 (T); 1915 (S); Fj; a few (E).
- P. heparana* (D. & S.) 1878 (P); common (Fs); 1892 (T); Fj; common (E).
- P. dumetana* (Treits.) FPP; 1878 (P); at light and bred from buckthorn, low creeping bramble and yellow loosestrife (Fs); 1891-1892 (T); abundant at light (Fj); rather common at light (V); numbers vary, 1969 being the latest good year; 1\* on *Lathyrus palustris* L. (E).
- Argyrotaenia pulchellana* (Haw.) (*politana* Haw. nec D. & S.) FPP; NRR. The fen is an unsuitable habitat, but vagrants might occur from the Breck, where it is plentiful.
- Archips podana* (Scop.) (*oporana* sensu auct.) 1885 (Fs); 1891 (T); Fj; fairly common (E).
- A. crataegana* (Hübn.) R (V); NRR.
- A. xylostearia* (L.) FPP; 1892 (T); NRR.
- A. rosana* (L.) Very common (O).
- Choristoneura diversana* (Hübn.) Fairly common, 1966-1971; 1\* on *Rhamnus catharticus* L. (E).
- Aphelia paleana* (Hübn.) Common (O).

- Clepsis senecionana* (Hüb. n.) (*rusticana* auct.) Wicken; used to be common in the Cambridgeshire fens (FPP); one, 1885; used to be common (Fs); one, 1892 (T); two 1892 (S); rare (Fj); two, 1949 (P-C); one, 1965 (E).
- C. spectrana* (Treits.) (*costana* sensu auct.) Common (O).
- C. consimilana* (Hüb. n.) (*unifasciana* Dup.) 1892 (T); 1915 (S); Fj; several (E).
- Ptycholoma lechearana* (L.) Fairly common; 1\* on *Frangula alnus* Mill. (E).
- Lozotaenia forsterana* (F.) Two, 1885 (Fs); one, 1970 (E).
- Ditula angustiorana* (Haw.) 1878 (P); common round the flowers of *Lycium*, 1970 (E).
- Pseudargyrotoza conwagana* (F.) Common round *Ligustrum* (E).
- Isotrias rectifasciana* (Haw.) (*hybridana* sensu Steph.) Fj; fairly common (E).
- Eulia ministrana* (L.) FPP; one, 1965 (C-H); one, 1967 (E).
- Cnephasia longana* (Haw.) Mr. Farn (FPP); one each, 1967 (E & JE).
- C. communana* (H.-S.) Mr. Bond (FPP); NRR.
- C. conspersana* Doug. FPP; 1878 (P); NRR.
- C. stephensiana* (Doubl.) (*chrysantheana* sensu auct.) One only (Fs); 1892 (T); 1918, 1925 (S); Fj; fairly common (E).
- C. interjectana* (Haw.) (*virgaureana* Treits.) Common (Fs); fairly common, 1\* on *Lysimachia* (E).
- C. pasiuana* (Hüb. n.) FPP; a few (E).
- C. incertana* (Treits.) Fj; bred from unrecorded foodplant (E).
- Neosphaleroptera nubilana* (Hüb. n.) FPP; Fr (V); common, 1918 (S). NRR.
- Tortrix viridana* (L.) Rare near a scrubby little oak in the middle of the fen (Fs); NRR.
- Croesia bergmanniana* (L.) 1885 (Fs); Fj; several, 1\* on *Rosa* (E).
- C. holmaniana* (L.) 1878 (P); Fs; at sugar, 1892 (T); Fj; one, 1969 (E); one, 1970 (JE).
- Acleris latifasciana* (Haw.) (*schalleriana* sensu P. & M., Meyr., *comparana* Hüb. n., *perplexana* Barr.) FPP; 1892 (T); Fj; common (E).
- A. comariana* (Lien. & Zell.) 1892 (T); very common, formerly confused with the preceding species (E).
- A. rhombana* (D. & S.) (*contaminana* Hüb. n.) Fs; Fj; several, 1\* on *Crataegus*, 1971 (E).
- A. aspersana* (Hüb. n.) FPP; 1 in rolled up leaves of meadow-sweet in June, 1880 (Car); 1925 (S); several, 1949 (P-C); one, 1969 (R. W. J. Uffen).
- A. shepherdana* (Steph.) Common (O).
- A. schalleriana* (L.) (*logiana* sensu auct.) FPP; NRR.
- A. variegana* (D. & S.) FPP; 1878 (P); Fs; 1892 (T); Fj; several (E).
- A. hastiana* (L.) FPP; 1881 (Meek); 1891-1892 (T); some very beautiful varieties occur (Fj); common (E).
- A. cristana* (D. & S.) FPP; this record is very doubtful (V); one, 1971 (E).
- A. lorquiniana* (Dup.) L plentiful (FPP); common (O).
- A. emargana* (F.) (*caudana* F.) Common (FPP); fairly common (E).

## COCHYLIDAE

- Hysterosia inopiana* (Haw.) Rare at light (Fs); NRR.
- H. schreibersiana* (Fröl.) Mr. Bond took about a dozen specimens at Wicken (FPP); the lane to Wicken Fen, 1876, Fr (V); plentiful in the lane to Wicken Fen, 1920, S (V); NRR.
- H. sodaliana* (Haw.) (*amanda* H.-S.) Several around *Rhamnus catharticus* L. 1915, S (V); Fj; a few, 1969-1971 (E, JE).

- Phtheochroa rugosana* (Hübner.) FPP; Fj; C (V).  
*Phalonidia manniana* (F. v. R.) (*udana* Guen., *notulana* Zell.) Abundant (FPP); EM (V); 1881 (Meek); Fs; 1891-1892 (T); Fj; Fr (V); 1915 (S); fairly common (E).  
*P. minimana* (Car.) (*walsinghamana* Meyr., *geyerana* sensu auct.) FPP; E. G. Meek, 1881, but record suspect owing to possible confusion with *P. vectisana* H. & W. (V); NRR.  
*P. permixtana* (D. & S.) (*mussehliana* Treits.) In 1885 Fs took six specimens which were identified as this species by Stainton. Fs himself was sceptical and thought he might have a new species. His description suggests that they may have been a well-marked form of *P. alismiana* Rag.  
*P. vectisana* (H. & W.) (*griseana* Haw. nec Hübner.) Lord Walsingham (FPP); 1892 (T); on the main drove (Fj); V; four, 1925 (S); NRR.  
*P. alismiana* (Rag.) (*udana* sensu Meyr.) FPP; Fs; 1892 (T); Fj; one, 1970 (JE).  
*Euxanthoides straminea* (Haw.) FPP; at light (Fs); one or two, 1892 (T); 1917, 1924, 1925 (S); Fj; a few, 1966-1971 (E, C-H).  
*Agapeta hamana* (L.) Very common (O).  
*A. zoegana* (L.) FPP; at light (Fs); Fj; Burwell Fen, 1930 (S); a few, 1949 (P-C).  
*Aethes tesserana* (D. & S.) Fr (V); NRR.  
*A. hartmanniana* (Clerck) f. *subbaumanniana* (Staint.) FPP; Fj; NRR.  
*A. williana* (Brahm) (*zephyrana* Treits.) C (V).  
*A. enicana* (Westw.) Common (FPP); Fs; 1925 (S); Fj; fairly common (E).  
*A. rubigana* (Treits.) (*badiana* sensu Hübner.) FPP; several at light, 1970-1971 (E, JE).  
*A. smeathmanniana* (F.) FPP; NRR.  
*A. dilucidana* (Steph.) Mr. Bond (FPP); NRR.  
*Commophila aeneana* (Hübner.) One, 1971 (E).  
*Eupoecilia angustana* (Hübner.) FPP; 1925 (S); Fj; H. C. Hayward, 1928 (V).  
*Cochylidia rupicola* (Curt.) Lord Walsingham (FPP); Fs; Fj; S (V); fairly common (E).  
*Falsuncaria ruficiliana* (Haw.) (*ciliella* Hübner. nec D. & S.) FPP; fen banks (Fs); NRR.  
*F. degreyana* (McL.) Two specimens by Lord Walsingham in 1868 and 1869 on a piece of ground near Wicken Fen which had been broken up (FPP); NRR.  
*Cochylis nana* (Haw.) Fairly common round *Betula*, 1971 (E etc.).

## ALUCITIDAE

*Alucita hexadactyla* (L.) Fj; NRR (G).

## PYRALIDAE

- Chilo phragmitella* (Hübner.) Abundant (O).  
*Calamatropha paludella* (Hübner.) Rare, Mr. Bond (FPP); NRR (V).  
*Chrysoteucha culmella* (L.) (*hortuella* Hübner.) 1892 (T); Fj; common (P-C, E).  
*Crambus pascuellus* (L.) Common (O).  
*C. silvellus* (Hübner.) (*adipellus* Zinck.) Very rare (FPP); a doubtful record (V, G). NRR.  
*C. uliginosellus* Zell. Rare (FPP); 1908 (J); 1920 (W); NRR. Pale forms of *C. pascuellus* L. are sometimes mistaken for this species which appears not to have been taken at Wicken by the regular collectors.  
*C. nemorella* (Hübner.) (*pratellus* sensu auct.) 1892 (T); Fj; NRR (G); several, 1969, 1971 (E).  
*C. perlella* (Scop.) FPP; 1878 (P); 1892 (T); Fj; 1949 (P-C); common (E).

- Agriphila selasella* (Hübner) 1850 (B); FPP; 1878 (P); on Burwell sedge fen, and rare at light at Wicken Fen, 1891–1892 (T); Fj; NRR (G); common in the NW corner of the fen, 1970–1971 (E).
- A. straminella* (D. & S.) (*culmella* sensu auct.) 1892 (T); Fj; very common (E).
- A. tristella* (D. & S.) 1892 (T); Fj; common (E).
- A. inquinatella* (D. & S.) A few taken by P-C in 1949 (G).
- Catoptria pinella* (L.) 1878 (P); NRR, but occurs in the district.
- C. falsella* (D. & S.) Taken by P-C in 1949 (G); one, 1969 (E).
- Schoenobius gigantella* (D. & S.) Rare (FPP); 1891 (T); Fj; 1920 (W); not common (V); fairly common, especially 1969–1971, and seems to be increasing in numbers (E).
- S. forficella* (Thunb.) FPP; Fj; 1923 (J); NRR (G); several in 1967 and 1969, but not common (E).
- Donacaula mucronellus* (D. & S.) About fifty, 1850 (B); FPP; rare (T, J, Fj, V); 1920 (W); NRR (G); one, 1970 (JE).
- Acentria nivea* (Ol.) FPP; Fj; two taken by P-C in 1949 (G); one, 1968 (E); 1970 (JE)
- Scoparia cembrella* (L.) Common (FPP); 1878 (P); 1892 (T); Fj; one, 1969 (JE); one, 1970 (E).
- S. arundinata* (Thunb.) (*dubitalis* Hübner) Common (FPP); one, 1971 (E).
- S. ambigua* (Treits.) Fj; fairly common (E).
- Eudorea pallida* (Curt.) Common (FPP); 1878 (P); 1891–1892 (T); common, 1908 and 1923 (J); abundant (Fj); NRR (G); a few in 1969 and 1970 (E).
- E. crataegella* (Hübner) FPP; R (V); NRR (G); one, 1969 (E).
- E. trunciolella* (Staint.) FPP; NRR (G.).
- E. lineola* (Curt.) Around thatch, 1878 (P); NRR (G).
- E. mercurella* (L.) Abundant around thatch, 1878 (P); 1892 (T); one, 1970 (E).
- Nymphula nymphaea* (L.) 1878 (P); Fj; 1920 (W); very common (E etc.)
- Paraponyx stratiotata* (L.) 1878 (P); abundant, 1881 (Meek); 1892 (T); 1920 (W); 1923 (J); Fj; 1949 (P-C); common (E).
- P. stagnata* (Don.) FPP; 1878 (P); 1892 (T); Fj; 1920 (W); NRR (G); several, 1969 (E and JE).
- Cataclysta lemnata* (L.) 1878 (P); 1892 (T); 1920 (W); Fj; Common (E etc.).
- Evergestis forficalis* (L.) Outskirts of the fen, 1892 (T); Fj; NRR.
- E. extimalis* (Scop.) Round Wicken, Mr. Bond (FPP); NRR (G).
- E. pallidata* (Hufn.) (*straminialis* Hübner) FPP; NRR (G).
- Pyrausta aurata* (Scop.) FPP; NRR.
- P. purpuralis* (L.) Common (FPP); 1878 (P); Fj; one, 1949 (P-C); it has been seen recently at . . . Wicken Fen (G).
- P. ostrinalis* (Hübner) Common (FPP); NRR.
- P. cespitalis* (D. & S.) FPP; NRR.
- Margaritia sticticalis* (L.) P-C in 1949 and 1957; H. C. Huggins, 1955; (G).
- Sitochroa palealis* (D. & S.) P-C in 1949 (G).
- S. verticalis* L. FPP; 1878, in swarms (P); swarming round the outside of the fen, 1892 (T); several, 1949 (P-C).
- Eurrhynx hortulata* (L.) (*urticata* Linn.) Common round the fen, 1892 (T); Fj; one, 1949 (P-C); occurs regularly in small numbers (E).
- E. lancealis* (D. & S.) 1958 (G); one, 1960 (E).
- E. coronata* (Hufn.) (*sambucalis* D. & S.) Common round the outside of the fen, 1892 (T); Fj; 1949 (P-C); several, 1969 (E).
- Anania verbascalis* (D. & S.) FPP; record requires confirmation (V, G); NRR.

- Ebulea crocealis* (Hübner) FPP; 1892 (T); Fj; NRR (G); locally common, I\* on *Pulicaria dysenterica* (L.) Bernh., 1971 (E).
- Osibotis fuscalis* (D. & S.) Common (O).
- Nascia ciliialis* (Hübner) Two at sugar, 1850 (B); rare, but has occurred in the last two or three years rather plentifully at light, Mr. Bond (FPP); thereafter taken by all recorders up to the present day, numbers varying from year to year.
- Udea lutealis* (Hübner) 1878 (P); outskirts of the fen, 1892 (T); Fj; 1949 (P-C); common (E).
- U. prunalis* (D. & S.) (*nivealis* F.) Outskirts of the fen, 1892 (T); Fj; P-C in 1949 (G).
- U. olivalis* (D. & S.) Outskirts of the fen, 1892 (T); Fj; two, 1971 (E).
- U. ferrugalis* (Hübner) O; I\* on *Ranunculus*, 1969 (E).
- Nemophila noctuella* (D. & S.) FPP; Fj; NRR.
- Pleuroptya ruralis* (Scop.) Fj; a few, 1949 (P-C); 1969 (E).
- Hypsopygia costalis* (F.) (*fimbrialis* D. & S.) FPP; 1892 (T); Fj; C (V); a few, 1949 (P-C); several (E).
- Orthopygia glaucinalis* (L.) At sugar, Mr. Bond (FPP); Fj; one, 1968 (E); one, 1970 (JE).
- Pyralis farinalis* (L.) Fj; NRR.
- Aglossa caprealis* (Hübner) Mr. Bond took 94 specimens in an oil-cake chamber at Wicken (FPP); around old stables and thatch, 1878 (P); Fj; several, 1930 (J. W. Metcalfe, in coll. H. C. Huggins).
- A. pinguinalis* (L.) Fj; NRR.
- Endotricha flammealis* (D. & S.) FPP; NRR (G).
- Galleria mellonella* (L.) Mr. Farn (FPP); being bred by Mr. S. Bailey in an old beehive, 1879 (P); Fj; NRR.
- Achroia grisella* (F.) Being bred by Mr. S. Bailey in an old beehive, 1878 (P); Fj; NRR.
- Aphomia sociella* (L.) FPP; 1878 (P); 1908 (J); Fj; P-C (G); 1967 (C-H); 1969 (E).
- Cryptoblabes bistriga* (Haw.) Rare (FPP); NRR.
- Acrobasis consociella* (Hübner) FPP; NRR.
- Eurhodope suavella* (Zinck). 1878 (P); NRR.
- E. advenella* (Zinck.) Two, 1892 (T); 1908 and 1923 (J); Fj; one, 1969 (E).
- E. marmorea* (Haw.) FPP; 1878 (P); R (V); NRR (G); one, 1970 (JE); one, 1971 (E).
- Oncocera palumbella* (D. & S.) FPP; its recorded foodplant does not occur at Wicken (G); NRR.
- O. formosa* (Haw.) FPP; R (V); P-C, in 1949 (G).
- Hypochalcia ahenella* (D. & S.) Mr. Farn (FPP); NRR.
- Myelois cribrella* (Hübner) FPP; NRR (G).
- Homeosoma nebulella* (D. & S.) FPP; Fr (V); NRR (G).
- Rotruda binaevella* (Hübner) FPP; NRR.

## PTEROPHORIDÆ

- Buckleria paludum* (Zell.) FPP; 1880 (Car); the foodplant became extinct in Cambridgeshire about 1913 (G); NRR.
- Platyptilia gonodactyla* (D. & S.) One, 1966 (C-H).
- P. ochrodactyla* (D. & S.) Mr. Bond (FPP); 1920 (W); NRR (G).
- P. pallidactyla* (Haw.) Mr. Bond (FPP); NRR.
- Stenoptilia zophodactylus* (Dup.) Fj; W. Rutledge, det. by E. Meyrick, no date (V); NRR (G).

*S. bipunctidactyla* (Scop.) Common (O).

*Pterophorus pentadactyla* (L.) Very common, 1878 (P); 1892 (T); 1908 (J); Fj; common (E).

*Adaina microdactyla* (Hübner.) Common (O).

*Oidaematophorus lithodactyla* (Treits.) 1908 (J); R (V); NRR (G); three, 1971 (E).

*Emmelina monodactyla* (L.) 1892 (T); 1908 (J); 1920 (W); Fj; 1949 (P-C); common (E).

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## OBITUARIES

### CAPTAIN JOHN ELLERTON, D.S.C., R.N., 1910-1971

The son of an admiral, John Ellerton followed his father's profession, entering the Royal Naval College, Dartmouth at the age of thirteen. His intention had been to become an executive officer, but he was obliged to transfer to the Paymaster Branch whilst still at college because of defective eyesight.

The most interesting part of his naval career was the thirteen years he spent as secretary to Admiral Sir Harold Burrough, an association which ended only when the admiral retired in 1949. The outbreak of the war saw them both at the Admiralty; then they were on Arctic convoys; then on Mediterranean convoys including the most famous of all in August, 1942, which brought relief to Malta after some of the heaviest naval action of the war. In November of the same year they were again involved in a major operation, providing cover for 'Torch', the allied invasion of north Africa. It was during these Mediterranean operations that Ellerton was awarded the D.S.C. for gallantry. In 1945 the admiral was appointed Allied Commander-in-Chief, Expeditionary Force and subsequently British Naval C-in-C. Germany. Ellerton accompanied him still and was present with him at the historic signing of the Peace Treaty at the conclusion of the war in Europe.

After the war Ellerton served at sea again in a cruiser, was the commander at a training establishment (an appointment normally reserved for officers of the Executive Branch), completed the Imperial Defence College course and served once more, this time as a captain, at the Admiralty. He retired at his own request in 1962 to become a partner in High Wycombe Iron Foundry, a firm with which he continued to work until his death.

After his retirement from the Service, he settled at Granborough in Buckinghamshire where he soon began to take a leading part in local affairs. Amongst other tasks he was chairman of the local conservatives and lay chairman of the Deanery Synod in Winslow. Cricket was one of his closest interests. Although he never played for the Navy, he became a selector for the Royal Navy team and was an ardent and competent club cricketer. He was also a keen shot, and a pheasant shoot would take precedence even over entomology.

John Ellerton's interest in entomology began late in his life, only a year or two before his retirement from the Navy. His wife says it was to help him get over the shock of the birth of his youngest child, a daughter. Another version is that he bought collecting gear as a birthday present for his eldest son, and then used it himself. At all events, he was soon deeply involved in his new hobby. He confined himself to the Lepidoptera. The smaller moths became his special favourites, but



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A. J. WIGHTMAN



he also caught many notable macros such as the rare migrant *Utetheisa pulchella* L. which he took in 1961 both at his home, then in Kent, and on holiday in Scotland.

Another of his specialities was *Trisateles emortualis* Schiff. and he could turn the popularity of that fashionable insect to good account. As secretary and treasurer of his parochial church council, he found clergy to take the services when his parish was temporarily without a vicar. 'Do you want *emortualis*?' he asked an unsuspecting parson at the Verrall Supper. 'Yes, indeed,' was the reply. 'Then if you will take duty at Granborough on the last Sunday in June, I will take you to the locality.'

Ellerton ran a mercury vapour trap regularly at his home and many of his records feature in Sir Eric Ansorge's 'Macrolepidoptera of Buckinghamshire'. A regular visitor to his trap was the elusive *Eupithecia insigniata* Hübn. and he was most generous in supplying specimens to his friends. In order to find time for entomology amongst his many other duties, he rose regularly at 5.30 a.m. to deal with his trap and his setting before breakfast.

He became a member of the South London Entomological and Natural History Society in 1960. It was not long before his talents were recognised and he was elected a member of Council. He took a leading part in advocating the renaming of the society, for he saw clearly that it was hampered in its task of functioning as a national body while operating under a title which suggested regional limitations. Elected President in 1969, in his chairmanship of Council meetings he was a model of brisk efficiency, business acumen and tact.

Ellerton wrote little, for to him entomology was a hobby and relaxation rather than a scientific pursuit. However, he published several useful notes and a valuable list of captures made on holiday in the west of Ireland. His Presidential Address entitled 'Microlepidoptera added to the British List since L. T. Ford's Review' entailed a considerable amount of research, for it gives the references in the literature to 109 species added to or deleted from our list since Ford performed a similar service in 1947. It constitutes a most useful work of reference to all microlepidopterists.

John Ellerton was at his best in the field, where the warmth of his personality, his infectious enthusiasm and generosity made him the most delightful companion.

During the summer of 1970 he was far from well and early in September he entered hospital for an operation for cancer. In the months which followed a series of further operations was necessary, all of which he bore with philosophic fortitude. In the new year he seemed to be recovering and spent his convalescence at home rearranging his collection of microlepidoptera in a new cabinet. However in March the symptoms recurred and further surgery was not possible. He died on the 22nd of April, one of the best-loved entomologists of his generation.

Our sympathy is extended to his wife, Eve, and his three sons and daughter. His second son, Hugh, has inherited his father's interest in entomology and is one of our members. His family have most generously presented his collection of microlepidoptera to the Society.

A.M.E.

#### ARCHIBALD JOHN WIGHTMAN 1884-1971

(Member of this Society 1920-1971)

Tribute to A. J. Wightman has already been made in *Entomologist's Record* March-April 1971 where also some account was given of his private affairs; this further personal appreciation will add the name of Wightman to that distin-

gished list of late members of this Society whose talents and achievements claim an honoured place in our Proceedings.

Born of a prosperous trading Lewes family, Wightman was well educated at Brighton Grammar School and apprenticed to the business of ironmonger. His family fortunes foundered in an age of increasing mechanisation and by the time of his return from two years in Australia the business passed into other hands. Wightman persisted in the job he knew best, married the girl for whom he had stoked his way home, and after military service on the western front and in Ireland he took up a post at Pulborough. His wife never took much active part in his collecting, she played a splendid hostess to his visitors, accompanied him on his trips and kept a good home, but she was never interested in his work or yet understood it. By the greatest stroke of irony it was she who, while Wightman worked the shingle at Dungeness, chanced upon a curious larva that Wightman thought was *zollikoferi* but which died and left unanswered one of the biggest noctuid conundrums of the century. I first knew her as a dear and charming lady, all pink and white who set the table and brewed tea while Archie chain-smoked Turkish cigarettes and exhaled noctuid wisdom, she never changed and her image remains. Her sudden death came while *leautieri* were hatching and Wightman spent that summer in contemplation in Devon. Reconciled to the solitary state he planned expeditions to all parts of the British Isles to the limit of his income, and one of his first tasks was to stitch together into one enormous coverlet all his late wife's beautiful furs, so that he could sleep beneath it in his car in remote places after collecting late at night: he converted the inside of his Anglia so that his bed comprised also a complete travelling chest of collecting requisites and which being long and narrow gave rise to the story that he carried his coffin with him. As the years passed and took their toll Wightman found himself increasingly alone and even his cast-iron philosophy could not equate why younger colleagues should be so stricken. His demise shocked but not exactly surprised those who were close enough to him to know the dimensions of his mind or his power of resolution; had he not indeed already sold his Seitz the previous autumn?

It is indicative of the man that he should first come into prominence at the time when *Nonagria neurica* was under hot controversy not only as to its occurrence in Britain but as to its separate identity from *N. dissoluta*, for this species stamped the pattern of Wightman's work that was to become a lifelong quest into the habits and variation of noctuid moths, and typified his abiding interest in the internal feeders. Wightman was also at his happiest collecting in the marsh and reedbeds, for while he was very much at home on his native chalk downs, the Sussex river valleys and coastline always held a special attraction for him. All his early work was centred on his home-town of Lewes—*ulvae* in reeds of the Cuckmere, *gnaphalii* at Laughton, *cinerea* and *lutulenta* on Brighton golf course, sugaring at Beachy Head, *lepida* on the Crumbles; he acquired an early love for Dungeness that lasted throughout his career and gave him the greatest pleasure whether discovering *livornica* and *lunula* on the hot shingle, cutting *sparganii* from the waterholes or turning out pupae of *albimacula* from the lichen, or above all sugaring the old railway posts for autumn migrants. He inherited a rich collecting lore from a sound body of Lewes collectors but equally soon learned to rumble the less particular and to distinguish between those Brighton dealers who were reliable and those who were not. His discovery early in life that specimens were faked and continental examples passed as British hardened into permanent suspicion of any unusual insect that was not supported by impeccable data and he compiled a dossier on the doubtful identity of many of the old records and of the personalities and labels associated with them.

When he moved to Pulborough in West Sussex he left behind not only the old Lewes collecting traditions but also the old era and henceforth he ploughed a more lonely local furrow but with an ever widening circle of more distant colleagues. The Arun valley and Storrington downs furnished the bulk of his collecting and for his coastal work he visited Littlehampton, Pagham and Wittering while for his heath species he went to Parham. The oakwoods at Arundel and Bedham offered a rich fauna which he explored with sugar and beating tray and it was at this period that he began to get *cannae* freely at Pondlye. Indicative of these years were *ripae* and *vestigialis* on the coast, *lychnitis* on mulleins on the downs, *chamomillae* around old hayricks, *consersa* in the *Silene*, *aurago* at yew berries and *semibrunnea* at ivy blossom, *straminea* and *puerina* by the river and *fissipuncta* under willow-bark. This last insect well illustrates Wightman's abiding interest in classification and in the natural relationships within and between genera—he could never understand or tolerate the unsubstantiated checklists published from time to time by all manner of experts both within and without the museums of all lands—and he could no more accept *fissipuncta* to belong to *Apamea* than he could lump *Dianthoecia* into *Hadena*; he felt, he saw, he knew intuitively by the simple faith of having seen and handled these insects in all their stages, and he deeply lamented the unqualified changes in their taxonomy.

The period of the thirties saw him most active with his pen to yield a stream of collecting notes and correspondence with other specialists like Draudt, Donovan, Cockayne and Edelsten. The Second World War curtailed collecting at night so in his daylight excursions Wightman became very adept at finding larvae of *iris*. When the exciting events of postwar collecting shattered notions of rarity along with concepts of distance and remoteness Wightman accepted the new media of this brash age and joined the trecks to Ham Street, Woodwalton and the Burren to enrich both mind and boxes with species new to Britain or of hitherto untold rarity, but it was the discovery of *subrosea* at Borth of which he wrote in his diary 'this pleased me most of all'. He went for *caesia* on the Isle of Man in '58, '60 and '62, was in Scotland in '58, the whole collecting season of '59, again in '60 and '61, he went for *exulis* to Lerwick in '60, and from '63 to '67 spent part of each summer in Ireland: each autumn found him at Dungeness and incredibly he managed to fit into this daunting programme the less-distant trips to fen, broad, west country and Wales and still somehow maintain his local interests at Pulborough.

His greatest loves were *cinerea*, *lichenea*, *gracilis* and *xerampelina* and the superb material he gathered together represents but a fraction of the many thousands that passed through his critical scrutiny. These species he studied annually, always arranging his field programme to provide the time necessary to set out traps for *xerampelina* larvae, to trudge many miles to clear, and reset them and to bring home their food and to rear them. The quest for *gracilis* larvae took him far and wide and in order to refute the claim that East Sussex moths from bog myrtle were as red as those from the New Forest he first tracked down the food-plant and then reared moths until his point was abundantly proven. Another long-standing love was *muralis* of which he assembled the most remarkable collection and to which his enthusiasm was further aroused by H. C. Huggins' work at Dingle; Wightman made annual trips to Cork from 1965 to '67 and recovered the extensive range of this most exquisitely variable moth, in 1967 he examined 245 moths on the old walls in 28 days—who else could apply himself so diligently to such a task? The scale on which Wightman collected and reared his moths was quite astonishing, he reared by the hundred in batteries of cages altered to suit the

feeding habits of each species and in this way he mastered the difficult ones that require opening buds, the internal feeders that so frequently perish in lesser hands, those that required hot sun and those that hibernate only in a special environment. He liked to find each species wild in the larval state and when he could not he would rear it from the egg, observe its way of life and range of foods and then go and find it in its natural surroundings. In this way he had added vastly to the knowledge of British moths and confounded many of the misstatements repeated from book to book. Conservationists might like to know that as far back as the thirties Wightman used to release all the bred specimens he did not require at the place he had collected them as larvae, and of *xerampelina* he found how they so quickly vanished on release without flight. He would release *iris* and *camilla* in the same way and once put some unwanted *camilla* larvae on the honeysuckle of his porch only to discover a subsequent pupa showing no white and the resulting butterfly a superb *nigrina*. We sometimes overlook that although a confirmed noctuid specialist Wightman was more than just knowledgeable on the rest of the macrolepidoptera as well as having a useful acquaintance with most other Orders. He must be amongst the few collectors ever to have found *cydippe* pupae—at night with the silver spots picked up by his lantern light—and is probably unique in rearing that lovely female *iris* ab. *iole* with chocolate overlain by powder blue; his sighting of *immorata* at Laughton in 1961 constitutes one of the more recent records and he broke new ground in beating out larvae of *brunneata* at Coylum bridge. In Australia he collected bird skins and the giant buprestid beetles for Queensland museum and learned his natural history there from a gun-toting outlaw with whom he lived rough.

The collection that Wightman formed dates from the 1920s and the only specimens with data earlier than this, e.g. of *neurica*, *lepida* and *cinerea*, are those of his first colleague E. P. Sharp, for his own earlier collection was dispersed when he left for Australia in 1909. He found soon enough that the standard cabinet practice of a row for each species was not for him and he adopted instead a system of glazed store boxes that allowed him to rearrange his material as his thoughts evolved on classification and which also enabled him to expand within a species as he explored its variation. Contrary also to the common practice of cramming insects into overcrowded space Wightman organised his material at predetermined spacing so that no antenna or leg would be at risk as specimens were removed or replaced. His whole style of presentation was directed to give maximum space for comprehensive handwritten data and the comparison of specimens to illustrate clinal, regional and aberrational forms demonstrating the range of pattern and size and colour to be found in Britain, and where necessary e.g. *Dianthoecia andalusica* and *luteago* to show continental material as well; because of his fierce dislike of muddling British with foreign insects Wightman cut off the wings of the latter and mounted them with data on card. The clinical cleanliness of his collection allowed no greasy body or stained paper; all internal feeding species were degreased as part of routine setting and constant vigilance ensured any other specimens that succumbed were dealt with promptly. For specimens taken at sugar that developed grease symptoms he would boil the abdomen instead of the normal degreasing in petrol, and it was during such a process that an old Sussex *erythrocephala* said to have been taken at sugar did in fact have the sugar boiled out of it many years later.

The degree of perfection Wightman looked for in a specimen was quite simply that of bred condition and full size, and for those species that are not easily—if at all ever—reared in captivity, such a standard set enormous problems. Many

people talk of 'bred' or 'mint' condition when what they really mean is indeed something far short although still good; to Wightman these terms meant pristine, no scale out of place no fringe cilia disturbed, no chip, dullness, flattened thoracic crest or missing leg or curled antenna. To achieve this rigorous standard he killed his noctuids by first running a drop of chloroform into the chipbox, put in the specimen and then watched it all the while, turning the box so that no part of the insect touched the sides, then when stupefied the insect was pinned on the cork lid of a wide-mouthed cyanide jar with the wings cross-pinned so as to remain flat—Wightman knew how compressed the thorax could look if a noctuid died with its wings above the body. He combed the sales rooms for species and forms he could not collect himself, selecting only the best with authentic data; most of these he relaxed and reset to conform with the immaculate uniformity of his collection, for until recent years very few noctuids came up for sale that met such criteria. Wightman argued that many moth varietal names were based on imperfect material and were thus valueless, for he could produce them simply by ageing or weathering the bred insect.

Wightman provided for some 1300 of his specimens, selected by him and A. L. Goodson, to be bequeathed to the Rothschild-Cockayne-Kettlewell collection and these included the whole of his life's work on *muralis* (306 examples) and *xerampelina* (248) and matching pairs of *cinerea* (86).

It was the clear-minded interpretation of mint condition that caused Wightman to take issue with P. B. M. Allan's theory that the better the condition of a migrant moth the more likely this will have newly flown in and not have bred here. Clarity was indeed Wightman's keynote of approach to all problems whether of politics, history, religion or natural history, he had no time for the faint-hearted or smart dialectical debater, he preferred the broadsword to the foil and clove his way direct to the heart of a problem caring not for convention or finesse. But it would be very wrong to think this man was not sensitive to opinion or above all to example or method, he simply had to be convinced in the most genuine manner. His thoughts on speciation brought him into conflict with Verity and Graves and their schools of racial and subspecies definitions, and true to form Wightman countered tedious argument with blunt declarations of belief and powerful commonsense and poured scorn on the false doctrine of split nomenclature and races that changed with season and year. As in matters of classification and species affinity, so with infraspecies Wightman had the inestimable advantage of knowing his material thoroughly, he knew not only species' habits and appearance through all stages but the large numbers he handled both wild and in his cages broadened all the while his horizon of the species' potential for variation and the recapitulation of forms possible from the evolutionary pool, and always of course he learned more of their way of life, of the infinite store of secrets each species revealed.

To the timid tyro Wightman could appear formidable and daunting, so dominating did he become in his later years, yet to his friends there was no more stirring occasion than to listen to the great man in full cry whether relating an adventure from his crowded private life or sharing his forthright views on entomological matters. The greatness of Wightman derives from the legacy of awareness that he has left to us, a greater share in the treasury of natural history knowledge which we ourselves may never have realised. His storehouse of knowledge was offered to novice and expert alike and a succession of Sussex entomologists have been especially fortunate in learning their skills from him, and all of us have gained immeasurably. So much of what he learned has been passed on in person that his

impact cannot be judged solely from his published work. His literary contributions all have the freshness and directness and authority of one who wrote from the genuine love of his subject backed by first-hand knowledge gained from a life-study enriched by acute observation, and written in plain, lucid prose.

A. J. Wightman was the very essence of the field naturalist, a true lover of all things wild and free, a giant amongst collectors, a Colossus of rhetoric, a powerhouse of energy whose unceasing quest into the British noctuids gave him such reward and us so much pleasure.

G. M. HAGGETT

### EDWARD STUART AUGUSTUS BAYNES, O.B.E., F.R.E.S.

Edward Stuart Augustus Baynes died after a long illness at his home at Glenageary, Co. Dublin, on 14th May 1972. Although he had considerably exceeded four score years he had shown no change in appearance for the past twenty and last summer was looking forward to next year's collecting.

Happily he had completed most of his best work; he will always be remembered for his *Revised Catalogue of the Irish Macrolepidoptera* (1964) and its supplement (1970). The book is undoubtedly the best so far published on the subject; apart from being the latest it lacks the credulity that sometimes disfigures Kane and the charming but often misplaced dogmatism of Donovan.

During the 25 years he collected in Ireland he took many interesting insects. Perhaps the best was the fine aberration *eblanaria* of *Selenia bilunariai* Esp., which he bred, described and named.

Baynes began collecting as a school-boy at Radley and kept it up in all parts of the world. On settling in Ireland he sold all his specimens and began again, Irish only. His collection and cabinets have been presented to the Irish National Museum.

Educated at Cheam and Radley, Baynes was trained as an architect and worked under Lutyens.

When the First World War broke out he immediately enlisted and after being twice wounded was invalided out in 1916.

He was then attached to the Foreign Office, finishing his career as Commissioner for British Trade at the Embassy in Dublin.

He leaves a widow and son with whom we all sympathise.

H.C.H.

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### JOINT COMMITTEE FOR THE CONSERVATION OF BRITISH INSECTS

The Council for the Society are pleased to publish, and fully support, the Code put forward by the Joint Committee For the Conservation of British Insects printed below. The need for such a Code must be apparent to all. It is earnestly recommended that a close study be made of the six main sections and that all members genuinely adhere to all the clauses.

There is a reference (2.1) to a list of macrolepidoptera, but the Council has not seen nor has approved a list.

## A CODE FOR INSECT COLLECTING

This Committee believes that with the ever-increasing loss of habitats resulting from forestry, agriculture, and industrial, urban and recreational development the point has been reached where a code for collecting should be considered in the interests of conservation of the British insect fauna, particularly macrolepidoptera. The Committee considers that in many areas this loss has gone so far that collecting, which at one time would have had a trivial effect, could now affect the survival in them of one or more species if continued without restraint.

The Committee also believes that by subscribing to a code of collecting entomologists will show themselves to be a concerned and responsible body of naturalists who have a positive contribution to make to the cause of conservation. It asks all entomologists to accept the following Code in principle and to try to observe it in practice.

1. *Collecting—general*

- 1.1 No more specimens than are strictly required for any purpose should be killed.
- 1.2 Readily identified insects should not be killed if the object is to 'look them over' for aberrations or other purposes: insects should be examined while alive and then released where they were captured.
- 1.3 The same species should not be taken in numbers year after year from the same locality.
- 1.4 Supposed or actual predators and parasites of insects should not be destroyed.
- 1.5 When collecting leaf-mines, galls and seed heads never collect all that can be found; leave as many as possible to allow the population to recover.
- 1.6 Consideration should be given to photography as an alternative to collecting, particularly in the case of butterflies.
- 1.7 Specimens for exchange, or disposal to other collectors, should be taken sparingly or not at all.
- 1.8 For commercial purposes insects should be either bred or obtained from old collections. Insect specimens should not be used for the manufacture of 'jewellery'.

2. *Collecting—rare and endangered species*

- 2.1 Specimens of macrolepidoptera listed by this Committee (and published in the entomological journals) should be collected with the greatest restraint. As a guide, the Committee suggests that a pair of specimens is sufficient, but that those species in the greatest danger should not be collected at all. The list may be amended from time to time if this proves to be necessary.
- 2.2 Specimens of distinct local forms of macrolepidoptera, particularly butterflies, should likewise be collected with restraint.
- 2.3 Collectors should attempt to break new ground rather than collect a local or rare species from a well-known and perhaps over-worked locality.
- 2.4 Previously unknown localities for rare species should be brought to the attention of this Committee, which undertakes to inform other organisations as appropriate and only in the interests of conservation.

3. *Collecting—lights and light-traps*

- 3.1 The 'catch' at light, particularly in a trap, should not be killed casually for subsequent examination.

- 3.2 Live trapping, for instance in traps filled with egg-tray material, is the preferred method of collecting. Anaesthetics are harmful and should not be used.
- 3.3 After examination of the catch the insects should be kept in cool, shady conditions and released away from the trap site at dusk. If this is not possible the insects should be released in long grass or other cover and not on lawns or bare surfaces.
- 3.4 Unwanted insects should not be fed to fish or insectivorous birds and mammals.
- 3.5 If a trap used for scientific purposes is found to be catching rare or local species unnecessarily it should be re-sited.
- 3.6 Traps and lights should be sited with care so as not to annoy neighbours or cause confusion.

#### 4. *Collecting—permission and conditions*

- 4.1 Always seek permission from landowner or occupier when collecting on private land.
- 4.2 Always comply with any conditions laid down by the granting of permission to collect.
- 4.3 When collecting on nature reserves, or sites of known interest to conservationists, supply a list of species collected to the appropriate authority.
- 4.4 When collecting on nature reserves it is particularly important to observe the code suggested in section 5.

#### 5. *Collecting—damage to the environment*

- 5.1 Do as little damage to the environment as possible. Remember the interests of other naturalists; be careful of nesting birds and vegetation, particularly rare plants.
- 5.2 When 'beating' for lepidopterous larvae or other insects never thrash trees and bushes so that foliage and twigs are removed. A sharp jarring of branches is both less damaging and more effective.
- 5.3 Coleopterists and others working dead timber should replace removed bark and worked material to the best of their ability. Not all the dead wood in a locality should be worked.
- 5.4 Overturned stones and logs should be replaced in their original positions.
- 5.5 Water weed and moss which has been worked for insects should be replaced in its appropriate habitat. Plant material in litter heaps should be replaced and not scattered about.
- 5.6 Twigs, small branches and foliage required as foodplants or because they are galled, e.g. by clearwings, should be removed neatly with secateurs or scissors and not broken off.
- 5.7 'Sugar' should not be applied so that it renders tree-trunks and other vegetation unnecessarily unsightly.
- 5.8 Exercise particular care when working for rare species, e.g. by searching for larvae rather than beating for them.
- 5.9 Remember the Country Code!

#### 6. *Breeding*

- 6.1 Breeding from a fertilised female or pairing in captivity is preferable to taking a series of specimens in the field.

- 6.2 Never collect more larvae or other livestock than can be supported by the available supply of foodplant.
- 6.3 Unwanted insects that have been reared should be released in the original locality, not just anywhere.
- 6.4 Before attempting to establish new populations or 'reinforce' existing ones please consult this Committee.

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## FIELD MEETING

EFFINGHAM, SURREY—22nd April 1972

*Leader:* Mr. R. F. BRETHERTON

Eleven members and visitors, some of whom came from as far as Norfolk and Portsmouth, met at Effingham station at 5 p.m. for a late afternoon and evening meeting.

The main purpose in the afternoon was to see if larvae of the small, green Pug moth, *Cloroclystis chloerata* Mab. were present on the blackthorn blossom here. In this most members of the party were successful. The pretty white and rose coloured larvae, apparently nearly full-fed, were beaten from the blossom over a wide area. They seemed to be scattered patchily in particular places, though they were nowhere abundant and were easily overlooked on the beating trays. *C. chloerata* was first found as a British species in Surrey in 1971, being bred from larvae. Members present reported that, in the past fortnight, they had found larvae also in Sussex and in the New Forest. Other small larvae were numerous at Effingham, *Opistograptis luteolata* L., *Allophyes oxyacanthae* L. and *Episema caeruleocephala* L. being especially common.

The party adjourned at 7.45 p.m. for welcome refreshments kindly provided by Mr. and Mrs. L. J. D. Wakely at their house. When they returned to Effingham after dark, a strong north east wind, a clear sky and a brilliant moon deterred movement by Lepidoptera. The second quarry, the Sloe Carpet, *Bapta distinctata* H-S., was not found: almost the only moths seen were a few *Orthosia stabilis* Schiff. The party therefore dispersed by about 10.30 p.m.

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## BOOK REVIEW

**Woodlice** by S. L. Sutton. 8 $\frac{1}{4}$ "  $\times$  5 $\frac{3}{4}$ ", 144+8 coloured plates and 37 text figures. Ginn & Co. Ltd., £2.00.

Most entomologists and allied workers who search litter, vegetable refuse, rotting wood, etc., have wondered what the woodlice species they so often meet in these habitats are; few have not felt they would like to know a little more about them and probably wondered about literature; and those who have pursued the matter a little further have found a distinct lack of works to consult. The beginner must have a most difficult time, and this may well account for the paucity of

students of the Isopoda. This is now changed; the volume under review is an excellent work and fills a gap in the available works of determination of our invertebrate fauna.

Within this slim volume one finds chapters on body structure; physiology; behaviour; genetics; food, predators and parasites; population ecology; distribution and habitat range; identification to British species; and study techniques. All very well written and readable. The keys are clear and concise and though a microscope is essential there is little doubt that identification to all our species is not too difficult. There is also a complete and comprehensive check list to the British species and introductions are not forgotten.

Figures of the relevant portion of the anatomy are neatly and clearly executed, without unnecessary and confusing detail and provide excellent support for the keys. The coloured plates of the woodlice are beautifully done, but the line drawings will be much more use in determination.

Although apparently expensive for its size, the book is worth every penny.

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## MEETINGS OF THE SOCIETY

are held regularly at the Society's Rooms, but the well-known ANNUAL EXHIBITION takes place in the autumn 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.

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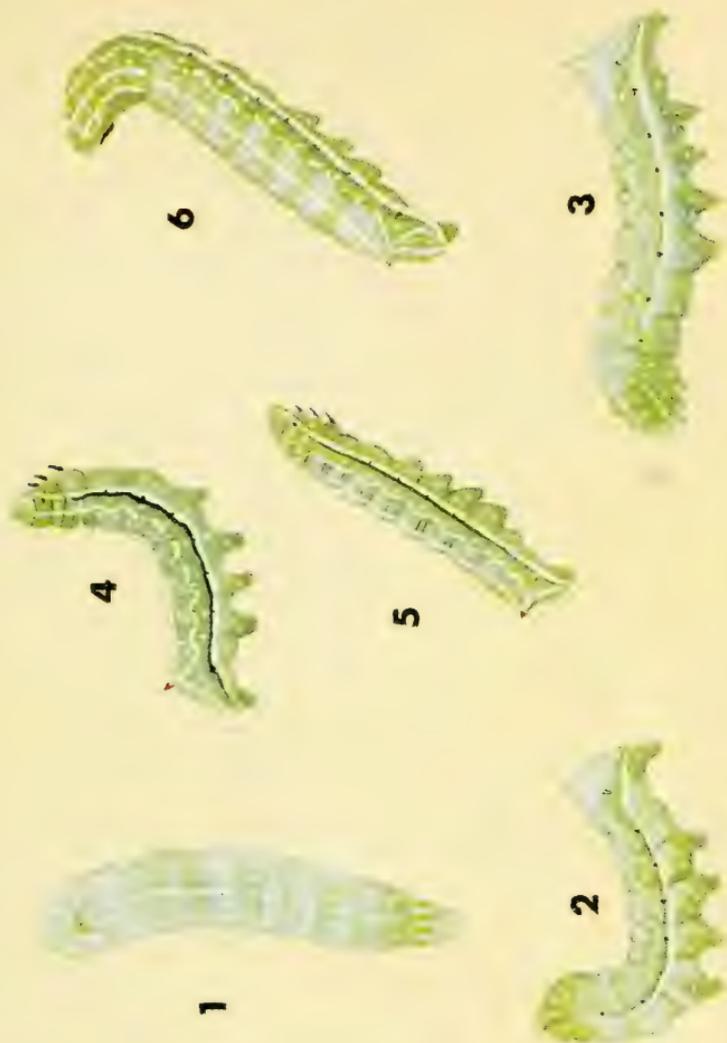
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R. W. J. Uffen, F.R.E.S.



1-3 *Amphipyra pyramidea* L.; 4-6 *Amphipyra berbera* Rungs



LARVAE OF THE BRITISH LEPIDOPTERA NOT FIGURED  
BY BUCKLER

## PART X

Compiled and illustrated by G. M. HAGGETT

The last issue (*Proc. Brit. ent. nat. Hist. Soc.* 1970, 3: 81–92) of this series of papers was incorrectly numbered Part XI. It was in fact Part IX and the present part remains correctly entitled Part X.

*Amphipyra pyramidea* L., the Bright Copper Underwing, and *Amphipyra berbera* Rungs ssp. *svenssoni* Fletcher, the Drab Copper Underwing.

When introducing the newly separated species *A. berbera* Rungs into British literature in 1968 D. S. Fletcher<sup>1</sup> also reviewed those publications containing figures of *Amphipyra* larvae and drew attention to the fact that in some illustrations larvae possessed a red caudal horn while in others it was pale yellow and less well developed. A year later Carter<sup>2</sup> published an account of rearing a specimen of *berbera* from a single wild larva; a very good illustration accompanied this account, reproduced from colour transparencies which I have since seen. Meanwhile in Germany Cleve and Urbahn succeeded in rearing both species to the last instar but then lost most to dysentery; Urbahn<sup>3</sup> noted several points of difference between the larvae of the two species and repeated his findings with additional material of the egg in the following year.<sup>4</sup> Urbahn and Cleve each found that the characters they had noted to distinguish the species were the opposite of what Carter had published and Urbahn supposed that this could be explained by 'local differences' and he wondered if the moth Carter reared had been verified by genitalic examination.

In 1969 I caught *Amphipyra* moths at Tilford, Surrey, and at Dolgellau, Merionethshire, and I obtained eggs from a number of females which D. S. Fletcher kindly verified by genitalia inspection to include both species at both localities. Each batch of eggs had been kept strictly separate and the parent labelled and as a further precaution to prevent any mixing I gave one batch of *pyramidea* to my mother at Arundel and a batch of *berbera* to A. J. Wightman at Pulborough. I kept batches of both species. The early hatchings of larvae were put on to honeysuckle but we later found both species preferred oak and larvae were reared to maturity on it in plenty. All the offspring from female moths identified as *berbera* produced *berbera* and all the offspring from female moths identified as *pyramidea* produced *pyramidea*. The total number of moths reared of each species was about one hundred. The underside wing marking characters given by Goater and Christie<sup>5</sup> proved to be absolutely reliable in separating the two species.

I found the larvae of the two species to be quite distinct with constant differences, indeed it was possible to see their identity at a glance. Like Urbahn I found the character of the red horn to be less reliable than differences between spiracles, lateral pattern and thoracic legs and these are all the more dependable because they all occur together, that is to say a larva with black thoracic legs will also have dark spiracles and a dark lateral line and will unquestionably be *berbera*. I found the following characters to be constant and list them in the order of increasing dependability for recognition:

1. GENERAL: *berbera* is less yellow-green on thorax and laterally. Spiracular band is boldly edged above with a conspicuous border of deep dark green that extends onto thorax as a finely etched wrinkled black line. The general appearance is much more variegated.
2. SIZE: *berbera* is the slighter and shorter of the two, an average of 5 mm less at full growth; *pyramidea* has the glaucous obesity of *B. nubeculosa* while *berbera* has a passing resemblance to a bee hawk.
3. CAUDAL HORN of *berbera* in last instar is regular in shape and bright carmine or vermilion, in *pyramidea* there is a hump of greenish yellow that terminates in a fine spike usually of the same colour.
4. CROCHETS of prolegs of *berbera* are pink, those of *pyramidea* are black.
5. SPIRACLES of *berbera* are thickly ringed in black, the valves dusky grey with a fine white aperture, those of *pyramidea* are clear white thickly ringed in black.
6. SPIRACULAR BAND in *berbera* is continuous from prothorax to anal flap and although weaker on rings 3 and 4 it is never totally lacking, whereas in *pyramidea* it is diminished to the point of absence on ring 3 and quite absent from the anterior half of ring 4.
7. THORACIC LEGS of *berbera* are totally jet black on the outer surface in all instars, those of *pyramidea* are green with a black or reddish dot at each joint.

I have minimised the character of the red horn because of the fact that it could mislead those who might expect it to be a sure guide. It is true that most larvae of *berbera* do possess a finer, sharper and brighter vermilion spike than do *pyramidea*; but I have had larvae of *berbera* with a pale reddish and blunter spike and the odd *pyramidea* with its humped tip pale orange. The shape and structure of this feature on ring 11 appears to me to be more dependable for in the last instar the stronger spine-like horn of *berbera* continues the smooth sweep of the line of the dorsal silhouette of rings 10 and 11, whereas in *pyramidea* a tiny spike is mounted on a swollen conical cushion, or pyramid.

The darker spiracles of *berbera* appear to be a constant point of difference in the early instars but in the last skin the centres may appear quite white although still thickly ringed with black. Urbahn<sup>3-4</sup> mentions all the above points of distinction except the second and gives an additional point as follows—'the white patterns on the green colour are in *pyramidea* especially in the region of the subdorsal line in the form of dots, in *berbera* by contrast they are more streaked and drawn out so that the subdorsal forms a complete zigzag line. This difference held good in all our bred larvae'.

Until its last instar the larva of *pyramidea* has uniform yellow-green or blue-green colour and the white markings are not so starkly conspicuous as they are in *berbera*, which instead presents a sharper blue-grey appearance with dark edge to the spiracular band and black truelegs, while at this stage the darker spiracles of *berbera* show up very obviously. The white spiracular band is continuous in the early instars in both species but is broader than in *berbera*.

The illustration of Carter's larva so clearly appeared to me to be *pyramidea* that I pursued the matter with Mr. Carter who had further checks made at the British Museum where the moth is preserved. These confirmed the insect to be an unquestionably clear example of *berbera*, and the curious anomaly remains that an undoubted *berbera* was reared from a larva that answers to *pyramidea* in

all the significant characters detected in larvae bred in Germany by Urbahn and in my own extensive material from Wales and southern England.

I was anxious to repeat my work and was able to do this the following year with 39 larvae reared from eggs laid by a *berbera* female taken at Bramley, Surrey, by Mr. R. F. Bretherton; the larvae were again reared on oak and all were identical to the Tilford and Dolgellau ones in all the principal characters, and all produced *berbera* moths.

In his second paper Urbahn<sup>1</sup> gives excellent illustrations of the eggs of the two species derived from electroscan microscope studies of Dr. Sattler. Both Urbahn and Sattler detect differences which to me appear to be very slight. Similarly I could see no significant differences between the pupae of the two species except that *pyramidea* is on average rather larger.

On the considerable evidence of Urbahn and my own work it can be fairly deduced that Buckler figured both species, Vol. 6 plate 103 figures 2a and 2b, to be *pyramidea* and figure 2 *berbera*.

In his earlier paper Urbahn<sup>3</sup> related how both he and Dr. Cleve found difficulty in getting eggs from moths taken before the autumn, despite their being fed in captivity; Urbahn found this was due to absence of sperms in the bursa and therefore no pairing had taken place, and he thought that both species needed time and feeding in order to mature before pairing. I also have found that no fertile eggs have come from moths taken late July or in August, whereas moths taken in September laid fertile eggs freely. The latest date I have found the moth wild (*pyramidea*) was 4th October. In 1971 I enclosed eight female *berbera* and one female *pyramidea* taken on 30th August and of these two *berbera* lived until late September, the *pyramidea* until 1st October, all having fed on sugar-water; eggs laid by both species were infertile. Another *pyramidea* caught 24th September laid fertile eggs during the period 4th to 13th October. Infertile eggs remain pale cream in colour but fertile eggs become coral-red after a week. Saundby<sup>6</sup> and de Worms<sup>8</sup> recorded that *berbera* appears earlier in the year than *pyramidea* and said it was the experience of most collectors that *berbera* was the first to emerge, and I too have found this to be so in both wild-caught and bred moths.

The method of egg-laying in captivity is to deposit them in scattered batches and the newly hatched larvae of both species are extremely active and spin considerable quantities of silk amongst which they rest during the first instar. Thereafter they live solitary lives and as they grew larger both species liked to sit with the head thrown back. Both species had the habit of exuding a globule of brownish fluid at the mandibles, which looked very like the early symptoms of dysentery but which proved harmless; indeed both species were very easy to rear and most hardy. The pupa was enclosed in a weak cocoon spun just beneath loose soil or amongst folds of cloth, dead leaves or paper. Both species could grow from egg to pupa in three to four weeks in outdoor temperatures.

Larvae under the name of *pyramidea* have been recorded from a wide variety of broad-leaved shrubs and trees and on honeysuckle, but in captivity the only successful large-scale rearings have so far been on oak.

Michaelis and Morgan<sup>7</sup> recorded the occurrence of both species in Caernarvonshire and *berbera* from the counties of Flintshire, Merioneth, Denbighshire, also in nearby Staffs., Cheshire and Salop. De Worms<sup>8</sup> remarked that both species were fairly equally distributed over southern Britain. At Tilford, Surrey, I find many more *berbera* attracted to mercury vapour light than *pyramidea*, and in Germany and elsewhere abroad it is *berbera* that appears to be commoner amongst the preserved material in collections. This is why I prefer the English name of Bright Copper Underwing for *pyramidea*.

*Description of last instar larva, AMPHIPYRA BERBERA* Rungs

Length to 35 mm when extended. Shape cylindrical, plump, broadest at the third and fourth rings, the rings wider than long, the head held well into the thorax.

Coloured yellowish on thorax, blue-white along the dorsum and above the subdorsals, shading blue-green to the spiracular line, rich grass-green below. Mediodorsal stripe clear white, broad and bold, broken weakly at the ring divisions and continuous from the anterior edge of prothorax right to the posterior rim of the anal flap. The dorsum of ring 11 is produced into a uniformly developed thorn-like prominence coloured bright vermilion and except for its very tip is finely divided by the pale continuation of the dorsal stripe, and there is no indication of a separate spine at the tip. Subdorsals run from the anterior edge of the prothorax to the anal flap and consist of fine white streaks along the thoracic rings which are extended on the abdominal, where they consist of an upward-swept streak on the anterior, a dot at the apex, another dot on the downward curve joined to a streak that reaches to the posterior edge of the ring. On ring 11 this line is thicker and solid, and sweeps up to touch the red horn and still as thick then curves sharply back to the anal flap. The spiracular band is clear white on the abdomen but narrower and tinged with deep yellow on the thorax, and is continuous from prothorax to anal flap; it is edged above on each abdominal ring by a thick conspicuous band of deep dark green and on the thorax by a fine black margin. The ventral surface is unmarked except for white tubercles. All tubercles on upper and lateral surfaces are creamy white.

Head pale green, mouthparts whiter, the lobes streaked in front with white and again as a continuation of the spiracular band low on the side of the head. True legs outwardly totally jet black. Prolegs deep grassy-green, crotchets pink. Spiracles white thickly ringed in black, or the valves shaded grey with the aperture itself remaining white. Only the sparsest of very fine short hairs can be traced. Prothoracic and anal plates similar to those of *pyramidea*.

Plate VI: figs. 4, 5 and 6 all last instar, reared on oak from Dolgellau, Merionethshire, female. Drawn 4.v.70.

*Description of last instar larva, AMPHIPYRA PYRAMIDEA* L.

Length to 40 mm when extended, firm, solid, plump rings each wider than long, overall shape cylindrical with pronounced taper from the horn on ring 11; a fleshy, remarkably smooth-skinned larva with only the very sparsest of fine short hairs on the body visible under a strong lens, but strong bristles at the head and prolegs and anal claspers. Head and prothorax tucked into thorax when at rest. Larva commonly rests upside down with the head and thorax thrown back.

Prothoracic plate weakly chitinated pale yellow-green and crossed by boldly marked dorsal and subdorsal lines of white tinged with yellow. Anal plate soft pale green, crossed only by the dorsal line, one white tubercle to each side of it, three bristles at each side of the posterior edge. Mediodorsal line cream-white and thinner on the thorax, broad clear white and of uniform width on all other rings, broken at each intersegmental division, the edges a little ragged at the centre of each ring, the line continued to the very tip of the horn on ring 11 and narrowly on down the middle of the last ring to the anal flap. Subdorsals much interrupted and consisting of a tracery of little white dots and fine streaks that follow the pattern of a sinuous line that arches upwards at the centre of each ring

until ring 11 when it becomes an unbroken thick white stripe to the apex of the horn sweeping back as a much thinner line to the anterior edge of the anal plate. Spiracular line white, heavily tinged with yellow on the thorax, absent from the posterior half of the third thoracic and anterior half of the first abdominal, recommencing again after the spiracle of that ring and continuing unbroken except at the intersegmental divisions and right around the rim of the anal plate; the line is broadest on abdominal rings 3 to 6 and is tinged with yellow for the rest of its length; it is edged above by a narrow margin of dark green that shades away into the ground colour.

The caudal horn consists of a bluntly pointed raised conical cushion or pyramid surmounted by a tiny short pinnacle on the dorsum of ring 11, in colour the apex of the horn is greenish yellow in most individuals but in some it may be flushed orange but in none of the *pyramidea* reared by me was it deep red.

Spiracles white, oval, finely ringed in black, situated at the upper side of the spiracular band except for the larger last pair which are clear above it. All tubercles large, cream-white including the trapezoidals. Head greenish grey, smooth and shining, the labrum white and a white stripe down the side of each lobe. True legs pale green flecked with tiny dots of black or reddish black at the joints. Prolegs fleshy green, powerfully equipped with blackish crotchets. Beneath the larva is plain green with small white tubercles.

During the last instar there are two distinct colour forms of the larva, a commoner that has a most beautifully blue-white ground colour shaded yellow-green on the first two thoracic rings and also at the abdominal ring divisions, and suffused dark green laterally on ring 11; and the other form which is plain grass green throughout with no trace of blue-white although there are the usual changes in hue that vary with light and age in all green caterpillars. In both forms the white spiracular band contrasts prettily with the deep green colour adjoining it but I saw no example display the dark sharp upper edge that is such a feature of *berbera*.

It is indeed fortunate that it was this species—whose larva has the pyramidal horn and not *berbera* with its spike—that was first called *pyramidea*, but perhaps we should rather say how thankful we are today that Linnaeus knew his larvae as well as he did his moths!

In 1972 I reared 27 further larvae from eggs laid by a Tilford female and all agreed with the descriptions and points of distinction already noted. There were however two additional points that I had failed to record; these were:

1. the presence of an inverted white V on the front of the head
2. the deep yellow spiracular band on the second thoracic ring is finely edged above by a firm black line.

These were reared without loss on hornbeam.

Plate VI: figs. 1, 2 and 3 all last instar, reared on oak, from Tilford, Surrey, female. Drawn 2.v.70.

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*Schrankia taenialis* Hübn. (*albistrigalis* Haw.) White-line Snout

The first account of the early stages of this tiny noctuid was given by Prof. van Leeuwen who reared it from the egg in 1887 but who lost the larvae during the winter. I am unable to trace either the original publication of this work or the reference given by Barrett (1900, *Lep. Brit. Isles* 6:305) who says 'It is figured in the young state in the *Tidschrift [sic] voor Entomologie*, vol. 23, plate 7, and also described, under the name of *taenialis*'; the only reference in that volume is to *Botys taenialis* from Celebes and neither this insect nor *Schrankia taenialis* are illustrated on plate 7. Urbahn, *Stett. ent. Zeit.* 1932, 306-7, says Prof. Leeuwen figured ('abbildete') egg and larva but gives no reference. Prof. Leeuwen's work was fully quoted by Snellen in 1890, *Tijdschrift v. Ent.* 33:174-8, including Leeuwen's own figure numbers 6, 7, and 8, but no published reference was given either there or in the full list of references at the beginning of Snellen's work, and we must conclude that Leeuwen's account remained unpublished. This account of Leeuwen's, repeated by Snellen, remained the only one until Urbahn published his very full and well-illustrated paper *Zur Biologie von Hypenodes taenialis* Hb. in *Stett. ent. Zeit.* 1932, 93:305-9. Urbahn observed that moths laid very few eggs and that many larvae vanished after hatching. He reared his larvae on flowers of *Calluna vulgaris* (L.) Hull. and found they ate only completely fresh flowers and confirmed Leeuwen's earlier observation that the larvae appeared to need a moist atmosphere. No other account seems to have appeared and the wild foodplant remains unknown. The moth is rarely plentiful in any one locality, instead it is mostly found singly and in a variety of habitat that includes damp deciduous woodland (West Sussex), open moorland (Bodmin), as well as its better-known preference both in this country and abroad for pine woods or mixed woodlands with a ground flora of *Calluna* and *Vaccinium*. Another habitat is 'deep hollow lanes' as Barrett (*Lep. Brit. Isles*, 6:306) found in Pembrokeshire, and in a similar locality at Kingskerswell, South Devon, in 1970 Mr. Bernard Skinner encountered the moth in remarkable numbers during 16th to 19th July and he obtained several females but not many eggs, and some of these he gave to me; there was no *Erica* or *Calluna* or *Thymus* amongst the very comprehensive list made by Mr. Skinner of plants growing in the lane, but there were two species of large umbellifers that were common and Allan (*Larval Foodplants*, 1949) says flowers of Cow Parsnip are eaten by *taenialis* larvae in confinement.

Only 13 of these eggs hatched, all at the end of July, and the following is an account of the development of these larvae which produced moths from 6th to 12th September; I had many years ago reared the larva of *S. costaestrigalis* Steph. on lettuce and I welcomed the chance to give *taenialis* the same food. The newly hatched larva is glossy pinkish grey flushed warmer red, grey on the last three rings, the head dark brown, long curved black bristles arise one from each large black tubercle; true legs dark brown, only two pairs of prolegs borne on very narrow and constricted rings and the anal claspers. The eggshell was not eaten. As feeding progressed the body grew darker and the skin more glistening. The larvae liked to hide inside cut lettuce stems and within the bells of *Erica*; they nibbled the lettuce, ate holes in the *Erica* flowers and shredded the stamens and flowers of *Thymus*. The larvae were constantly but slowly on the move. The first moult was passed on 2nd August, the larvae now dusky olive becoming chocolate brown as they grew and the bristles tiny and short. The second moult, 8th August, colour pale grey-ochreous, skin opaque, head grey-brown, spiracles black, a tiny dark-grey triangular anal plate, the prothoracic plate narrow, black streaked with grey, the larva with pronounced fleshy lateral cushions; larvae ate

freely the blanched lower parts of lettuce leaf including the juicy midrib, they disliked exposure and hid within their food. *Third moult*, 12th August, the lateral dorsal warts now evident and traces of maroon shading arranged in a broken band low down on the first four abdominal rings with other maroon flecks around the fleshy lateral cushions higher upon the sides, head more rounded and dark brown. At this stage larvae were offered sliced runner beans of which they ate both the juicy pod and immature beans. *Fourth moult*, 16th August, larvae now fed rapidly on cut runner beans, eating especially the actual beans themselves, also lettuce leaves and particularly their succulent midribs. Surprisingly large quantities of squashy red and green frass were passed and the larvae clearly preferred fresh food to stale or decayed. Frass would become piled as a larva fed without moving, sometimes a larva would pass a globule of greenish fluid, and a moist environment appeared to be necessary for their successful development. As in earlier instars larvae liked to hide away upside down with the body humped so that the head and thorax were pressed tight against the prolegs. *Cocoons* were spun, 23rd–24th August, and pupation took place about two days later. *Moths* emerged 6th–12th September.

*Cocoon*. The cocoon, which is well illustrated by Urbahn, is a delicate and ingenious structure and an account of its construction may be of interest. A site was chosen about an inch above the soil on a support from which the completed cocoon could freely hang, a twig or old grass stalk suiting very well. The larva first fashioned a tiny but very firm pad of silk on the underside of its support and from this a short stalk or tie of closely spun silk threads expanding into a broad, roughly square, sheet of silk; into this sheet were stuck fragments of soil and particles of plant debris, and this task the larva accomplished by reaching down from a firm grip with the anal claspers and picking up each fragment with the first pair of thoracic legs and finally securing it in place with the mandibles. A larva might examine each particle in turn before selecting the piece it found suitable, and it might drop the same piece repeatedly before getting it into position; it might also return a number of times to the same fragment which could not easily be freed until it could finally be lifted. When the silken sheet was completely bedecked with these particles the larva folded the curtain around itself and secured the seam so that the lower end of the shroud was rounded to a blunt point while the other tapered to its point of attachment, and a broadly spindle-shaped structure resulted. Urbahn remarked that some of his larvae attempted to occupy the same sheet during the construction of cocoons with the result that imperfect cocoons were made from which pupae later fell out; I had one such instance where a larva on opposite sides of the same sheet each tugged in turn in an attempt to wrest the sheet from the other, and although one larva eventually walked away the other was so delayed in its pupation that neither produced a moth. The healthy pupa itself was placed upright and the moth escaped through a rent in the cocoon wall immediately below the short stalk, the moth climbing a short distance from the cocoon before expanding its wings. Of eight cocoons six were pendant and two were attached along one side.

*Pupa* (text figure 1 overleaf). The description given by Urbahn is very brief and as no other is recorded I take this opportunity to describe it fully; Urbahn illustrates the pupa (also the egg, fully grown larva and cocoon) Taf I *Stett. ent. Zeit.*, 1932.

Length 7.5 mm, width (across thorax) 1.75 mm.

Long and slender, of uniform width from the flattened prothorax to the fifth abdominal ring, remaining rings tapering to the bluntly pointed last ring. Tips of

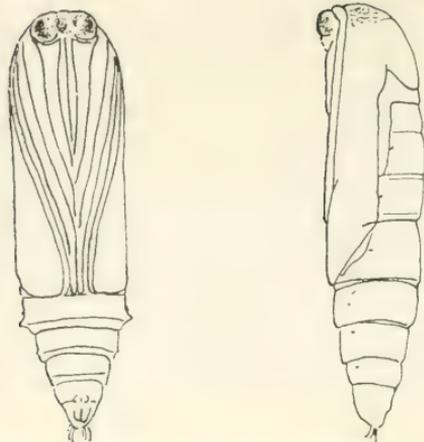


Fig. 1. Pupa of *Schrankia taenialis* Hüb., lateral and ventral aspects.

wing cases join with antennae and legs to cover ventrally all of the fourth abdominal ring and this reaches two-thirds of the total body length. Each of the abdominal rings 4-6 is narrowly flanged posteriorly and on the fifth this is produced at each side adjacent to the spiracle into a pointed prominence. Abdominal rings 5 and 6 are free. The pupa is flattened ventrally but rounded dorsally, and the eye cases are raised forward. The cremaster consists of a pair of groups each of about five hooked bristles, set with a small gap between them and placed at the dorsal side of the last ring, which declines abruptly from the ventral surface to it. Spiracles round, orange-brown, placed high on the sides of abdominal rings 5-8, but tight to the wing margins on other rings. The cuticle is smooth and shining but soft and translucent, being a light golden orange colour with the wings, appendages, ring divisions and suture lines being very finely etched in dark brown. The eyes and frontoclypeus are darker chestnut brown. Seen from the venter the pupa appears pale yellow-orange with dark eyes and three dark intersegmental divisions below the wings.

#### *Description of last (fifth) instar larva*

Length when fully extended 12 mm but the larva is rarely seen in this position as it spends much of its life humped, and when disturbed or exposed to bright light it pulls its head and thorax tight to the prolegs so swelling taut the already fat abdominal rings. The structure of the body rings is most remarkable and (along with *S. costaeatrigalis* Steph. and possibly *Tholomiges turfosalis* Wocke) quite different from any other genus of British noctuid larva or indeed any other British family of Lepidoptera. The thorax is broadly cylindrical with each ring composed of subsegments by deep folding of the skin. The first four abdominal rings are much swollen, the first of these is larger than the second, the third is larger than the first, while the fourth is so grossly enlarged as to be largest of all. The remaining rings are narrowly transverse, being about twice as broad as long. Each ring is developed laterally into fleshy cushions and bosses, the third and fourth abdominal rings being especially remarkable for their distended obesity both ventrally and dorsally.

Head globular, flattened in front, weakly lobed, ochrous brown flecked with darker brown and bearing sparse pale bristles. True legs dark brown, prolegs two pairs only, borne on the sixth and seventh abdominal rings, and these two rings

so truncated as to appear one and together no longer than the preceding ring. Prolegs and anal claspers small, pale grey, equipped with surprisingly large ginger-coloured crotchets. Prothoracic plate weakly chitinised, of same colour as the body but margined posteriorly with a clear fine jet-black streak to each side of the median centre and with a row of tiny black tubercles along its anterior edge. Anal plate weakly chitinised, pale grey, with an irregular pattern of tiny black dots scattered around its entire edge. Trapezoidal and other warts on dorsum and lateral surfaces appear as tiny brown rings supporting a minute pale bristle except on the thorax where they are conspicuously black. There are no stripes or regular ornamentation. The larva is unicolorous, some shade of ochrous muddy brown weakly mottled with purplish pink and becoming more generally purplish at full growth. To the naked eye the larva has a dull plain appearance, relieved only by the darker intersegmental divisions and darker banding of the third thoracic and fifth abdominal rings.

Plate VII: fig. 1 newly hatched larva 29.vii.70  
 fig. 2 third instar 10.viii.70  
 fig. 3 fourth instar 15.viii.70  
 figs. 4-6 last instar 21.viii.70

reared *ab ovis* ex female Kingskerswell, S. Devon, from B. Skinner, on lettuce and sliced runner beans.

*Gortyna borelii* Pierret Fisher's Estuarine Moth

This most recently recognised British noctuid received its press notice only in 1970 (*Ent. Rec.*, 83:51), the moth having been taken by Mr. J. B. Fisher in Essex in 1968 and 1970. Mr. J. M. Chalmers-Hunt is to be congratulated in being so quickly off the mark the following summer in discovering the fully fed larva and also a pupa in roots of *Peucedanum officinale* L. which is the well-known food of the species on the Continent. Mr. B. Skinner equally deserves our thanks for his own work in locating the pupa and I am much indebted to him for allowing me to make use of his unpublished field notes.

Chalmers-Hunt found the larva fed at ground level and for as far as twelve inches below ground, tunnelling out burrows in the heavy rootstock and ejecting piles of frass at the surface of the soil, the frass becoming conspicuously bleached when old and dry. The plants showed distinct signs of wilt. One larva was found in the act of pupating on 1.viii.71. Mr. Skinner when searching for the pupa also noticed that sickly looking plants gave the first clue and that confirmation came from a friable crust of blanched frass at ground level at the root crown. The pile of frass varied from 7 to 20 cm in diameter and reached as high as 5 cm, and took the appearance of an inverted saucer or shallow dish. No pupa was found under older, drier frass and it appeared that a larva might shift from one plant to another. Within tenanted plants a pupal shaft extended from below the frass crust vertically down into the solid root, in situations where the frass was thicker the shaft extended up through it also. The pupa was placed head upright within the solid root without any obvious sign of silk or cocoon, and in order to be extracted it had to be carved out with great care, removing the root sliver by sliver. Whereas the pupal chamber was an average of 2-4 cm below ground level, in one instance it was 10 cm deep. Only one pupa was contained in each root although the rootstocks were clearly large enough to support more than one larva.

Moths of the genus *Gortyna* are separated from those of *Hydraecia* principally on the presence of a projection from the frons, but the early stages of the insects

of both genera are also very similar, and the larger species of *Hydraecia*—*petasitis* Doubl., *hucherardi* Mab. and *micacea* Esp. as well as *Rhizedra lutosa* Hübn.—all have little to distinguish them from *Gortyna*. *Gortyna* larvae do bear heavier developed tubercular chitin patches, however, and whereas the beaked pupa of *Gortyna* is formed within the host plant, the round-headed pupae of *Hydraecia* and *Rhizedra* lie in a weakly pressed-out earthen cell in the soil outside the foodplant.

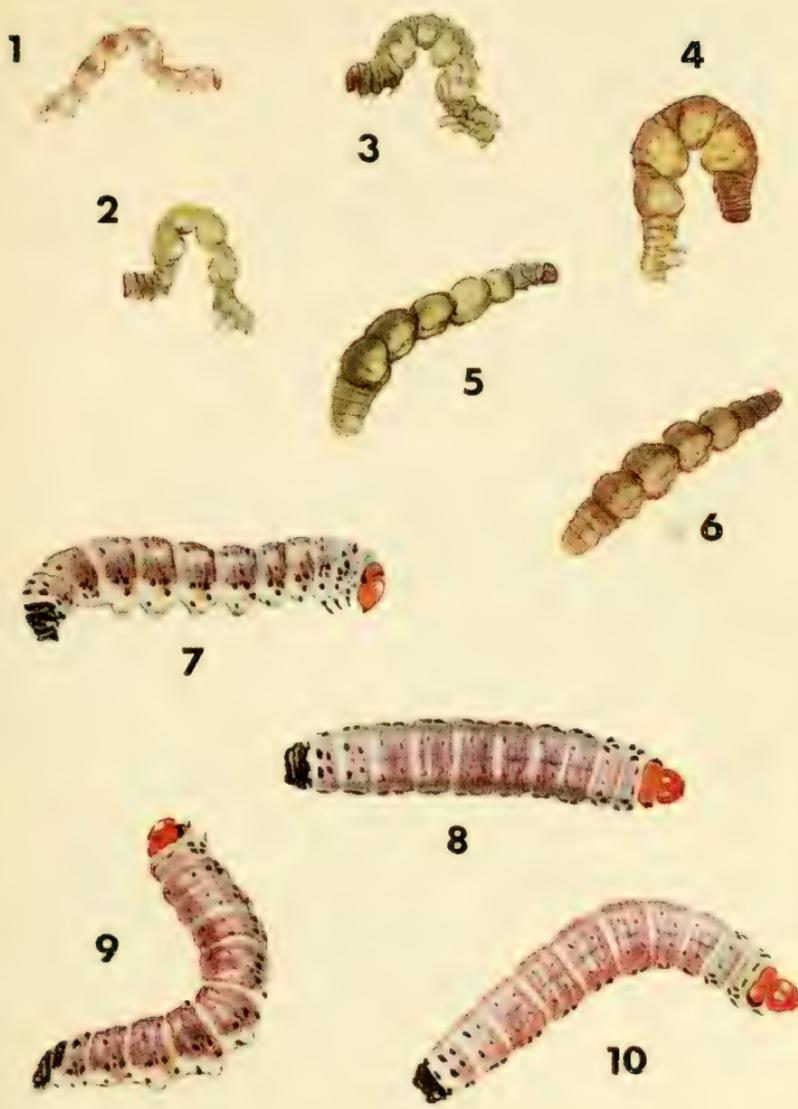
Mr. Chalmers-Hunt kindly sent me three empty pupa cases and I was surprised to see how closely they compared with those of *Hydraecia hucherardi* Mab. rather than with *Gortyna flavago* Schiff. In shape, cuticle and spiracles I found these cases to be very like *hucherardi* and the cremaster was especially similar in having a central pair of strong straight spines that are flanked by a slighter pair in front and with another small pair placed well to the rear and further back. The cremaster of *Gortyna flavago* consists solely of one pair of large widely splayed spines. From these dehisced cases I could not make out any frontal beak but Mr. Skinner confirms that a small projection is present as it is in *G. flavago*. In fact it so happened that Mr. Skinner had pupae of both *flavago* and *borelii* at the same time and was able to observe how very similar in overall appearance the two pupae were, but both more slender than *mydraecia*.

Mr. Skinner found that the empty pupa case of *borelii* remained within the root. The pupal beak does not appear to be used to aid the moth to escape, instead it simply accommodates the frons projection of the moth within. This curious structure is found also in *Nonagria*, whose pupae are also formed within the host plant, and would seem to indicate in *Gortyna* an evolutionary relic persisting from what were essentially insects of aquatic habitat and now transitional to *Hydraecia* and *Rhizedra* whose species pass the pupal stage in the soil.

#### *Description of the fully grown last instar larva*

Length 50 mm. Rings cylindrical, slightly flattened dorsally, broader than long, the second and third thoracic rings broader than the following abdominals, being swollen laterally, the body with marked taper at the seventh abdominal ring. The skin very smooth, dully shining, weak transverse quilting laterally across the abdomen, the thorax much wrinkled transversely.

Ground colour dull waxy cream but heavily overlain with smoky purple inclined to grey on the dorsum of each abdominal ring, this colour extending to envelop the patch of lateral warts; the posterior edge of every abdominal ring remains pale in stark contrast to the purple band of its own ring and the darker anterior edge of the following ring. The second and third rings of the thorax are weakly suffused with pinky grey across the dorsum. The dilating dorsal vessel shows clearly on abdominal rings 1–7. Strongly chitinised black warts and heavily armoured plates are the only other ornamentation of the body; the dorsal trapezoidal warts are small and oval, bolder on the first two abdominal rings and strong again on the seventh, and very heavily developed on the eighth. On the second thoracic there are a pair of chitinous black transverse streaks flanked by a group of four large warts, the largest of which are triangular in outline, and there is a similar set of warts on the third thoracic but the dorsal streaks are absent. Each spiracle is set within a group of three large black warts and one tiny wart. The spiracles are narrowly oval and jet black. There is a large black wart low down laterally, which is especially conspicuous above each true leg. Each wart supports a fine short hair. Prolegs cream, short and fleshy, well able to grip and climb, banded in dark brown. Thoracic legs deep shining black except the last joint which is reddish black. Prothoracic plate bright reddish brown, semi-



1-6 *Schrankia taenialis* Hubn. (1—newly hatched, 2—third instar, 3—fourth instar, 4-6—last instar); 7-10 *Gortyna borelii* Pierret, last instar.



circular, shining, edged laterally with a heavy black border, the plate marked by a pale dorsal line. Anal plate black, massive, heavily burnished, covering the whole of the dorsum of its ring, the preceding ring also largely covered by a black heavily chitinised band. Anal claspers very short, squat, soft grey, being no more than a fleshy extension of the black rim of the anal plate. Head smooth and shining, globular with well-differentiated epicranial suture, coloured bright gingered with darker mouthparts.

Plate VII: figures 7 to 10, all last instar, collected by J. M. Chalmers-Hunt in Essex on I.viii.71 feeding in root of *Peucedanum officinale* L. Drawn 5.viii.71.

## EASTERN IMMIGRANTS AND RESIDENT NATIVES: A SURVEY OF SOME BRITISH LEPIDOPTERA

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

More efficient trapping and recording of Lepidoptera during the past 20 years has led to the recognition of more species as immigrants to the British Isles, and also permits some classification of them according to the directions from which they mainly come to us. Immigrants from northern and central Europe have so far attracted less attention than the more spectacular arrivals from the south and west, probably from the Mediterranean basin, the Azores, or even across the Atlantic. There are, however, some 20 species which come to us mainly from the north-east; and among these are half a dozen of special interest because they are also permanently resident in Britain in forms which more or less easily distinguish them from the immigrants. These species are the main concern of this article. They are *Eurois occulta* L. (Great Brocade), *Enargia paleacea* Esp. (Angle-striped Sallow), *Lithomoia solidaginis* Hübn. (Golden-rod Brindle), *Plusia interrogatoris* L. (Scarce Silver Y), *Itame brunneata* Thunberg (Rannoch Looper). To these should probably be added the pyrale which was for long known as *Dioryctria splendidella* H-S., but which is now thought to be con-specific with our native *D. abietella* D. & S. (Shaffer, 1966). Insects of the 'splendidella' type certainly come as immigrants from the east, but there are not yet enough reliable records to make detailed study possible. There are also immigrants from the north and east which are outwardly indistinguishable from residents but which may have a very different genetic make-up. It has, for instance, been recorded (Harper, 1968, 1969, 1970) that immigrant *Pieris brassicae* L. and *P. rapae* L. come up the Spey Valley in Inverness-shire from the north-east in July, between the broods of those which come from south Scotland or England; and he has proved by breeding that the former are rigidly single-brooded. Probably neither of these species is permanently resident in Speyside.

Recognition that these species are sometimes immigrant to Britain (and, in the case of *E. occulta*, also to Ireland) is relatively recent. Barrett (1897/1901) and South in the first edition (1907) drew attention to casual occurrences of most of them far outside their main habitats, but nowhere hinted at immigration as the cause. Even the last revised edition of South (1961) does so only in the case of *L. solidaginis*, though it adds rather inadequately to the original notes of occurrences in unexpected places. Capt. Dannreuther's collection and publication of annual migration records from the 'thirties onwards, and their continuation from 1952 by R. A. French, marked the beginning of systematic study of the

immigration of Lepidoptera to the British Isles, but for a long time they made little reference to these species. In 1938 some interest in *P. interrogationis* was aroused by a note in the *Entomologist* on its occurrence as an immigrant in Denmark (Bager, 1938). Probably as a result of this, accounts of it in Scotland and Northern Ireland were included in the migration records for 1939; but in retrospect it is clear that these referred to residents in their usual distribution areas. The migration records made no further reference to this species until they noted its invasion of southern England in 1955, along with that of *I. brunneata*, which had been first mentioned in 1946 and 1947. *L. solidaginis* was first included in 1954, and *E. paleacea* in 1956. For *E. occulta* collectors in the 'thirties were already referring (inaccurately) to the 'dark Scottish' and 'pale English' forms, but without suggesting that the 'pale' forms might be immigrants. The first explicit published suggestion of this which I have seen came from Baron de Worms: it was prompted by the capture of single specimens by himself at Horsell and by J. P. Purefoy at Esher, Surrey, on the same night of 14th/15th August (de Worms, 1945). These records were picked up in the migration records for 1945, and there was a further reference in 1948 to captures in Kent. There were no further mentions until the big invasion of 1955, though several records of unusual occurrences of *E. occulta* were published otherwise during the intervening years, and many moths were seen in 1954. It was in fact the largely simultaneous occurrence of all these species, except *E. paleacea*, in southern England in 1954 and 1955 which aroused wider interest in them as probable migrants.

Beirne in his *Origin and History of the British Macrolepidoptera* (1947) not only omitted all these species from a long list of 'suspected migrants' (pp.279/280), but for some of them built elaborate theories of their origin in the British Isles upon the assumption that the casual records marked out their ranges as resident species. Thus his map of the distribution of *E. occulta* gave it a resident territory which covered the whole of Scotland, all England north-east of a line from Lancashire to London, and also two small patches in northern Ireland, from each of which there were, and still are, only single examples known. From this distribution he argued that the species was a second glacial phase arrival in the British Isles, and that it 'obviously must have had a wider distribution in Ireland at some time in the past than it does now'. In the case of *I. brunneata*, after noting its existence in the pine forests of the Scottish Highlands, he postulated a separate 'Doggerland' race, surviving in the East Anglian Fenlands and allegedly feeding on *Salix* instead of bilberry, to account for the scattered records in the south. (Most of these are not, in fact, near the Fens.) For the other species he ignored altogether the southern records, of which, indeed, few were available at the time he wrote.

Nine years later E. B. Ford (1955) fully accepted the paler specimens of *E. occulta* as immigrants and suggested that they came from Belgium and Scandinavia. Of *I. brunneata*, he said that its distribution was rather mysterious. He regarded as just possible Beirne's idea that the English specimens represent relict colonies of an ancient race, but he concluded that 'it is far more likely that these southern specimens are descendants of recent immigrants': *not*, be it noted, that they are immigrants themselves. For the other three species he made no reference to immigration or recent establishment, but he cited the rosy colour of the Irish race of *P. interrogationis* as an example of the effects of prolonged isolation. As late as 1958 C. B. Williams (*Insect Migration*) did not discuss any of these species or include them in his list of 22 moths (other than sphinges) which he regards as definite migrants to Britain. They, may, however, have been within his larger total of 150 'suspected migrants' which he does not

detail. He comments pertinently: 'the fact that I can only mention 22 certain migrants out of a total of 150 suspects is an indication of the lack of knowledge that we have even in this well-studied group of insects'.

The evidence that these species are in fact immigrants to Britain, as well as permanent residents in it, is necessarily circumstantial, since the actual arrival of nocturnal moths on our shores can hardly ever be directly observed, as sometimes happens in the case of butterflies. The weight of the evidence depends upon the culmination of a number of indications, both positive and negative, none of which, taken alone, would be decisive. The main indications are irregularity of appearance, usually though not always far from their known centres of regular occurrence; sudden and nearly simultaneous appearance, sometimes of more than one species, in these widely separated places; the absence or great rarity of records of larvae from them; and the superficial differences which are often clear enough to separate them from the residents and to show that they are migrants from abroad, rather than internally, as has sometimes been suggested.

That these species come from northern or central Europe, rather than from the south-west, is indicated in the first place by the grouping of the records of them in the British Isles. Though these are widely spread, and not identical for all the species considered, their main weight is easterly and northerly. This is brought out clearly by the table overleaf, in which their regional distribution is compared with that of three typically south-western immigrant species, *Rhodometra saccharia* L. (Vestal), *Heliothis peltigera* Schiff. (Bordered Straw), and *Palpita unionalis* Hübn. (Scarce Olive-tree Pearl).

Information about the distribution and racial forms on the Continent of the species which we are considering also points to northern or central European origins for the immigrants, though such information is surprisingly difficult to assemble in adequate detail. Finally, meteorological evidence can be very helpful, both by defining the dates on which the prevailing winds would have made the arrival of immigrants from a given direction possible, and by providing a basis for 'back-tracking' them to probable departure points. This technique has been worked out by Mr. R. A. French and Mr. G. W. Hurst and was applied to migrant arrivals from the south-west after the famous dust-storm of early July 1968 (Hurst, 1969; French and Hurst, 1969; Shaw and Hurst, 1969). Mr. Hurst has very kindly allowed me to see and make use of two earlier papers which deal on the same lines with immigrations during 1964 and with the arrivals of *E. occulta* in the British Isles from 1955 to 1964.

The use of meteorological data and the 'back-tracking' technique has, however, some difficulties and limitations. First, there is often irritating doubt about the precise dating of the records concerned. Some recorders bulk their records over several days, especially when a species is numerous. Most probably date their light-trap records from the day before the night of capture, but some quote the date of the following morning, when they have cleared their traps. Relatively few report precisely 'night of xth/yth', and only occasionally can the actual hour of entry to the trap or of other means of capture be given. There may therefore be an uncertainty of up to about 30 hours about the exact time of many records. This can clearly be critical for any assessment of the meteorological possibilities or for the reliability of a 'back-track'. Second, the time of capture does not in any case necessarily coincide with the arrival of the immigrant in Britain, still less in the place of capture; it may have arrived some days before and then moved about. When large numbers arrive suddenly and simultaneously in several places, it is reasonable to regard them as new arrivals; but those recorded on later nights there or elsewhere may be either survivors of these or a fresh wave of

TABLE I

*Distribution of Records of Probable Immigrants by Regions, 1945-1970*

Region	<i>Heliothis peltigera</i> L.	<i>Rhodometra sacrararia</i> L.	<i>Palpita unionalis</i>	<i>Eurois occulta</i>	<i>Enargia paleacea</i>	<i>Lithomoia solidaginis</i>	<i>Plusia interrog.</i>	<i>Itame brunneata</i>
S. W. England	207	249	192	6	1	—	—	—
South England	78	284	179	26	25	6	7	8
East Anglia	17	18	69	68	10	6	13	10
Midlands	13	37	7	18	3	7	2	10
Wales	10	16	7	2	1	—	1	—
N. England & S. Scotland	9	5	1	242	4	3	2	12
N. Scotland & Isles	1	12	12	115	1	—	8	—
Ireland & Man	10	108	6	8	—	—	—	—
Totals	345	729	473	485	45	22	33	40

The numbers for *H. peltigera*, *R. sacrararia*, and *Palpita unionalis* have been taken from Migration Records for 1945 to 1967, except that those for *R. sacrararia* in 1947 have been excluded because in that, 'the great Vestal Year', extensive local breeding distorted the records of immigrants. The numbers for the other species come from the annexes to this paper; for *I. brunneata* pre-1945 records are included.

The regions are constituted thus: S. W. England: Cornwall, Devon, Somerset, Dorset; South England: remaining counties south of the Thames, with London; East Anglia: Essex, Suffolk, Norfolk, Cambs., Lines.; Midlands: remaining English counties south of Humber and Mersey; N. England & S. Scotland: Lanes. and Yorks. north to Clyde and Forth; N. Scotland with all Scottish islands; Wales; Ireland and the Isle of Man. It should be remembered that there were certainly many more regular recorders in South England than in other regions.

immigrants. The meteorological evidence may help here by suggesting dates after which further arrivals would be unlikely or impossible. The period of survival after immigration probably differs widely between species, depending not only on their natural life-spans, but also on the age of individuals at the time of arrival. The condition of apparently newly arrived *E. occulta* certainly ranges from very fresh to very worn, and some females are virgin at the time of capture while others lay fertile eggs. Consideration of the total pattern of the records of the species discussed here suggests that the survival period is fairly short—probably a maximum of a fortnight for *E. occulta*, 15 or, more probably, only ten, days for *E. paleacea*, about a week for *L. solidaginis*, *P. interrogationis* and *I. brunneata*. The timing and placing of the records also give the impression that with these species (unlike some other migrants) there is not much further movement after arrival. It looks as if individuals or groups drop out of the wind currents nearly simultaneously over a very wide area, but then 'stay put', perhaps because they are hungry or exhausted. There is very little indication that they are recorded first in the east and only gradually later towards the west, or first on the coast and later inland.

The meteorological 'back-tracks' which I have seen have been made in this group of species only for the invasions of *E. occulta* from 1955 to 1964. They all point to Norway, from the region of Alesund or Bergen southwards, as the

probable starting points, the centre of impact in Britain being determined by the degree of east in generally northerly air-streams. The spread of the immigrants would thus be more or less east to west in Scotland and northern England, but more from north-east to south-west in those cases where they reached southern England. This fits fairly well with the actual distribution of the records of *E. occulta*, but does not agree with the much more southerly grouping of the records of *E. paleacea* and *P. interrogationis*, which in some years came with it, apparently in the same air-streams. One of the points which requires further investigation is the extent to which the immigrants may deviate, purposefully or otherwise, by their own flight from the direction of the winds which give them most of their velocity. If the wind-speeds were of the order of 20 m.p.h., as seems to be assumed, strong-flying noctuids such as these could probably diverge considerably from the direct line of the air-stream during flights which, as implied by the back-tracks, covered between 400 and 800 miles and lasted for between 24 and 48 hours. This duration itself contains the surprising implication that normally entirely nocturnal moths such as *E. occulta* and *E. paleacea* do, when migrating, continue to fly in daylight. The conclusion that they do so is, however, unavoidable, since they could not cross even the narrower parts of the North Sea within a single summer night except with the help of winds of much greater speeds than those actually recorded around the relevant dates. Nevertheless, the 'back-tracking' technique seems to require more refinement before it can be accepted as the sole guide to the origins of our immigrants, whether they come from northern and central Europe or from further south.

It is, however, clear that a necessary condition for the arrival of these species in the British Isles is the occurrence of north-easterly air-streams during July and August—probably more northerly for *E. occulta*, more easterly for the other species. The prevalence and timing of these winds vary from year to year, though they are usually present in some degree. It does not follow, however, that migrations take place whenever they occur. Probably immigrant *E. occulta* have been reported somewhere in the British Isles in almost every year since 1945, but in large numbers only in 1948, 1954, 1955, 1960 and 1964; *E. paleacea*, *P. interrogationis* and *I. brunneata* in eleven to eight years each, not all the same ones; while for *L. solidaginis* the influx of 1954 is, as far as the records go, unique. The details of their distribution, and that of the resident forms, are discussed below. It is noteworthy that, though northerly and easterly winds were very prevalent in 1969 and 1970, very few immigrants of these species were recorded. We know nothing about how these migrations were triggered off in their countries of origin. Much detailed information about variations in abundance, local migrations, weather conditions, on the other side of the North Sea, would be needed to throw light on this. Collection of this and its collation with fuller information about arrivals in Britain, and with the meteorological data, could be an enlightening project for international research.

#### EUROIS OCCULTA L.

This insect has a very wide, circumpolar, distribution. In North America it is found as far south as Colorado, and throughout most of Canada. In Scandinavia, Denmark, Holland and the north German plain it is widespread at low levels, but further south, in central Germany, the Rhineland, eastern Belgium, France and Austria, it is mainly a hill and mountain insect, and it is found widely in the Alps as high as 2,000 m. It is extremely variable in colour and markings. Bergmann (1954) 4(1):203-211, illustrates variable series from Thuringia; he says that usually the mountain forms, as from the Harz, are darker than those from

the foothills, and still more so than the light grey insects found in north Germany; but he adds that breeding gives different forms from the same parent, so that clear-cut races cannot there be distinguished.

In Britain the classical home of native *E. occulta* is the wooded shore of Loch Rannoch in Perthshire, where it was discovered early in the last century. A majority of the specimens which I have seen in collections come from this area. In their commonest form they have a dark, blackish ground colour, which obscures the claviform stigma and throws into prominence the white inner and outer cross-lines. These features usually separate them at a glance from the probable immigrants taken sporadically in England and elsewhere in Scotland. Both races are, however, variable, and there can be difficulty in allocating some single specimens. But those Rannoch specimens with a lighter ground colour have a brighter and more contrasting appearance than the immigrants, while the darkest of the latter have a duller, more leaden colouration, and usually show a dark outline to the claviform stigma. There are excellent colour photographs of both forms in the 1st edition of *South* (plate 117), which are there identified with 'the typical grey form' and 'the black var. *passetii* Thierry-Mieg.', with a note that some specimens are paler than the type. Unfortunately the corresponding coloured drawings in the revised edition of 1961 are less helpful. Ford (*Moths*, plate XX) gives excellent black-and-white figures, but the origin data attached to them have been accidentally reversed, the dark specimen being ascribed to Essex and the pale to Rannoch, contrary to what is said in the text (p. 80).

The usual time of emergence of the native form is early to mid-July; examples may still be found well into August, but these are usually worn. This flight period is appreciably earlier than the usual dates for the pale, immigrant form, though certainly in some years there is an overlap. Wild larvae are most usually collected from bog myrtle (*Myrica gale* L.) in the spring, after hibernation, but they probably eat dock, dandelion and other low plants in their earlier instars, and have also been found on bilberry, willow and even birch after hibernation. In the wild the species is apparently rigidly single-brooded, but some larvae obtained from captured females, both native and immigrant, can be forced indoors and will produce moths during the winter.

Because collectors concentrated for so long upon Rannoch, the limits of distribution of the native form are hard to discover. Southwards, I have seen examples of it from Flanders Moss in Stirlingshire, and westwards from Port Appin and Barcaldine on the Argyllshire coast, from Arisaig in Inverness-shire, and from Glen Shiel in Wester Ross. East and north of Rannoch, all those which I have seen from Glen Garry are of the native form, but beyond the watershed between Garry and Spey there are complications. At Dalwhinnie, Richardson (1949) in early August 1948—a year in which there was clearly a large immigration—saw two or three grey insects at sugar among about 20 black ones. Further down the Spey Valley, at Newtonmore, Commander G. W. Harper, who has recorded regularly since 1952, tells me that the black form is locally abundant, but that he gets at least one or two of the pale form in his trap in most years; they come always in August or later, whereas the dark moths are seldom seen after July. Pale insects have also been taken occasionally at Aviemore, but all those which I have seen which have been bred from larvae found there are dark. Further still to the north-east, on the Culbin Sands in Morayshire, Richardson on three nights in mid-August 1948 saw 40 *E. occulta* at sugar, all of which were pale; and other records from there refer to pale insects. Probably the native race does not extend in this direction beyond the edge of the mountains. I have seen no account of any form of *E. occulta* in Aberdeenshire. It seems, therefore, that

the native, black, form is confined to an area about 100 miles square in the central and western Highlands; within this it is widespread and locally abundant wherever there are suitable bogs with a good growth of bog myrtle. There is no indication that it has any migratory tendencies.

In the middle and upper Spey Valley there is an interesting situation in that the 'immigrant' form is found alongside the 'native' form frequently and in some numbers. It is possible that the 'immigrant' form is permanently or temporarily established there, though the absence of any pale specimens bred from wild larvae tells against this. Admixture of the two forms is another possibility. Cross-breeding must be hindered by the difference of timing, but would not be totally prevented thereby in some years, such as 1955, when the immigrants began to arrive at the end of July. If cross-pairings do take place, and if the offspring are viable, the result could probably be recognised: but no account of a mixed family is on record. Here is a piece of desirable local research waiting to be done.

*E. occulta* has been found in many Scottish islands. In Arran, Canna, Rhum, Skye, Benbecula and Orkney the timing and circumstances of the captures show that the insects were immigrants from abroad. In Shetland the position is obscure. The species was first found there in 1880; and Jenner Weir (1880), who described these captures, remarked: 'It is singular that the specimens are quite as light in colour as the usual southern type, none being like those taken in Scotland.' But in 1884, in a note on the Lepidoptera of the northernmost island, Unst, he said: 'They are somewhat intermediate in colour between northern and southern specimens.' In 1896 King, Bright and Reid said of the only one they caught on Unst that it was light, in strong contrast to the Rannoch form; and Hare reported four, all of the grey form, at sugar there in July 1932. Richardson tells me (*in lit.*) that some of his very fresh specimens caught on Unst in 1950, though pale, have notably prominent bars in the band outside the median area, a character which he has not seen elsewhere; and Kettlewell & Cadbury (1963) speak of all their captures in 1961, both on Unst and elsewhere in Shetland, as being 'of the Scandinavian dark grey form'. It seems that the Shetland *E. occulta*, though they have nothing to do with the Rannoch form, are more mixed and variable than most immigrants. There remains a question whether they are immigrants, natives, or both. As regards regularity of appearance, South (1893), commenting on McArthur's frequent collecting there from 1880 to 1892, says 'always rare; as a rule only two or three each season'; but in later years it has been taken only irregularly, and some collectors have failed to find it. Kettlewell and Cadbury noted that in four expeditions to Shetland in 1959 to 1962 they saw it only irregularly in August: in 1961 they had both it and *Plusia interrogationis* (not previously known from Shetland) together in their traps on two nights, but they saw neither in 1962. They concluded that 'it seems feasible to suppose that (both) occur in Shetland as migrants, and that they both come from the same region in northern Europe, probably Scandinavia'. Since Shetland is some 160 miles north-east of the Scottish mainland, immigrants to it could well have a special origin. This could explain the different appearance of some of the Shetland specimens of *E. occulta*. Alternatively, some may belong to a local resident race, as is suggested by the July dates for some of them, while, as in Speyside, others are immigrants. On present evidence, the question remains open.

Records of probably immigrant *E. occulta* in the British Isles are far more numerous than those of the other species considered. Over 480 individuals have been traced in the period 1945-70, from over 80 localities; and, without exhaustive

search, over 100 have been noted for earlier years. Since 1945 probably immigrants have been noted somewhere in every year except 1957, though in 1950 only in Shetland and in 1953 only in Ireland. Absence of records does not necessarily mean that the species was completely absent, especially in the early years when recorders were fewer and were not yet using mercury-vapour light traps; but it probably does indicate that it was not numerous or widespread. In only five years have the recorded numbers exceeded twenty: 1948 (c. 50), 1954 (c. 60), 1955 (c. 115), 1960 (c. 40), 1964 (c. 130); and most other years show only less than ten. For the period as a whole the coverage was very wide: 29 counties in England, two in Wales, five in Scotland besides the islands, and also the Isle of Man and three counties in Ireland. But the main concentrations have been markedly in northern Scotland, in Cumberland, Westmorland, Yorkshire and Berwickshire, and in Lincolnshire, Essex and Kent to the south-east. As will be shown later, however, the pattern did differ considerably between the five big years. Since there are certainly fewer recorders in Scotland and northern England than in the south, the actual concentration of immigrant *E. occulta* there must be considerably understated. For instance, in Kent the ten records, all of single specimens, come from six different places, whereas in Cumberland about 100 *E. occulta* were reported from the same number of places, with individual concentrations of up to 30.

Immigrant *E. occulta* show very markedly the feature of sudden and nearly simultaneous appearance over wide areas. This was very clear in the largest and best-reported influx, in 1964. Apart from a single specimen at Leek, Staffs, on 3rd July, which was possibly not an immigrant, this began with single records in Dorset and Yorkshire on 12th August and two more, in north Lancashire and again in Yorkshire, on 13th. The 15th provided over 30, of which 17 were in Cumberland, and the 16th added as many more, of which one was in Co. Clare. Thereafter the numbers tailed off sharply to seven on 17th, five on 18th, and four singles until 27th. This was clearly a single wave of immigrants which reached the British Isles on a wide front and in depth from 12th to 15th or 16th August. Records after then probably represent survivors of these arrivals, most of them in places where the species had already occurred. The timing, though not the main distribution, coincided with that of much smaller influxes of *E. paleacea* and *P. interrogationis*.

The migrations of 1954 and 1960 showed a similar concentration of timing. In 1954, of 60 individuals, all which can be closely dated, except two in Essex on 23rd and 24th July, were reported between 22nd August and 2nd September, with a peak of 18 on the 24th. The main centres, as in 1964, were in Cumberland (28), and Westmorland (21), with outliers in Berwickshire and Northumberland, but there were also single records in Cheshire, Cardiganshire, Oxfordshire, Somerset and Kent; and in Essex, in addition to the two July insects, a worn female *E. occulta* was taken on 28th August along with a fresh *L. solidaginis*. The invasion of *E. occulta*, however, clearly antedated by several days the arrivals of *L. solidaginis*, the records of which ran from 26th August to 3rd September and had a more south-easterly distribution and almost certainly a different origin.

In 1960 over 30 *E. occulta* were reported from 3rd to 21st August, which appear to belong to a single migration. About a third were in northern England and Berwickshire, but there were as many in the Spey Valley in Inverness-shire and a number in the islands—Benbecula, Skye, Rhum, Canna, and the Isle of Man. There was also a surprising capture of four in a light trap in Co. Dublin, on 12th August. It is, however, notable that in 1960 none were seen south of Cheshire.

Mr. Hurst has commented that, though there was an air-stream from Scandinavia in early August, it had an easterly touch which would have made captures unlikely except in the north-west.

The big migration of 1955 had much less definite timing. There were two very early captures on 9th and 10th July in Surrey and Berwickshire. After a gap of a fortnight, one was taken in Oxfordshire on 26th July, others in Berwickshire on 27th, 29th and 31st, one in Northamptonshire on 30th, and on 31st one in Wiltshire described as being of 'the dark northern form'. Thereafter it was reported on most nights until 31st August, being most numerous in the last fortnight. There were probably at least three, perhaps four, waves of immigrants, in early July, late July, mid-August, and late August. Yorkshire, Cumberland, Westmorland and Berwickshire provided two-thirds of those recorded, but there was a wide spread further south, reaching from Somerset and Gloucestershire across to Kent, Essex (where two recorders reported 15 individuals), and through the eastern counties. From north Scotland, however, none were reported in 1955. Mr. Hurst has suggested back-tracks to southern Norway for arrivals about 2nd/3rd and 8th August, and thinks that this would have remained possible until about the 13th, but not later. The biggest numbers were, however, recorded late in the month, especially in Cumberland (e.g. nine at Brampton on 23rd and 24th). It must be noted that *P. interrogationis* was recorded during this period apparently in two waves—Kent, Surrey and Essex—from 28th July to 2nd August (9), and from 13th to 17th August (4).

The immigration of 1948 was clearly large, but its documentation is slight. Its geographical range was wide: from Kent to Morayshire and extending across England to Warwickshire and Lancashire and to the head of the Spey Valley in Scotland. The main wave of arrivals came probably in mid-August, but one of the two Kentish records is for 3rd July, and those at Dalwhinnie for 3rd August. It seems to have been more like the invasion of 1955 than those of the other big years.

For the other years the numbers of *E. occulta* reported are too small to justify individual analysis of their dispersion. But, as appears in Table 2 below, in the years in which the total numbers were small, there was no heavy proportionate concentration in north England and south Scotland; most were reported either from England south of the Humber or from the north Scottish mainland and islands. This may reflect some difference of origin.

TABLE 2  
*Distribution of numbers of E. occulta reported, 1945–1970*

Region	Numbers and percentages in		Other years	
	1948, 1954, 1955, 1960, 1964			
England & Wales south of Yorkshire	79	20%	41	47%
North England & south Scotland	232	58%	10	12%
North Scotland & islands	81	21%	34	39%
Ireland and Man	6	1%	2	2%
Total	398	100%	87	100%

There are, however, again clear coincidences of date. Two were taken on 14th August 1945, in Surrey, two at Tully in Co. Galway on 3rd August 1953, seven in four different places in Kent and Essex between 31st July and 2nd August 1959, with others a little earlier or later in Lancs, Hants,

and Lincs and a good grouping in Inverness, Ross and Orkney from 10th to 17th August 1967. Mr. Hurst is inclined to associate the 1959 arrivals, mostly in Essex, with a flow of northerly air from Scandinavia which only brushed the east coast of England.

Taking the records of probable immigrants as a whole, the vast majority fall in August, with a peak around the middle of the month, flanked by about a dozen in the last ten days of July, a few early in September, and one at Scunthorpe, Lincs, as late as 18th October 1947. As has already been said, this is a later timing than that of the native Scottish insects. Since emergence dates for *E. occulta* must be largely determined by the time by which their small, hibernated larvae can feed up in the spring, the late dates for most of the immigrants point to a place of origin where spring comes late, either far to the north or high in the mountains or both. Southern and central Norway, which have been suggested on meteorological grounds, satisfy both these requirements. But there are a few arrivals in early July which do not fit the general pattern: Beckenham, Kent, 3rd July 1948; Leek, Staffs., 3rd July 1964 (this was said to be a dark example, possibly a native vagrant from Scotland); a couple at Wallington, Surrey, and Kyles Hill, Berwickshire, on 9th and 10th July 1955; and, just outside this period, a curious record of one found on a post near Maidenhead, on 4th June 1943. If these really were immigrants, they probably came from further south, perhaps from Holland or the north German plain.

Most of the recorded occurrences of *E. occulta* in two successive years in the same place were in 1954 and 1955. Since 1955 was itself a year of large immigration, these recurrences cannot be accepted as indications of breeding or temporary establishment. But there are a few cases where it recurred in the same place in years when few immigrants were reported. Thus it was reported at Willesborough in Kent on 15th August 1961 and again on 25th July 1963; no others were reported south of the Highlands in 1963. At Threkeld, Cumberland, where thirteen were seen in 1964, one was taken on 3rd September 1965—the only record for England. Finally, there is the long series of recurrences of 'pale' *E. occulta* at Newtonmore, Inverness-shire: (1963, one; 1964, six; 1965, six; 1966, one; 1967, one; 1968, none; 1969, one; 1970, one). These support the possibility, already discussed, that the immigrant form is more or less resident in that area. Elsewhere, there are two records of larvae of probably immigrant stock. One was found crawling on grass in a Birmingham garden on 1st May 1948, and an adult was reported in the same area later in that year. Another was found at Boston, Lincs, in March 1951, from which a female adult was obtained: this, though rather darker than other Lincolnshire examples, does not at all approach the blackness of the native Perthshire form. A single adult was taken in Boston in 1948, and many at Woodhall Spa in 1949, but none in 1950 or 1951. Apart from the Spey Valley, one can only say that the indications of even temporary establishment of the immigrant form are very slight.

#### *ENARGIA PALEACEA* Esp.

Like *E. occulta*, *E. paleacea* has a circumpolar distribution, extending in Europe to the Alps and Pyrenees; but in northern and central Europe it is said to be rarer than *E. occulta* and more localised, mainly in marshy forests (Bergmann, 1954). In Scandinavia it is found mostly in the south, and in Denmark in the islands and in north Jutland (Hoffmeyer, 1962). In Holland, Belgium and the Rhineland it is said to have appeared recently in new localities and to be extending its range (Lempke, 1964). In France it has an eastern and central range, but reaches west at least as far as the Paris region (L'Homme).

In Britain *E. paleacea* has two quite separate areas of residence. In Scotland it is locally common in Morayshire, reaching northwards to the Black Isle in Ross-shire and south-westwards in old birch woods in Inverness-shire nearly to the head of the Spey Valley; but it seems to be unknown south of the Cairngorms in Aberdeenshire and Perthshire. In England it inhabits a belt stretching from just north of York southwards through central Lincolnshire, Notts, Derbyshire and Staffs. as far as Wyre Forest on the borders of Shropshire and Worcestershire. Within these limits colonies seem to be becoming fewer and more isolated, but it is not rare where it occurs.

Scottish specimens generally have a brighter and more orange ground colour and more pronounced cross lines than the English, which tend to be pale yellow. These differences are obvious in series, but some specimens can hardly be thus separated, especially if they are a little worn. Most of the immigrant specimens which I have seen look more like the English than the Scottish race, but they include some with a strong dusky suffusion over most of the forewings (ab. *teichi* Krul) which I have not seen in any natives. Bergmann (1954) says that this form is fairly frequent in central Germany. Resident *E. paleacea* fly from late July to early September, beginning rather later in Scotland. In contrast to the position with *E. occulta* immigrant *E. paleacea* both begin and end a little earlier than the natives, the extreme dates being 9th July and 30th August 1968. The species is rigidly single-brooded: larvae hatch in April or early May and feed up quickly between spun leaves of birch, both *Betula pendula* Roth. and *B. pubescens* Ehrh.

Before 1945 there are over a dozen references to the occurrence of *E. paleacea* outside its usual areas. The first British capture was made in Birch Wood, near Swanley, Kent, and it seems to have recurred there, since Stephens (1829) wrote of 'not more than three or four there within the last ten years'. There was one at Lewisham, now deep in London, in 1846, and another at Highgate in 1870: these are both dark, suffused, ab. *teichi* and are now in the Rothschild-Cockayne-Kettlewell collection in the British Museum. In Essex, Barrett (1899) mentioned records from Maldon and one 'a year or two ago' at Woodford, and the Victoria County History (1903) another at Hazeleigh. There is one old Norfolk record, from Tivetshall, south-west of Norwich (V.G.H., 1901): three from Northumberland, at Twizell before 1839, Haggerston Mead, 1900, and Stocksfield, 1917; and in Berwickshire at Burnmouth in 1880 (A. C. Long, *in lit.*). Barrett also mentioned occurrences in Somerset, Glos, and Cumberland, the evidence for which is not clear.

Over 40 such records since 1945 are set out in Annexe 2. Most of these clearly refer to immigrants or, in a few cases, just possibly to descendants of immigrants; four of them, which come from places not far from the known areas of residence in England, may refer to wandering natives. Within these areas it is possible that immigrants may sometimes have been passed over as natives. The pattern of the records is less clear-cut than that of *E. occulta*, and it is less easy to interpret. More than half were noted between 13th and 28th August 1964—12 in the same places as *E. occulta* and four actually with it. But, though the *E. paleacea* records stretched from Stirling and Cumberland to Kent and inland as far as Salisbury and Oxford, the weight of numbers was much more southerly than with *E. occulta*, in the zone from Norfolk to Wiltshire and the south coast, the two species were reported in almost equal numbers, although these *E. occulta* were only about one fifth of the British total. Thus, though both species came in the same general N.E. air-stream, it is likely that the *E. paleacea* had a more southerly origin, perhaps in Denmark or Holland, rather than in Norway.

In 1954 the two examples of *E. paleacea* reported, in Cardigan and Westmor-

land, were taken in the same places as *E. occulta* and, in the second case, on the same night. It was not, however, noted in the other three big years for *E. occulta*. The small influx of *E. paleacea* to Hants, Kent and Surrey in early July 1958 may have had an association with two records of *E. occulta* there which are not precisely dated; and the wider scatter of five immigrant *E. paleacea* in 1968 may also have been connected with the only two records of *E. occulta*, in Surrey and Derbyshire.

As regards possible temporary establishment, single specimens, a female and a male, were taken at Chandler's Ford, Hants, in late July in 1951 and 1952 'in a garden which was practically a birch wood', and there were no records of it elsewhere. It was also taken in the Chiddingfold area of Surrey in 1956, 1958, 1964 (three), and 1965 (two). The capture of 1958 was possibly, and those of 1964 were probably, primary immigrants; but the records of 1965 (one at Wormley, the other three miles away at Chiddingfold) were unmatched elsewhere. Taken along with the Chandler's Ford case, this recurrence is strongly suggestive of temporary establishment. This would fit in with the reported tendency of the species to extend its range on the Continent.

### *PLUSIA INTERROGATIONIS* L.

*Plusia interrogationis* is a boreo-alpine insect, characteristic of moorland. It is well spread over Scandinavia to the Arctic, but is commonest in south Finland; local and usually rare in Denmark, where it is probably recruited by immigration; occasional only in the plains of north Germany, Belgium and Holland, but widespread in hilly country through south and central Germany to the Ardennes, Vosges and Alps, where it is found up to 2,400 m; also found in the French Massif Central and in the Pyrenees. It flies readily both in bright sunshine and at night. Alpine specimens are mostly large and bright, being much streaked and suffused with white. Those from Scandinavia are smaller and have more uniformly leaden grey forewings but conspicuously lighter hindwings; ssp. *norrlandica* Schultze has been described as a small, dark bluish grey race from Finnish Lapland. Native British insects are more like the alpine race, though they are rather smaller. Tutt (1892) described rosy-flushed examples as ab. *rosea*, and Ford (1955) says that this is characteristic of the Irish race, though Tutt apparently described it from British specimens. Immigrants to Britain have been referred to ab. *cinerea* Warren, but this is probably a mistake. Warren in the Supplement to Seitz (1931-38) described *cinerea* from specimens in the Tring museum which came from the central Pyrenees; and he separated it as probably a good species and said that it only occurred there. All the suspected immigrants to Britain which I have seen resemble the Scandinavian insects.

In Britain *P. interrogationis* is well distributed on heathery moorlands from north Scotland southwards as far as north-east and south-west Yorkshire, the Peak district, Cannock Chase, and the Long Mynd in Shropshire; in Wales it reaches at least as far south as Radnorshire. In Ireland it is widespread but not very common in the north, in Co. Kildare, and in the south-west in Co. Kerry and Co. Cork (Baynes, 1964).

Early records of *P. interrogationis* outside these British limits have been traced at Battle, Sussex, 1870; Reigate, Surrey, before 1902; Ealing, Middlesex, before 1898; Cheshunt, Herts, before 1901; Cambridge, one on a gas-lamp in Jesus College, 1886, and another at Cherry Hinton, 1917. There are also records from Lincs., near Louth and at Grantham, 23rd July 1873, and from Edwinstowe in Notts.; these are distant from any known area of residence and probably repre-

sent immigrants rather than internal vagrants. Mentions of one in woods near Newquay, Cornwall, July 1902, or two at Torquay, 1860 and 1904, and at Bickleigh Vale near Plymouth, may indicate the existence of unknown colonies on Bodmin Moor and Dartmoor rather than the arrival of immigrants.

Since 1945, records of over 30 probable or suspected immigrants are given in Annexe 4, of which five may represent vagrant natives. I have not been able to check these specimens by inspection which, given the differences between the natives and most immigrants, could be decisive as to their origin. On the other hand, in much of northern England and Scotland immigrants may have been overlooked because of the wide distribution of the native form. The captures in Shetland in 1959 and 1961, though probably immigrants from the Continent, may well have had a different origin from those further south.

In England the largest recorded influx, of 14 examples in 1955, seems to have come in two waves. The first yielded eight captures in Essex and Kent on 28th and 29th July, the second four in Kent, Essex and Surrey from 13th to 17th August, with possible extensions to Caernarvonshire on 13th and Bradford, Yorks, on 19th. In 1964 there were three in mid-August in Norfolk, Surrey and Hants. All these fitted closely with the southern fringes of the large invasions of *E. occulta* in both years, and with that of *E. paleacea* in 1964. The only capture of 1959, in Essex, was made along with an *E. occulta*, and the two in Essex and Herts in 1960 fit with some of those of *E. occulta* in date, though that species was not reported south of Cheshire in that year. The capture on the Isle of Canna on 30th August 1966 was the first for the island, and was preceded a week earlier by an *E. occulta*. All the probable immigrants seem to have been taken at light traps except that caught at Boldre, Hants., in July 1968, which was flying on a heath by day.

The numbers of probably immigrant *P. interrogationis* are too small to permit firm conclusions. But (apart from those from Shetland and Canna) the weight of the records is, like those of *E. paleacea*, south-easterly, and it seems likely that the points of origin were in Denmark, north Germany or Holland. In 1960 in particular the winds at the relevant date were east rather than north, which makes it unlikely that the arrivals in East Anglia came from Scandinavia. Though eggs have been obtained, and adults bred in captivity, from one immigrant *P. interrogationis*, there are no indications of temporary establishment in Britain.

#### *LITHOMOIA SOLIDAGINIS* Hübner.

Another essentially moorland species with a boreo-alpine range, *L. solidaginis* is found throughout Scandinavia, is local in Denmark, and in Holland is confined to Guelderland, becoming a mountain insect in central and south Germany to the Eiffel and the Alps. In Britain its distribution is very similar to that of *P. interrogationis*, but it is not known in Ireland. Despite its English name, it has nothing to do with golden-rod; the larval food-plants are mainly *Vaccinium* sp., *Calluna*, and even *Betula* and *Salix*. Its flight period in Britain, as on the Continent, is from mid-August to mid-September.

Apart from an old and doubtful record from Liskeard, Cornwall, (v.c.H.) I know of no traces of the occurrence of *L. solidaginis* far away from its normal haunts either before or after 1954: the immigration of that year is apparently unique, so far as the records go. The details of it are given in Annexe 3. They include 21 individuals, mentioned in the migration records for 1954; but the three Berwickshire records must probably be deleted as referring to residents, since their captor, Dr. A. G. Long, found the species commonly in the same and adjacent localities in later years and has noted that it should be regarded as indigenous there. The record from Hutton Roof, Westmorland, is also suspect

on grounds of propinquity to areas of residence. On the other hand, a specimen from Chesterfield, Derbyshire, now in the British Museum, probably belongs to the immigrant form and has been added. There is thus a firm total of 19 individuals, recorded from 12 different places in nine counties in the Midlands, East Anglia and the south-east, between 26th August and 3rd September. This invasion came clearly about a week after the arrivals of *E. occulta*, and probably had no connection with them. All the specimens I have seen, except that from Chesterfield, can be referred to f. *cinerascens* Stand. This has a more uniform ashy grey ground colour than the resident insects, which are mostly much variegated with white, though a melanic form occurs in the West Riding of Yorkshire which is closer to the immigrants, and there is much individual variation elsewhere. Scandinavian and Danish insects seem to be very much like our own residents, but specimens in the British Museum collection from Saxony and the Rhineland are mostly of f. *cinerascens*, and Bergmann illustrates this among other forms which occur in Thuringia. It was suggested in migration records, 1954, that the immigrants belonged to the German race, and this is no doubt correct. Other scarce immigrants recorded at the same time, which could have come from central Europe, were *Nymphalis antiopa* L. (London, 3rd September), *Celerio galii* Rott. (Southminster, Essex, 2nd September), and *Plusia confusa* Stephens (Penrith, Cumberland, 31st August).

#### ITAME BRUNNEATA THUNBERG

This small Geometrid moth is a forest and moorland species generally found among bilberry (*Vaccinium myrtillus* L.), though Continental authors say that its larva will feed on birch in places where *Vaccinium* species are absent. It is found widely throughout Scandinavia to the Arctic, and is locally common in Denmark. It is a hill and mountain insect in central and south Germany and Austria, and is common in the Alps up to at least 2,500 m. Further west, it is found in the Ardennes, Vosges, French Massif Central, and the Pyrenees.

In the British Isles *I. brunneata* is found regularly only in the Scottish Highlands, where it is very local in old, open woods of Scots pine (*Pinus sylvestris* L.) which have a dense undergrowth of bilberry. It was discovered by Dale and Curtis in July 1825 in Black Wood of Rannoch, where it now seems to have become rare; but it is still found in Rothiemurchus and other forests of Inverness, extending into Ross and Moray, and also near Braemar in Aberdeen. The larva hatches and feeds up in the spring on bilberry, and the usual flight period of the moth is the month of July, sometimes into early August. In the males, the antennae are pectinated; in the females, which are smaller, these are simple. In the Scottish race the males are a warm brown colour, with four rather darker cross-lines on the forewings and traces of three on the hindwings. The females are lighter in colour, and have the cross-lines on all wings much more sharply marked.

The specimens caught in England clearly belong to a different race from that of the Scottish Highlands. The males, which alone I have seen, are generally much larger, and have a duller, more purplish, ground-colour and less distinct markings. E. B. Ford's excellent colour plate (*Moths*, plate 29, figs. 11 and 12), which shows specimens from Aberdeen and Staffordshire, brings out the differences very clearly. Many, though not all, of the English captures have been made in June, well before the usual flight time in Scotland, the earliest English date being 7th June 1947 and the latest 27th July 1955.

Barrett, and South in the original edition, make no mention of occurrences of

*I. brunneata* outside the Highlands. There are, however, over a dozen such records before 1945. The earliest I have seen is of one at Raincliff Wood, Scarborough, Yorkshire, in 1894, followed by one at Bexley, Kent, about 1896 and another in Northumberland in 1902, and a reference to one knocked out of a sallow bush at Horning, Norfolk, in 1905, which was not published until 1920—an '*annus mirabilis*'. No less than ten *I. brunneata* were reported between 15th and 25th June; four in adjacent places, Maer Wood and Burnt Wood, in Staffs, two at Chester, two in Wicken Fen, Cambridgeshire, and singles at Bishop's Stortford, Herts. and Grange-over-Sands, North Lancashire. At that time recorders were few and their equipment for detecting immigrants poor, so that these records must represent a very considerable immigration.

From 1945 to 1970 a total of 26 individuals have been traced. Except for the Berwickshire group, discussed below, all were single captures, spread over eight eastern and southern counties in seven different years. All of those in which the sex is known to me were males, in surprising contrast to experience with most other immigrant species, in which the sex ratios of those recorded at light are generally more or less equal. Where several were noted within a year, there is a good coincidence of dates. Thus, of the three examples for 1955, the first came into my trap at Ottershaw, Surrey, on the night of 11th/12th July, the second was caught at Bradwell-on-Sea, Essex, on 13th July, and the third, presumably a later arrival, in the same place on 27th July. Of the seven examples in 1960, six were noted from 25th to 27th June; and the three in 1968 occurred on 18th July in Essex, Suffolk and Norfolk.

The record of eight *I. brunneata* by Dr. A. G. Long in 1956 is the largest known aggregation outside the Highlands. The first three were caught on the very hot afternoon of 15th July flying over *Erica cinerea* L. at Pettico Wick, near St. Abb's Head, and two more were taken at mercury vapour lamps that evening at Old Cambus Quarry a little further up the coast. Next day, one was caught and another missed at Coldingham Moor in the same area; and on 18th July a badly worn specimen came to light at Gordon Moss, some 20 miles inland. At the time Dr. Long supposed that the species might be native in Berwickshire, though he noticed no *Vaccinium* in the localities concerned. But he found no *I. brunneata* in later years, and it seems most likely that the 1956 captures represented a compact body of immigrants which did not penetrate, or were not noticed, elsewhere. Alternatively, they may just possibly have been the offspring of moths which arrived in 1955 along with those recorded then further south.

The distribution of these records suggests that the immigrant *I. brunneata* come from Denmark, central Germany, or the Ardennes rather than from Scandinavia. The first two captures in 1955, on 11th/12th and 13th July did, it is true, nearly coincide with the first isolated arrivals of *E. occulta* in Surrey and Berwickshire on 9th July; but, as has already been suggested because of their early date, these latter may well have had an origin different from main migrations which began at the end of the month. There was in 1955 an apparent association of *I. brunneata* with the pyrale *Dioryctria abietella* f. *splendidella*, which was recorded at Westcliff-on-Sea, Essex, on 10th, 11th and 27th July, at Dover on 9th and 29th, and Ottershaw, Surrey, on 22nd and 23rd July. This association was repeated in 1960, when *D. splendidella* was taken on 24th June and *I. brunneata* on 26th June at Bradwell-on-Sea, Essex; and in 1956 *splendidella* was taken in some numbers in Essex and Kent at about the time of Dr. Long's captures of *I. brunneata* in Berwickshire. In 1960 *Lithosia quadra* L. and the pyrale *Pyrausta perlucidalis* Hübner were also trapped along with *I. brunneata* in Essex and Kent.

## NOTE ON THE ESTIMATION OF TOTAL NUMBERS OF IMMIGRANTS

It is not possible in the present state of knowledge to make any confident estimate of the total numbers of insects involved in the migrations discussed. Most of the records in recent years come from light traps; but those from which records are available are still few, unevenly distributed over the country, and of varying efficiency and continuity in their operation. We also know very little about the flight habits of the species concerned, or about the catching power of light traps for those which come within their range. Nevertheless, if only to stimulate discussion and further research, some heroic guess work may be permissible.

Let us first assume that, for large and fast-flying moths such as *Eurois occulta*, all those which come within a radius of 25 metres of mercury-vapour light traps are captured and recorded. This is probably a conservative assumption; the attraction range of such traps has been put at about 100 yards (Robinson, 1950), though of course not all moths which are attracted actually enter the traps. Second, let us assume that each trap captures all, or nearly all, of the immigrants which were present for a substantial time within a square kilometre round it. This, though perhaps startling, is not improbable; a moth in random movement for an average of four hours within it would stand a high chance of coming within attraction range, and, if the immigrants were evenly spread in the neighbourhood, moths which left that area without being caught would be replaced by an equal number of others. Finally, let us assume that, as the records of *E. occulta* at least seem to indicate, the immigrants drop randomly over a wide area, at high densities in the centre, at progressively lower densities towards the fringes.

In the immigration of *E. occulta* in August 1964 ten recorders, nearly all of whom were running traps, reported 84 moths in Berwickshire, Cumberland, north Lancashire and Yorkshire, giving an average of 8.4 per recorder; and no traps there are known to have failed to capture any. The relevant area is about 25,000 sq. km., so that multiplication suggests about 210,000 *E. occulta* for this part of the immigration. Further south, where the densities were lower, estimation is more difficult because allowance must be made for an unknown number of traps which did not catch any at all. Fortunately a cross-bearing is available for parts of East Anglia and south-east England where immigrations of *Enargia paleacea* and *Plusia interrogationis* were reported at the same time. Fourteen recorders in this area reported altogether 26 *E. occulta*; five of whom also reported *E. paleacea*; eight reported *E. paleacea* only, and two others *P. interrogationis* but neither of the other species. Assuming (though this may be incorrect) that no other traps were operated in the area at the time, we have 26 *E. occulta* for 24 traps—an average density of about one per sq. km., giving about 30,000 individuals for the area embraced by them. There were also records, all of single specimens, from London, Beds., Bucks, the four south-western counties, the Isle of Man, and Co. Clare in Ireland. Densities of *E. occulta* in these fringes were clearly very much lower, but the area is large; perhaps 20,000 might be added to cover it. Thus in Britain from Berwickshire southwards the total immigration of *E. occulta* in 1964 may have been of the order of 260,000 moths. There was clearly also a large influx to Inverness-shire and to the Western Isles, and the absence of records from central Scotland is probably only due to the almost total absence of recorders there at that time.

It should be noticed that the assumption that the immigrants drop randomly over a wide area, which fits the pattern of the records of *E. occulta* and the other

species considered here, is not appropriate for most of our immigrants from the south-west, such as *Herse convolvuli* L., *Heliothis peltigera* Schiff., *Rhodometra sacaria* L. These seem to arrive as 'fronts', mainly on the south and west coasts, whence they spread much more sparsely inland and northwards. To measure their numbers it would be necessary to regard light traps rather as interceptors in the line of flight, each one of which covers a front of about  $\frac{1}{20}$  of a kilometre. Some idea of the total numbers involved might then be obtained from the number of traps and of moths caught in relation to the length of the front over which arrivals were reported. If this approach were applied to the records of *E. occulta* in 1964, it would suggest a total for Britain from Berwickshire southwards only about one quarter of that given above.

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#### ANNEXES

Special abbreviations used in Annexes 1 to 4 are as follows:

A.E.S. Bulletin of the Amateur Entomologists' Society

C.H. J. M. Chalmers-Hunt, *The Butterflies and Moths of Kent*, vol. 2, 1962-8.

E. *The Entomologist*

*Ent.Gaz.* *The Entomologist's Gazette*

*E.R.* *The Entomologist's Record and Journal of Variation*

Lep.Yorks *The Lepidoptera of Yorkshire* (reprinted from the *Naturalist*, 1967-70).

Mig. Rec. Dannreuther, T. and (from 1952) French, R. A., Annual reports in *The Entomologist on immigrants in Britain*.

mv Mercury vapour light

n.e.d. No exact date

PLCES: Annual Report and Proceedings of the Lancashire and Cheshire Entomological Society

SLENHS, BENHS Proceedings and Transactions of the South London (since 1968 British) Entomological and Natural History Society; also records of the annual exhibition.

#### ANNEXE 1

##### RECORDS OF EUROIS OCCULTA L. IN THE BRITISH ISLES (probable immigrants only) 1945 to 1970 (c. 485)

- 1945 SURREY. Woking, 14/15 viii, one of the bluish-grey form at sugar (C. de Worms,  
(3) *E.* 78:144); Esher, 14 15.viii, one, pale grey, slightly worn (J. B. Purefoy,  
C. de Worms, *E.* 78:174, Mig. Rec.).

- CUMBERLAND. Bassenthwaite, 24.viii, one pale male taken, others seen (J. L. Messenger, *verb. comm.*).
- 1946 WESTMORLAND. Grange-over-Sands, 21.vii, one of the light form at electric  
(1) light (R. C. Lowther, *E. 80*:47).
- 1947 LINCS. Scunthorpe, 18.x, one in bred condition from a 'keep left sign': ?  
(1) second brood (J. H. Duddington, *E. 81*:53).
- 1948 KENT. Beckenham, 3.vii (R. J. Wheeler, *E. 82*:108, Mig.Rec.); Brook, 13.viii,  
(52) one fresh (Duffield, per Dr. E. Scott, *E. 82*:108, Mig.Rec.).
- LONDON. Mill Hill, 20.viii (H. King, *E. 8*:248).
- WARWICKS. Acocks Green, 1.v, one larva crawling on grass; imago also taken locally (H. E. Hammond, *Ent.Gaz.* 2:171).
- LINCS. Boston, 12.viii, female at sugar (E. M. Pilcher *in lit.*).
- YORKS. Barnby Moor, 26.viii (Lep. Yorks, p.13).
- LANCS. Barrowford, 15.viii (J. M. Heath *in lit.*); Freshfield, n.e.d. (Gordon Smith, 1951).
- MORAYSHIRE. Forres, 14/17.viii, 40 at sugar in three nights, all grey (A. Richardson, *E.82*:82, *E.R.* 77:16 and *in lit.*).
- INVERNESS-SHIRE. Dalwhinnie, 3.viii, two or three grey among 20 black (A. Richardson, *E. 82*:82).
- 1949 LINCS. Woodhall Spa, 10.viii, seventeen at sugar, some fresh, others worn  
(18) (E. M. Pilcher *in lit.*).
- DENBIGH. Ial, n.e.d. (Gordon Smith, 1951).
- 1950 SHETLAND. Unst: Hermaness, 5 & 6.viii, four, Petester 8.viii, two—all fresh,  
(6) some with prominent bars outside the median area (A. Richardson, *E.R.* 77:16 and *in lit.*).
- 1951 LINCS. Boston, March, one larva found, from which a female of the pale form  
(1) was bred (E. M. Pilcher *in lit.*).
- 1952 NORFOLK. Cley-next-the-Sea, July, three (P. Kearney per C. de Worms, *in lit.*).  
(3)
- 1953 IRELAND: CO. GALWAY. Tully, 3.viii, two (Rev. D. Murray, *E.R.* 66:295).  
(2)
- 1954 SOMERSET. Frome, 24.viii, one in mv.trap (G. H. W. Cruttwell, *E. 88*:19).  
(59) KENT. Goudhurst, n.e.d., male at light (W. V. D. Bolt—C.H. p. 142).
- ESSEX. Southminster, 23 & 24.vii, two worn males, 28.viii, one worn female, with *L. solidaginis* (A. J. Dewick, *E.R.* 67:155).
- OXON. Shillingford, 25.viii, one over buddleia (Morris Brown, *E. 87*:216).
- CARDIGANSHIRE. Trawscoed, August (J. M. Heath *in lit.*)
- CHESHIRE. Chester, n.e.d. (Gordon Smith).
- WESTMORLAND. Kendal, 22.viii, one, 23.viii, two, 24.viii, eight, 25.viii, three, 26.viii, two, 27.viii (J. E. Thorpe and N. Birkett, *E.R.* 66:240); Hutton Roof, 25.viii, two, 26.viii, two, in trap (J. H. Vine-Hall, *Ent.Gaz.* 5:244).
- CUMBERLAND. Penrith, 22.viii, six, 23.viii one, 24.viii five, 25.viii, two, 26.viii, three, 27.viii/2.ix, one each night (7) (W. F. Davidson); 24.viii, one (G. A. K. Hervey—N. Birkett, *E.R.* 66:240); Brampton, 28.viii, two, 31.viii, one (Sir G. Johnson, *E.R.* 67:110 and *in lit.*).
- NORTHUMBERLAND. Riding Mill, one wedged in the bark of a tree, n.e.d. (F. W. Gardner—A. G. Long *in lit.*).
- BERWICKSHIRE. Gavinton, 24.viii, one at light, 25.viii, one at sugar (A. G. Long, *E.R.* 66:285 and *in lit.*).
- 1955 SOMERSET. Weston-s.-Mare, 21.viii, in trap (C. S. Blathwayt, *E.R.* 67:274,  
(c. 114) Mig. Rec.).
- GLOS. Minchinhampton, 29.viii one grey male in trap (A. Richardson, *E. 89*:46, Mig. Rec.).
- WILTS. Codford St. Mary, 31.vii, one of the 'dark northern form' (Jackson, *SLEHS* 1955:31, Mig. Rec.).
- HANTS. Mudeford, 11.viii, one worn at light (F. B. M. Carr, *E.R.* 67:308, Mig. Rec.); Martyr Worthy, 14.viii (D. W. H. Fennell—B. Goater *in lit.*).
- SURREY. Wallington, 9.vii (Mig. Rec.).

KENT. Brook, 4.viii (Mig. Rec.).

ESSEX. Westcliff-on-Sea, 29.viii female of pale mottled form, no eggs, 31.viii, one worn, two others (H. C. Huggins, *E. 88*: 267, 263, 89:72, Mig. Rec.); Southminster, 29.vii, one female 30.vii, 8.viii, male, 10.viii, male, female, 12.viii, male, 14.viii two males, 16.viii male, 17.viii male, 25.viii male, 26.viii two females, 27.viii one male (A. J. Dewick *in lit.*, Mig. Rec.).

SUFFOLK. Waldringfield, 30.viii (Waller—A. Aston, *E.R. 76*:245).

HERTS. Tring, 18 & 20.viii (A. L. Goodson, *E. 88*: 272, Mig. Rec.); Bishop's Stortford, 6.viii (Clifford Crauford) *E.R. 73*:154).

CAMBS. Cambridge, n.e.d. (B. O. C. Gardiner, *E.R. 67*:310, Mig. Rec.).

OXON. Steeple Barton, 26.vii, female (ova); 29.viii, female, both at light (H. B. D. Kettlewell, *E. 89*:100).

NORTHANTS. Wellingborough, 30.vii, 16 & 21.viii, all pale grey males (P. J. Gent, *E.R. 68*:24, Mig. Rec.).

LINCOLNSHIRE. Scunthorpe, 10 p.m. 5.viii, pale form on buddleia (J. H. Duddington, *E. 88*:236, Mig. Rec.); Grimsby, 11.viii (Mig. Rec.); Gainsborough, n.e.d. (W. Reid, *PLCES.*, 1955/58:14).

YORKSHIRE. Halifax, 8.viii (W. E. Collinson—S. M. Jackson *in lit.*); Sheffield, 25.viii, 31.viii (W. Reid, *E.R. 67*:275, Mig. Rec.); Sheffield moors, 25.viii, grey female at sheet (A. Richardson, *E. 88*:270, Mig. Rec.); Skipwith Common, 26.viii—worn female at sugar (S. M. Jackson *in lit.*).

LANCS. St. Anne's-on-Sea, 14.viii, pale, in trap (C. I. Rutherford, *E. 88*:279, Mig. Rec.).

WESTMORLAND. Kendal, 14.viii, male, 20.viii, three males, 24.viii, female, 24.viii, very worn (N. Birkett, *E.R. 68*:40 and *in lit.*); Hutton Roof, 14.viii, one, 19.viii, two (J. H. Vine-Hall, *Ent. Gaz. 5*:244).

CUMBERLAND. Brampton, 25—14.viii, two, 15, three, 16, one, 17, one, 18, one, 19, one, 20, one, 21, one, 22, one, 23, five, 24, four, 29, one, 30, one, 31, two (Sir G. Johnson *in lit.*, Mig. Rec.); Great Salkeld, 23.viii, one pale form, worn (G. A. K. Hervey—Birkett *in lit.*).

BERWICKSHIRE. 39—Kyles Hill, 10.vii, female at sugar, Spottiswoode, 27.vii, at light, Bell Wood, 29.vii, at light, Gavinton, 31.vii, in trap, Kyles Hill, 12.viii, four at light; Gavinton, 24.viii, four in trap; Oxdean Pond, fertile female; 27.viii; Gavinton, 30.viii, one in trap (A. G. Long, *E.R. 68*:10—14).

1956 NORTHUMBERLAND. Riding Mill, pale female, 3/15.ix (F. W. Gardner, *E. 90*:66, (c. 5) Mig. Rec.).

INVERNESS. Newtonmore, early August, a few pale grey (G. W. Harper, *E.R. 69*:32, Mig. Rec.).

1957 None.

1958 KENT. Ham Street, n.e.d. (H. C. Huggins, *SLENHS 1958*:18).

(3) HANTS. Whitehill, July (J. M. Heath *in lit.*).

INVERNESS. Aviemore, 9.viii, worn pale female (C. G. de Worms coll., *E. 92*:2).

1959 KENT. Ham Street village, 31.vii, at light (B. F. Skinner—Chalmers Hunt, (9) p. 143, Mig. Rec.).

ESSEX. Westcliff, 2.viii (J. M. Heath *in lit.*); Rowhedge, 2.viii (*SLENHS Exhibition, 1959*); Southminster, 1.viii male, 4.viii female, 7.viii male (A. J. Dewick *in lit.*, Mig. Rec.).

LINCS. Boston, 3.viii, male in trap (E. M. Pilcher *in lit.*); Scunthorpe, 8.viii (J. H. Duddington, *E. 92*:236, Mig. Rec.).

LANCS. Morecambe, 21.vii, pale form (C. J. Goodall *in lit.*).

1960 LANCS. Morecambe, 8.viii, one pale grey (C. J. Goodall, *E.R. 72*:219, Mig. (c. 40) Rec.).

CHESHIRE. Heswall, 5.viii (B. R. Dickson, *PLCES 1958—61*:34).

CUMBERLAND. Bassenthwaite, 21.viii, pale grey in trap (C. I. Rutherford, *E.R. 72*:271, Mig. Rec.); Penrith, 5 & 6.viii, a few in trap (W. F. Davidson—n.b. *in lit.*, Mig. Rec.).

BERWICKSHIRE. Coldstream, 3.viii (Miss A. G. Elliott—A. G. Long *in lit.*); Gavinton, 4/21.viii, four in trap (A. G. Long *in lit.*).

- INVERNESS. Aviemore (Cairngorms and at Craiggellachic), 6 & 7.viii, six (R. G. Chatelain, *E.R.* 72:216, Mig. Rec.): possibly residents; Newtonmore, 17.viii, five pale (G. Harper, *E.R.* 73:64, Mig. Rec.).
- HEBRIDES. Rhum, 5.viii in good condition, and several next few days (P. Wormell, *E.* 95:94); Benbecula, 5.viii, two, 6.viii, two (Mig. Rec.); Skye. Glenbrittle, 6 15.viii, three of grey form (A. Richardson, *E.R.* 77:16); Canna, dead in a building 17.viii (J. L. Campbell, *E.R.* 72:220, Mig. Rec.).
- ISLE OF MAN. 19.viii (A. Richardson, *E.R.* 73:93, Mig. Rec.).
- IRELAND. CO. DUBLIN. Glenageary, 12.viii, four of continental form (E. S. Baynes *in lit.*, Mig. Rec.).
- 1961 KENT. Willesborough, 15.viii, one rather worn in trap (M. V. Singleton—  
(3) C-H. p. 243).
- SHETLAND. Mainland, 13&14.viii, dark Scandinavian form in traps, with *P. interrogationis* (H. B. D. Kettlewell & C. J. Cadbury, *E.R.* 75:154).
- 1962 NORFOLK. Hickling Broad, July (Dr. T. W. D. Peet, *in lit.*).  
(2) HEBRIDES. Rhum, 1.viii. (W. L. Steel & G. E. Woodroffe, *Trans. Soc. Brit. Ent.* 18:123).
- 1963 KENT. Willesborough, 25.vii (M. Singleton—C-H., p. 367).  
(2) INVERNESS. Newtonmore, 16.viii, one (G. Harper *in lit.*, Mig. Rec.)
- 1964 CORNWALL. Polperro, 15.viii (Mig. Rec.).  
(c. 130) DEVON. Bishopsteignton, 15.viii (Mig. Rec.).
- SOMERSET. Frome, 14.viii (Mig. Rec.).
- DORSET. Portland, 12.viii (Mig. Rec.).
- HANTS. Minstead, 14.viii (L. W. Siggs, *E.R.* 77:32, Mig. Rec.); Burghclere, 16.viii, with *H. convolvuli*, 27.viii (R. Saundby, *E.R.* 76:216, Mig. Rec.); Martyr Worthy, 17.viii (D. H. Fennell,—B. Goater *in lit.*).
- BERKS. Wytham Woods, 14.viii (Mig. Rec.); Boars Hill, 15.viii (D. Agassiz, *in lit.*, Mig. Rec. given as 'Oxford').
- KENT. Willesborough, 14.viii, in trap (W. L. Rudland—C-H. p. 367); Bromley, 16.viii, in trap (D. R. M. Long—C-H. p. 367).
- LONDON. Wembley, 17.viii, in trap (M. G. Mason, *E.R.* 76:267).
- ESSEX. Southminster, 14.viii, two, 15.viii, four, 16.viii, 17.viii, 18.viii (nine in all) (Mig. Rec.).
- SUFFOLK. Weston, nr. Beccles, 14.viii, one, 15.viii, two, 18.viii, one (A. Aston *E.R.* 76:245, Mig. Rec.); Bawdsley, 14/15.viii, male in trap (G. A. Cole *in lit.*).
- NORFOLK. Hickling, 14/15.viii, male, 15/16.viii, fresh, dull grey female (r.c.k. coll.).
- BEDS. Stevington, August (J. M. Heath *in lit.*).
- OXON. Chipping Norton, July, one (P. D. J. Hugo, *AES* 25:108).
- BUCKS. Granborough, 16.viii, at light (J. Ellerton—Ansoorge, *Macrolepidoptera of Buckinghamshire*, p. 35).
- STAFFS. Leek, 3rd July, one dark (Mig. Rec.).
- YORKS. Bradford, 12, 13, 15 (2), 24.viii (Mig. Rec.); Royds Hall, nr. Bradford, 15/17.viii, six (P. Kay—J. Briggs *in lit.*); Rippenden, 15.viii, three in trap (W. Collinson—J. Briggs *in lit.*, Mig. Rec.); Frizinghall, 17.viii (P. Tempest—J. Briggs *in lit.*); Sheffield, 14/24.viii, seven in trap, including two infertile females (W. Reid, *E.R.* 76:296, Mig. Rec.); Filey, 15.viii (Mig. Rec.); Pickering, 15.viii (Mig. Rec.), 16.viii, two (J. Briggs *in lit.*).
- LANCS. Carnforth, 13/16.viii, about 12 in trap (H. Robinson—C. J. Goodall, *E.R.* 77:17, Mig. Rec.).
- CUMBERLAND. Kirkoswald, 14.viii, two, 15.viii, seven, 16.viii, 21 (Mig. Rec.); Threlkeld, 15.viii, ten, 17.viii, three (Mig. Rec.).
- BERWICKSHIRE. Gavinton, 15/17.viii, four in trap (A. G. Long *in lit.*).
- ISLE OF ARRAN. 8/15.viii (M. Leech, *E.R.* 76:230).
- INVERNESS. Newtonmore, 14.viii, two, 16.viii, two, 18.viii, three (G. Harper *in lit.*, Mig. Rec.); Aviemore, 24.viii, female (R. G. Chatelain, *E.R.* 76:235).
- HEBRIDES. Canna, 14.viii, two in trap, worn, grey form (J. L. Campbell, *E.R.* 77:63, Mig. Rec.); Rhum, 21.viii (Mig. Rec.).

IRELAND: CO. CLARE. Ballynalachan, 15.viii, female, no eggs (H. C. Huggins, *E.R.* 76:223).

- 1965 CUMBERLAND. Threlkeld, 3.iv (A. Vine-Hall *in lit.*, Mig. Rec.).  
 (6) INVERNESS. Newtonmore, 3.viii, two, 27.viii, 6.ix, 14.ix, in trap (G. Harper *in lit.*).
- 1966 YORKS. Birkenshaw, nr. Bradford, 28.viii, two (*Lep. Yorks.*, p. 13).  
 (5) INVERNESS. Newtonmore, 23.viii (G. Harper *in lit.*).  
 HEBRIDES. Canna, 23.viii, one very worn in trap (J. L. Campbell, *E.R.* 78:267, 79:97).
- SHETLAND. Sullcon, Mainland, 7.viii, female, grey form, at sugar (B. Goater *in lit.*).
- 1967 INVERNESS. Newtonmore, 17.viii (G. Harper *in lit.*).  
 (5) ROSS-SHIRE. Muir of Ord, 10 & 13.viii (G. Thomson, *AES* 26:113).  
 ORKNEY. August, two (J. Heath, *in lit.*).
- 1968 SURREY. Wormley, 30/31.vii (J. L. Messenger, *E.R.* 80:259).  
 (2) DERBYSHIRE. Rowsley, 27.viii, in trap (T. W. Harman, *E.R.* 81:82).
- 1969 WEST LOTHIAN. Winchburgh, 19.viii, one very worn in trap (E. Pelham-Clinton *in lit.*).  
 (6) INVERNESS. Newtonmore, 23.viii (G. Harper *in lit.*).  
 ORKNEY. Mainland, 17.viii, Scorradale, two, Quoyberstane, one—small, light grey (R. I. Lorimer, *Ent. Gaz.* 21:100).
- 1970 DERBYSHIRE. Clay Cross, 30.viii, one at tungsten light (J. Culpin, *BENHS* Exhibition).  
 (7) LANCs. Nelson, 30.viii, in trap (J. Rogers—J. Briggs *in lit.*).  
 AYRSHIRE. Glenapp, mid-September (D. ffennell, *pers. comm.*).  
 WEST LOTHIAN. Winchburgh, 21.viii, in trap (E. Pelham-Clinton *in lit.*).  
 PERTSHIRE. Crieff and Rhynd, early September, singles (D. ffennell *in lit.*).  
 INVERNESS. Newtonmore, 31.vii, pale form (G. Harper *in lit.*, *E.R.* 83:96).

## ANNEXE 2

## RECORDS OF ENARGIA PALEACEA IN BRITAIN

(probable immigrants only)

1945 to 1970 (45)

- 1951 HANTS. Chandler's Ford, 26.vii, female at light among birch (B. Goater, *Ent. Gaz.* 3:68).  
 (1)
- 1952 HANTS. Chandler's Ford, 18.vii, male at light in the same place (B. Goater, *Ent. Gaz.* 4:245).  
 (1)
- 1954 CARDIGANSHIRE. Trawscoed, August (J. M. Heath, *in lit.*).  
 (2) WESTMORLAND. Kendal, August (J. E. Thorpe, *R.R.* 66:296).
- 1956 SURREY. Chiddingfold, 14.vii (Mig. Rec.; R. Mere; de Worms, *E.* 91:209).  
 (1)
- 1958 HANTS, early July, two (Mig. Rec.).  
 (4) SURREY. Chiddingfold, 8.vii (Mig. Rec.; R. Mere; de Worms, *E.* 91:209, where the date is erroneously given as 1957).  
 KENT. Ham Street, 8/9.vii, one, fresh, at light (de Worms, *E.* 91:209; Mig. Rec.).
- 1961 WORCESTERSHIRE. Rednal, 8.viii, one male at light in old oak woodland; possibly a native straying from Wyre Forest. (T. N. D. Peet, *SLENHS.* 1963:18, and *in lit.*).  
 (1)
- 1963 NORFOLK. Norfolk Broads, 3/4.viii, in trap, with *Pelosia obtusa* (C. J. Cadbury, *E.R.* 76:181).  
 (2) LINCs. Boston, 6.ix., large heavily marked male in my trap (E. M. Pilcher *in lit.*): possibly native.
- 1964 WILTS. Old Sarum, 15/16.viii (R. F. Haynes, *E.R.* 76:268, Mig. Rec.).  
 (24) BERKS. Wytham Woods, 14.viii, with *E. occulta* (Mig. Rec.); Boars Hill, 15/16.viii, three, with *E. occulta* (Mig. Rec.).  
 HANTS. Burghclere, 15.viii, one male, one female, 18.viii, one female, with

- E. occulta* and *H. convolvuli* on 16.viii (Sir R. Saundby, *E.R.* 76:216, Mig. Rec.).
- SURREY. Wormley, 13.viii, male, 17.viii, two males, in trap (J. L. Messenger, *E.R.* 76:266, Mig. Rec.); Reigate, 15.viii, male at light (D. A. Trembath, *E.R.* 77:23, Mig. Rec.).
- LONDON, Parkway, N.W.1., 15.viii on a shop window (J. S. Hopton, *Ent. Gaz.* 16:14.).
- KENT. Ham Street, 28.viii, one very worn (de Worms, *E.* 98:156, Mig. Rec.).
- ESSEX. Bradwell-on-Sea, 14.viii, with *E. occulta* and *P. interrogationis* (Mig. Rec.); Rayleigh, 20.viii, one very pale (D. More, *E.R.* 76:245, Mig. Rec.).
- SUFFOLK. Weston, near Beccles, 15/16.viii, one male, one female, with two *E. occulta* (A. Aston, *E.R.* 76:216, Mig. Rec.).
- NORFOLK. Wells, 13.viii (J. M. Heath *in lit.*); West Runton, 16.viii (Mig. Rec.); Barton Broad, 22.viii, male (C. G. Bruce, *E.R.* 77:48, Mig. Rec.);
- YORKS. Bradford, 19.viii, one, pale (J. Briggs *in lit.*, Mig. Rec.): possibly a native.
- CUMBERLAND. Threlkeld, 17.viii, one, of the pale form, in trap, with several *E. occulta* (J. H. Vine-Hall, *Ent. Gaz.* 17:37, Mig. Rec.).
- STIRLINGSHIRE. Stirling, 16.viii, one, worn, at light (D. L. Coates, *E.R.* 80:11).
- 1965 SURREY. Chiddingfold, 11.viii (Mig. Rec.); Wormley, 23.vii, male (J. L. Messenger; Mig. Rec.).
- 1967 (1) HANTS. New Milton, 21.vii, at light (B. V. Ridout, *BENHS Exhibition*, 1969).
- 1968 (5) DORSET. Iwerne Minster, 30.viii (H. J. Moore; French *in lit.*).
- HEREFORDSHIRE. Ledbury, 30.viii, male ab. *teichi* (M. Harper coll.).
- HERTS. Tring, 21.vii (A. L. Goodson, *BENHS Exhibition* 1968).
- YORKS. Leeds, 24.viii (S. Sutton; French *in lit.*): possibly native.
- WESTMORLAND. Beetham, 28.viii., one, dark, at light (J. Briggs *in litt.*).
- 1970 (1) ESSEX. Little Baddow, 6.viii, at blended light in garden (G. A. Pyman *in lit.*).
- 1971 SUSSEX. Tilgate Forest, 16.vii, male at mv light (E. H. Wild, *E.R.* 83:325).

## ANNEXE 3

RECORDS OF LITHOMOIA SOLIDAGINIS Hubn. IN BRITAIN  
(probable immigrants only)

- 1954 HANTS. Burghclere, 28.viii (Sir R. Saundby, *E.R.* 66:295).
- (19) SURREY. Byfleet, 27.viii (S. Wakely, *E.R.* 66:255).
- KENT. Abbey Wood, 28.viii (Showler, *E.R.* 66:273); Folkestone, 3.ix. (R. W. Fawthrop; A. M. Morley, *E.R.* 66:255).
- MIDDLESEX. Feltham, 28.viii & 1.ix (E. W. Classey, *Ent. Gaz.* 5:231).
- HERTS. Tring, early September (A. Goodson, *SLES Exhib.* 1954).
- ESSEX. Southminster, 28.viii (A. J. Dewick, *E.R.* 66:295); Rayleigh, 28.viii & Westcliff, 26.viii (H. C. Huggins, *E.R.* 66:255).
- NORFOLK. Swaffham, late August (Mig. Rec.).
- CAMBS. Wisbech, late August, three (Mig. Rec.).
- LEICESTERSHIRE. Hinckley, 30.viii & 1.ix (J. E. Thorpe, *E.R.* 66:295); Market Harborough, 1.ix (H. A. Buckler, *E.R.* 67:62).
- DERBYSHIRE. Chesterfield, 27.viii: this specimen, though identified as the dark ab. *rangenowi* Stichel and not the pale f. *cinerascens* Staud., was probably an immigrant. (J. H. Johnson, *Ent. Gaz.* 6:113).
- WESTMORLAND. Hutton Roof, 26.viii (J. H. Vine-Hall, *Ent. Gaz.* 5:254): possibly native.

## ANNEXE 4

RECORDS OF PLUSIA INTERROGATIONIS L. IN BRITAIN  
(probable immigrants only)  
1945 to 1970 (33)

- 1954 (1) HEREFORDSHIRE. Moccas, n.e.d., one 'somewhat shattered' (R. B. Sisson *E.R.* 67:66); possibly native.

- 1955 KENT. Ham Street, 29.30.vii, at light (A. Richardson, *E. 88*:262, Mig. Rec.);  
 (14) Wye, 13.viii, female in trap (W. L. Rudland—C.H.); Mig. Rec.; Westwell,  
 Ashford, 17.viii, male at light (P. Cue; Scott, *Bull. Kent Field Club 1*:10;  
 Mig. Rec.).  
 ESSEX. Bradwell-on-Sea, 28.vii, male, 29.vii, five males, 14.viii, one (A. J.  
 Dewick, *E.R. 67*:235, Mig. Rec.); Hockley, 29.vii, male at light (D. More;  
 Huggins, *E. 88*:237, Mig. Rec.).  
 SURREY. Carshalton, 13/14.viii, in trap (Dudley Collins *in lit.*).  
 YORKS. Bradford, 17.viii (Mig. Rec.); possibly native.  
 CAERNARVONSHIRE. 17.viii (Mig. Rec.); possibly native.
- 1956 NORFOLK. West Runton, 25.vii (R. G. Todd, *E.R. 69*:19).  
 (1)
- 1957 Lincs. Boston, 8.viii, male in trap, large with light ground (R. E. M. Pilcher  
 (1) *in lit.*); possibly native.  
 ESSEX. Westcliff, 2.viii, at light, with *E. occulta* (D. Down; Huggins, *E.*  
 (2) *92*:157; Mig. Rec.).  
 SHETLAND. Unst, 1.viii, at light (Kettlewell and Cadbury, *E.R. 75*:152).
- 1960 ESSEX. Bradwell-on-Sea, 13.viii female—ova obtained, and bred in November  
 (3) (A. J. Dewick *in lit.* Mig. Rec.).  
 HERTS. Tring, 19.viii (Mig. Rec.).  
 BERWICKSHIRE. Birgham House, near Coldstream, at light, n.e.d. Miss  
 G. A. Elliott; A. H. Long *in lit.*; (possibly native).
- 1961 SHETLAND. Hillswick and Tingwall Valley, Mainland, 13 & 14.viii, six in  
 (6) traps, along with *E. occulta*; no more later (Kettlewell & Cadbury, *E.R.*  
*75*:172).
- 1964 HANTS. Whitehill, 16.viii (D. Wright; B. Goater *in lit.*; Mig. Rec.).  
 (3)
- SURREY. Bramley, 15/16.viii, male in trap (R. F. Bretherton, Mig. Rec.).  
 NORFOLK. Barton Broad, mid August (C. G. Bruce, *E.R. 77*:49).
- 1966 ISLE OF CANNA, 30.viii, at light: first record (J. L. Campbell, *E.R. 79*:97).  
 (1) Possibly a stray from the Scottish mainland or other islands.
- 1968 HANTS. Boldre, July, flying on a heath by day (H. G. Middleton; B. Goater  
 (1) *in lit.*).

RECORDS OF *ITAME BRUNNEATA* Thunberg IN BRITAIN  
 (probable immigrants only)

Before 1945 (14)

- 1894 YORKS. Raincliff Wood, Scarborough, n.e.d. (R. H. Barker; Porritt, *Lepidop-*  
*tera of Yorkshire*, 2nd ed., 208; *Naturalist*, March 1895:80).  
 1896 (about). KENT. Bexley, one n.e.d. (L. T. Ford; C.H. *in lit.*).  
 1902 NORTHUMBERLAND. Muckle Moss, nr. Haydon Bridge, n.e.d., identified by  
 Wailles and V. P. Perkins (*Tyneside Nat. Field Club, Trans. 5*:9.).  
 1905 NORFOLK. Horning, n.e.d., one knocked out of a sallow bush (E. A. Bowles;  
 Edelston, *E. 53*:263).  
 1920 HERTS. Bishop's Stortford, 25.vi, one at light (C. Mellows, *E. 53*:236).  
 (10) CAMBS. Wicken Fen, 16 & 19.vi, two at light (A. P. Wickham, *E. 53*:210).  
 STAFFS. Maer Wood, 20.vi, male, now in O.U.M. coll. (P. C. Reid); Burnt  
 Wood, 20.vi., male, now in O.U.M. coll. (W. Hughes); two further males  
 from these localities recorded (*E. 53*:188).  
 CHESHIRE. Chester, 18.vi, two males at electric light (Gordon-Smith): now in  
 R.C.K. coll.  
 LANCs. Grange-over-Sands, 15.vi (J. H. Hutchinson, *teste* R. C. Lowther;  
 N.B. *in lit.*).

1945 to 1970 (26)

- 1946 KENT. Church Wood, Blean, 23.vi, male on heathy ground by day (C. de  
 Worms, *E. 80*:115, Mig. Rec.).  
 1947 KENT. Aldrich Wood, Littlebourne, 7.vi, male in poor condition (J. H. P.  
 Sankey, *E. 80*:221, Mig. Rec.).

- 1955 SURREY. Ottershaw, 11/12.vii, male in trap (R. F. Bretherton, *E.* 88:210, Mig. Rec.).  
 ESSEX. Bradwell-on-Sea, 13.vii, male, 27.vii, male (A. J. Dewick *in lit.*, Mig. Rec.).
- 1956 BERWICKSHIRE. Pettico Wick, nr. St. Abbs Head, 15.vii, three by day; Old  
 (8) Camber, 15/16.vii, two at light; Coldingham Moor, 16.vii, one taken; one missed, by day; Gordon Moss, 18/19.vii, one, badly worn, at light (A. H. Long, *E.R.* 69:88).
- 1958 DURHAM. Chester-le-Street, 2.vii, one at light (T. C. Dunn, *E.* 93:131).
- 1960 KENT. Folkestone Warren, 26/27.vi, at light (R. M. Mere, Mig. Rec.).  
 (8) SURREY. Wormley, 27.vi, male at light (J. L. Messenger, *E.R.* 72:197 Mig. Rec.).  
 LONDON. Wimbledon, 25/26.vi, large male at light (J. V. Dacie, *E.R.* 74: 116, Mig. Rec.).  
 HANTS. Whitehill, male 26.vi (D. Wright, Mig. Rec.).  
 BUCKS. Chalfont St. Peter, 27.vi, male in trap (Sir E. Ansorge, *Ent. Gaz.* 11:184, Mig. Rec.).  
 HERTS. Tring, 2.vii, male, now in R.C.K. (Mig. Rec.).  
 ESSEX. Bradwell-on-Sea, 26.vi, male at light (Mig. Rec.).  
 Lincs. Boston, 23/24.vi, male in trap (E. M. Pilcher *in lit.*).
- 1966 NOTTS. Burton Joyce, 14.vi (*SLENHS. Exhib.*, 1966).
- 1968 ESSEX. Stanford-le-Hope, 18.vii, male (R. Tomlinson, *E.R.* 81:233).  
 (3) SUFFOLK. Norton, nr. Bury St. Edmunds, 18.vii (Rev. G. Ford, *E.R.* 80:294).  
 NORFOLK. Foxley Wood, nr. Elmham, 18.vii (J. M. Heath *in lit.*).

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Folly Hill, Birtley Green,  
Bramley, Surrey.  
February, 1972

## PROCEEDINGS

10th FEBRUARY 1972

A Vice-President, Mr. J. M. CHALMERS-HUNT, in the Chair

The following new members were declared elected: Dr. M. Hull and Mr. P. C. N. Dean.

### EXHIBITS

Mr. E. H. WILD—Some uncommon forms of British Lepidoptera: *Argynnis paphia* L. (Nymphalidae), a female with underside hindwings flushed with blue, taken in 1948 from a colony at Selsdon now extinct; *Aphantopus hyperantus* L. (Satyridae) with the underside forewings 'obsoleta'-like and hindwings with oval ocelli without white centre points, and another with the black of the rings almost absent, both from the same Selsdon colony which is now extinct; *Maniola tithonus* L. ab. *albida* Russel (Satyridae) from Swanage, Dorset, 1971; *Agrotis ipsilon* Hufn. (Noctuidae), a minute male with very pale forewings, Selsdon, 1947; *A. clavis* Hufn., a form close to ab. *virgatapallida* Tutt, the basal area not completely black, Selsdon 1970; *Agrochola macilenta* Hübn. ab. *obsoletastraminea* Tutt, described as the rarest form of the species, anterior wings pale straw coloured without central dark spot.

Mr. G. PRIOR—An example of *Eustrotia bankiana* F. (*olivana* Schiff.) (Noctuidae) from a light trap in a garden in North Harrow, Middx., June 1971; and an example of *Parascotia fuliginaria* L. (Noctuidae) from the bars of a conservatory in North Harrow, 8.ix.71.

Mr. P. A. BOSWELL—*Camponotus vagus* Scop. (Hym., Formicidae) from Seignosse le Penon, France, September 1971, consisting of workers showing the large variation in size, a male and alate females. The species is very common in dead tree trunks and branches behind coastal sand dunes. These nests are said often to contain corpses of large insects, and a dead beetle found in one nest was also shown.

Mr. R. F. BRETHERTON—A unicolorous form of *Phigalia pilosaria* Schiff. without markings, varying to black. This form accounts for five to ten per cent of all *P. pilosaria* at Bramley, Surrey.

Mr. G. R. ELSE—First instar larvae of *Lasiocampa trifolii* Schiff. (Lasiocampidae) from eggs deposited by two females taken at mercury vapour light on Hayling Island, Hants, during an evening in August 1971. The ova were kept in a very cool place during the winter but larvae had commenced to emerge by 5th February and, so far, are feeding well on various species of grass.

## COMMUNICATIONS

Commenting on Mr. Prior's *Eustrotia bankiana* F., Mr. R. F. Bretherton thought the insect most likely an immigrant. He said the only English colonies were in Wicken and Chippenham Fens, though there is another in Ireland. There are about half-a-dozen records of migrant insects of this species in S.E. England and these moths are usually larger than our native examples. Another member interposed the remark that the exhibited moth looked smaller. The *Parascotia fuliginaria* L., continued Mr. Bretherton, was probably a second brood insect which may occasionally be found.

Mr. J. M. CHALMERS-HUNT drew attention to the predominantly Surrey distribution of this last named species, commenting on the fact that a few do turn up in scattered places in the south of England; he asked if anyone thought this might be migration. Mr. Bretherton did not think so. The species might well be spreading, he thought, and in any case it was a cryptic moth and could be overlooked, though it comes readily to light.

It was pointed out that there was a breeding colony of *Eustrotia bankiana* at Walberswick, Suffolk, which made Mr. F. D. Buck ask if this might not be a colony founded by migrants. Mr. Chalmers-Hunt thought this might be possible, especially as the first record for this species in S.E. Kent was some eight years ago, yet since then there have been several; here it could have become established.

## DISCUSSION ON REARING EARLY STAGES OF INSECTS

The discussion was opened by Mr. S. N. A. Jacobs who said that his particular interest, the Nepticulidae Lithocolletidae and Coleophoridae, must be bred because, apart from the superiority of bred specimens for the cabinet, it was the only way in very many cases to be certain of the identity of the insects. There was also the aspect of conservation of our insect life which is best effected by obtaining ova from a feral female and returning the living surplus progeny to the original locality.

Mr. A. E. Stubbs pointed out that very little indeed was known of the early stages of Diptera, and went on to explain the range of habitats and pabulum of this Order, drawing attention to the problems of keeping these larvae alive and the rearing difficulties.

When breeding almost all Orders a major problem is produced by moulds and this becomes a factor of no small significance. Dr. B. J. MacNulty said that mould could be controlled by the use of Thymol crystals, which some thought might be too drastic for Lepidoptera. Attention was drawn to the value of TCP solution and that it had been advocated that larvae could be washed in it. Mr. E. H. Wild, in response to a certain amount of disbelief, said he regularly painted the insides of his breeding cages with TCP, and had in fact washed a larva in it with gratifying results.

Col. A. M. Emmet said mould was the big problem when rearing microlepidoptera, particularly the leaf miners. He used *Sphagnum* to retain moisture and believed it delayed the onset of mould.

The problem of getting females to lay eggs was raised by Mr. Chalmers-Hunt. Mr. B. F. Skinner said it was a matter of providing acceptable conditions for the female; certain species required certain conditions and these must be provided. Usually a piece of crushed tissue would suffice, but if the moth does not lay, alternatives must then be sought. A spot of honey or sherry in the sugar water had been known to help.

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### MEETINGS OF THE SOCIETY

are held regularly at the Society's Rooms, but the well-known ANNUAL EXHIBITION takes place in the autumn 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.

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## THE CONSERVATION OF THE LARGE BLUE BUTTERFLY (*MACULINEA ARION* L.) IN WEST DEVON AND CORNWALL

BY T. G. HOWARTH

There is no doubt that the preservation of our fauna and flora is of immediate interest and concern to most of our members and consequently I hope that my remarks concerning one of our rarest butterflies may at least prove stimulating.

In the latter half of the last century the Large Blue butterfly (*Maculinea arion* L.) was found very locally but quite commonly in Northamptonshire, Gloucestershire and South Devon but it disappeared from many of its former haunts so that it was considered to be on the verge of extinction in England. In the last decade of the century, however, it was discovered in the Atlantic coastal area of N.E. Cornwall and N.W. Devon and it is this area to which I shall confine my remarks.

The species like most others has years of abundance and scarcity but it has vanished completely from many localities even in this area so that it has now become one of the rarest members of our endemic butterfly fauna. In the early 1960's this decline in numbers and retraction in the area of distribution gave cause for anxiety to many, and to members of the Devon and Cornwall Trusts for Nature Conservation in particular, who felt that an investigation into the status of the insect in their mutual areas should be undertaken due to lack of exact information. (It may be stated here that the late Capt. R. A. Jackson, President of this Society in 1945 and 1946 undertook a survey in 1948.) Accordingly, the Nature Conservancy was contacted and a Joint Committee was set up in 1963. This consisted of three members of each of the two County Trusts and representatives from the Nature Conservancy, the Society for the Promotion of Nature Reserves and the Royal Entomological Society of London, under the Chairmanship of Professor L. A. Harvey of Exeter University.

Before going further it may be as well to explain as briefly as possible some of the complexities of the life-history and ecology of the species for the benefit of those who are unfamiliar with them.

The butterfly is on the wing during the latter half of June and into July sometimes extending into August, the exact time varying according to the season.

After pairing the female oviposits on the flower-heads of *Thymus drucei* Ronn.

The ovum hatches in about a week and the young larva feeds on and inside the thyme blossom, where, due to its salmon pink cryptic coloration it is difficult to see. It is said to be cannibalistic if it encounters others of its brethren. It continues feeding thus and moults for the third and last time when about three weeks old. It is then still very small and under 4 mm in length. It ceases to feed on the thyme blossom and wanders until found by an ant of the genus *Myrmica* which proceeds to 'milk' it. Many larvae of the Lycaenidae, to which *Maculinea* belongs, possess a dorsal gland on the seventh abdominal segment, which, when stimulated by the touch of an ant, secretes a sweet fluid attractive to the latter insect. According to Frohawk after a while the larva assumes an extraordinary attitude, which, if one may be forgiven for being anthropomorphic, may be described as 'hunching its shoulders' or distending its thoracic segments. On this signal the ant gets astride the larva and then gripping it in its jaws proceeds to carry the *arion* larva back to its nest. Prof. C. A. Clarke of Liverpool, who bred the species in 1953-4, never observed the hunching by the larva and neither did he find the larvae cannibalistic so that there is evidently a great deal still to be discovered about the insect's biology.

The species occurs in the coombs and small valleys that run in from the littoral,

usually in a west to east direction where it prefers and seems confined to the rough south-facing slopes and valley bottoms which nearly always have small streams which drain the hinterland.

Just prior to the setting up of the committee, Mr. G. M. Spooner, who was to become the committee's secretary, wrote a valuable paper on the probable causes of the butterfly's decline. These may be divided into two types—either natural or by human agency.

Dealing with these in more detail—under natural causes—is the decline in numbers brought about by the usual factors in population control such as weather, parasites and predators. In the past the Large Blue disappeared from some localities for no apparent reason where it had been in comparative abundance previously. This may have been caused by the locality becoming unsuitable in some way and the butterflies dying out or moving elsewhere. It may be stated here that though no parasites have been bred from *arion* it seems unlikely that none exists. It is also possible that the host ants sometimes consume their guests if conditions become adverse as happened when Mr. R. Goodden attempted to breed the butterfly recently from Continental stock.

Weather too, plays its part, for the insect in its adult state is a sun-lover and any continuous spell of inclement weather during its flight period may well cause a decline in numbers. Spooner quotes several instances where the butterfly was apparently in considerably reduced numbers after a very bad summer the previous year. This has happened since commencement of the present investigation, in 1965, when, after a period of comparative abundance in the major site, there were three or four days of exceptionally bad weather during the flight period. On the first day only six specimens were seen and since that time nothing approaching the former number have been seen there. From the conservation point of view there is little, if anything, that can be done in this connection.

From the foregoing remarks concerning the insect's life-history it will be realized that the presence of *Thymus* and *Myrmica* ants are of primary importance and absolutely essential for the butterfly and any factors affecting these adversely will jeopardize the existence of the butterfly.

In the area that is being dealt with, *Thymus drucei* forms part of the grass-land community and except where this is maintained by exposure both general and to salt spray towards the cliff edges, there is a gradual transition to dwarf and then larger shrubs particularly the gorses—*Ulex gallii* Planch and *Ulex europaeus* L.—the further inland one progresses.

Sometimes *Thymus* forms a sward where it finds conditions suitable but one would not expect to find *arion* in such exposed sites.

Thyme is unable to grow amongst shrubs more than approximately 12 inches in height such as *Calluna*, *Erica* and *Ulex* and it is quickly crowded out, particularly by the latter which has a high growth rate.

*Thymus drucei* is partial to well-drained situations such as the sides of valleys where the soil is unstable, the edges of paths where other vegetation is kept short by trampling, grazing or drought, and dry walls.

Sometimes it grows into large clumps in such situations, and ant-hills of the Yellow Ant, *Lasius flavus* (L.), are a particularly suitable micro-habitat.

When Yellow Ants 'earth-up' their mounds they further improve the thyme by mulching with fine soil which also improves the drainage.

Dealing with agricultural practices affecting thyme, some of these are beneficial to the plant and others decidedly the reverse. These may be placed under the following headings: fire—both intentional and accidental, ploughing, spraying and grazing.

It has been a long-standing practice to burn or swale the valleys and hillsides during the winter months in order to improve the grazing by reducing the gorse and other shrubs and providing this is carried out piece-meal and is done fairly frequently—about every three years—so that the burn is not too fierce, it seems doubtful if this does damage to the butterfly for it has apparently survived for many generations because of or in spite of this treatment.

It must be pointed out in this connection that now that the existing colonies of *arion* have become completely isolated any swaling, if carried out, must be done with the utmost caution as there is no evidence that *Myrmica* ants and consequently the butterfly larvae are able to withstand this hazard. In the past it seems reasonable to suppose that had a certain number of insects been destroyed in a locality by swaling then the butterfly may well have been able to re-colonise the site from those near-by for it existed in many sites within the general area under discussion.

It might not be inappropriate here to mention the case some years ago of a wealthy member of this Society who acquired a site with a resident population of *arion* and who forbade any collecting or burning within his preserve. After a few years the area became completely overgrown so that it was unsuitable for both the butterfly and collector!

Accidental fire constitutes one of the greatest hazards to the butterfly should this occur in a dry summer after the insect has oviposited and before the larva has been taken underground. Due to our ever-growing and affluent population, the use of the car and the subsequent accessibility of the terrain by coastal foot-paths, this danger has greatly increased during recent years. Because there is vocational pressure being exerted within the area a number of picnic sites have been proposed by the Councils concerned. Though this tends to concentrate the visitors in one spot it also tends to attract them.

Ploughing up of marginal land has always constituted a danger to species resident in this type of habitat and now that farmers have the equipment such as crawler tractors and the current financial incentive of a grant there is always the possibility that this may occur, as has actually happened on one occasion since the formation of the committee. This problem is complicated by the fact that the land is sometimes farmed by a tenant and not the actual owner so that the ploughing up of a site may occur through ignorance of the butterfly's presence or lack of liaison between the conservationists, the owner and the farmer—or simply cupidity on the latter's part. It is fortunate that some sites are in such steep-sided valleys that even the use of a caterpillar or crawler tractor would be impracticable so that they are not immediately endangered. But nevertheless the ploughing up and cultivation of the surrounding land may well preclude the possibility of suitable adjacent sites becoming available, should the species ever be in a position to extend its range.

Spraying with selective herbicides and insecticides might constitute a danger to both insect and thyme if carried out in adjacent farmland due to drift but fortunately there has been no evidence of this since the investigation began. The careful use by spot treatment of selective herbicides or brushwood killers containing the chemical 2:4:5:T may offer a solution, though an expensive one, to the problem of scrub control.

Grazing by cattle or horses if done too heavily constitutes a threat as these animals tend to trample the ground unduly without grazing the herbage short enough to encourage the growth of thyme and at the same time offering little control of *Ulex*. On the other hand sheep grazing may be of benefit providing it is not done so severely that the thyme florets are consumed. At the present time

perhaps this method taken in conjunction with light burning offers a reasonable solution to herbage control suitable for the encouragement of a good thyme sward.

Up to 1955 and the advent of myxomatosis it is thought that rabbit grazing was one of the chief factors in maintaining the presence of thyme for, soon after the disappearance of the rabbit, there was a general increase in the height of the herbage and a resulting tendency for the *Thymus* to be smothered.

Mention must now be made of the other factor or agency with which many of us are more immediately concerned, that is collecting. Spooner records that when *arion* was comparatively common, large numbers were frequently taken from localities, where, in spite of this, the butterfly existed year after year. When one collection came on the market in 1939 it was found that the owner had amassed no less than 770 British specimens! I mention this not through jealousy but our National collection only contains 150 less specimens than this, now, 30 years later. Spooner also gives examples of the butterfly vanishing from sites, privately preserved, where there had been no collecting. However, there is no doubt whatever that collecting in any form at the present time may well cause the extremely small populations which still exist, to fall below their survival level if they have not already done so. As ours is considered to be the premier field Society in Great Britain I take this opportunity of exhorting any members who may be thinking of collecting a specimen or two of British *arion* not to do so. It is not a question of *over*-collecting but *any* collecting.

Having mentioned some of the factors affecting the Large Blue I now come to the investigation itself. At the start, the whole coast between Tintagel and Clovelly was surveyed prior to the emergence of the butterfly with the primary object of ascertaining the number and exact locations of probable sites. The criteria used for this were:

1. The presence of *Thymus drucei* and *Myrmica sabuleti* Mein. *M. scabrinodis* Nyl. and *M. laevinodis* Nyl. (*rubra* L.)
2. The presence of a certain amount of cover or shelter for the adult butterflies and records of the species having occurred in the area based on the collation made by Spooner.

In all, some 32 sites were found which were thought to be worth while re-visiting. Of these only 13 proved to have the butterfly and of these only three had more than a dozen examples recorded from them during numerous visits during the flight period. The weather was poor.

Marking experiments with quick-drying cellulose lacquer were carried out at four of the sites but in all the sites visited only 85 specimens were seen, half of these were from just two sites and the better of these—the headquarters—call it such, only had some 27 specimens recorded in it.

In 1964 the survey was continued and was concentrated in the main site. The weather was good and using the capture-marking-release and recapture method it was estimated that the whole population of this—the major colony—amounted to not more than 200 specimens—with a maximum daily population of not more than 70 individuals. One very surprising fact emerged from these marking experiments was that the average 'life-span' was only three or four days and the longest amounted to nine days. Though the total number of specimens had increased compared with the previous year, the number of populated sites fell from 13 to ten. By 1968 this number had dwindled to two and by 1970 in these two sites only 31 sightings were made during the season. This figure was

arrived at without marking the specimens so that the actual number of specimens present may well have been less.

In the course of the marking experiments it was noted that in only one instance was a specimen found to have wandered away from the original marking-point—in this case to a distance of approximately half a mile over the hill into another valley, indicating that *arion* may be considered a sedentary species in these conditions but should these alter or the necessity arise, then it might well disperse over a sufficiently wide area to establish or re-inforce other colonies beyond the confines of its original site.

One of the primary difficulties of conservation within the area under discussion is, or has been, the lack of ownership by any conservation body of any of the sites where the butterfly exists so that the implementation of suitable management plans to attempt to control the various factors previously mentioned, has had to depend upon the goodwill and active co-operation of the land-owners and sometimes their tenants. These, with but few exceptions, have been highly co-operative and sympathetic. It is rather ironical that where a body such as the National Trust or the S.P.N.R. has owned a small section of coast this has not contained a south-facing slope so essential to the butterfly and it was not until last year that the Society for the Promotion of Nature Reserves at last acquired, after very protracted negotiations the site which was, in 1965, the second best, but no *arion* have been seen there since 1967!

The main conservation measures taken by the committee since its setting-up have been to encourage the increase in *Thymus drucei* and attempting to restrict the growth of invasive and smothering plants and by wardening of sites to prevent collecting. It seems unlikely that in spite of conservation propaganda the avid collector will be dissuaded from collecting entirely so that the services of a warden full-time are essential during the flight period of the butterfly in each site. The few sites where the butterfly is known to occur have been warded efficiently but the recruitment of sufficient and suitable personnel to do this rather lonely and difficult task has been a considerable problem throughout.

One of the reasons put forward for the persistency of collectors has been the difficulty of breeding the species in captivity. This has been done successfully by only very few people, such as Frohawk, Purefoy in the past (1905-6) and by Prof. C. A. Clarke more recently (1953-4), and none on a comparatively large scale. At the moment rearing experiments with foreign stock are being undertaken by Mr. Robert Goodden and should a successful technique be developed to breed the butterfly on a large scale it may be possible to rear the butterfly from local stock, should they still exist, and use these as a re-inforcement or for a re-introduction near-by.

For the future what is needed ideally is the establishment of a National Reserve that has a viable colony of the butterfly present within its boundaries, or if not, then it should have contained one in the past. The reserve or reserves should be warded and managed and renovated so as to provide suitable conditions for the re-establishment of the species should it be necessary to re-introduce it and it is still possible to do so. The species need not be considered in isolation in the above context as there are plenty of other interesting members of the endemic fauna and flora, but its presence should certainly add weight to any consideration or argument, if and when the choice of sites is being made for a badly needed National Nature Reserve within this area of outstanding natural beauty.

I have purposely confined my remarks to this particular area but there are rumours of the butterfly occurring elsewhere and I would ask any members who know of the insect's presence in other areas to get in touch with the committee or

the appropriate County Trust so that some measures may be taken to preserve it. It is all very well thinking that the fewer the people that know about a locality the better but the individual can often do little to prevent destruction of a site should he even be in a position to do so. This has actually happened in the past to *arion* sites, the knowledge of which were closely guarded secrets. This type of information, if forthcoming is always treated in the strictest confidence by the bodies concerned. It is so easy to criticise these and their lack of knowledge than to render assistance so that 'they' or is it 'we' are wiser before the event rather than after.

I hope I have succeeded in explaining some of the difficulties which have made the attempted conservation of this unique, and one of our most interesting and most vulnerable, butterflies, so abortive.

#### REFERENCES

- Clarke, C. A., 1954, *Ent. Rec.* 66:209-210.  
 Frohawk, F. W., 1924, *The Natural History of British Butterflies*, Vol. 2. pp. 137-149.  
 Spooner, G. M., 1963, *Entomologist*, 96:199-201.

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## PROCEEDINGS

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10th FEBRUARY 1972

A Vice-President, Mr. J. M. CHALMERS-HUNT, in the Chair

The following new members were declared elected: Dr. M. Hull and Mr. P. C. N. Dean.

#### EXHIBITS

Mr. E. H. WILD—some uncommon forms of British Lepidoptera: *Argynnis paphia* L., a female from an extinct colony at Selsdon, 1948; *Aphantopus hyperantus* L., two examples from the same Selsdon colony; *Maniola jurtina* L. ab. *albida* Russell from Swanage, Dorset, 1971; *Agrotis ipsilon* Hufn. from Selsdon, 1947; *Agrotis clavis* Hufn., a form close to ab. *virgatapallida* Tutt from Selsdon, 1970; and *Agrochola macilenta* Hübn. ab. *obsoletastraminea* Tutt. He gave descriptions.

Mr. G. PRIOR—an example of *Eustrotia bankiana* F. (*olivana* Schiff.) from a light trap in a garden in North Harrow, Middlesex, in June 1971; and an example of *Parascotia fuliginaria* L. from a conservatory also in North Harrow, 8th September 1971.

Mr. P. A. BOSWELL—*Camponotus vagus* Scop. from France in September 1971. Workers, a male and alate females were shown. He read a note.

Mr. R. F. BRETHERTON—a unicolorous form of *Phigalia pilosaria* Schiff. without markings, varying to black; a form accounting for five to ten per cent of all *Phigalia pilosaria* at Bramley, Surrey.

Mr. G. R. ELSE—first instar larvae of *Lasiocampa trifolii* Schiff. from eggs deposited by two females taken at mercury vapour light on Hayling Island, Hants, during an evening in August last year. The ova were kept in a very cool

place during the winter, but larvae had commenced to emerge by 5th February and, so far, are feeding well on various species of grass.

#### COMMUNICATIONS

Commenting on Mr. Prior's *Eustrotia bankiana* F., Mr. R. F. Bretherton thought the insect most likely an immigrant. He said the only English colonies were in Wicken and Chippenham Fens, though there is another in Ireland. There are about half-a-dozen records of migrant insects of this species in south-east England and these moths are usually larger than our native examples. Another member interposed the remark that the exhibited moth looked smaller. The *Parascotia fuliginaria* L., continued Mr. Bretherton, was probably a second brood insect which may occasionally be found.

Mr. J. M. Chalmers-Hunt drew attention to the predominantly Surrey distribution of this last named species, commenting on the fact that a few do turn up in scattered places in the south of England; he asked if anyone thought this might be migration. Mr. Bretherton did not think so. The species might well be spreading, he thought, and in any case it was a cryptic moth and might be overlooked, though it comes readily to light.

It was pointed out that there was a breeding colony of *E. bankiana* at Walberswick, Suffolk, which made Mr. F. D. Buck ask if this might not be a colony founded by migrants. Mr. Chalmers-Hunt thought this might be possible, especially as the first record for this species in south-east Kent was some eight years ago, since when there have been several; here it could have become established.

#### DISCUSSION ON REARING EARLY STAGES OF INSECTS

The discussion was opened by Mr. S. N. A. Jacobs who said that his particular interest, the Nepticulidae, Lithocolletidae and Coleophoridae, must be bred. Apart from the superiority of bred specimens for the cabinet, it was the only way in many cases to be certain of the identity of the insects. There was also the aspect of conservation of our insect fauna to be considered, and this could best be effected by obtaining ova from feral females and returning the living surplus progeny to the original locality.

Mr. A. E. Stubbs pointed out that very little indeed was known of the early stages of Diptera, and went on to explain the range of habitats and pabulum of this Order, drawing attention to the problems of keeping these larvae alive and the rearing difficulties.

When breeding almost all Orders a major problem is produced by moulds, and this becomes a factor of no small significance. Dr. B. J. MacNulty said that mould could be controlled by the use of Thymol crystals, which some thought might be too drastic for Lepidoptera. Attention was drawn to the value of TCP solution and that it had been advocated that larvae could be washed in it. Mr. E. H. Wild, in response to a certain amount of disbelief, said he regularly painted the insides of his breeding cages with TCP, and had in fact washed a larva in it with gratifying results.

Col. A. M. Emmet said mould was the big problem when rearing microlepidoptera, particularly the leaf miners. He used *Sphagnum* to retain moisture and believed it delayed the onset of mould.

The problem of getting females to lay eggs was raised by Mr. Chalmers-Hunt. Mr. B. F. Skinner said it was a matter of providing acceptable conditions for the female; certain species required certain conditions and these must be provided. Usually a piece of crushed tissue would suffice, but if the moth does not lay,

alternatives must then be sought. A spot of honey or sherry in the sugar water had been known to help.

A member suggested that corrugated card with holes punched into the corrugations was often suitable for species that liked bark. Mr. Skinner also recommended the shoots of Cock's-foot Grass cut down as a possible oviposition site.

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24th FEBRUARY 1972

A Vice-President, Mr. J. M. CHALMERS-HUNT, in the Chair

The following new member was declared elected: Mr. P. N. Kearney.

EXHIBITS

Col. A. M. EMMET—Leaves of *Lonicera periclymenum* L. (Honeysuckle) from the Scilly Isles, taken during the previous week, containing lepidopterous larvae of the family Lithocolletidae mining the upper surface. The species is unknown to the exhibitor, being unable to find it in Hering's *Bestimmungstabellen der Blattminen von Europe*, 1957. It was suggested it could be a new species, though *Caloptilia syringella* F. has been recorded in *Symphoricarpos rivularis* Suksdorf (Snowberry) on the continent besides its normal foodplants; and as Snowberry is in the same family as Honeysuckle, the larva could be *C. syringella*. It was also pointed out by the exhibitor that *Phyllonorycter trifasciella* Haw. sometimes commences to feed in the upper surface of the leaf and then transfers its attention to the lower surface; and he has even known this larva to change its leaf. So there is also the possibility that the unknown larva could be a *Phyllonorycter* species.

Mr. S. A. WILLIAMS—six species of *Oligota* (Col., Staphylinidae) including two photographs of habitats, from the Canary Islands.

COMMUNICATIONS

With reference to the minutes of the previous meeting, Mr. R. W. J. Uffen said that information regarding the treatment of moulds when rearing insect larvae could be found in the Amateur Entomologists' Society's *Silkmoth Rearer's Handbook*.

Mr. S. A. Williams read a paper entitled 'Coleopterorum Canariensis' in which he described his trip to the Canary Islands collecting Coleoptera. He illustrated his talk with coloured transparencies and an interesting discussion centering around migration and the insular position of the islands ensued.

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9th MARCH 1972

A Vice-President, Mr. J. M. CHALMERS-HUNT, in the Chair

A welcome was extended to Mr. J. B. Fisher.

EXHIBITS

Mr. C. O. HAMMOND—Two syrphid flies taken at Cothill National Trust Reserve. (1) A male *Cheilosia chrysocoma* Meig., a species easily recognised in the genus by the long tawny-brown hairs on the abdomen, taken 4.v.58. (2) A male *Brachypalpus eunotus* Loew, the second British example, taken 3.v.53. The first was taken by J. H. Wood at Ledbury, Herefordshire, 6.v.1899.

Mr. R. W. J. UFFEN—A random selection of insects from coastal habitats to illustrate his talk.

Mr. B. GOATER—An empty pupa case of *Laspeyresia servillana* Dup. (Lep., Tortricidae), protruding from its gall on the stem of *Salix cinerea* L., taken in the New Forest, Hants.

Mr. K. SIDE—A copy of *An Atlas of Bryophytes found in Kent* by Mrs. A. G. Side, which was presented by the author to the Society's library.

## COMMUNICATIONS

With reference to his exhibit of the undetermined mine shown at the last meeting (see p. 128), Col. A. M. Emmet said he had spent some time searching the Hering herbarium for a clue to its identity. He had indeed found a mine which he believed to be the same, but unfortunately this too had not been determined.

Mr. R. F. Bretherton drew attention to the fact that the management committee of the Hering Memorial Research Fund was still open to receive applications for grants.

In response to Col. Emmet's question regarding how long the sawfly sticks containing the *Laspeyresia servillana* Dup. had been indoors, Mr. Goater replied that he had gathered them at the end of January. One moth had emerged ten days earlier and another the previous day. A member asked if any had been pecked out by birds, and Mr. Goater replied that he had not noticed any. Mr. J. M. Chalmers-Hunt said some lepidopterists thought these galls should be collected by the end of December to prevent this kind of disappointment, and Col. Emmet added that pecking out was a local peculiarity; in some places the birds did, and in others they did not. It was, he said, the same with *Aegeria andrenaeformis* Lasp. (Lep., Sesiidae), which when he first found it in Saffron Walden, Essex, was never pecked out; subsequently it became apparent, increased in frequency, and it was now some time since he had seen the moth there.

A paper 'Coastal Habitats', was read by Mr. R. W. J. Uffen, illustrated by coloured transparencies and which provoked a lively discussion.

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23rd MARCH 1972

A Vice-President, Mr. J. M. CHALMERS-HUNT, in the Chair

The following new members were declared elected: Prof. E. R. Laithwaite, Mr. I. R. Sims and Mr. R. N. Hobbs.

## EXHIBITS

Mr. G. PRIOR—*Earophila badiata* Schiff. (Lep., Geometridae), a very dark example bred *ab ovo* on cultivated rose at Ruislip, Middx.

Mr. A. E. STUBBS—Two spring tachinid flies which are parasitic on Lepidoptera: *Servillia ursina* (Meig.), a large bumble-bee-like species locally frequent on heaths, downs and wood margins; and *Gymnochaeta viridis* (Fall.), a metallic green species common in woodland.

Dr. P. A. BOSWELL—Weevils from *Rumex* at Old Woking, Surrey, 13.iii.72: *Apion miniatum* Germ. and *A. violaceum* Kirby (Col., Curculionidae).

## COMMUNICATIONS

Mr. R. F. Bretherton commented on the abundance in west Surrey during the past week of *Polygona c-album* L. (Lep., Nymphalidae); it was much the

commonest of the hibernated butterflies. Other members said they had noticed this elsewhere. Dr. C. G. M. de Worms said he had also seen unusual numbers of *Gonepteryx rhamni* L. (Lep., Pieridae).

Mr. E. H. Wild reported *Orthosia cruda* Schiff. (Lep., Noctuidae) on 27th February, an early date; he also said it was good year for *Apocheima hispidaria* Schiff. (Lep., Geometridae), which other members confirmed.

Mr. E. S. Bradford said that he had bred the pyralid moth *Crytoblabes gnidiella* Mill. from imported pomegranates; British records for this species are few.

Mr. J. M. Chalmers-Hunt said that he had kept larvae of *Coleophora lixella* Zell. through the winter. In the autumn they feed in cases on thyme, but in the spring they change their foodplant to grass and make new cases. One of his larvae had already done this.

Dr. W. S. Bristowe, gave a lively talk on 'The Reminiscences of a Spider Collector'. This provoked a discussion on the importance of spiders in the balance of insect life, and of the specialised defensive mechanisms which they have caused other arthropods to evolve, and which they have developed themselves.

13th APRIL 1972

A Vice-President, Mr. J. M. CHALMERS-HUNT, in the Chair

The death was announced of Mr. R. J. Burton.

#### EXHIBITS

Mr. S. N. A. JACOBS—A larval case of *Coleophora tricolor* Wals. (Lep., Coleophoridae) in the spring stage, after having discarded the winter case on a seed head of *Acinos arvensis* (Lam.) Dandy (Basil-thyme); the larva entered a leaf of *Dactylis glomerata* L. (Cock's-foot) in a case made from the skin of a vacated mine in the grass leaf. The larvae (two) in their winter cases, were kindly given to him by Mr. R. W. J. Uffen for drawing.

Mr. C. O. HAMMOND—The four species in the genus *Criorhina* (Dipt., Syrphidae), the early spring flies of which resemble bees: *C. ranunculi* Panz., from Cuffley, Herts, 10.iv.49, a red-tailed and white-tailed mimic of humble bees; *C. berberina* F., the normal form with black abdomen from Windsor Forest, Berks., 13.v.67, and var. *oxyacanthae* Meig., previously considered a separate species with the thorax and abdomen densely covered with yellow hairs, from Cosford Mill, Surrey, 19.v.68; *C. floccosa* Meig., from E. Horsley, Surrey, 21.v.66; *C. asilica* Fall., from Trent Park, Herts., 18.v.59, an excellent mimic of the honey bee.

Mr. E. H. WILD—Two melanic aberrations of *Biston strataria* Hufn. (Lep., Geometridae): one heavily dusted similar to the aberration *insularia* Th. Meig. of *B. betularia*, taken at Croydon, Surrey in 1948; the second resembling the aberration *consonaria* Jordan also of *B. betularia*. Closely related species must carry a number of analogous genes. This exhibit could represent an example of parallel mutation in the two species.

Col. A. M. EMMET—The following nepticulid Lepidoptera: male and female *Stigmella atricapitella* Haw. from Madingley, Cambs.; male *S. ruficapitella* Haw. from Westerham, Kent; ? female *S. ruficapitella* Haw. from Farningham, Kent; and male *S. svenssoni* Johansson from Madingley, Cambs. These can be distinguished as follows:

male *atricapitella* by the black head and long androconial scales on the hindwings ( $2/3$  the length of the fringes);

female *atricapitella* are distinguishable by the black head with ochreous forehead;

male *ruficapitella* generally have the head black, they are distinguishable by the short androconial scales on the hindwings ( $1/3$  the length of the fringes);

moths which are believed to be female *ruficapitella* have red heads;

male *svenssoni* have red heads and lack androconial scales, the hind wings being pale grey;

female *svenssoni* are indistinguishable from *ruficapitella* except by the genitalia.

The other two allied species not shown are *S. samiatella* Zeller and *S. roborella* Johansson.

Mr. A. E. STUBBS—*Cordilura impudica* Rond. (Dipt., Scatophagidae), bred from a pupa found in the stem of *Carex* sp. (?*C. riparia* Curt.) growing beneath willow carr at Leckford, N. Hants, 3.x.72. Infested *Carex* shoots turn brownish and the burrow, 2–5 inches long, occupies the centre of the shoot near the base. At the top of the burrow there is either a blemish or an exit hole beneath an outer leaf sheath. Larvae were also found, but the shoots were still green. Both larvae and pupae have conspicuous prothoracic spiracles. The *Carex* in the habitat was not producing flowering shoots, though the insect was not to blame since there were plenty of uninfested shoots. This is the first Palaearctic member of the genus to be reared, though Nearctic species are known from *Carex* and *Scirpus*.

Mr. K. C. SIDE—The following Coleoptera: *Carabus intricatus* L. (Carabidae), taken in Boconnoc Park, near Lostwithiel, Cornwall, 1.iv.72. Except for a single record from Scotland the species appears to be confined to Devon and Cornwall. *Meloe violaceus* Marsh. (Meloidae) taken on the same day in the same locality. This very local species differs from the commoner *M. proscarabaeus* L. in having a transverse depression at the base of the prothorax. It is also of a brighter blue colour and is more finely punctured. *Lebia crux-minor* (L.) (Carabidae) found amongst lichens and mosses on a dry stone wall on Bodmin Moor, 4.iv.72. Although recorded from a number of counties, chiefly in the south, it is always very rare.

Dr. C. G. M. DE WORMS—*Dasycampa rubiginea* Schiff. (Lep., Noctuidae) taken 12.iv.72 in his mercury vapour light trap at Woking, Surrey. The species appears to be numerous this year.

Dr. S. L. SUTTON—(1) A coloured sketch of *Platyarthrus hoffmannseggii* Brandt, he appealed for records. (2) An example of *Hemianax ephippiger* Burm. (Od., Aeshnidae), taken on the side of a lorry in Hunslet, Leeds, Yorks. The insect was at first thought to be *Aeshna mixta* Lat. He said there were three other records in these islands, at Devonport, Dublin and another in a cave, adding that the species was recorded as far as Iceland and had been known to breed in the Camargue in southern France.

#### COMMUNICATIONS

Commenting on the Lepidoptera Dr. C. G. M. de Worms said *Pieris rapae* L. (Pieridae) had been seen in the grounds of the British Museum (Nat. Hist.) that morning; *Odontotia carmelita* Esp. (Notodontidae) and *Polyphoca ridens* F. (Thyatiridae) have been seen; he thought the season was some two weeks early.

With reference to *Pieris rapae* L., Col. Emmet said he had also seen one in North Essex that morning.

An enquiry was made by Mr. P. Baker about the identity of a chironomid

fly\*. He said the verges on the roadside beside the Staines reservoir recently appeared as though the grass was afire, with the 'smoke' drifting across the road. So much so that cars had to put on their headlights and considerably reduce speed. This was in fact a vast swarm of chironomid flies, specimens of which he produced.

Mr. Dixon reported *Pieris rapae* L. at Titchfield Abbey on 18.iii.72.

The mines in the leaves of honeysuckle which were the subject of Col. Emmet's comments on 24th February and 9th March (see pages 128 & 129) would seem to be those of *Phyllonorycter trifasciella* Haw. (Lep., Lithocolletidae). Mr. Gregory, in Cornwall, had bred this moth from mines just like those Col. Emmet had described.

*Platyarthrus hoffmannseggi* Brandt, said Mr. F. D. Buck, used to occur with the ants on Bookham Common, Surrey; and Mr. A. E. Stubbs added he could find them in his garden at Hanwell in west London under bricks.

The dragonfly *Hemianax ephippiger* Burm., said Mr. A. E. Gardner, was a well-known migrant and was distributed from Spain right into Asia. It breeds in southern Spain, southern France, Italy and North Africa; and he discovered it on the island of Porto Santo near Madeira. In addition to the British records cited by Dr. Sutton there were two others, both on shipping, and another at midnight on the pavement in Tunbridge Wells. The species is quite distinct and should not be confused with any other dragonfly that might be met in Britain. The nearest species is *Anax imperator* Leach (Aeshnidae) which is half as big again as *Hemianax ephippiger* Burm. and is either blue or green according to sex, while *H. ephippiger* is brown. He believed its occurrence was far too irregular for it to be placed on the British list. *Aeshna affinis* is another migrant dragonfly which has been known to reach our shores.

Dr. Sutton said that at one time insects were thought to reach us in ships, but now much research has been done on weather patterns and the arrival of migrant insects.

There followed a brief discussion on migrants and the validity of including some on the British list.

Dr. Sutton then gave a talk on 'The Significance of Spurn Head, Yorkshire, as a Nature Reserve'.

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27th APRIL 1972

A Vice-President, Mr. J. M. CHALMERS-HUNT, in the Chair

The following new members were declared elected: Dr. C. J. Luckens, Mr. J. St. E. Cardew, Mr. J. M. Wilson and Mr. R. J. White.

#### EXHIBITS

Mr. G. PRIOR—Two examples of *Cucullia verbasci* L. (Lep., Noctuidae) reared on Figwort from larvae supplied by Mr. Ralph Whitlock.

Dr. P. A. BOSWELL—Queens and workers of the genus *Lasius* (Hym., Formicidae) to illustrate the role of temporary parasitism in colony foundation by some members of this genus. Included were two queens of *L. mixtus* Nyl. which were taken wandering on the sand dunes at Harlech, Merioneth., 20.iv.72.

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\* Mr. A. M. Hutson of the British Museum (Nat. Hist.) says the flies 'were mainly *Tanytarsus* (*Tanytarsus*) sp. (sensu Edwards 1929). The specimens were not in good condition and nearly all females so specific identification was not possible. Also present was one *Chironomus* (*Polypedilum*) *nubeculosum* Meig.

Donisthorpe's suggestion that newly mated queens of this species remain in their host nest until the spring, when they leave in search of a host nest, would explain this and other similar captures in the spring. The same species was found by the exhibitor on sand dunes on several occasions in the spring of 1967 on the Gower peninsula, Glam. The closely related species *L. umbratus* Nyl. appears however, to seek out a host nest immediately after its mating flight in the late summer. I can find no records of queens of this species being found wandering in the spring.

Mr. A. E. STUBBS—Living examples of two common spring craneflies (Tipulidae): *Limonia tripunctata* Meig., a yellow species with three small black spots on the wings, bred from leaf litter collected at Leckford, Hants, in March; *L. nubeculosa* F. from Newbury, Berks., the species is characteristic in having mottled wings plus three dark rings on the femora.

Mr. & Mrs. T. G. HOWARTH—Two second or third instar larvae of *Tomares ballus* F. (Lep., Lycaenidae) the Provence Hairstreak, feeding on White Clover. The larvae were bred from two ova laid by a female in Moraira, Alicante, Spain, 29.iii.72.

#### COMMUNICATIONS

Mr. R. F. Bretherton announced an award to Dr. G. C. D. Griffiths and another to Mr. C. Pitakpaivan from the Hering Memorial Research Fund.

Field meeting reports were given by Mr. R. F. Bretherton for Effingham, when he reported *Chloroclystis chloerata* Mab. (Lep., Geometridae) on Blackthorn flowers, and Mr. B. F. Skinner for Dartford Heath, who also reported the pug larva. Both Mr. B. Goater and the Rev. David Agassiz reported finding this larva commonly in Hertfordshire.

A talk was given by Dr. M. G. Morris on 'Insect Conservation—Theory and Practice' which he illustrated with slides.

11th MAY 1972

A Vice-President, Mr. J. M. CHALMERS-HUNT, in the Chair

The death was announced of Mr. F. T. Vallins.

The following new members were declared elected: Messrs. D. S. Burroughs, P. A. Cordell, J. B. Fisher and D. A. Lepard.

#### EXHIBITS

Mr. E. S. BRADFORD—Specimens of *Cucullia chamomillae* Schiff. (Lep., Noctuidae) bred from young larvae taken along Faversham Creek, Kent.

Mr. C. F. DEWHURST—Three species of sphingids (Lep.) from Marsabit, N. Kenya, 6.v.71, the larvae of which had been feeding on, and badly damaging, sweet potatoes: *Hippotion celerio* L., *Agrius convolvuli* L. and *Basiothia medea* F.

Dr. P. A. BOSWELL—Workers of the local dolichoderine ant, *Tapinoma erraticum* Lat. from Pyrford, Surrey, 7.v.72. (Also workers of *Lasius niger* L. (Formicidae) with which it is readily confused. However, the gaster of *T. erraticum* is very mobile when the ant is in motion, a characteristic which readily separates it from *L. niger* in the field.

Mr. A. E. GARDNER—A series of the very rare *Rhynchaenus decoratus* Germ. (Col., Curculionidae) taken on *Salix purpurea* L. (Purple Willow), at Leckford, N. Hants, 16.iv.72. Until a single example was taken by Mr. S. A. Williams in June 1970, the only known records for the species appear to be the Solway District of Scotland (Dr. Sharp 1879) and one doubtful record from Suffolk.

## COMMUNICATIONS

Commenting on Mr. Bradford's exhibit, Mr. J. M. Chalmers-Hunt said he had taken a larva of *Cucullia chamomillae* Schiff. at Faversham Creek at two in the morning. Mr. D. O'Keefe added that he had found it in abundance in the same locality and had successfully reared some two-thirds of those he had taken.

Referring to the comments on *Chloroclystis chloerata* Mab. larvae during the previous meeting (see p. 133) Mr. Prior said that Mr. Fenn had found the larvae in Norfolk near Thetford.

Slides of the Russwurm illustrations to the new edition of South's Butterflies were shown by Mr. T. G. Howarth.

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25th MAY 1972

A Vice-President, Mr. J. M. CHALMERS-HUNT, in the Chair

The following new members were declared elected: Messrs. J. L. Fenn, M. Heath, and M. J. Thomas.

## EXHIBITS

Dr. P. A. BOSWELL—An alate queen and workers of *Camponotus herculeaneus* (L.) (Hym., Formicidae), the largest European ant, taken during the Society's field meeting in Normandy, 22.v.72. The ant was nesting in a dead tree on a hillside at Acquigny.

Mr. A. E. STUBBS—*Luciola lusitanica* Charp. (Col., Lampyridae), related to our British *Lampyris noctiluca* (L.), from Parga, Greece, May 1972. The males fly at night over marshy meadows, flashing with a brilliant green glow at about one second intervals. In some areas well over 100 may be in view at once, the majority flashing in phase. The female is wingless and occurs amongst grass; it displays two minute lights which are inconspicuous.

Dr. C. G. M. DE WORMS—*Chloroclystis chloerata* Mab. (Lep., Geometridae) from a locality near Salisbury, Wilts., April 1944, with *C. rectangulata* L. for comparison. The presence of this small pug was made known when Mr. E. C. Pelham-Clinton bred two examples from larvae beaten from *Prunus spinosa* L. blossom in Surrey in May 1971. In April 1972 it was discovered that the larvae were prevalent in many areas among blackthorn over a wide area of southern and eastern England, so that there was evidence that the insect had always been with us, but had been overlooked because of its similarity with *C. rectangulata* L. and the fact that few people may have beaten blackthorn blossom on which the larva of *C. chloerata* Mab. seem to feed exclusively. Now that the species is well recognised and its distinguishing features have been established, it is probable that old specimens may be discovered mixed with *C. rectangulata*. So it proved when a small bred series of *C. chloerata* obtained from blackthorn blossom in the neighbourhood of Salisbury, Wilts., as far back as April 1944, was found in the exhibitor's collection. *C. chloerata* can be distinguished from *C. rectangulata* by the less notched line bordering the outer edge of the central band on the forewing of the former species; but a more satisfactory distinguishing character can be found on the underside of the hindwing where the central black line is very acutely elbowed in *C. rectangulata*, while that in *C. chloerata* is much less acute and even obtusely angled.

## COMMUNICATIONS

Mr. K. G. W. Evans reported that one of the *Chloroclystis chloerata* Mab. he had beaten from blackthorn was actually *C. rectangulata* L.

Referring to the Lepidoptera recently observed, Dr. C. G. M. de Worms reported *Leptidea sinapis* L. (Pieridae) to be in good numbers, as were *Clossiana euphrosyne* L. (Nymphalidae), among the eight species of butterflies noted at Chiddingfold, Surrey; also seen were *Erynnis tages* L. and *Pyrgus malvae* L. (Hesperiidae).

Col. A. M. Emmet reported obtaining larvae of *Endromis versicolora* L. (Bombycidae) from a female taken at Aviemore, Inv., which laid eggs before being liberated.

A paper 'Insects and their Parasites' was read by Prof. G. C. Varley which he illustrated with slides. The paper was followed by a lengthy and interesting discussion.

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8th JUNE 1972

A Vice-President, Mr. J. M. CHALMERS-HUNT, in the Chair

The Chairman welcomed to the meeting Mr. Julian Jumalon of Cebu University, Philippines.

The following new members were declared elected: Mrs. B. R. E. Watson and Messrs. A. M. Barker, J. R. Cooke, L. W. Lowe and G. F. Lepard.

## EXHIBITS

Col. A. M. EMMET—*Stigmella crataegella* Klim. (Lep., Nepticulidae), the first recognised British examples, together with the two species with which it has hitherto been confused: *S. oxyacanthella* Staint. and *S. hybnerella* Hübn. The mines of the three species were also shown. Both *crataegella* and *oxyacanthella* have bright green larvae and the frass in the mine is 'coiled', but the former feeds in July and August while the latter feeds in September and October; both being univoltine. However, *crataegella* larvae have been mistaken for the first brood of *oxyacanthella*. This has been possible because *crataegella* is exceptionally difficult to rear, and, as far as is known, only Dr. J. H. Wood was successful in breeding it about 1890.

He recognised that it was distinct from *oxyacanthella* which is unicolorous, while *crataegella* is fasciate. However, he confused it with *hybnerella*, which was then called *gratiosella* Staint. The two imagines are virtually indistinguishable, though the early stages are quite different, for the larva of *hybnerella* is whitish and the mine consists of a narrow gallery with a fine central line of frass leading to a broad irregular blotch.

Thus *crataegella*, although one of our commonest species of Nepticulidae, has hitherto passed unrecognised through confusion with *oxyacanthella* in the larval state and *hybnerella* as an imago.

Also shown was a living imago of *Ectoedemia (Dechtiria) quercifoliae* Toll. (Lep., Nepticulidae), a species not previously recognised in Britain.

Mr. C. O. HAMMOND—A natural size illustration in water-colour, by the exhibitor, of the very rare butterfly *Prepona praeneste praeneste* from a specimen taken at Chanchamayo, Peru. This is the only red-coloured species in the genus, the others being blue.

## COMMUNICATIONS

Mr. Brian Hargreaves gave a talk 'Illustrating Lepidoptera' which he illustrated with books, examples of his work and materials; he concluded with a series of coloured transparencies of completed plates prepared for publication. The talk was followed by a discussion.

22nd JUNE 1972

A Vice-President, Mr. J. M. CHALMERS-HUNT, in the Chair

## EXHIBITS

Col. A. M. EMMET—*Dechthiria atricollis* Staint. (Lep., Nepticulidae) bred from larvae in hawthorn leaves taken in September to October 1971 at Biggin Hill, Kent. Continental entomologists are currently tending to regard *D. atricollis* and *D. angulifasciella* Staint. as conspecific. *D. atricollis* feeds on apple, pear and cherry, in addition to hawthorn. The pattern of the mine is similar in all these foodplants. *D. angulifasciella* feeds on rose and, reputedly, in *Poterium sanguisorba* L. and the mine is formed differently. Moreover it feeds almost a month later.

Males of *atricollis* have a yellowish-grey pencil of hairs on the costa of the hindwing, which is not mentioned in our textbooks. *D. angulifasciella* has not yet been examined to see if it has a similar character.

Mr. J. M. CHALMERS-HUNT—*Endromis versicolora* L. larvae, nearly full-grown, feeding on *Betula pendula* Roth., from ova deposited by a female taken by Col. A. M. EMMET at Aviemore, Inv., in May 1972.

Mr. G. PRIOR—*Chrysolina menthastri* (Suff.) (Col., Chrysomelidae), taken on water mint at Cosford Mill, Surrey, 18.vi.72.

## COMMUNICATIONS

The shortage of Lepidoptera in evidence so far this season prompted Mr. R. F. Bretherton to compare the captures in his mercury vapour light trap at Bramley, Surrey, this June with those for the corresponding period last year; also shown in comparison are the dusk temperatures. The nightly average moth captures are as follows:

June	1972		1971	
	average catch	dusk temperature	average catch	dusk temperature
1st-7th	21	48.1°F.	66	50.7°F.
8th-14th	15	47.7°F.	87	52.0°F.
15th-21st	35	51.0°F.	93	52.3°F.

The highest nightly totals were: 1972—86 at 54°F. and 1971—220 at 57°F.

From these figures it could be inferred that the basic cause of the dearth of lepidopterous insects during the present month was the lower temperatures.

The question of delayed emergence arose and one member said that some *Euphydryas aurinia* Rott. (Lep., Nymphalidae) he had remained in pupae for 31 days, whereas Frohawk gave a figure of approximately 15 days.

Mr. E. H. Wild reported taking a completely spotless example of *Spilosoma urticae* Esp. (Lep., Arctiidae) at Dungeness, Kent recently. Moths had been in small numbers, though more plentiful than at Tilgate or Ham Street.

Last week-end, said Mr. Bradford, whilst gardening he had disturbed larvae of *Hepialus humuli* L. (Lep., Hepialidae) which was quite late.

At East Blean Wood, Kent, Mr. Chalmers-Hunt had, last year, seen *Mellicta athalia* Rott. (Lep., Nymphalidae) but had failed to find it this year; and Mr. Bradford added that he had seen no butterflies at all in that locality this year.

Cinematograph films in colour with sound were shown, entitled 'Where have all the butterflies gone?' and 'The Lonely Places'. They were introduced by Mr. T. G. Howarth.

13th JULY 1972

A Vice-President, Mr. J. M. CHALMERS-HUNT, in the Chair

The following new members were declared elected: Dr. G. Houghton and Mr. R. F. A. Eley.

#### EXHIBITS

Mr. S. N. A. JACOBS—Specimens of nepticulid Lepidoptera bred from mined leaves of wild rose. These were in two cultures, 9/71 showing heavy frass and following the edge of the leaf, and 10/71 showing the frass in fine pellets and the mine spreading widely across the leaf. The larvae in both cases were whitish green with brown head and plates, and the adults (six from 9/71 and two from 10/71) all look similar though the genitalia have not so far been examined.

Last meeting Col. A. M. Emmet (see page 136) pointed out Dr. Bryan P. Beirne's statement that *Dechtiria angulifasciella* Staint. and *D. atricollis* Staint. were probably biological races of the same species ('The male Genitalia of the British Stigmellidae', *Proc. Roy. Irish Academy*, L. Section B. No. 9:205). The mines of culture 9/71 closely resemble those associated with *D. atricollis* in apple, while those in culture 10/71 are those normally associated with *D. angulifasciella*.

The two cultures were taken from different rose bushes in the same locality at Shoreham, Kent, on the same day, so that it would not be unreasonable to assume that all the heavy frass mines came from the progeny of one female while the light frass mines came from another. If the two cultures are indeed conspecific, the vastly divergent mines must result from some genetic influence.

Mr. M. W. F. TWEEDIE—A series of *Spilosoma lubricipeda* L. from Chyenhall near Penzance, Cornwall; and also from Rye, Sussex. The Cornish moths are far more heavily marked with black than those from south-east England.

Col. A. M. EMMET—*Ectoedemia* (= *Dechtiria*) *quercifoliae* Toll and *E. subbimaculella* Haw. These two species had not been recognised as distinct until last autumn. The larva of *subbimaculella* has a dark brown head and makes a slit in the cuticle of the oak leaf which it mines, some of the frass dropping out by the action of gravity through the slit. The larva of *quercifoliae* has a much lighter red-brown head, and makes no slit in the cuticle. Both species feed in November often in fallen leaves.

On the Continent the distinction between these species is recognised, but there is a tendency, mistaken in the exhibitor's opinion, to regard *quercifoliae* as conspecific with *E. albifasciella* Hein., which makes a somewhat similar mine, though with constant mine differences. Both species are univoltine, but *albifasciella* feeds two months earlier than *quercifoliae*.

Long series of *quercifoliae* and *subbimaculella* were shown. No entirely reliable point of difference has been detected, but in the majority of examples the crown of the head in *quercifoliae* is much darker and the white patch along the base of the wings, extending outwards along the dorsum, is larger and more conspicuous.

The genitalia of these specimens have not yet been examined, but according to Continental authorities there are no detectable differences in the genitalia of *albifasciella*, *subbimaculella* and *quercifoliae*; that they allow *subbimaculella* and *quercifoliae* to be distinct, but equate *quercifoliae* and *albifasciella*, smacks of inconsistency.

Mr. A. E. STUBBS—The following Diptera (Rhagionidae): *Rhagio annulata* (Deg.), *R. scolopacea* (L.), *R. tringaria* (L.) and *R. strigosa* Meig., all from Bix Bottom, Oxon., 27.v.72.

Mr. C. O. HAMMOND—A photograph of the giant hogweed *Heracleum mantegazzianum*, Sommier & Levier; the first to establish itself in Trent Park, Cockfosters. The picture as taken 14.vi.72. This superb specimen stood 10 ft. 4 inches high.

#### COMMUNICATIONS

Dr. C. G. M. de Worms reported that *Plebejus argus* L. (Lep., Lycaenidae) was just out at Portland, but he had seen no *Sterrha muricata* Hufn. (Lep., Geometridae) this season.

Male *Anthocharis cardamines* L. (Lep. Pieridae) were reported to be out in Cornwall on 4th and 5th July, by Mr. M. W. F. Tweedie. In response to a question regarding the type of locality, Mr. Tweedie said it was sallow scrub in a marshy situation. Mr. J. M. Chalmers-Hunt said the species appeared to be more common in the west than in the east, particularly in marshy situations.

Mr. Chalmers-Hunt reported rearing *Euspilapteryx pyrenaeella* Chrét. (Lep., Lithocolletidae) from material taken on the Isle of Wight meeting on 10th and 11th June.

The capture of a female example of *Necrodes littoralis* (L.) (Col., Silphidae) at mercury vapour light in Pheasant House Wood, Little Baddow, Essex, on 24.vi.72, was recorded by Mr. F. D. Buck. As far as he could ascertain there was only one previous Essex Record, that of a male taken by S. R. Ashby in Epping Forest at Chingford, in 1901.

A talk 'Quaternary Entomology' was given by Dr. G. R. Coope, illustrated with coloured transparencies.

#### 27th JULY 1972

A Vice-President, Mr. J. M. CHALMERS-HUNT, in the Chair

The following new members were declared elected: Messrs J. G. Coutsis, D. G. Chelnick and P. M. Sterling; The Lancashire and Cheshire Entomological Society was elected a corporate member.

The Chairman welcomed Mr. Hisakaza Hayashi, from Osaka, to the meeting.

#### EXHIBITS

Mr. G. PRIOR—A bred example of *Bapta distinctata* H.-S. (Lep., Geometridae) from Effingham, Surrey, stock.

Mr. E. S. BRADFORD—Four examples of *Agonopterix putridella* Schiff. (Lep., Oecophoridae) from Faversham, Kent, and four examples of *Infurcitinea argentimaculella* Staint. (Lep., Tineidae) from Herts.

Mr. K. G. W. EVANS on behalf of Mr. L. H. EVANS—Following the exhibit made last year (1972, *Proc. Brit. ent. nat. Hist. Soc.*, 5(1):27) of the beetle *Trichius fasciatus* (L.) (Scarabaeidae) from Hundred House, Radnor, a further visit was made this year to the same locality, 1-14.vii.72. Further living examples were

shown from a colony in large decaying trunks of Alder. One trunk of some 24 inches diameter was found to be heavily infested with many pupae lying just below the lifting bark and in large beds of frass. With the season so late the emergent adults had not yet taken to flight. All the trunks were also heavily infested with *Sinodendron cylindricum* (L.) (Col., Lucanidae).

Mr. F. D. BUCK—Seed heads of Pearl Grass, a cultivated form of Quaking Grass, which had formed in a spiral fashion. Normal seed heads were also shown for comparison.

Mr. T. J. WILKINSON—*Lophopteryx cucullina* Schiff. (Lep., Notodontidae) caught at mercury vapour light on Shoreham Downs, near Sevenoaks, Kent, 22.vii.72, showing the natural camouflage of the species not usually seen in set specimens.

Col. A. M. EMMET—Three *Clepsis spectrana* Treits. (*costana* sensu F.) (Lep., Tortricidae), including a melanic female, bred from *Artemisia vulgaris* L. growing beside the river Mersey at Manchester, early in May; also mines of *Heliozela stanneella* F.R. (Lep., Heliozelidae) from Epping Forest, 27.vii.72.

Mr. L. K. EVANS—*Sterrha vulpinaria* H.-S. (Lep., Geometridae), two specimens from Croydon, Surrey, taken at mercury vapour light, 26.vii.72. The species has been established in N.W. Kent, but has spread into Surrey in comparatively recent times. It is now not uncommon in the Croydon area and since 1965 has been seen at Norbury, West Norwood, Streatham and Shirley; and more recently further south in this area.

Mr. C. O. HAMMOND—*Megamerina loxocerina* Fall. (Dipt., Megamerinidae) from Northaw Great Wood, Herts., 16.vii.72. This is the sole British representative in the family. In life this fly closely resembles small ichneumon flies both in its appearance and by its habit of running about quickly over leaves. Two examples were presented to the Society.

Mr. J. M. CHALMERS-HUNT—A dipterous larva taken in Kiln Wood, Kent, subsequently determined as a syrphid.

Mr. A. E. STUBBS—Two examples of *Tipula nigra* L. (Dipt., Tipulidae) taken beside the Kennet and Avon canal at Thatcham, Berks., 18.vii.72. Of the 60 species of British *Tipula* this is the only black one; it is very local.

#### COMMUNICATIONS

Referring to Mr. Evans' *Sterrha vulpinaria* H.-S., Mr. R. F. Bretherton said he had taken it at Slades Green, Surrey, sitting on elm leaves. Mr. Chalmers-Hunt said the larva was not known, even on the Continent, but he believed it to be associated with elm; he had had the species in his light trap at West Wickham, Kent. Mr. E. H. Wild said he gets it in his garden at Selsdon, Surrey, Mr. S. N. A. Jacobs had seen two on hawthorn in his garden at Bromley, Kent and Dr. C. G. M. de Worms reported it from Portland, Dorset.

Mr. Chalmers-Hunt reported seeing an example of *Eupithecia haworthiata* Doubl. (Lep., Geometridae) in a train carriage on the way to the meeting. He said it was one pug that could always be readily determined by the dull orange patch on the dorsum of the first abdominal segment. On the Berkshire downs he had noted two male *Melanargia galathea* L. (Lep., Satyridae), and he had seen two *Limenitis camilla* L. (Lep., Nymphalidae) at Ham Street, Kent.

An example of *Nola albula* Schiff. (Lep., Nolidae) was reported by Mr. Bretherton from his light trap at Bramley, Surrey.

Col. A. M. Emmet reported that Mr. G. A. Pyman had two *Enargia paleacea* Esp. (Lep., Noctuidae) in his trap at Little Baddow, Essex, 23.vii.72. The species feeds on birch.

On 14th July, said Mr. Wild, he had found *Celerio galii* Schiff. (Lep., Sphingidae) on a path at Walberswick, Suffolk, and shortly afterwards a colleague had found another.

Both male and female *Melissoblaptis zelleri* Joan. (Lep., Pyralidae), rarely seen in flight, were reported to have been coming to light at Sandwich, Kent, in some numbers.

It was queried if *Lophopteryx cucullina* Schiff. (Lep., Notodontidae), taken at Dungeness and Sandwich, Kent, at light, might not be migrant, but Mr. Chalmers-Hunt doubted this. He said night temperatures had been high and flight ranges had probably been extended.

Dr. C. G. M. de Worms commented on the Lepidoptera in the New Forest, Hants, and in Wiltshire. Butterflies, he said, were generally scarce. In the New Forest *Argynnis paphia* L. (Nymphalidae) was low in numbers and *Limenitis camilla* L. (Nymphalidae) was anything but plentiful. The larvae of *Gonepteryx rhamni* L. (Pieridae) were still quite small.

*Gonepteryx rhamni* L. had been seen ovipositing on 22nd July by Mr. S. N. A. Jacobs.

Mr. Bretherton said he had to date seen no *Apatura iris* L. (Lep., Nymphalidae), only one *Limenitis camilla* L., but the ringlet numbers were well up.

It was pointed out that in normal seasons *Gonepteryx rhamni* L. oviposits only after hibernation.

*Papilio machaon* L. (Lep., Papilionidae) larvae, said Mr. Wild, had only just hatched and were very scarce. Other members reported *Pyrgus malvae* L. (Lep., Hesperidae) in flight and fresh on 23rd July and *Thymelicus lineola* Ochs. (Lep., Hesperidae) had turned up at mercury vapour light trap on 22nd July.

Several *Vanessa cardui* L. (Lep., Nymphalidae) had been seen in the New Forest during the previous week by Dr. de Worms.

Referring to the recent interest in *Chloroclystis chloerata* Mab. (Lep. Geometridae) (see 27th April, p. 133) Col. A. M. Emmet said he had been looking over his series of *C. rectangulata* L. and discovered he had four examples of *C. chloerata* included. One had been taken at Saffron Walden in 1948, two at Oxford in 1951 and the other had been bred from hawthorn. Mr. Bretherton asked if anyone had caught a feral imago of this species this year, but nobody had. Mr. D. W. H. ffennel, it was reported, had run a mercury vapour light trap in his garden at Winchester, Hants, for many years and only this year had found the larva in his garden.

The larva of *Panaxia dominula* L. (Lep., Arctiidae) was reported, by Mr. Wild, to have been found by Mr. K. N. Gravenor, feeding on *Ranunculus repens* L. (Creeping Buttercup). Several members agreed that the species was a catholic feeder, but nobody could remember a previous instance of the moth eating a buttercup species—which was regarded as a poisonous group of plants.

Last autumn Mr. Bradford's attention had been drawn to the emergence of *Pyralis farinalis* L. (Lep., Pyralidae) from the grating below a domestic boiler. Two floorboards had been lifted and a certain amount of stable debris on which the insect had been feeding had been discovered between the joists. It appeared that the kitchen in which the boiler stood had been built over a site previously occupied by a stable.

Referring to Col. Emmet's *Clepsis spectrana* Treits., Mr. Bradford said he had bred some from *Epilobium*, and cast some doubt on the identity of the melanic example. Mr. Jacobs, however, said he had two or three melanic examples of this species and was satisfied with the determination, and so was Mr. R. W. J. Uffen who also had a melanic example. The moth, it appeared, favoured a wide range

of foodplants, and thistle and Yellow Loosestrife were cited. Attention was also drawn to its inconsistent feeding method, sometimes mining and sometimes external; and Mr. Uffen said he had known an instance where a larva had both spun and mined at the same time.

There followed a discussion on:

#### THE NEXT 100 YEARS OF THE SOCIETY

The discussion was opened by Mr. S. N. A. Jacobs who said that over the 49 years he had been a member there had been really no change in the Society's character. It had been a Society of mainly amateur membership with a small professional element. The friendly atmosphere was an outstanding feature over these years and with it went assistance and advice, particularly for the younger member and the beginner.

He was not so optimistic about the next 100 years; a more professional attitude may well develop; the use of computers could well bring the use of numbers instead of names, and by using this kind of aid the 'splitters' might substantially alter our approach to taxonomy. A downward trend, he thought, was to be expected.

Dr. C. G. M. de Worms endorsed Mr. Jacobs' views. Professionalism was, he said, gaining ground and we were seeing more and more high-brow theses on distribution, etc., being published. He hoped this would not take place in our Society. The Society, he hoped, would not change and we should continue on the same basis and status.

Mr. L. K. Evans was not too pessimistic. For a long time yet the work of the collector would be required.

Referring to the professional and amateur relationship in the Society, Mr. J. M. Chalmers-Hunt said the amicable basis on which the professional entomologist met the amateur at our meetings, both indoor and in the field, was a significant feature of the Society; and Mr. G. Prior added that it was unlikely that this aspect will change because those professionals who do not want to meet in this atmosphere will not join.

The relationship between these two elements in the Society was on a higher level now than ever before, said Mr. Bretherton. Over the years professional members and amateur members had grown closer together, and this particularly applied to those members who were on the staff of the British Museum (Nat. Hist.).

A most important issue, continued Mr. Bretherton, was the size of the Society. Should we be bigger? The modern trend was for organisations to become larger for economic reasons; but if we did grow from our present 600 to, say, 1200 we *would* be different. No longer could we meet in rooms such as those which we are in tonight, for though all our members do not, nor indeed could not, attend meetings, our present accommodation could not cope with a much larger membership.

Mr. K. G. W. Evans agreed with Mr. Bretherton that the membership was the key to the character of the Society. They, he said, are the only people who can change the Society. He did, however, point out that a reduced membership could cause us considerable problems and that we must continue our efforts to keep membership up.

It was Mr. E. S. Bradford's opinion that over the next 100 years the working week would be progressively reduced and thus more time being available, the amateur would become more professional in his approach.

Drawing attention to the range of the addresses of members who attend our

meetings, Mr. R. W. J. Uffen pointed out that we have members travelling in from 50 miles outside London in one direction and from 50 miles outside London in the opposite direction; a range of 100 miles between them. It was a rare Society that drew its attendance membership, particularly on a regular basis, from such a wide area, and it therefore followed that the Society must be offering something out of the ordinary to attract members from these distances. He believed it was the all-pervading friendly atmosphere overlying a common interest that was responsible; that must be carefully fostered over the next 100 years.

The one thing we must do, said Col. A. M. Emmet, is provide members with what they want. In spite of the wide area our attendance membership comes from, there is still a large number of members living too far away to reach our meetings. To satisfy the needs of these members we should aim to publish more.

Mr. T. G. Howarth said that a large part of the subscription was in fact spent on publications and to increase our present commitment required larger membership. The present acceleration in population growth combined with greater leisure potential may very well provide such an increase. We should continue to emphasise our present policy of encouragement to the young and the inexperienced. He envisaged a membership of 900 to 1000 in 100 years' time. He took note of the question of accommodation and regretted that the communal building for scientific societies at one time proposed for the South Bank did not materialise to the extent that a home could be found for societies such as ours. It was to be hoped that the idea was not dead and that in the next 100 years such a project might reach fruition.

The increasing population of these Islands with its attendant demands on the environment prompted Mr. Wild to draw attention to the undoubted demand for conservation, but he thought the professional 'semi-conservationist' is wrong in his approach particularly that of closing areas to the collector.

Conservation, said Mr. F. D. Buck, must play a major part in our activities during the next 100 years. It should be a conservation by habitat role and not just a 'protect this species' effort. The closing of reserves to all by conservationists was to be condemned, but, Mr. Buck pointed out, it was less the professional conservationist that was responsible than the amateur who was interested only in his own field of study. Conservation must be on the broadest basis. A further point is those who do have permission to work in reserves should 'earn their corn', not only by actively helping to conserve but by providing the reserve authority with records of captures and observations.

With the present demand on land for housing, industry, leisure parks, etc., continued Mr. Buck, the conservationist is tending to grasp anything for a reserve and we are sometimes acquiring nature reserves of uneconomic proportions; 10, 11, 12 acre sites, which are hardly large enough to conserve anything and unless there is a 'closed' policy on these small sites they could be trampled out of existence in the not too distant future.

Collecting was, he said, an activity that must be phased out eventually. Its place should be taken by recording with the camera. Collecting will still be necessary, but collecting for the cabinet is largely self-indulgent and while in some Orders is acceptable, and indeed necessary, it should be pursued with the greatest caution, and where possible eschewed altogether.

Mr. S. A. Knill-Jones replied quite categorically that the incidence of over-collecting was nil, and Mr. Chalmers-Hunt said one can best learn only by collecting. Mr. K. G. W. Evans added that we should not get so many interested without collecting; but to this Mr. S. N. A. Jacobs replied that we must under no circumstances forget that we also are part of the ecology.

It has now been illegal for some time, said Mr. Prior, to take birds eggs, but a number of birds so protected are being shot by farmers because they are now pests.

Photography, it was pointed out, was expensive and a job for the professional; further, some work must be done by collecting. In reply Mr. P. A. Goddard said that photography was equally effective as collecting, and that stalking with a camera was more informative than collecting. Further, he denied photography was a job for the professional. He was certainly not a professional, yet he believed his insect photography could effectively stand beside anybody's. Mr. Chalmers-Hunt expressed the opinion that photography and collecting should go hand in hand.

The fact that we, too, are part of the environment struck a sympathetic note with Mr. Bradford who felt that perhaps the United Nations might be asked to look beyond the Human Rights Charter to consider the Rights of Life in all its aspects.

A different line of thought was taken by Mr. A. E. Stubbs. With the exploding world population and its demands on world resources we may possibly have to adopt a new line of thought regarding western society by the turn of the century. The consumption of oil by then may have restricted private transport so that only public transport may be available to most people, and this in turn may limit how far they can travel, and where to. Thus access to field localities may be reduced to the availability of public transport.

He also said it was a sad reflection on our membership's attitude to conservation that replies to his request for information regarding the proposed Benfleet Country Park, published in our Proceedings (4(3):101) produced only two replies.

Comparison with birds eggs was, Mr. Stubbs continued, unfair, as in this case adequate reference collections were available.

Mr. Buck said this was precisely the point. In certain fields of natural history adequate reference collections were available and some fields, like ornithology and botany, excellent illustrated literature could be used. As insect collections became available in such places as local museums and societies like ours, private collections became less necessary.

Another view was that we appear to have a pessimistic outlook. Fifty or so years ago a trip to Southend was an exceptional treat; now we get out each weekend and travel widely. Far from declining it was envisaged that transport would become cleaner, cheaper and faster, and that in 100 years' time one might be seeing regular collecting trips, not to the New Forest, Wicken Fen or Aviemore, but to Australia or New Guinea.

With regard to ornithology and photography, one member drew attention to the fact that nesting birds could not now be photographed.

Reference was made to the Joint Committee for the Preservation of British Insects, its Code and list. It was suggested that standards might now be set for museums and also for those who sell insects.

Today, said Mr. Wild, the Biological Records Centre was compiling distribution records for a wide range of animals and plants. Some of these schemes were initiated by interested societies, but we had taken no lead in this field. Compiling records and organising data could have been a function of this Society and Mr. Stubbs agreed.

Subsequent to the meeting Mr. K. W. Mardle, in a letter, made the following comments: (1) Although Philip Goddard explained how photography illustrates the habitats and behaviour of insects, while collecting only indicates the morphology, I think that both photography and collecting can be combined to act as one.

I photograph those insects which are in an unusual situation or displaying unusual behaviour, and collect material which cannot be identified in the field. I think also, that more emphasis could be placed on the actual study of the insects and their relationships with their environment; it is all very well photographing and collecting, but it seems that very little study of the living insects in the natural surroundings goes on.

(2) The point was made that foreign insect fauna will be within the reach of the future British amateur entomologist. That is no excuse to slacken our efforts to conserve what insects we do have in this country. For example, if urban development destroys most of those insects which pollinate flowering plants, there will be very little of the latter occurring in England either.

In conclusion, increase in membership is obviously needed, but this cannot be done if the Society has little to offer the prospective members. I would like to see the activities of the Society bend towards the actual study of insect behaviour (looking more deeply into habitats and observing the activities of the insects) and conservation. I would also like to see more sideline activities, such as illustrators and modellers coming to the fore.

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14th SEPTEMBER 1972

A Vice-President, Mr. J. M. CHALMERS-HUNT, in the Chair

The deaths were announced of Mr. J. L. Atkinson, Mr. R. C. Edwards and Miss B. A. Thorn.

EXHIBITS

Mr. E. H. WILD—A female *Lasiocampa quercus* L. (Lep., Lasiocampidae) showing almost male coloration with traces of yellow basal patches; bred from a normal female from Kingston, E. Dorset, taken in August 1971. It was one of three females from the same batch of eggs, the other two resembling the parent.

Mr. R. G. KEMP—A bilateral gynandromorph *Ortholitha chenopodiata* L. (*limitata* Scop.) (Lep., Geometridae) from Cliffe Marshes, near Rochester, Kent, 14.vii.72

Mr. R. W. J. UFFEN—Two *Vespula* (Hym., Vespidae) wasps to show how colour could be retained by proper preparation. The method used was to slit the venter of the abdomen and place the specimen in methylated spirit. He also showed a *Polyplocia ridens* F. (Lep., Thyatiridae) from Epping, Essex.

Mr. R. F. BRETHERTON—A living example of *Blaps mucronata* Lat. (Col., Tenebrionidae) from the tower room of an ancient church in north Devon, 12.viii.72, and which had lived in the pill box ever since without food or water.

Mr. E. S. BRADFORD—A larva of *Hepialus humuli* L. (Lep., Hepialidae) and 1,735 chalcidoids that had emerged between 2nd and 6th August 1972. The larva was found while digging the garden in late June 1972.

Mr. B. F. SKINNER—A male *Apamea lateritia* Hufn. (Lep., Noctuidae), taken in the exhibitor's garden in S.E. London at mercury vapour light, 17.vii.72. Although a fairly common and widespread species in Europe it had only been recorded once before in Britain, from Glamorgan in 1887. A second specimen visited Mr. D. O'Keefe's trap at Bexley, Kent, the following night, but eluded capture. Strong north-easterly winds prevailed at the time and a number of *Celerio galii* Schiff. (Lep., Sphingidae) were also recorded between 15–21.vii.72.

Mr. A. E. GARDNER—*Hypocoelus oxelai* Palm (Col., Eucnemidae) taken on a dying beech, 12.vii.72, in Bere Forest, S. Hants. Wood showing exit holes was also shown.

## COMMUNICATIONS

The chairman announced that Mr. Kirby was leaving to read for an honours degree at Manchester. He had been our recorder for some time and would be succeeded by Mr. E. S. Bradford.

Mr. J. M. Chalmers-Hunt announced that Mr. P. A. Goddard had presented a large number of photographs of Lepidoptera to the Society. These had been arranged and placed in albums by Mr. E. S. Bradford. The meeting expressed its thanks to both members.

The recent catch at mercury vapour light traps was referred to by Mr. R. F. Bretherton. He said that the first week in September had been dry, clear and with a north-easterly wind. His trap had attracted a lot of moths, up to 100 a night, but all had been mid-August to end of July species. Since then the weather had worsened and there were no September species at all yet.

Mr. E. H. Wild agreed with Mr. Bretherton and said he had obtained *Lomaspilis marginata* L. (Geometridae).

Referring to the chalcid flies Mr. Bradford exhibited, Mr. S. N. A. Jacobs said he thought these flies laid polyembryonic eggs and that several larvae emerged from each egg.

*Blaps* species of beetle, said Mr. Buck, fed on a variety of things, though in most cases a little fungoid growth was present. He cited old potatoes, farinaceous foods and the droppings of rats and mice. He also said these insects could go for a long time without food or water. The genus was closely related to the *Pimelia* and *Ocnera* genera of the North African desert, where *Blaps* was also well represented; and in these conditions long periods passed when food and water was either not available or in short supply.

Coloured transparencies were shown by Dr. P. A. Boswell, Mr. G. Roche, Mr. E. S. Bradford and Mr. C. O. Hammond.

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28th SEPTEMBER 1972

A Vice-President, Mr. J. M. CHALMERS-HUNT, in the Chair

The following new members were declared elected: Mrs. J. M. Milner, Messrs. P. A. Abury, P. J. Croft, H. Hayashi, P. J. Jewess and R. H. Mays.

## EXHIBITS

Col. A. M. EMMET—(1) Unidentified mines of a *Phyllonorycter* species (Lep., Lithocolletidae) mining the upper side of beech leaves, from the Gog Magog Hills, Cambs., early in September. *Phyllonorycter faginella* Zell. mines beech leaves but on the underside. The exhibited mines could be that species mining the wrong side of the leaf, another British species usually associated with a different plant, or a species new to Britain. (2) Nepticulid mines in *Cotoneaster simonsi* Baker taken by Mr. E. C. Pelham-Clinton on the island of Rhum, Inv., in 1969. These appear to belong to *Nepticula cotoneastrella* in which case they are a species new to the British list. There appears to be some doubt, however, if *N. cotoneastrella* is in fact a good species.

Mr. C. F. DEWHURST—A male *Tettigonia viridissima* L. (Salt., Tettigoniidae) from Dorset, 23.ix.72; two others were seen and more were heard stridulating. He also showed two female *Ectobius panzeri* Steph. (Dict., Blattidae) one of which was carrying an ootheca, taken Pembrokeshire, 11.ix.72, among sand dunes. Of nine examples seen only one was a male.

Mr. C. O. HAMMOND—*Callicera spinolae* Rond. (Dip., Syrphidae), a female caught in the Woodland Garden at Houghton Hall, W. Norfolk, 19.ix.72, the first record for the county. The three previous British captures were all from Suffolk: one female Southwold, 1.x.28, J. W. Bowhill; one female Brandeston Marshes, 10.ix.42, C. Morley; and one female Monks Soham, October 1947, C. Morley. The male has not yet been taken in Britain.

Mr. L. EVANS—Two unidentified species of millipede from the Transvaal.

Mr. J. M. CHALMERS-HUNT—The fungus *Daldinia concentrica* Ces & de Nat.

#### COMMUNICATIONS

Dr. F. B. Hora gave a talk on 'Fungi' which he illustrated with coloured transparencies and which was followed by a lengthy and interesting discussion.

12th OCTOBER 1972

A Vice-President, Mr. J. M. CHALMERS-HUNT, in the Chair

The death was announced of Mr. A. M. Morley.

#### EXHIBITS

Dr. P. A. BOSWELL—Larvae and adults of *Himacerus mirmicoides* (Costa) (Hem., Reduviidae) taken on various dates during the second half of August 1972 on overgrown allotments at Old Woking, Surrey. The young larvae are mimics of the *Lasius niger* group of ants, while the older larvae mimic the *Formica fusca* group. At one time it was thought that the bug larvae were intimately connected with the ants they mimic. This, however, is not now believed. *Lasius niger* L. is common where these larvae were found but the nearest nest of *Formica fusca* L. is at least 100 yards away. Workers of the ants mimicked were also shown for comparison.

Mr. G. PRIOR—(1) The larvae of an undetermined hemipterous species beaten from Juniper at Watlington, Oxon, 7.x.72. (2) Examples of the larvae of six species of Pugs from the Thetford area of Norfolk. They were: *Eupithecia centaureata* Schiff., *E. succenturiata* L. *E. absinthiata* Clerck, *E. icterata* Vill., *E. trisignaria* Hübn. and *E. tripunctaria* H.-S.

Mr. J. M. CHALMERS-HUNT—A reproduction of the photograph showing the 'ghostly' face of Mr. C. S. Gregson reproduced in *Ent. Rec.*, 12:Pl. 9.

Mr. T. G. HOWARTH—A fully grown larva, pupae and adults of *Catopsilia florella* F. (Lep., Pieridae), the African migrant from Gran Canaria, Canary Islands. The early stages were collected at San Augustin, Gran Canaria in October, by Dr. J. F. Perkins. The species was recorded from the archipelago for the first time in 1964 and has since become common on that island and Tenerife. According to Dr. Perkins it was only found on its larval foodplant *Cassia* in the garden of his hotel where the plants were watered regularly. The exhibitor drew attention to the remarkable resemblance of the larva and pupa to the leaves and stems of the foodplant which it greatly enhanced by the yellowish lateral stripe of both stages.

#### COMMUNICATIONS

The current month, said Dr. C. G. M. de Worms, had been remarkable with respect to Lepidoptera. He had spent two nights at Portland, Dorset, when there had been no wind, and there had been a great many moths. Among the usual species were: *Aporophyla lunula* Stroem. (*nigra* Haw.), and *Agrotis ipsilon* Hüfn.

A single example of *Palpita unionalis* Hübn. (Pyrilidae) which he had not seen for many years was also obtained. There were also a few *Plusia gamma* L. (Plusiidae) present.

Butterflies were not plentiful but he particularly noted *Pararge aegeria* L. (Satyridae). However, at Seaton, Devon, things were better and Mr. Woollat said *Vanessa atalanta* L. (Nymphalidae) were in fair numbers.

He had been fortunate to catch *Celerio galii* Schiff. (Sphingidae) in July and had also captured a *Euplagia quadripunctaria* Poda (Arctiidae) with almost no white on its forewings at all.

Reporting on the captures from his mercury vapour light trap, Mr. E. H. Wild said that in the first ten days of October his catch had increased considerably. His trap performance over the past four months was:

July	9922 moths of 176 species
August	1841 moths of 103 species
	(last 2 weeks only)
September	2312 moths of 65 species
October	1893 moths of 49 species
	(first ten days)

Notable insects were: *Pheosia gnoma* F., fresh, 1 & 7.x.72; *Leucania pallens* L. second brood not out till October; *Lampra fimbriata* Schreber 3 & 4.x.72; *Eupithecia pulchellata* Steph., fresh, 7.x.72; *Rivula sericealis* Scop., 7.x.72; *Euxoa nigricans* L., 9.x.72; *Mesographe forficilis* L., 9.x.72; *Herculia glaucinalis* L., 7.x.72.

He queried if *H. glaucinalis* L. might not be double brooded since he had last seen it on 29th July, *Mesographe forficilis* L. had also reappeared after a break having been last seen on 13th September, prior to which it had appeared nightly.

Mr. R. F. Bretherton said he gets *Herculia glaucinalis* L. most years as a second brood which is generally somewhat smaller. His trap was still attracting enormous quantities of *Noctua pronuba* L.

Between 6th and 8th October, Mr. R. W. J. Uffen had been working on the saltmarsh between Tilbury and Stanford-le-Hope, Essex, and had seen *Cochylis hybridella* Hübn. flying. The *Coleophora* he had found feeding on *Aster tripolium* L. came out only the previous evening (11th). *Cucullia asteris* Schiff. larvae were found from half to full grown and a few *Plusia gamma* had been noted flying in the afternoon. *Plutella maculipennis* Curt. was also seen in flight on the marshes. Pasture behind the sea wall was so dry that many *Tipula paludosa* Meig. were ovipositing in cow pats.

Ten days previously Mr. J. M. Chalmers-Hunt had found the larva of *Evergestis extimalis* Scop. at Dartford, Kent, on *Diplotaxis tenuifolia* (L.) DC. The species was local but abundant and the colony ranged from quite small larvae to full grown examples and some were preparing to pupate.

Dr. C. Hawkes stood in for Dr. N. E. Hickin who was unable to attend and introduced the film 'The Woodborers' which he supported with some coloured transparencies. The film was followed by a lively and interesting discussion.

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26th OCTOBER 1972

A Vice-President, Mr. J. M. CHALMERS-HUNT, in the Chair

The death was announced of Major A. W. Collier.

The following new members were declared elected: Messrs. T. J. Blackman.

B. Chesney, R. E. Cutter, A. St. J. Green, P. K. Merrifield, A. J. MacLellan and A. Lewis.

#### EXHIBITS

Mr. S. A. WILLIAMS—*Oxytelus (Tanycraeus) piceus* (L.) (Col., Staphylinidae) taken at Denny Lodge, New Forest, Hants, 6.x.72. The species occurred in numbers in a large compost heap consisting of garden refuse mixed with the rotting bodies of squirrels and other 'pests'.

Col. A. M. EMMET—A *Coleophora* case on *Poterium sanguisorba* L. from Featherbed Lane, Surrey, taken that afternoon. He suggested it might prove to be *C. gryphipennella* Bouch. (Lep., Coleophoridae), and showed an example for comparison, though this species usually feeds on rose, closely allied to *Poterium*.

Mr. A. E. STUBBS—Two rare species of Diptera new to Wales. *Paraclusia tigrina* (Fall.) (Clusiidae), a male taken with others, on dead wood on the trunk of a live beech tree, near Brecon, 24.ix.72. The only recent records are from Wychwood, Oxon and Knowle Park and Bromley, Kent. *Paloptera scutellata* Mcq. (Pallopteridae), a female swept from *Juncus effusus* L. near Abergele, Denbigh., 17.x.72. Most records for this species are from south of the river Thames.

Dr. P. A. BOSWELL—*Exochomus quadripustulatus* (L.) and *Chilochorus bipustulatus* (L.) (Col., Coccinellidae) from Woking, Surrey, 26.x.72. Both were very common on birch though *E. quadripustulatus* is said to be usually found on conifers. Conifers and heather were also plentiful in the area, but few were found on these. Aphids were very common and active on the birch although not many leaves were left. However the majority of the beetles were resting on the smaller birches away from the foliage and the aphids.

Mr. K. C. SIDE—*Apoderus coryli* L. from Ham Street, Kent, 17.x.72, on hazel, an exceptionally late date for this insect.

#### COMMUNICATIONS

A pair of *Vespula germanica* (F.) (Vespidae) were reported to have been seen *in cop* at 9 a.m. in Bromley, Kent, 25.x.72; an extremely late pairing.

*Monopis rusticella* Hübn. (Lep., Tineidae) was seen in West Wickham, Kent, the previous day (25th) by Mr. J. M. Chalmers-Hunt; and Mr. P. J. Baker recorded *Vanessa cardui* L. and *V. atalanta* L. (Lep., Nymphalidae) on Michaelmas Daisy at Virginia Water recently.

Mr. J. Heath said that five examples of *Nymphalis antiopa* L. (Lep., Nymphalidae) had been recorded at the Biological Records Centre this year and Mr. Wilson added a sighting in Herts in early September.

The status of the Clouded Yellow species of butterfly this year was raised by Mr. Chalmers-Hunt, and Mr. Heath said none at all had been reported. There was, he added, virtually no migration this year.

Referring to Dr. Boswell's exhibit, Mr. F. D. Buck said that in an irregular fashion some species of ladybird tended to concentrate in one place to hibernate; under loose bark, sacking, in sheds, etc., and what Dr. Boswell had seen was probably the beginning of a similar convocation.

Mr. J. Heath of the Biological Records Centre, Monks Wood, gave a talk, illustrated by coloured slides, on 'Mapping the Invertebrates of Europe'. An animated and constructive discussion followed.

9th NOVEMBER 1972

A Vice-President, Mr. J. M. CHALMERS-HUNT, in the Chair

The following new members were declared elected: Messrs. S. J. Bondi, J. P. Burnie, D. L. E. Conn, R. G. Lecke and G. J. Walden.

## EXHIBITS

Mr. R. F. BRETHERTON—Larvae of *Orgyia recens* Hübn. (Lep., Lymantriidae) in their third instar *ex ovis* laid in early September this year, they are F<sub>3</sub> from Yorkshire stock.

Mr. E. S. BRADFORD—An example of *Cryptoblabes gnidiella* Mill. (Lep., Pyralidae) bred from a pomegranate bought in Boreham Wood, Herts, two weeks previously. The moth emerged on 7th November. He also showed the pomegranate with a pupa of the same species *in situ*.

Mr. A. E. STUBBS—(1) Three scarce fungus gnats (Dipt., Mycetophilidae) from Bix Bottom, Oxon: *Ditomyia fasciata* (Meig.), *Coroplatus testaceus* Dalmon *Cerotelion lineatus* (F.). (2) A pamphlet 'Wildlife Conservation and Dead Wood'.

Mr. A. E. GARDNER—Two species of curculionid Coleoptera taken in flood refuse at Brockenhurst, New Forest, Hants., 17.iii.72: *Tropiphorus elevatus* (Hüb.) (*carinatus* (Müll)); and *Liosoma pyrenaicum* Bris. v. *troglydytes* Rye.

## COMMUNICATIONS

A report on the field meeting held at Rowney Wood and Madingley was given by Col. A. M. Emmet.

Dr. C. G. M. de Worms gave a talk on 'Memories of Collecting in Britain during the Last 50 Years'.

A discussion took place on the Annual exhibition during which Dr. C. G. M. de Worms, Col. A. M. Emmet, Mr. J. M. Chalmers-Hunt, Mr. E. S. Bradford, Mr. A. E. Gardner and Mr. S. N. A. Jacobs were the main contributors.

Mr. C. O. Hammond showed some coloured slides of members at the Centenary Exhibition.

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 FIELD MEETINGS
 

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ASHTEAD COMMON, SURREY—21st May 1972

Leader: Mr. K. G. W. EVANS

This was a joint meeting with the Croydon Natural History and Scientific Society with the purpose of establishing the status of a number of insects that have been recorded from this locality many years ago. Ashtead had been the regular venue for field meetings of the Society for many years up to the late 'forties but had to be abandoned because of a disastrous fire and the drainage due to nearby building developments.

Although at the outset the weather was uncertain no less than 40 members and friends attended, embracing a large compass of field interests. Unhappily, it was found that several acres had again been devastated by fire, but the whole area is so large that this did not limit activity. As the day progressed the weather became warm and sunny.

The list of Lepidoptera being sought was deliberately optimistic but, in the event, larvae of *Orthosia miniosa* Schiff. and *Dicycla oo* L. were found on oak. Considerable quantities of larvae of many species were beaten out and most of the party expressed themselves as having had an enjoyable day.

Species identified are as follows:

#### LEPIDOPTERA

Imagines: *Pararge aegeria* L., *Aglais urticae* L., *Nymphalis io* L., *Polygonia c-album* L., *Pieris brassicae* L., *P. rapae* L., *P. napi* L., *Anthocharis cardamines* L., *Gonepteryx rhamni* L., *Pyrgus malvae* L., *Cosymbia punctaria* L., *Eupithecia abbreviata* Steph., *Asthena albulata* Hufn., *Bapta bimaculata* F., *Lithina chlorosata* Scop., *Adela viridella* Scop., *Capua favillaceana* Hübn., *Laspeyresia succedana* Schiff. (*ulicetana* Haw.), *Lithocolletis cramerella* F. and *Micropteryx calthella* Schiff.

Larvae: *Thecla quercus* L., *Orthosia stabilis* Schiff., *O. cruda* Schiff., *O. incerta* Hufn., *O. munda* Schiff., *Brachionycha sphinx* Hufn., *Bombycia viminalis* F., *Cirrhia icteritia* Hufn., *Amphipyra pyramidea* L., *A. berbera* Rungs ssp. *svenssoni* Fletcher, *Cosmia trapezina* L., *Pseudoips prasinana* L., *Episema caeruleocephala* L., *Hemithea aestivaria* Hübn., *Hydriomena furcata* Thunb., *Oporinia dilutata* Schiff., *Operophtera brumata* L., *Colotois pennaria* L., *Theria rupicaprararia* Schiff., *Erannis leucophaearia* Schiff., *E. aurantiaria* Hübn., *E. marginaria* F., *E. defoliaria* Clerck, *Phigalia pilosaria* Schiff., *Alcis repandata* L., and *Ectropis biundularia* de Vill.

#### COLEOPTERA

*Bembidion quadrimaculatum* (L.), *Malachius bipustulatus* (L.), *Athous haemorroidalis* (F.), *Dalopius marginatus* (L.), *Rhyzobius litura* (F.), *Coccinella septempunctata* L., *Adalia bipunctata* (L.), *Calvia quattuordecimguttata* (L.), *Propylea quattuordecimpunctata* L., *Thea vigintiduopunctata* (L.), *Clytus arietus* (L.) and *Curculio glandium* Marsh.

#### DIPTERA

*Servillia lurida* F., *Palloptera scutellata* Meig. and *Hilaris pilosa* Zett. A specially interesting observation was made of *Dilophus febrilis* L. being held by a female *Rhamphomyia sulcata* Meig. while in cop.

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### CENTENARY FIELD MEETING IN SCOTLAND

27th May to 2nd June 1972

Leader: Mr. B. GOATER

This meeting was based on Tummel Bridge, Perthshire, and six people attended. Cool weather prevailed, with a lot of rain, and very few insects were seen on the wing. The portable mercury vapour light trap attracted a poor number of moths which indicated that the season was late in Scotland as well as in the south of England. On the other hand, larvae were to be had in quantity, day and night, by searching, sweeping and beating; and the party concentrated on this form of entomological activity for most of the week. Botany and ornithology were not neglected, and several extremely interesting plants and birds were seen.

Most time was spent in the woods and on the boggy moorland near Tummel

Bridge, and in the famous Black Wood of Rannoch. One pouring wet day was devoted to an excursion to that botanists' 'Mecca', the cliffs above Lochain na Lairige, to the west of Ben Lawers, and on another day we went to the Spey Valley in Inverness-shire, where the party split up; two encountered a driving blizzard of sleet while looking for Dotterel on the high ground; the others met more clement weather while paying their respects to the Ospreys at Loch Garten, and beating juniper in Strathspey.

One of the objectives was to rediscover *Amathes alpicola* Zett. on the high ground south of Loch Rannoch. We were unsuccessful, though we reached suitable country with plenty of the foodplant, *Empetrum*. This, however, lacked the associated mats of lichen under which the pupae can be found at Aviemore, and was therefore difficult to work. Also, judging from the fact that two hours' work up the 'Burma Road' yielded one parasitised pupa only, the species may have had a poor season in the Highlands in 1972. A compensatory find was that of *Anarta melanopa* Thunb. on two hills south of Loch Rannoch.

The following is a selection of the species noted during the week:

#### PLANTS

Rannoch district: *Lycopodium selago* L., *L. clavatum* L., *Equisetum sylvaticum* L., *Botrychium lunaria* (L.), *Meum athamanticum* Jacq., *Pinguicula vulgaris* L. and *Listera cordata* (L.) (growing under heather).

Creag an Lochain: *Selaginella selaginoides* (L.), *Cystopteris fragilis* (L.), *Polystichum lonchitis* (L.), *Trollius europaeus* L., *Thalictrum alpinum* L., *Cardaminopsis petraea* (L.), *Silene acaulis* (L.), *Potentilla crantzii* (Crantz) (confirmed in August), *Geum rivale* L., *Sedum rosea* (L.), *Saxifraga stellaria* L., *S. aizoides* L., *S. oppositifolia* L., *Polygonum viviparum* L., *Oxyria digyna* (L.), *Orchis morio* L. and *Agropyron donianum* F. B. White (confirmed in August).

#### LEPIDOPTERA

Imagines: *Ancylis unguicella* L., *Argyrotaenia pulchellana* Haw., *Lampropteryx suffumata* Schiff., *Eupithecia satyrata* Hübn. ssp. *callunaria* Doubl., *Chesias rufata* F. ssp. *scotica* Rich. (one at Aviemore), *Selenia dentaria* F. (*bilunaria* Esp.), *Petrophora chlorosata* Scop., *Ematurga atomaria* L., *Pheosia gnoma* F., *Anarta melanopa* Thunb., *Polia bombycina* Hufn., *Acronycta menyanthidis* Esp.

Larvae: *Eurois occulta* L., *Noctua comes* Hübn. and *Amathes baja* Schiff. on *Myrica*; *Amathes castanea* Esp., *A. agathina* Dup., *Diarsia mendica* F., *Syngrapha interrogationis* L., *Entephria caesiata* Schiff. *Epirrita filigrammaria* H.-S. and *Noctua comes* Hübn. on *Calluna*; *Hydriomena furcata* Thunb., *Perizoma didymata* L., *Eulithis populata* L. *Noctua comes* Hübn., *Diarsia mendica* F. and *Syngrapha interrogationis* L. on *Vaccinium*; *Graphiphora augur* F., *Diarsia brunnea* Schiff. *Amathes baja* Schiff., *Noctua comes* Hübn. *D. mendica* F., and *Crocallis elinguaris* L. on *Betula*; *Chrysoaspis festucae* L. on *Iris*; *Hypena proboscidalis* L. and *Plusia chrysitis* on *Urtica*; *Olethreutes mygindana* Schiff. (heavily parasitised) on *Arctostaphylos*; *Thera cognata* Thunb. and *Eupithecia pusillata* Schiff. (*sobrinata* Hübn.) on *Juniperus* at Strathspey. All the larvae subsequently produced imagines, with the exception of *Epirrita filigrammaria*, yet to emerge.

#### BIRDS

Osprey, one at Strathtummel, beside the pair at Loch Garten; Buzzard, a few; Golden Eagle, at least two pairs watched in two localities; Hen Harrier, fairly common on the moors in Strathtummel, including a probably bigamous male; Peregrine, one, Glen Feshie; Ptarmigan, several on the high ground in the

Cairngorms; Dotterel, one flying through sleet, and calling, high Cairngorms; Golden Plover, frequent on the moors; Dipper, on the rocky streams; Crested Tit, several near Loch an Eilean; Scottish Crossbill, party near Loch an Eilean.

### FINGRINGHOE WICK, ESSEX

8th July 1972

Leader: Mr. R. M. PAYNE

The object of the meeting was to obtain records, particularly of the less popular Orders of insects, at this major reserve of the Essex Naturalists' Trust. Nine members and friends attended despite the very poor weather. A dull, damp morning and a wet afternoon curtailed and severely limited any useful field work, but the following insects were noted:

#### LEPIDOPTERA

*Hydriomena furcata* Thunb., *Gymnoscelis pumilata* Hübn., *Deilinia exanthemata* Scop., *Hypsopygia costalis* F., *Crambus pascuellus* L., *C. hortuellus* Hübn. *Clepsis consimitana* Hübn., *Cnephasia interjectana* Haw., *Aleimma loeflingiana* L., *Laspeyresia nigricans* F., *Notocelia udmanniana* L., *Olethreutes lacunana* Schiff. *Scrobipalpa instabilella* Dougl., *Mompha propinquella* Staint., *Schreckensteinia festaliella* Hübn., *Argyresthia pygmaeella* Hübn., *A. retinella* Zell., *A. nitidella* F., *Coleophora siccifolia* Staint., *C. viminetella* Zell., *C. fuscedinella* Zell. *C. alnifoliae* Barasch, *Lithocolletis oxyacanthae* Frey, *L. corylifoliella* Haw., *L. sylvella* Haw., *Parornix betulae* Staint., *Caloptilia stigmatella* F., *Phylloporia bistrigella* Haw., *Eriocrania sparmanniella* Bosc., *Micropterix aruncella* Scop., *Stigmella luteella* Staint., *S. hybnerella* Hübn., *Nepticula pygmaeella* Haw., *N. lapponica* Wocke, *N. salicis* Staint., *N. aurella* Staint.

#### COLEOPTERA

*Ophonus pubescens* Müll., *Bembidion minimum* F., *Dromius linearis* (Ol.), *Amischa analis* Grav., *Propylea quatuordecimpunctata* (L.), *Meligethes viridescens* F., *Corticaria pubescens* Gyll., *Cantharis pallida* Goeze, *Rhagonycha lignosa* Müll., *Malthinus fasciatus* Ol., *Crepidodera transversa* Marsh., *Chalcoides aurea* Geof., *Lagria hirta* L., *Oedemera lurida* (Marsh.), *Anaspis pulicaria* Costa, *Apion aestivum* Germ., *Polydrusus tereticollis* Deg.

#### ODONATA

*Lestes sponsa* (Hanse.), *Enallagma cyathigerum* (Charp.), *Coenagrion puella* (L.), *Ischnura elegans* (v.d.L.).

#### HYMENOPTERA

*Himataria recta* Thoms., *Profenusia pygmaea* (Klug), *Messa nana* (Klug).

#### DIPTERA

*Nemotelus notatus* Zett., *Odontomyia tigrina* (F.), *Chrysopilus cristatus* (F.), *Thereva nobilitata* (F.), *Dioctria rufipes* (Deg.), *D. baumhaueri* (Meig.), *Machaerium maritimae* Hal., *Xanthogramma pedissequum* (Harris), *Tropidia scita* (Harris), *Meliera crassipennis* (F.), *M. picta* (Meig.), *Chyliza leptogaster* (Panz.), *Pherbina coryleti* (Scop), *Agromyza alnibetulae* Hendel, *Aphanotrigonum fasciella* Zett., *Conioscinella mimula* C. frontella (Fall.), *Pachyophthalmus signatus* (Meig.), *Coenosia antennata* Zett.

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are held regularly at the Society's Rooms, but the well-known ANNUAL EXHIBITION takes place in the autumn. 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.

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MEMORIES OF COLLECTING IN BRITAIN  
DURING THE PAST FIFTY YEARS

By Dr. C. G. M. de WORMS

I suppose we can all look back to our early collecting and try to remember what lit the flame which, in cases like my own, has continued to burn throughout a whole lifetime. My own interest started in the days before the First World War; by the time of its outbreak I already knew most of our butterflies, and I still have memories of seeing the slopes of the Leas at Folkestone dancing with hundreds of Clouded Yellows. That was in August 1913, the year I was introduced to the famous Warren and *Lysandra bellargus* Rott. (Adonis Blue) in that celebrated locality, which is now very different from those delectable days. Even as far back as 1916, while on holiday at Bude, I heard of a rare blue butterfly occurring to the south, but it was too late to see *Maculinea arion* L. (Large Blue) in its haunts which were to prove so fruitful for this insect some 15 years later.

I intend to divide this period of half a century into three parts.

Firstly, the 17 years starting from 1922 and leading up to the outbreak of the Second World War in 1939. This will be the span on which I will be mainly concentrating, since it now belongs very much to the past to probably the majority of the members of our Society who were hardly on the active list at that time.

I will then dwell on the six years covered by the war, which proved in my own instance, entomologically very rewarding and productive.

Finally, I will cover the past quarter of a century which has elapsed since the end of the War, but in much less detail. I will emphasise the highlights of this period both in my own sphere and those which saw many remarkable discoveries of new species among our Lepidoptera. In this way I will endeavour to interweave my own experiences with the more outstanding features of the past.

It was when I went up to Cambridge just over 50 years ago, in 1921, that I became what might be termed an active collector and began to set and display my captures which became the nucleus of a collection which has grown substantially through the years. Naturally in the 1920's transport, at least by road, was not as convenient or congenial as it is today, so that one's range was rather limited. The chief venue in that vicinity was of course Wicken Fen about which Col. A. M. Emmet gave such an entertaining and illuminating account (1972, *Proc. Brit. ent. nat. Hist. Soc.*, 5(2):46-74).

There was indeed a ritual about night collecting there which lasted up to the start of the Second World War; and it is sad that it has fallen into disuse in the face of modern methods of night collecting. During my six years at the University I used to pay regular visits throughout the summer months. I cannot remember or plead guilty, however, to that ecstatic occasion to which Col Emmet referred when I took my first *Hydrillula palustris* Hübn. (Marsh Buff) in June 1929, though my apparent elation seems to have made its mark on the local inhabitants. In those days one met all the leading collectors some time or another at Wicken, and my first meeting with the late Edgar Hare took place there as far back as 1922. He was to be a lifelong friend, as was also the late Ian Heslop, who was a contemporary at Cambridge. Just before I went down in 1927 I had also met Dr. H. B. D. Kettlewell and Ronald Demuth, both very much still with us, I am glad to say.

Another great Mecca at that time was Royston Heath, visited in August by a host of collectors in search of the remarkable aberrations of *Lysandra coridon* Poda (Chalk-hill Blue) which had reappeared each year since just before the

First World War. This locality was at its zenith in the early 1920's. During the long vacation term, which I often spent at Cambridge, I used to pay frequent visits to Royston, but nothing more than ab. *semisyngropha* Tutt, used to come my way, though some major aberrations were taken on occasions when I was there. This virtual gold mine, which the late L. W. Newman used to say brought him in at least £300 each season in its heyday, suddenly petered out in 1927 and though there are still quite a lot of *L. coridon* Poda there, no major aberrations have been taken in more than 40 years.

Another haunt in the Cambridge region in those days was Monks Wood, near Huntingdon, in the middle of which was then a small house inhabited by Major Maples and his wife, both keen on butterflies. They kept open house to a few keen undergraduates, especially when *Strymonidia pruni* L. (Black Hairstreak) was on the wing. They would allow us to take only a very restricted number feeding on the privet blossom.

It was in 1926 that I had my first collecting introduction to two other famous areas, the Norfolk Broads, and of course, the New Forest which was *par excellence* the leading locality in the Country; also visited annually by every notable lepidopterist of the day. I well remember camping out for nearly a week at the end of June, with a friend, near Lyndhurst, and getting large catches nightly with our modest Tilley lamps. It was the time when *Stauropus fagi* L. (Lobster) and *Boarmia roboraria* Schiff. (Great Oak Beauty) were numerous, and *Argynnis paphia* L. (Silver Washed Fritillary) was just appearing in quantity along the rides bordered with a sea of brambles; very different from present-day conditions. Even at that time the Forest had seen the last of *Apatura iris* L. (Purple Emperor) as the rides had been methodically bereft of sallow bushes. To some extent the same can be said of *Nymphalis polychloros* L. (Large Tortoiseshell), though in the 1930's it was still possible to see a few in the spring on sallow bloom. It was in 1926 that I first met George Wateridge, who was one of that fine type of forester of the same calibre as the Gulliver brothers. He knew all the Forest butterflies and most of the more spectacular moths. For nearly 20 years he used to keep me informed when anything of special note was to be obtained. He was a specialist in the Crimson Underwings and was to remain a good friend until his death in 1949.

I shall always remember my first visit to the Norfolk Broads in 1926, when I spent some time on a sailing yacht with non-entomological friends from Cambridge. However, I managed to engage in my hobby whenever we tied up for meals or overnight. It was in late June and *Papilio machaon* L. (Swallowtail) was at its zenith, careering over the broadland marshes. Larvae of *Orgyia recens* Hubn. (Scarce Vapourer) were to be found on sallow, and I took at dusk a noctuid which was to be of special interest 40 years later. For what I had thought to be *Plusia festucae* L. (Gold Spot) was in fact *P. gracilis* Mab. (Lempke's Gold Spot).

Now to come to 1927, an important year for me when I first joined this Society through the good offices of Mr. M. Goodman, whom I originally met while collecting with a friend on the Sheepheas at Horsley, where we saw *Hamearis lucina* L. (Duke of Burgundy) in plenty that season. I still have a mental picture of one of the first meetings of the Society that I attended at Hibernia Chambers, just south of London Bridge, with the awesome figure of Dr. E. A. Cockayne in the Chair, ably assisted by the Secretary, Stanley Edwards and by Henry Turner, together with such eminent figures in the natural history world as Hugh Main, Edward Step and the genial bearded face of Robert Adkin, that famous lepidopterist. A. E. Tonge, the great photographer of lepidopterous ova, was a frequent visitor in those days, when we used to hold our Annual Exhibition,

as now, at the end of October; but in the evening with excellent refreshments provided by Messrs. Ring and Brymer, the well-known City caterers. The Exhibition of 1930 will always have vivid memories for me, when a young man who was a visitor produced the most amazing *Nymphalis io* L. (Peacock) that I have ever seen. It had no trace of any eyespots. This extraordinary insect was caught at his home and sent to him through the post surviving undamaged. There was quite an auction in private among such leading experts as L. W. Newman, P. M. Bright of Bournemouth and W. Rait Smith. I believe Mr. Bright finally acquired it at a high figure. The fortunate exhibitor was our past President Jack Greenwood. I wonder where his gem among the butterflies is now? These meetings continued at this venue until the start of the War.

Returning to the collecting field, my most frequent source of captures near my home at Egham, Surrey, during the late 1920's was Swinley Forest, a marvellous piece of woodland, unspoilt at that period, lying between Ascot and Bagshot, which provided all the large fritillaries, also *Limenitis camilla* L. (White Admiral) besides all the usual run of woodland moths, especially *Odontosia carmelita* Esp. (Scarce Prominent). I see from my diaries I also paid no less than six visits to the New Forest in this year. It brought me my first *Melitaea athalia* Rott. (Heath Fritillary) which I caught in Blean Woods, East Kent and *Cartocephalus palaemon* Pall. (Chequered Skipper) from a wood in the Midlands which has since disappeared. The year 1928 was another profitable one with the addition of *Melitaea cinxia* L. (Glanville Fritillary) from Ventnor and *Euphydryas aurinia* Rott. (Marsh Fritillary) from Hod Hill.

During the late summer 1928, friends and myself rediscovered a neglected piece of downland not far from Worthing which harboured a good population of *Lysandra coridon* Poda (Chalk-hill Blue) and *Lysandra bellargus* Rott. (Adonis Blue), and in the next few years was to prove another veritable gold mine for *L. coridon*. We obtained some most remarkable forms and aberrations which were the envy of many of the fraternity when they were shown at the Annual Exhibition. Unfortunately our secret eventually leaked out and for the next 15 to 20 years it virtually replaced Royston as a source of aberrations, being visited by all the leading butterfly enthusiasts. As in the case of Royston, however, this remarkable strain once more unaccountably gave out, and not because of overcollecting. The year 1929 was an active twelve months in which I was first introduced to Witherslack, where in late June a friend and I took *Coenonympha tullia* Müll. (Large Heath) on Meathop Moss. We then went by bus to the top of Kirkstone pass where we scaled the heights of the Red Screes to find *Erebia epiphron* Knoch, the delightful little Mountain Ringlet, in fair numbers in a little-known spot. On descending we made our way by train and car to Delamere Forest where we had a very profitable night, going on the next day to Warboys near Huntingdon, where *Strymonidia pruni* L. (Black Hairstreak) was still well on the wing and numerous. A very energetic and successful round trip.

Quite late in July that year I went with Dudley Palmer to north Cornwall where we found *Maculinea arion* L. (Large Blue) still on the wing and also very numerous; we returned to Swanage to find *Thymelicus acteon* Rott. (Lulworth Skipper) swarming in the vicinity. As may be deduced, those were the days when localities were by no means overrun with either collectors or the general public, and collecting in them was a most exhilarating past-time with usually no lack of quarry; especially in this very fine summer of 1929 which saw an influx of migrants such as the Clouded Yellows which had also been in ascendancy the previous year. I see that by the end of the 1920's I had taken nearly all our main specialities of butterflies, actually 55 species in all.

The 1930's have always stood out for me as the most productive period I have ever known. If I were asked which was the best year, in my experience, for insects and for collecting in general, I should unhesitatingly say 1933. The sun began to shine in early May and went on, without a break it seemed, the whole summer. Only two recent years seem to compare with this amazing season: 1947 and 1959. In the early thirties most of the well-known haunts that many of us now visit annually were comparatively unknown. I have already mentioned many of the fashionable spots in the south, such as the New Forest and Wicken Fen, while the only area in the Highlands that attracted collectors up to the end of the 1920's appeared to be Rannoch. Aviemore was still virtually unworked and started to become known only at the beginning of this decade. Hardly anyone seemed to venture into Ireland, while the Shetlands had been very much neglected since the time of McArthur early this century. It was in 1930 that I first went to the Hamstreet Woods in East Kent. This remarkable area owes its popularity to the arrival a few years previously in Folkestone of the late Arthur Morley who set about discovering all the best collecting localities in this region. His much lamented death in October last at the great age of 93 has removed one of our leading and keenest lepidopterists. It was in 1930 that I was first introduced to searching for aberrations of *Lysandra bellargus* Rott. (Adonis Blue) on the downs at Folkestone, at the end of August each year. This was quite a ritual attended by all the leading lycaenid experts of the day. The hillside most frequented had a series of small ridges each worked by a single individual and woe betide any more youthful amateur like myself who might encroach on the ridges being meticulously scrutinised by such vip's as Rait Smith or the Reverend Stiff.

The first half of the 1930's provided a wealth of insects almost annually wherever one seemed to cast one's net, but there is only scope to describe and underline the more outstanding. Once, in 1932, on 11th June, I flushed a small moth by day in the Hamstreet woods. It turned out to be *Colobochyla salicalis* Schiff. (Lesser Belle) which had not been seen anywhere in this country for many years. I shall always remember what a sensation it caused when I showed it to the annual assemblage of entomologists, being entertained at the Grand Hotel, Eastbourne, by Robert Adkin. These gatherings were most delightful. Some 40 guests, among them some of the most eminent of their day, used to sit down to a sumptuous lunch followed by an outing to a local wood, and for those who stayed overnight, a more extensive expedition the next day. These meetings at Eastbourne were usually in mid-June and I remember the late T. R. Eagles and I were considered rather renegades when we broke off to make a dash for Vert Wood near Lewes, the home of *Scopula immorata* L. (Lewes Wave). The moth was flying in plenty on that occasion, but it has not been seen there, its only known locality, since about 1956.

The late summer of 1932 saw myself and Nigel Wykes on a trip to Witherslack and thence to the Norfolk Broads which was equally rewarding. We sampled the local specialities, largely through the help of Charles Mellows who used to spend his summer holidays on Barton Broad. He showed us the best spots for *Pelosia muscerda* Hufn. (Dotted Footman), also *Arenostola brevilinea* Fenn (Fenn's Wainscot) and *Nonagria algae* Esp. (Reed Wainscot). We returned with a goodly harvest of very local species.

Now I will return to that *amus mirabilis*, 1933. I will endeavour to describe some of the leading expeditions I made in that amazing year. First, it can be appreciated what an advanced season it was, when I say that I went to Ongar Park Wood, on the afternoon of 27th March and found *Archiearis notha* Hübn. (Light Orange Underwing) already out in plenty, flying high round the aspens. By

perseverance I took a good series, but have seen very little of this insect since then. I next had my first taste of Aviemore which was just becoming popular. Travelling by train on 8th April, I spent the Easter period in glorious weather with large catches of the early noctuids at willows and sap runs from the birch; while found hanging from birch twigs after dark were some grand *Endromis versicolor* L. (Kentish Glory). I was accompanied in my quest by the late Alfred Hedges and his companion Harold Gilles. Searching railway posts at Struan provided my first *Poecilopsis lapponaria* Bois. (Rannoch Beauty). Mr. Morley joined me over Easter, and on the Monday we had quite a perilous and crowded journey by train to the Lake District where Witherslack was once more our haven. Our main quarries were *Trichopteryx polycommata* Schiff. (Barred Tooth-stripe) in its handsome local form, and *Gypsitesa leucographa* Schiff. (White-marked), both of which we obtained. The final port of call on this long and energetic tour was Conway, where we found *Nyssia zonaria* Schiff. (Belted Beauty) in numbers on the sandhills, and we eventually bred it through as well. The end of April 1933 saw me at Minehead staying with Mr. George Hancock. He conducted me on a search of local railway posts near Taunton which yielded a few *Xylomiges conspicillaris* L. (Silver Cloud) which also produced a fine bred series. I note that on 20th May that year I led a field meeting of the Society to Chilworth St Martha's where wych elm produced a lot of larvae of *Strymonidia w-album* Knoch (White-letter Hairstreak).

The next day I was in a Northants wood seeing *Carterocephalus palaemon* Pall. (Chequered Skipper) in quantity. The last week of that month took me to Kent where I caught many *Pachetra sagittigera* Hufn. (*leucophaea* D. & S.) (Feathered Ear), though not at the recorded ground at Wye. I was delighted to find *Hapalotis venustula* Hübn. (Rosy Marbled) flying at dusk when I went to Brentwood on 1st June. This was one of its few localities then, though now it is spreading fast in the southern counties.

I was at Wicken the second week of the month with Oliver Howard and Arnold Hughes obtaining a host of the fen species. A few days earlier I had visited Lea Bridge Road in East London and found larvae of *Leucoma salicis* L. (White Satin) in prodigious numbers, and bred a long series from this source. It was such an early season that I ventured to north Cornwall with Archibald Russell as early as 23rd June when we were joined by Ian Heslop. *Maculinea arion* L. (Large Blue) was already well out at Millook south of Bude, and each morning about midday they would get on the wing and were none too easy to follow in the thick bracken and heather. The first day of July was a notable day in my collecting annals. Col. Labouchere had told me that *Apatura iris* L. (Purple Emperor) was to be found in a certain spot in the Petworth area. That day we were on the ground by 10.30 a.m. in brilliant sunshine. We were casually walking along a muddy track when a large butterfly flew up and was in my net, fortunately. It was a perfect male *A. iris* L. Thereafter that day, and two subsequent Sundays, we were treated to an amazing display of this grand insect, sailing round the treetops, often as many as half-a-dozen at a time. Mr. Heslop disturbed a pair *in cop* on the ground in the middle of the month. I do not think I have seen so many examples of this fine butterfly on the wing since that wonderful summer, though I can truly say, except for possibly two seasons I have seen this species either flying or in its larval state every year since that date, nearly 40 years ago and in a wide range of localities, even in the Eastern Counties.

The third week in July 1933 I accompanied Archibald Russell to the Torquay district where Dr. Perkins conducted us round some of the gardens in the town where we flushed a number of *Euplagia quadripunctaria* Poda (Jersey Tiger) from

bushes. Here night operations yielded *Eilema caniola* Hübn. (Hoary Footman) and *Leucania putrescens* Hübn. (Devonshire Wainscot) in Ansteys Cove. The end of that month saw me at Folkestone where Mr. R. Crewdson was in residence. I shall not readily forget the night of 4th August when I took a mysterious dagger moth on sugar at Dungeness. It turned out to be *Apatete auricomis* Schiff. (Scarce Dagger) of which Mr. Morley had also recently taken one here. It was indeed one of a handful of this rare species which has visited us in the past 50 years, though earlier this century it was reasonably common in Kent. While looking for aberrations of *Lysandra bellargus* Rott. I heard that *Colias hyale* L. (Pale Clouded Yellow) had appeared in some fields near Dover. On visiting this area nearly every clover field was found to be harbouring this agile butterfly which gave several enthusiasts plenty of exercise waylaying them in full flight, as they seldom settled.

During my stay in those parts I went into the woods near Beckley, just beyond Rye, on several occasions with Dr. Bull, whom many will remember. *Catocala promissa* Schiff. (Light Crimson Underwing) graced many of our sugar patches at a time when most collectors hardly looked beyond the New Forest for this fine moth. I revisited the Norfolk Broads that year during the last week in August with Mr. Morley, when we saw a lot of small larvae of *Papilio machaon* L. (Swallowtail), while at night the chief wainscots were *Arenostola dissoluta* Treits. (Brown-veined Wainscot) and *A. brevilinea* Fenn (Fenn's Wainscot). Early that September I went to stay with Mr. Heslop near Bristol, chiefly for some shooting; but I do not think I have seen so many *Lycæna phlaeas* L. (Small Copper) on the wing in the continued warmth and sunshine, a third brood which provided a lot of aberrations. I paid a visit to Portland at this period where I first met Dr. Harold King. Here I obtained a lot of *Leucochlaena hispida* Geyer (Beautiful Gothic). This wonderful year ended with my introduction to *Cirrhia ocellaris* Borkh. (Pale Lemon Sallow) at Barton Mills, in the middle of September, where the sugaring of poplar leaves brought this insect in dozens.

So much for 1933; but the next year was hardly less rich, though the prolonged summer weather was lacking. However, the season opened with a trip at the end of March, again with Mr. Russell, to Aviemore, where we found that *Brachionycha nubeculosa* Schiff. (Rannoch Sprawler) was just emerging and was found at rest on birch trunks on warm days, while the males flocked to light fairly late and a few even on the sugar patches. Shortly afterwards I took the spring geometer *Trichopteryx polycommata* Schiff. (Barred Tooth-stripe) in the Warren at Folkestone, quite different from the northern form. At the end of April larvae of *Melitæa cinxia* L. (Glanville Fritillary) were swarming near Ventnor. In the middle of May *Pareulype berberata* Schiff. (Barberry Carpet) was my quarry near Bury St. Edmunds where it used to abound, but it has virtually gone now, owing to the destruction of its foodplant, the wild barberry. At that period the delightful little noctuid *Emmelia trabealis* Scop. (Clouded Sulphur) was in plenty along the railway near Mildenhall, with some of the little *Scopula rubiginata* Scop. (Tawny Wave) also there. At the end of that June I visited Woodwalton Fen for the first time, with Mr. Stanley Smith, who lived in the vicinity. *Arenostola extrema* Hübn. (Concolorous Wainscot) was among a large concourse of moths at sugar. I had a remarkable experience a week later when on visiting Alice Holt late in the afternoon of 7th July I found *Limnitis camilla* L. (White Admiral) in spate and within half an hour took an all black specimen (*nigrina* Weym.) and two semi-melanics. *Apatura iris* L. (Purple Emperor) was once more quite common that summer, as was *Colias hyale* L.

(Pale Clouded Yellow) in East Kent. *Leucania albipuncta* Schiff. (White-spot Wainscot) was common, also in Kent.

A real entomological tragedy took place in September that year. On the first of the month I was on Wye downs with Arthur Morley in search of *Atethmia xerampelina* Esp. (Centre-barréd Sallow). We put sugar on posts round the Crown chalkpit and on the first round we noticed a large shiny noctuid. I well remember saying, 'fancy meeting *typhae* on the sugar'; meaning the Bullrush Wainscot. We did not approach it, or give it further thought, until to our dismay a week later we heard that some *Apamea zollikoferi* Freyer (Scarce Arches), a very rare migrant from eastern Europe, had been taken at Dungeness. Then only, did we appreciate that the Bullrush Wainscot has no tongue to imbibe sugar and that there is little doubt we passed over this prize which in some forms bears a striking likeness to *Nonagria typhae* Thunb.

What of those subsequent five years 1935 to 1939 leading up to the Second World War? In the spring of 1935 we were told of another Sussex wood where *Apatura iris* L. was fairly prevalent. On one occasion that May it was possible to beat a larva of this butterfly, or sometimes two at a time, from a relatively few bushes of low sallow. I am glad to say the wood is still extant and not much different from that day. The third week in June that year saw me in the Cotswolds with Nigel Wykes, then a master at Eton College; here our captures were equally noteworthy. We ran over to Bristol on 23rd June which was a very promising night and we took a series of *Sterrha dilutaria* (Silky Wave) above the tunnel on Durdham Down. We then set our Tilley lamps in a large coppice of small-leaved limes not far from the Somerset bank of the Avon Gorge. Great was our surprise when just after midnight the first of five male *Drepana harpagula* Esp. (Scarce Hooktip) appeared on our sheet. At that time it was the only known locality for this rare insect. This wood was cut down during the war and the insect disappeared, to be rediscovered in 1962 flourishing in the Wye Valley. A few nights after this success on 25th June, another notable occasion, this time in Tilgate Forest with Mr. A. Russell. We almost did not venture out owing to a violent thunderstorm, but fortunately we decided to brave the elements, and it turned out to be almost a record night for those times. Two Tilley lamps were placed on top of the tunnel and no less than a couple of dozen *Stauropus fagi* L. (Lobster) arrived. That number I have never exceeded in a single night since, not even with a large mercury vapour light. *Tethea fluctuosa* Hübn. (Satin Lutestring) was plentiful and we got one *Apatele alni* L. (Alder Dagger), quite a rarity in those days, but no *Harpyia bicuspis* Borkh. (Alder Kitten), of which I had seen one arrive on Mr. Edelsten's sheet some ten days earlier in the same spot. Four days later, on 29th June, I made a memorable dash to the Lake District with the late Jack Craske. Leaving London by train on the Saturday afternoon we reached Windermere in time to catch a bus up the Langdale Valley to the Dungeon Ghyll Hotel, where after a quick meal we had a first class night's sugaring nearby. Luckily the next morning was favourable for us to ascend the Pikes about 1500 ft above the hotel, but when we reached the special slope for *Erebina epiphron* Knoch (Mountain Ringlet) the sun had disappeared. We started to descend early, but suddenly looking back I spotted a gleam of sun. We rushed back up several hundred feet just in time and the little butterflies were soon on the wing in dozens. A nice series was obtained and we got back to Windermere in time to catch the night train back to London.

It was in the late summer of this year that I first met the much lamented Archibald Wightman, that redoubtable collector who was a mine of information on anything to do with most Lepidoptera, and with whom I was to collaborate

in the field for the next 35 years. On a visit to Cornwall in September I joined forces with Mr. R. Pennington, that most meticulous collector who introduced me to *Antitype xanthomista* Hübn. (Black-banded) and to the larva of *Hadena barrettii* Doubl. (Barrett's Marbled Coronet).

The highlight of 1936 was a lengthy tour I undertook in late June, starting in the Cotswolds. It was here that in coming to see my captures, Bainbrigge Fletcher picked up a unique aberration of *Lysandra bellargus* Rott. (Adonis Blue) with the streaked underside of the 'sagittata' form. A few days later I found *Coenonympha tullia* Müll. (Large Heath) abundant on Whixall Moss. I then went on to that famous collecting resort of Kinloch Rannoch where Mr. R. Crewdson was in residence. A red letter day occurred on 3rd July when we motored over to Braemar. Mr. Crewdson had contacted the factor on the Invercauld estate, who conducted us to the top of the local mountain where we found *Zygaena exulans* Hoh. (Scotch Burnet) swarming, so that it was difficult not to tread on them. It was like a carpet of Burnets. I broke my journey at Witherslack, where I met Dr. Smith who showed me a lot of *Plebejus argus* L. (Silver-studded Blues) he had just taken in that vicinity. I at once recognised them as the long-lost race *masseyi* Tutt, which had not been seen for at least 15 years. He conducted me to the ground where this charming 'blue' was in comparative abundance, but it disappeared about 1942 and has been found nowhere since.

The year 1937 opened with a trip to North Wales where larvae of *Amathes ashworthii* Doubl. (Ashworth's Rustic) were comparatively numerous at the end of April. It was here that I first met the family Frazer of Formby, who were to give me so much hospitality over the next 15 years.

This trip was followed just after the Coronation in mid-May with yet another to Rannoch with Archibald Russell, where we took the spring specialities such as *Isturgia carbonaria* Clerck (Netted Mountain Moth), *Anarta cordigera* Thunb. (Small Dark Yellow Underwing) and *A. melanopa* Thunb. (White Underwing). Another noteworthy date was 19th June when I revisited Leigh Woods, this time with Mr. Russell. That night no less than 13 of *Drepana harpagula* Esp. (Scarce Hooktip) graced our sheet lit by Tilley lamps, quite a record for those days. A few days later I continued my tour as far as North Wales where *Plebejus argus* L. (Silver-studded Blue) was in plenty on Great Orme Head in form *caernensis* Thompson. I next joined forces with Dr. Kettlewell at Rannoch where we concentrated on *Apamea exulis* Lef. (Northern Arches). We were elated when one came to our light, as the mainland form *assimilis* Doubl. was quite a rarity. Later in Sutherland I spotted an example of this insect in a small case of local captures in a hotel which gave a clue as to its true type of habitat, on the peat bogs. On the way south *Itame brunneata* Thunb. (Rannoch Looper) was abundant in Glen Affric. The season ended with a visit to Prawle in South Devon where *Leucania l-album* L. (White-L Wainscot) had recently established itself. *L. vitellina* Hübn. (Delicate Wainscot) was also common.

The year 1938 will always stand out as perhaps the best year for migrants up until 1939, and it was indeed one of the earliest. On 23rd March I took a series of *Bapta distinctata* H.-S. (Sloe Carpet) near Effingham. In mid-June I accompanied Mr. Austin Richardson from his home in the Cotswolds to Abersoch in North Wales, where we found *Zygaena purpuralis* Brunn. (Transparent Burnet) in abundance. We returned south the same day after covering over 400 miles. Early in July I travelled to the far north with Archibald Russell on my first visit to Shetland. We sailed from Aberdeen to Lerwick on the s.s. *St. Sunneva* later sunk during the War; then from Lerwick to Unst in the old *Earl of Zetland*. We made rendezvous with Edgar Hare and John Smart. We were in luck with

the specialities, since the northern form of *Hepialus humuli* L. (Ghost Swift), seemed in plenty. We motored nightly to Hermaness to sugar, while our driver caught delicious sea trout which provided some choice meals. We had one excellent night when some two dozen *Apamea exulis* Lef. (Northern Arches) came to the sugar. It was a wonderful summer for the footman group and probably a record one for *Lithosia quadra* L. (Large Footman) which was abundant in the New Forest, one collector seeing as many as 200 in one night at his Tilley lamp. In late August I made my headquarters at Ashford, travelling daily to and from London, and my usual evening venue was Dungeness. Insects abounded at sugar and Mr. Morley one evening counted over 2000 moths, including *Laphygma exigua* Hübn (Small Mottled Willow) and *Leucania vitellina* Hübn. (Delicate Wainscot). The last days of September saw me at Prawle with Mr. Hare and 150 *Leucania l-album* L. (White-L Wainscot) on the sugar on a single occasion.

More sinister things were, however, diverting us. The owner of the grounds where we were operating invited us into his house to listen to a very bellicose speech by Hitler and the next morning we read that the fleet had been mobilised. We thought war was just around the corner and packed up there and then and made for London, where the next day the famous Munich settlement was announced. We felt very disgruntled having left this wonderful collecting spot for such an anticlimax.

It was evident the war clouds were gathering and one wondered how much longer collecting with impunity would be possible. However, as it turned out most of 1939 was very productive. In mid-April I had my introduction to the Wyre Forest in company with Sir Beckwith Whitehouse, travelling from Birmingham, it proved a very good night at the willows and light. June saw some excellent nights with light at Tilgate Forest, Pamber Forest and Wicken Fen, also a remarkable one on the 21st at Hamstreet in a north-easterly gale which would not tempt Mr. Morley out. However, when I braved the elements the first round of sugar provided four *Moma alpium* Osbeck (Scarce Merveille du Jour). When I returned to my car a *Cucullia gnaphalii* Hübn. (Cudweed Shark) was sitting on the bonnet. The night yielded further *Moma alpium* at light as well as *Stauropus fagi* L. (Lobster) and *Harpyia bifida* Brahm (Poplar Kitten). July saw me at Woodwalton Fen on the 2nd, when I had what has never been surpassed for me in numbers on the sugar patches, at least 2000, nearly all the fen specialities being present. A week later I made a perilous visit to the Isle of Wight with Anthony Russell, later killed at Singapore. We worked the undercliff of Tennysons Down for the tiny *Sterrhia humiliata* Hufn. (Isle of Wight Wave) which did not oblige. The sea became so rough that we had to be rescued prematurely. Early in August I joined him and his father Archibald Russell and family at Rannoch where our quarry was the *assimilis* form of *Apamea exulis* Lef. (Northern Arches) of which we took several at sugar and at light, by trekking some miles along the north side of Rannoch Moor to a small bothy to do so. It was one of the most desolate spots I have ever known. Later I found the platform of Rannoch station quite a good locality for this species. We went on to Forres where we found a host of insects. One night when taking *Enargia paleacea* Esp. (Angle-striped Sallow), Mr. Hare and I were cut off by the tide and had to wait several hours to regain our car. That tour ended with a visit to the Norfolk Broads where *Nonagria algae* Esp. (Reed Wainscot) was especially plentiful. Ugly news was emanating from Europe, becoming daily more menacing and within a week we were plunged into a war that was to last for the next six years.

Worthy of some comment are some of the leading collectors of this period

immediately prior to the Second World War, mainly in the 1930's. I would rate Sidney Castle Russell the most outstanding among the butterfly specialists of the older generation. He amassed one of the finest collections of British butterflies ever made, largely obtained by his own industry and enthusiasm. He was one of the fortunates who was able to be in the New Forest in those two phenomenal years 1918 and 1919 just at the end of the First World War when aberrations of *Argynnis paphia* L. (Silver Washed Fritillary) were in their ascendancy. I often used to meet him in his favourite Island Thorns enclosure, which at that time used to be regularly visited by the redoubtable F. W. Frohawk, by far the greatest savant of his day on the biology of our butterflies. Among the younger generation the leading specialists were the Rev. J. M. Marcon and Bobby Craske, both still quite active. With his late brother, Bobby Craske got together one of the best collections of our butterflies, which included many remarkable aberrations, especially among the 'blues' and the smaller fritillaries. In his day Ian Heslop obtained more species of our butterflies than anyone else, and of course these included most of the rare migrants. Among the all-rounders, that is to say those who collected all our Lepidoptera, there was W. Rait Smith, and R. A. Adkin and his brother, who had major collections of the macros, also largely obtained by their own efforts, Ben Adkin having an unrivalled series of the Bombyces. Among other specialists were H. M. Edelsten, an authority on marsh-loving moths, and also the recently departed Archie Wightman who by the start of the war had a magnificent series of the noctuid moths. The late Edgar Hare was another rival in the field of the younger generation at that time, with Austin Richardson just starting to embark on his major collecting expeditions by which he was to build up a very fine assemblage of the macrolepidoptera probably unequalled for numbers of species on our list. The leading savant and authority on the moths in those days was Dr. Cockayne who was associated for many years with this Society and its general welfare.

The Second War period scattered most of the younger collectors over the face of the globe. As I was in the scientific world, I was appointed to the special chemical section at Porton near Salisbury, which from June 1940 was to be my base for the next four and a half years. In order to spy out the land in that area I went to Salisbury in late April where Roy Pitman, still with us, showed me where there was a colony of *Panaxia dominula* L. (Scarlet Tiger) of which I kept only a few larvae. A few weeks later a quite albinistic aberration emerged which is perhaps unique. In this insect the black was replaced by pale grey and Kettlewell named it *decolorata*. He later bred a deformed example of this aberration from another source. In late April larvae of *Amathes ashworthii* (Ashworth's Rustic) were extremely plentiful on the Sychnant Pass.

The grave events in France in May ended all long-distance collecting for the rest of that year, in which there was a very dry and sunny summer. There was still plenty to keep me busy in spare moments in the Salisbury district, mainly on the local Downs, where I had the assistance of Harry Haynes who knew every nook and cranny for the butterflies of that vicinity, and was indeed my guide and friend for the next four years. The New Forest was readily accessible and Salisbury was famous for its 'blues'. The next year, 1941, was a late but prolific one. In early May I stayed with the Rev. Haines near Cinderford in the Forest of Dean where the black-bordered form of *Ectropis consonaria* Hübn. (Square-spot) f. *waiensis* Richardson was prevalent on tree trunks. The New Forest seemed indeed to benefit from not being tidied up during this war-time period. Bee hawks of both species were in profusion that spring and it was in July that a recurrence took place of that wonderful flood of fritillary and White Admiral aberrations,

as in the first war years of 1918 and 1919. I have little doubt that this was a direct consequence of the great increase of butterfly populations in this area due to neglect of clearing rides, etc., during this period. In those days too Capt. R. A. Jackson, our past President, lived not too far off at Bishop's Waltham, and I remember his local wood producing in June 1941 many *Acosmetia caliginosa* Hübn. (Reddish Buff). Salisbury was the main habitat of *Oria musculosa* Hübn. (Brighton Wainscot). Each August collectors used to trail behind reapers in the wheat fields who flushed this insect as they went along. Night work was precarious indeed, and when I went to Harewood Forest sallowing with Bertie Dixon, we were soon waylaid by a local policeman who wanted to know what we were doing, but did not molest us too much, though an air raid was in progress over Southampton at the time. However, Scotland, especially the highlands, did not seem to feel the impact of war and in 1942 I paid two visits to Aviemore. It was on the first occasion that I broke my journey to look along the posts at Struan for *Poecilopsis lapponaria* Bois. (Rannoch Brindled Beauty). On arrival at my destination I was met by Inspector McKenzie with the greeting; 'so it's you'. On asking for an explanation he said someone had 'phoned from Struan that a most suspicious character had boarded the evening train. I had been watched scanning the posts and the caller was sure I had very sinister purposes. It was later, in early June, on a second visit that year that Archibald Russell, Edgar Hare and myself decided to scale the mountain heights as we had heard that *Amathes alpicola* Zett. (Northern Dart) had been taken there a few years before, and after a very arduous climb we dug up, by scratching under the moss, a number of pupae of this fine noctuid moth which had virtually been known only from Rannoch hitherto.

I remember that our display of series of this insect caused quite a sensation at the exhibition of our Society held in the Chapter House of Southwark Cathedral that October. Our new area soon became known and has been visited by many collectors in the even years since then, though this moth has periods of abundance alternating with some of great scarcity. In April 1942 I had a most remarkable sallowing night in woods in Gloucestershire with Austin Richardson. It was one of those nights when everything seemed to be patronising the blooms, including no less than nine *Jodia croceago* Schiff. (Orange Upperwing), including two pairs *in cop*, from which we bred fine series that autumn. Just as in the first war the New Forest produced a second season of fritillary aberrations in July 1942, and I remember a small box being shown me by the Rev Marcon with several very melanic and streaked *Argynnis paphia* L., though my own piece of good fortune was to take a radiated ab. *valesina* Esp. The present treatment of the New Forest would seem to preclude a recurrence of these phenomenal numbers and consequential abnormalities.

I will always remember 1943 as the great *Celerio livornica* Esp. (Striped Hawk) year, in fact it has never been surpassed for this fine hawk moth. I was lucky enough to obtain one at honeysuckle in early June, near where I lived in Salisbury, when this very peaceful wartime invasion took place that month. A very prolific wartime month it was, and a little later I saw several flying in daylight in the early evening in the garden of Col. Hawley, just outside Salisbury. Shortly afterwards on another trip to the Highlands we had some amazing sugaring nights at Aviemore, with large numbers of *Hyppa rectilinea* Esp. (Saxon) coming to our patches. Train travel during the war kept up a very high standard and was the only adequate means of getting about. There were few private cars and none too good public road transport. The Scottish highlands were readily accessible and in those distant parts even rationing was at a minimum,

so that for the longer holidays, such as Easter or Whitsun such well-known localities as Aviemore were an easy and profitable venue. In May 1944 the little noctuid *Anarta cordigera* Thunb. (Small Dark Yellow Underwing) was in great numbers there. Sometimes several pairs could be spotted at rest on rocks in the afternoon sunshine. May the following year also produced another northern noctuid, *Apatele euphorbiae* Schiff. (Sweet Gale), which could be found in almost similar numbers with as many as seven on a single large rock on the famous 'Burmah Road'; but the summer of 1945 when the war ended, brought another phenomenal and peaceful invasion, that of *Pontia daplidice* L. (Bath White), and other rare migrants among our butterflies, such as *Lampides boeticus* L. (Long-tailed Blue) and *Everes argiades* Pall. (Short-tailed Blue); also *Issoria lathonia* L. (Queen of Spain Fritillary) reached our shores in mid-July. Quite a lot of *P. daplidice* L. bred all along the south coast, though Devon and Cornwall seemed to be their main headquarters. I saw it once only in East Kent while in company with Ian Heslop who shortly afterwards near Bude had both *I. lathonia* L. and *L. boeticus* L. in the net at the same time. The late summer of this *annus mirabilis* saw a truly amazing spate of rare immigrants, which probably occurs at the most once a century. Everywhere butterflies seemed in plenty that summer; in mid-July too, *Apatura iris* L. (Purple Emperor) gave a remarkable display in woods in the Salisbury area, when several could be seen flying round trees at the same time. In Kent most clover and lucerne fields in Thanet were alive with *Colias hyale* L. (Pale Clouded Yellow), possibly the last year they have been here in any quantity.

The few years immediately following the War saw a short revival of *Nymphalis polychloros* L. (Large Tortoiseshell) in the south and at Easter, in mid-April 1946. They seemed comparatively common round Lowestoft when I stayed with the late Jim Burton. In the same area small larvae of *Limenitis camilla* L. (White Admiral) were to be found by the dozen on the trailing honeysuckle. In early May that year with Eldon Ellison I revisited Aviemore, where such insects as *Anarta melanopa* Thunb. (White Underwing) swarmed on the high mountain moors and the only way to obtain them was to put down bunches of bearberry at intervals, and then quickly clap a net over them as these very agile insects came to savour the small bell-shaped flowers. In early July I went to stay with the late Capt. Jackson near Bishop's Waltham. He took me out to a nearby wood one evening when at dusk the bushes seemed to be dancing with small snow-flakes which turned out to be a flight of *Nola albula* Schiff. (Kent Black Arches). Later that month I was again in the Eastern Counties at Lowestoft, when the summer brood of *Nymphalis polychloros* L. (Large Tortoiseshell) appeared. We even found some pupae of this butterfly, which we eventually bred out, hanging under the eaves of a shed.

The year 1947 will always be remembered as the great season for the Clouded Yellows. In fact nothing has equalled it since and possibly 70 years earlier, 1877, was its only rival. By August this great migrant which had already produced a generation over here had spread right across the British Isles, even as far as Shetland. No doubt this phenomenal summer after one of the coldest winters on record had encouraged this butterfly to breed over here. *Colias croceus* Fourc. (Common Clouded Yellow) was accompanied by many *C. hyale* L. (Pale Clouded Yellow), and even by a few *C. australis* Verity (Berger's Clouded Yellow) mainly in East Kent during August. By September *C. croceus* Fourc. had reached amazing numbers. When I accompanied Bertie Dixon to the Lizard early that month, it was possible to see Clouded Yellows flying every few hundred yards over the whole of the 300-mile route. When we reached our destination every

field was full of this butterfly, with a large proportion of female *helice*. It was also abundant in the Isle of Wight in early October when I was with Russell Bretherton and many others looking for *Sedina buettneri* Her. (Blair's Wainscot). Each collector's beat was jealously guarded in the restricted marsh where it occurred for its short duration of some five years in the vicinity of Freshwater. The counter attraction was *Rhodometra sacraria* L. (Vestal) which had suddenly appeared in quantity both there and along most of the south coast, in numbers hitherto unprecedented. The technique was to drag a long chain some ten yards long, up and down the stubble fields and thereby flush this pretty little geometer, which appeared in many forms, quite a lot of them rosy pink. Since they were easy to breed and generations would be completed within a month, very large numbers were bred in an amazing variety of shades.

This year was altogether most remarkable from many standpoints, particularly as the continued warmth brought out extra broods of many species. One little insect which swarmed this year was *Psodos coracina* Esp. (Black Mountain Moth). When Mr. Bretherton and I visited Aviemore in late June we energetically scaled some of the heights south of that well-known resort and on the dry, bare plateau at the top, this small moth was literally in thousands; so much so, that it was difficult not to tread on them as they crawled over the sparse herbage. I do not think I have ever seen any insect in such profusion. Besides this species, moths came to sugar in quite remarkable numbers, while larvae of *Endromis versicolora* L. (Kentish Glory) could be beaten by the dozen all over the small birches in that area.

With the introduction of the mercury vapour light some 25 years ago a revolution in collecting took place. Though this apparatus may never have been the means of discovering a new resident species, it has at any rate been a means by which knowledge of the lepidopterous fauna has been vastly increased. It has changed to a considerable extent field collecting, almost eliminating such one time favoured pastimes as sugaring and searching after dark.

Thus the immediately succeeding years saw the discovery of a number of insects whose existence in this country would at one time have been hardly credited. Mention has already been made of *Sedina buettneri* Her. at Freshwater to be followed in 1948 by the appearance of *Hadena compta* Schiff. (Varied Coronet), *Minucia lunaris* Schiff. (Lunar Double-stripe) and *Catocala fraxini* L. (Clifden Nonpareil) all in Kent during 1949. *Calamia virens* L. (Burren Green) was discovered in Clare in 1950, which year also saw the finding of *Thalera fimbrialis* Scop. (Sussex Emerald) and *Calophasia lunula* Hufn. (Toadflax Brocade) both at Dungeness and Eastbourne. All seem to have become permanent residents except *M. lunaris* and *C. fraxini*. They were to be followed in 1952 by the arrival of *Cosymbia puppillaria* Hübn. (Blair's Mocha) and *Lithophane leautieri* Boisd. (Blair's Pinion) in the Isle of Wight and *Hydraecia hucherardi* Mab. (Giant Ear) in East Kent. The year 1948 probably saw the last appearance of *Nymphalis polychloros* L. (Large Tortoiseshell) in any quantity. I saw several in the Isle of Wight that spring and also in Suffolk that summer; while 1949 was another good Clouded Yellow year, possibly the last of any real abundance. In 1949 there was another immigration of *Celerio livornica* Esp. which was not so plentiful as in 1943. In September that year *Catocala fraxini* L. (Clifden Nonpareil) was in some numbers in the Hamstreet Woods. This grand moth on the sugar patches was a wonderful sight, with its flush of blue hindwings; and on the wing looked like a small bird.

What of the 1950's? They were indeed a most productive period, but I do not propose to deal with this decade in as much detail as the earlier years. In 1949

the late Jim Burton discovered *Nonagria neurica* Hübn. (Sussex Wainscot) to be prevalent on the Suffolk coast. I joined him there in 1950 when we also found *Arenostola brevilinea* Fenn (Fenn's Wainscot) equally widespread in that region. It was thought that these two species were confined to the Sussex marshes and Norfolk Broads respectively. This discovery opened up a new area for collectors somewhat similar to the Burren, which brought quite a 'gold rush' to this hitherto little-known part of Ireland after the finding of *Calamia virens* L. (Burren Green) there in 1950.

I did not sample the Burren till 1954 when I accompanied the late Eldon Ellison to those wild parts in August and found this lovely moth in plenty, mostly just emerged on short grass after dark and hardly ever coming to the mercury vapour lights. We obtained most of the local specialities at that time of the season.

The end of 1954 saw quite an influx of *Celerio galii* L. (Bedstraw Hawk) which had not been seen in quantity since about 1888. A very productive season occurred in 1955, when there was a very hot July and August, most of which I spent in the Highlands with Mr. and Mrs. Bretherton, when we saw all the local Lepidoptera in great profusion, especially *Amathes depuncta* L. (Plain Clay) and *Enargia paleacea* Esp. (Angle-striped Sallow).

Ireland again saw me in 1956 in company with Mr. Ellison, this time at Killarney. We had some phenomenal nights, mainly in Kenmare estate, where we had obtained special permission to collect. On our homeward journey via North Wales we had a spate of *Amathes ashworthii* Doubl. (Ashworth's Rustic) early that July. In September 1956 an amazing invasion of *Acherontia atropos* L. (Death's-head Hawk) took place, one of the biggest ever. The late Geoffrey Todd had 17 to light in one night on the Norfolk coast, while they were seen hanging in dozens on the rigging of a ship in the Channel. In 1958 I paid a second visit to Shetland after an interval of 20 years, this time with Commander Harper, in August, when again we had our fill of the local fauna, including lots of the melanic form *edda* Staud. of *Amathes glareosa* Esp. (Autumnal Rustic), and were treated to a marvellous display of the Aurora Borealis. It was a wonderful summer in 1959, one of the best of the century for prolonged sunshine. That September we had a remarkable influx of *Vanessa cardui* L. (Painted Lady) and *Vanessa atalanta* L. (Red Admiral), especially in the Scilly Islands which I visited that September and sampled not only its special races of noctuids, but several migrants, including *Leucania unipuncta* Haw. (White Point).

The 1960's were no less prolific and were also full of surprises, especially when a couple of *Acherontia atropos* L. (Death's-head Hawk) turned up in my mercury vapour trap near Struan in the Highlands during September 1960. The highlight of 1961 was the reappearance of *Utetheisa pulchella* L. (Crimson Speckled Footman) in the autumn, after an absence of many years from these shores. I was lucky enough to take one at Prawle, where I was working with Mr. Hare. More surprises filled 1962 with the rediscovery of two moths thought to be extinct, *Drepana harpagula* Esp. (Scarce Hooktip) in the Wye Valley and *Trisateles emortualis* Schiff. (Olive Crescent) in the Chilterns, where it had not been seen for 100 years. I took it here first in 1964.

Earlier in June 1962 Mr. Messenger and I had great fortune in Kerry, not only seeing large numbers of the local insects, but taking in a single night *Celerio galii* L. (Bedstraw Hawk) and *C. livornica* Esp. (Striped Hawk); a double probably without precedent. It was in 1965 that the most astonishing discovery of this century occurred. In August that year Mr. Revell, on holiday near Harlech, had an example of *Coenophila subrosea* Steph. (Rosy Marsh Moth) to his light,

a species that had not been seen in Britain for 120 years. I felt convinced it was not a migrant and must be breeding in that region, though the origin of this stray was then unknown to me, or to Mr. Austin Richardson who had a hunch that Borth Bog north of Aberystwyth be prove a likely place. It was not until 1967 that we mounted an expedition; our intuition proved to be correct and this well-known spot was found to be the seat and breeding ground of this wonderful noctuid. The discovery of this long-lost species emphasises how little we still know of some of our insect fauna. We are all inclined to follow the crowd round most of the easy and well-known localities, and not to act the part of pioneers into *terra incognita* that still exists in our islands and has never seen a net. Yet another example has been the recent occurrence of *Gortyna borellii* Pierret (Large Frosted Orange) on the Essex coast, and *Chloroclystis chloerata* Mab. (Sloe Carpet) all over the south-east of England. These will not be the last of our Lepidoptera found to lie hidden under our noses. I am far from being a pessimist and feel that the study and pursuit of our butterflies and moths can still give us plenty of interest and pleasure and particularly I hope to myself for many years to come.

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#### THE PROFESSOR HERING MEMORIAL RESEARCH FUND

The British Entomological and Natural History Society announces that awards may be made from this Fund for the promotion of entomological research with particular emphasis on

- (a) Leaf miners,
- (b) Diptera, particularly Trypetidae and Agromyzidae,
- (c) Lepidoptera, particularly micro-lepidoptera,
- (d) General entomology,

in the above order of preference, having regard to the suitability of candidates and of the plan of work proposed.

It is envisaged that awards would be made to assist travelling and other expenses necessary for field work, for the study of collections, for attendance at conferences, or, exceptionally, for the costs of publication of finished work. In total they are not likely to exceed £150 in 1973.

Applicants need not be resident in the United Kingdom, and research in any part of the world may qualify.

Applicants should send a statement of their qualifications, of their plan of work, and of the precise objects and amount for which an award is sought, to R. F. BRETHERTON, C.B., M.A., F.R.E.S., Hon. Treasurer, Folly Hill, Birtley Green, Bramley, Guildford GU5 0LE, Surrey, as soon as possible and *in any case not later than 30th June 1973.*

## THE MICROLEPIDOPTERA OF WICKEN FEN SUPPLEMENT FOR 1972

By Col. A. M. EMMET

A total of eleven new species of microlepidoptera was recorded from Wicken Fen in 1972, while seventeen others were taken for which there had been no recent records. I have also received records for one new species and one 'rediscovered' species taken in earlier years from Mr. H. E. Chipperfield. This raises the recorded number of species to 567, and reduces the tally of species lacking recent records to 164.

The most notable capture of this year was a single specimen of *Monochroa quaestionella* H.-S. Wicken is its only known British locality and it appears not to have been taken for over 50 years. The textbooks give the foodplant as *Lotus*, which is extremely scarce at Wicken, suggesting that there it has an alternative pabulum. If this could be discovered, we should be able to learn more about the present status of this rare moth.

Almost all the records are my own only because hardly anyone is sending lists of captures either to me or the secretary of the Wicken Fen Committee. May I appeal once more to entomologists to send their records which will then be published when appropriate, with due acknowledgements.

Details of the 1972 captures are as follows, abbreviations as published in the original list (1972, *Proc. Brit. ent. nat. Hist. Soc.*, 5(2):52-5).

### A. NEW SPECIES

- Eriocranio sparrmannella* Bosc. Tenanted in fairly common on *Betula* in July (E).  
*Nepticula fragariella* Heyd. Tenanted in in *Agrimonia* in September (E).  
*Phyllonorycter harrisella* L. One around *Quercus* in August (E).  
*P. tristrigella* Haw. M\* on *Ulmus* (E).  
*Ypsolopha horridella* Treits. One in August (E).  
*Elachista alpinella* Staint. One in August (E).  
*Ptocheuusa paupella* Zell. Several round *Pulicaria* in July (E).  
*Mompha propinquella* Staint. Several in July and August (E).  
*Blastodacna hellerella* Dup. (*atra* sensu Meyr.) Several at light in July (E).  
*Acleris boscana* F. L\* on *Ulmus*. Suspected feeding places in spun leaves have been noted for the past three years (E).  
*Agriphila geniculeus* Haw. Several at light in August (E).  
*Eurrhpara perlucidalis* Hübn. One 7.viii.65, H. E. Chipperfield (1967, *Ent. Rec.* 79:317).

### B. SPECIES MARKED 'NRR' (no recent record) IN THE 1971 LIST

- Calybites auroguttella* Zell. M and larval 'cones' not uncommon on *Hypericum* in August and September (E).  
*Yponomeuta plumbella* D. & S. One in August (E).  
*Y. dentella* F. (*harpella* D. & S. *xylostella* sensu auct.) one in July (R. W. J. Uffen).  
*Elachista paludum* Frey. Several in July (E).  
*E. pulchella* Haw. (*obscurella* Staint.) One in August (E).  
*Monochroa quaestionella* H.-S. One at light, 16.vii.72 (E). The specimen is now in the British Museum (Nat. Hist.).  
*Teleiodes vulgata* Hübn. Two at light in July (E).  
*Gelechia sororculella* Hübn. Several in August (E).  
*Reuttia subocellea* Steph. One in July (E).

*Cydia funebrana* Treits. One in July (E).

*C. compositella* F. One in July (E).

*Zeiraphera insertana* F. (*corticana* Hübn.) Several on trunks of *Quercus* in July (E).

*Celypha striana* D. & S. One in August (E).

*Hysterosia inopiana* Haw. One amongst *Pulicaria* in July (E).

*Evergestis pallidata* Hufn. (*straminalis* Hübn.) Three in July and August (E).

*Pyrausta aurata* Scop. Two in August (E).

*P. farinalis* L. One, 1957, H. E. Chipperfield.

*Rotruda binaevella* Hübn. One at light in August (E).

C. ADDITIONAL RECORDS for the following species suggests that they are more plentiful than had previously been supposed. Those that have been bred are marked with an asterisk.

*Nepticula ulmariae* Wocke; \**Fomaria septembrella* Staint.; *Heliozela betulae* Staint.; \**Bucculatrix nigricomella* Zell.; \**Phyllonorycter messaniella* Zell.; \**P. dubitella* H.-S., bred from mines taken the previous November by ff and E); *Choreutis punctosa* (Haw.); *Argyresthia semifusca* (Haw.); *Epermenia chaerophyllella* Goeze; *Eucosma obumbratana* Lein. & Zell. (*expallidana* Haw.); *Cnephasia longana* Haw.; *C. incertana* Treits.; *Scoparia arundinata* Thunb. (*dubitalis* Hübn.); *Eudonia crataegella* Hübn.; *Sitochroa verticalis* L.; *Pleuroptya ruralis* Scop., abundant in the remoter parts of the fen.

Mr. H. E. Chipperfield has furnished records for the following scarce or under-recorded species: *Mompha ochraceella* Curt., 1964; *Eucosma howenwartiana* D. & S., 1966; *Epiblemma rosaecolana* Doubl., 1965; *Gypsonoma minutana* Hübn., 1964, constituting the earliest record; *Pandemis cerasana* Hübn., 1964; *Crambus nemorella* Hübn. (*pratellus* sensu auct.), 1961; *Pyrausta purpuralis* L., 1935; *Eurrhyncha lancealis* D. & S., 1952 and 1964.

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*Outline Life Histories of some West African Lepidoptera: a correction.* Mr. D. G. Sevastopulo writes on two plants mentioned in the above paper (1970, *Proc. Brit. ent. nat. Hist. Soc.*, 3:95-122; these are *Anchomenes difformis* (pp. 114, 115, 116) and *Newboldia imperialis* (pp. 97, 101).

He draws attention to the fact that *Anchomenes* is not the name of any genus of vascular plants. He also says that while there is *Nebouldia laevis* (P. Beauv.) Bureau (Bignoniaceae) in West Africa it is the only species in the genus. *Newboldia* is not a published name for any vascular plant, nor has such a binominal as *Newboldia* or *Nebouldia imperialis* been published for a vascular plant.—Editor

**MOLOPHILUS LACKSCHEWITZIANUS ALEXANDER 1952  
(DIPTERA: TIPULIDAE) NEW TO THE BRITISH ISLES**

By ALAN E. STUBBS and PETER J. CHANDLER

The genus *Molophilus* has hitherto been represented by 21 species on the British list. They are all small species, the majority of them yellow, but a few are blackish. The male genitalia have a complex range of characters which provide a ready means of distinguishing the species, though the females are often impossible to separate at present.

Whilst sorting a collection of Irish material (made by PJC), a yellow *Molophilus* was found which failed to agree with any of the male genitalia illustrated in the standard British key (Coe, 1950). Reference to a work on Palaearctic species by Lackschewitz (1939) quickly revealed an illustration of identical male genitalia under the name *hastatus* sp. nov. However, this name cannot be used since it is preoccupied. Alexander (1927) designated *M. hastatus* for a new species taken in Tasmania, Australia and he sorted out the confusion in an Indian publication (1953) which erected *lackschewitzianus* nom. nov. for the European species. Attention was drawn to this amendment in the European literature by Stary and Roskošný (1969).

Subsequently, specimens have been collected in England (by AES) and the British material is now as follows:

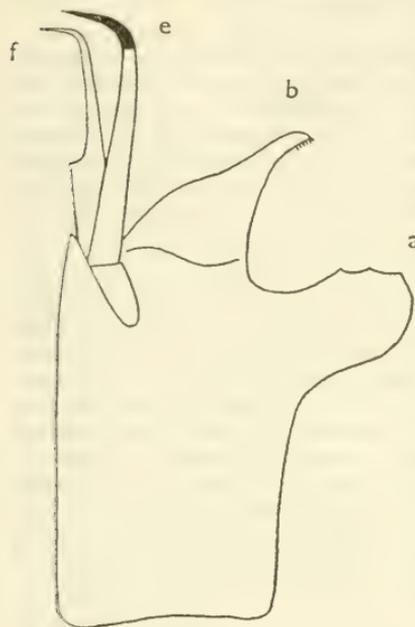
- 2 males, 1 female (probably the same species), 15.v.72, Glencar, Leitrim, Eire. Lightly wooded ground near a waterfall. (PJC).
- 1 male, 29.v.72, Vann Lake (Surrey Naturalists Trust Reserve), Ockley, Surrey. Clay woodland adjoining a lake. (AES).
- 1 male, June 1972, Dunsley, near Whitby, North Yorkshire. Woodland with seepages and ferns on shales. (AES).
- 1 male, 29.vi.72, Fell End, Beetham, near Arnside, Westmorland. Woodland on limestone and drift (AES) (associated Diptera suggested that some species had strayed in from other habitats).

The type male material was taken at Unter-Steiermark, Steinbruck, 19.v.17, by Zerny. Lackschewitz (1939) also refers to further material taken by Zerny which was thought to be of females of this species—Unter-Steiermark, Wotsch, 20.v.17 and Tuffer 20–21.v.17. Unter-Steiermark is a province of eastern Austria. Stary and Roskošný (1969) give a further locality in the extreme east of Czechoslovakia—Vihorlat, Morske oko 7.vi.66 1 ♂, 10.vi.66 1 ♂ collected by Roskošný.

The British list includes most of the European species of *Molophilus* likely to occur in Britain and there seemed no reason to suspect the presence of *M. lackschewitzianus* which was described from Eastern Europe. The original British discovery in Ireland raised some interesting distribution questions, but the subsequent English records suggest that the species may well be widespread. All the records are from lowland situations, the Westmorland record lying within the climatically mild area around Morecambe Bay. It is interesting to note that one of us (AES) has collected large numbers of *Molophilus* in many parts of England, Scotland and Wales for a number of years without previously locating this species. The close spacing of the four British records must be regarded as coincidence rather than earlier oversight, since the yellow species, in general, cannot be separated in the field and the genitalia are so distinctive under a microscope. The mainland of western Europe is not well recorded and we are not aware of any other records.

The British material of *lackschewitzianus* has the thorax uniformly light

yellowish-brown with a grey head and light brown antennae. The abdomen is yellowish-brown in the male but is darkened in the supposed female. In Coe (1950), the species runs easily to couplet 8 and would run either to couplet 13, or following ambiguities at couplet 14, may run to couplet 18. In any event, the female cannot be satisfactorily separated. The male can be determined on the basis of the accompanying figure of the male genitalia which may be described as follows (lettering of styles and coxites is as given in figs. 28-30 in Coe, 1950): *a*. well developed, about as long as broad and projecting almost at right angles to long axis of hypopygium (angle varies slightly between specimens). The serrate distal (top in figure) margin is most marked in the Westmorland specimen illustrated; *b*. strongly developed, roughly triangular in side view, with a brush of short black bristles at the tip; *c*. very poorly developed; *d*. not developed; *e*. outer style long and slender, gently tapering to a pointed curved tip which is black not twisted; *f*. inner style slightly shorter, broad in basal third, becoming abruptly slender and tapering to a curved point distally.



Lateral view of male hypopygium of *Molophilus lackschewitzianus* Alexander

pygium is covered in long bristles which have been omitted from the figure. There seem to be minor differences between the material from different localities but in part this results from distortion in drying.

Mr. A. M. Hutson has kindly confirmed identifications and advised on literature. The specimens have been placed in the British Museum (Natural History).

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91 Clitherow Avenue,  
 Hanwell,  
 London, W.7.  
 14th December, 1972.

Weston Research Laboratories,  
 644, Bath Road, Taplow,  
 Maidenhead, Bucks.

# PROCEEDINGS

## CENTENARY EXHIBITION

The Centenary Exhibition of the Society was held on Saturday, 4th November, 1972, at Holland Park School. This venue was found to be easily accessible, the Hall and adjacent rooms in which the Exhibition was held were cool and spacious, and the abundance of seats upon which to rest and converse with one's friends most welcome. The tables for the exhibits were a little low for comfort, and a poor light in the central Hall detracted somewhat from the display. One hundred and one Exhibits were on display, brought by Members of the Society and friends.

The centrepiece was a huge exhibit depicting the *Sphingidae* of the World, set around a map which was intended to show the origin of the contents of the different showcases: so comprehensive was the collection of specimens, however, that the map was nearly out of range! The following Regions were represented: Europe outside Britain (three species), Britain (all the native species plus some of the migrants), Malta (one species), Cyprus (one species), Canary Is. (one species), Aden (one species), India (four species), Thailand (two species), Malaysia (39 species), Borneo (two species), Formosa (12 species), Japan (22 species), Philippines (one species), Africa (34 species), Madagascar (11 species), Australia (nine species), West Indies (33 species), Canada (12 species), North America (18 species), South America (37 species). The exhibit was prepared by Cdr. W. R. L. Gilchrist from his own specimens and others loaned by Dr. B. J. MacNulty and Messrs. A. G. M. Batten, E. S. Bradford, A. E. Gardner, A. Hayes (British Museum, Nat. Hist.), T. J. G. Homer, J. A. Naylor and E. A. Sadler.

Several other Members selected material from abroad for their exhibit. The Society held a 'mini' Field Meeting in Montenegro from 9-22 July, and Messrs. R. F. Bretherton and P. W. Cribb showed an interesting selection of Lepidoptera, mostly Rhopalocera, from that little-worked region. Two collecting sites were chosen, the coast near Budua, and the northern mountain massif of Durmitor. They recorded 101 species of butterflies, of which 23 were additions to Rebel's list (1913) for Montenegro and 33 for the Durmitor area. Mr. Bretherton also showed 28 species of butterflies caught in May 1972 in the United States at Baltimore, Maryland, and during a journey by car through Virginia, North Carolina and Tennessee. Two species of particular interest were *Pieris virginiensis* Edwards, which has become rare and largely replaced by the European *P. rapae* L., and *Boloria toddi* Holland from almost the southern limit of its range in Maryland. Those busy globe trotters, Mr. & Mrs. Greenwood nevertheless often find time for collecting in distant lands, and they showed interesting and spectacularly beautiful species from South Africa, Indonesia, Tasmania, Australia and New Jersey, U.S.A.

Baron C. G. M. de Worms also showed that he ventures far beyond Europe in search of Lepidoptera in displaying some of his harvest of 1972 from the Middle Atlas region of Morocco, which he visited from 30th May until 12th June, and from the Kuala Lumpur district of Malaya where he had a short collecting trip between 5th and 9th August. He also showed specimens from eastern Jamaica taken in September 1971. Species from the tropics were also shown by Gp. Capt. L. W. Burgess (Guyana), Dr. J. A. Cornelius (Malaysia, Thailand and Nigeria),

Mr. P. J. Croft (N. America and Venezuela), Dr. G. A. N. Horton (India, Burma and Ceylon), Mr. T. J. G. Homer (Jamaican noctuids), Lieut. S. Swift (Malaysian butterflies, including rarities and mimics) and Mr. D. A. Trembath (Kenya). Mr. A. M. A. Low showed a fine representative series of *Troides* Hübn. species and allied genera. Mr. S. R. Bowden, who customarily produces a fascinating exhibit on the genetics of *Pieris* hybrids, prepared something in a lighter vein though no less interesting and spectacular. He called his exhibit, 'Variations on a Theme', and it consisted of 138 bred specimens selected to show variation of phenotype of the *Pieris napi* L./*P. bryoniae* Ochs./*P. melete* Ménétériès complex of species and their hybrids.

From Europe, Miss Marie-Louise Archer, helped by her father, showed a nicely set collection of Rhopalocera taken in France while on holiday in August 1972, and Mr. R. J. Revell showed several butterflies and a good many moths, also from France in the summer of 1972. Mr. E. P. Wiltshire showed examples of *Hydraecia lucherardi* Mab. from the Orne estuary, northern France, believed to be the first specimens taken on the north coast of France for nearly 50 years. Elsewhere, it is known from the south and west coasts of that country and, of course, from the Romney Marsh district of Britain.

One of the Society's major activities in recent years has been to take part in a survey of the natural history of the grounds of Buckingham Palace. Dr. J. D. Bradley has been responsible for the moth trap which is operated regularly in the grounds, and he put on display a representative collection of the moths which have appeared therein. It included a second specimen of the gelechiid moth *Monochroa hornigi* Staud., taken on 10.vii.70. The first was taken on 17.vi.63 and recorded and illustrated in *Proc. S. Lond. ent. nat. Hist. Soc.*, 1963: Pl. 8. These are the only known British specimens.

During 1972, the Society held several Field Meetings of a more ambitious nature to celebrate Centenary Year. One of these was in Perthshire during Whit week, and Mr. Revell exhibited some of the moths which he bred from larvae obtained during that week. They included *Eurois ocellata* L., *Plusia interrogationis* L., *Amathes agathina* Dup., *Crocallis elinguaris* L., *Entephria caesiata* Schiff., *Oporinia filigrammaria* H.S., *Eupithecia sobrinata* Hübn. (Inverness-shire) *Colostygia didymata* L., and *Hydriomena furcata* Thunb. Among the few insects seen on the wing were specimens of *Anarta melanopa* Thunb., and a short series of these was shown.

Several Members produced exhibits of a regional flavour. Notable among these was Messrs. K. G. W. and L. K. Evans's case of moths taken in Radnorshire during two visits, in July 1971 and 1972, which included such northern species as *Entephria caesiata* Schiff., *Perizoma blandiata* Schiff., *Plusia bractea* Schiff. and *P. interrogationis* L. *Leucania straminea* Tretis. was found to be common on the banks of the river Wye. Dr. G. A. N. Horton's local exhibit was entitled, 'There is More to Monmouthshire than the Wye Valley'. Indeed there is, judging from the three drawers illustrating this contention. They included representative species from a small fen, the Severn estuary salterns, the northern hills, and species from various districts in the county which included *Harpyia bicuspis* Borkh., *Parascotia fuliginaria* L., *Agriphila latistrius* Haw., *Euphyia cuculata* Hufn., *Selenia lunaria* Schiff., *Xylena vetusta* Hübn. *Crambus uliginosellus* Zell., and many other local insects. Likewise, Mr. H. N. Michaelis showed representative species from North Wales which included all the specialities such as *Amathes ashworthii* Doubl., *Idaea contiguaris* Hübn., *Nyssia zonaria* Schiff. and *Alucita spilodactyla* Curt. Mr. H. E. Chipperfield showed species from two contrasting areas of Suffolk, the coastal marshes and sandhills, and Breckland.

Mr. R. I. Lorimer was able to show two additions to his List of Orkney Lepidoptera 1970, (*Ent. Gaz.* 21), namely *Plusia interrogationis* L. and *Aporophyla nigra* Haw.

Mr. R. C. Dyson's exhibit illustrated the range of variation in Britain of *Agrotis ripae* Hübn., a species which has interested him for many years. It is impossible to describe the forms adequately in a word, but they may be summarised thus: (a) *Ireland*: nr. Dublin (mainly dull coloured), Rosslare, Co. Waterford (some well marked specimens). (b) *Wales*: Gower, Glam. (small, dullish), Pembroke (apparently scarce; large & well marked females), *England*: Sandscale, Lancs. (variable and well marked), N. Devon (fine, large, variable and well marked; dark females), Dawlish, S. Devon (orange hued), Hunstanton, Norfolk (putty coloured), Wittering, Sussex (pale, on white sand), Greastone, Kent (a little darker than Sussex form, on darker sand). Mr. R. P. Demuth showed a comprehensive selection of British noctuids showing racial variation, though unfortunately he included only a couple of specimens from each locality, with the exception of *Hadena lepida* Esp. of which he had a long series illustrating the colour range found from East Anglia right across to the extreme west of Ireland. Dr. J. V. Banner showed variation in *Noctua comes* Hübn. and *Orthosia gracilis* Schiff. from several localities.

Mr. R. Tubbs has been remarkably successful in breeding British Rhopalocera: for Centenary Year, he displayed the results of breeding through six generations a strain of *Lysandra coridon* Poda containing the ab. *syngrapha* Kef. gene, illustrated with helpful notes, and also bred *L. bellargus* Rott. showing blue scaling in the females. Many Members who specialise in the butterflies arranged excellent displays of their choicest specimens. Outstanding in Mr. and Mrs. Watson's exhibit was a specimen of *Maniola jurtina* L., probably unique, which showed a combination of abs. *anommata* Verity + *antiaurulancea* Leeds + *antilaeticolor* Leeds. Baron de Worms showed some good aberrations of *Lysandra coridon* Poda taken over the last 30 years; Mr. R. C. Revels had a fine male *Papilio machaon* L., with the dark markings extended, bred F<sub>4</sub> in 1972, a male *Aphantopus hyperantus* L. ab. *pallens* Schultz taken at Monks Wood, Hunts, in 1972, and other aberrations, in *Maniola jurtina* L., *M. tithonus* L., *Lysandra coridon* Poda and other species. Mr. R. M. Craske seemed to have been very successful in his search for rare forms of butterflies during the shockingly bad summer of 1972, and showed some good insects, mostly from Sussex. Messrs. A. D. A. Russwurm and H. G. M. Middleton produced a joint exhibit containing the pick of their captures over the last 15 years, including several taken in 1972. Mr. A. S. Wheeler's small exhibit contained some magnificent specimens, most of which had been exhibited before; they included a fine bilateral gynandromorph of *Celastrina argiolus* L., bred from a few ova given the exhibitor in 1944 by Mr. L. Hugh Newman. Capt. A. P. Gainsford also showed some fine butterfly aberrations, and some photographs of one of the localities where *Maculinea arion* L. still survives. Last but not least, the exhibits of Maj. Gen. C. G. Lipscomb and Messrs. J. H. Payne, J. H. C. Phillips, F. S. Reeves and D. B. Tyler did much to grace the tables, and to excite the envy of fellow rhopalocerists.

One of the most interesting and instructive exhibits of British Heterocera was that of Mr. B. R. Baker. He showed a drawer of immaculately set clearwings representing eleven species, all taken within 15 miles of Reading, Berks, and four drawers, arranged with supreme artistry, illustrating signs of the presence of the early stages of *Sesia apiformis* Clerck, *Sphecia bembeciformis* Hübn., *Synanthedon salmachus* L., *S. vespiformis* L., *Conopia spheciiformis* D. & S., *C. flaviventris* Staud., *C. anthraciniformis* Esp., *C. myopaeformis* Borkh., C.

*formicaeformis* Esp., *Aegeria culiciformis* L., *Bembecia scopigera* (Scop.) and *B. muscaeformis* Esp. He also showed three clearwing parasites, *Phaogenes cephalotes* Wesm. and *Ephialtes crassiseta* Thn. (Ichneumonidae), and *Macrocentrus marginator* Nees (Braconidae). Clearwings were exhibited by several other members, and it seems that interest in the group is growing.

During 1972, the newly discovered pug, *Chloroclystis chloerata* Mab. was found in several localities by beating the larvae from Blackthorn in April. Rev. D. J. L. Agassiz exhibited some moths bred from larvae so obtained from Essex, Herts, Middx. and Surrey, and Dr. J. R. Langmaid showed some from the New Forest, Hants. Baron de Worms showed three examples bred from blackthorn in April 1944 near Salisbury, Wilts, which had lain undetected in his collection for 28 years!

Virtually no migrant species were recorded during the year, but the notable exception was a specimen of *Apamea lateritia* Hufn., the second British specimen, taken by Mr. B. F. Skinner at mercury vapour light in West Norwood, London, S.E.27, on 17.vii.72. Numerous good migrant species taken in previous years by members were on show; the majority had been seen at other Annual Exhibitions of the Society.

A great many other interesting species and rare aberrations were on show, and it is impossible to mention them all. Mr. Agassiz exhibited bred specimens of *Depressaria silesiaca* Hein. and *Bucculatrix capreella* Krog. from Aviemore, and a melanic *Dioryctria abietella* D. & S. from Enfield, Middx., 3.ix.72. Mr. A. D. Blaxill showed colourful series of Sphingidae, Arctiidae and *Catocala* spp. Mr. Bretherton produced some of his gems from Surrey taken over the last 20 years. Mr. Botwright had interesting aberrations in *Cymatophorima diluta* Schiff., *Biston betularia* L. and *Noctua pronuba* L. Among Mr. R. Fairclough's specimens was a wonderful series of *Acleris cristana* (Schiff.), the result of intensive breeding over the last two years. Mr. J. Culpin showed some interesting species from Derbyshire, including some of great rarity in the county. Mr. P. J. Gent had in his exhibit a very extreme form of *Xanthorhoe fluctuata* L. ab. *costovata* Haw. Mr. T. W. Harman's case contained a number of species, mostly bred, and included extreme forms of *Semiothisa clathrata* L. Mr. R. Hayward showed an intersex of *Hepialus humuli* L.

Dr. H. B. D. Kettlewell and Mr. C. W. D. Gibson exhibited local forms of moths from the north of Scotland, which included *Apamea exulis assimilis* Doubl. and *Paradiarsia glareosa* ssp. *edda* (Staud.). The latter are the first recorded from the British mainland. Messrs. R. P. and S. A. Knill-Jones displayed a number of historic specimens including the first known captures of *Luperina nickerlii* ssp. *knilli* Boursin from Co. Kerry. Mr. F. S. Reeves showed a specimen of *Coscinia cribraria* L. taken in 1971, showing that the species still survives and giving hope that it may recover its numbers. Mr. Austin Richardson showed some of his finest captures of rare migrants, subspecies and aberrations (many named by himself), and a superb series of *Nycteola revarana* L. one of his specialities. Mr. L. W. Siggs exhibited most of his noteworthy captures in the New Forest, including *Owrapteryx sambucaria* L. ab. *olivacea* Stand. taken in 1972. Mr. W. G. Tremewan showed aberrations of *Zygaena filipendulae* L. from Cornwall and Surrey. *Mimas tiliae* L. ab. *brunneacentripuncta* Tutt was exhibited by Mr. D. B. Tyler, together with a watercolour painting of the specimen by Mr. A. D. A. Russwurm. Other interesting specimens were shown by Messrs. B. W. Weddell and E. H. Wild, and Dr. de Worms also showed a selection of British moths taken in 1972, as well as other material to which reference has already been made.

Paintings of Lepidopterous subjects, all of very high quality, were shown by

Miss J. Marshall and Mr. Brian Hargreaves, and colour photographs of the standard of perfection one has come to expect from them, by Mr. I. G. Farwell, and Jean Matthews. Mr. M. W. F. Tweedie showed a series of monochrome photographs illustrating ultra-violet 'coloration' in flowers.

The 'state of play' regarding the various mapping schemes being operated by the Biological Records Centre at Monks Wood was again displayed with admirable clarity by Messrs. J. Heath and M. J. Skelton.

Only thirteen exhibits included microlepidoptera at all, and in several of these only one or two specimens were shown in displays devoted mainly to the macrolepidoptera. This was disappointing in our centenary year, for the microlepidoptera were less well represented than at the society's recent exhibitions.

The Micropterigidae were well covered by Mr. J. Heath, who showed set specimens together with coloured drawings of the adults, their genitalia and the setae on the accessory claspers of the male genitalia, a most interesting detailed study of a small and highly specialised group.

The Nepticulidae were the sole subject of Lt. Col. A. M. Emmet's exhibit. He showed adults, selected from his collection, of 71 and leaf-mines of 81 different species. The leaf-mines were displayed in polythene sheets of the type manufactured for showing coins, a novel and successful method suggested by Mr. E. S. Bradford. Mr. Bradford also showed a number of Nepticulidae, but it is difficult to write about his exhibit. He showed a large case packed to capacity with fine and in many instances rare microlepidoptera. Unfortunately he was too pressed for time to label his specimens! Those who do not know Mr. Bradford's modesty might have thought that this was a cunning plot to attract attention to his exhibit, since microlepidopterists found it a fascinating occupation to pore over his case and hazard identifications for his chosen insects. Though Mr. Bradford's exhibit was an important one, it will receive scant mention in this report since time did not permit for the proper identification and cataloguing of several hundred specimens.

The Adelidae were represented only by Messrs. R. and A. J. Fairclough's examples of *Nemophora cupriacella* Hübn. from Lymington, Hampshire. The Tineidae, likewise, were thin on the ground, the only examples noted being some of the common species which have larvae that feed in rotten wood which, together with some Oecophoridae with similar habits, were shown by Mr. G. R. Else.

The only examples of the Lyonetiidae were specimens of *Bucculatrix capreella* Krog., a species relatively new to the British list. These were bred by the Rev. D. J. L. Agassiz from larvae found feeding in *Achillea* in the Aviemore district of Scotland. The same exhibit showed another new species, *Caloptilia rufipennella* Hübn. which was added to the British list in 1971. This specimen was one of several captured near Thorpeness in Suffolk in September, 1972.

The Yponomeutidae were represented by specimens of *Yponomeuta evonymella* L. taken by Dr. G. A. Neil Horton in Monmouthshire.

The Coleophoridae attracted two exhibits. Mr. J. M. Chalmers-Hunt showed the whole of his extensive collection of this family. Mr. H. N. Michaelis showed examples of *Coleophora serpyllitorum* Hering from Great Orme, Denbighshire, the only known British locality, and of *C. adpersella* Ben. from Caernarvonshire. The latter species was recently added to the British list on the evidence of specimens taken in the south of England, but its presence in numbers in the saltmarshes of north Wales suggests that it is a long-established resident.

Mention has already been made of Mr. Else's wood-feeding Oecophoridae. A notable rarity in the same family was Dr. Neil Horton's *Oecophora bractella* L.



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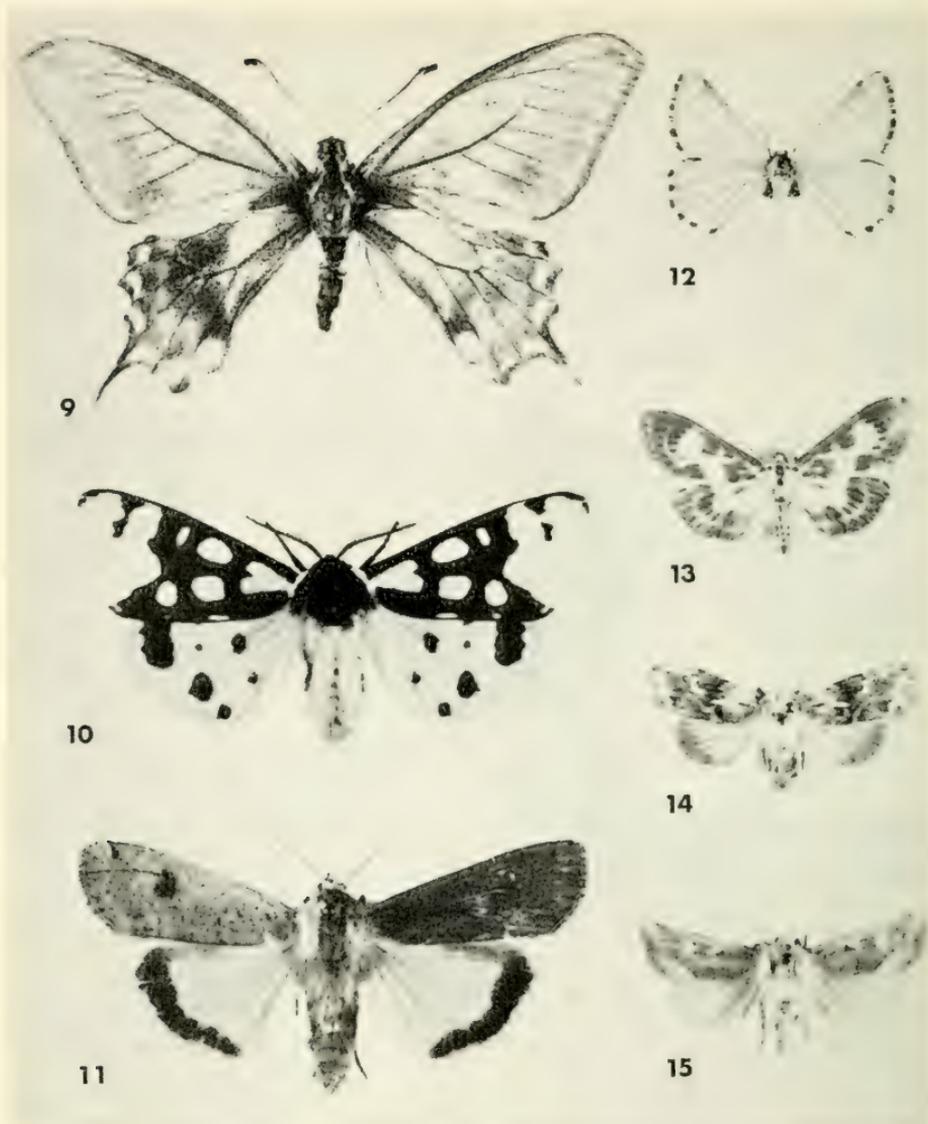


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Photographs by David Walker, Photographic printing by Shell Research Ltd., Sittingbourne

CENTENARY EXHIBITION, 4th November 1972

1. *Maniola jurtina* female ab. *aurolanca* Leeds, Maj.-Gen. C. G. Lipscomb;  
 2. *M. jurtina* L., R. C. Revels; 3. *Erebia aethiops* Esp., A. D. A. Russwurm;  
 4. *Euphyia bilineata* L., K. G. W. & L. K. Evans; 5. *Coenonympha tullia* Müll.  
 ab. *lanccolata* Arkle, H. G. M. Middleton; 6. *Apamea lateritia* Hufn., B. F.  
 Skinner; 7. *Gonodontis bidentata* Clerck, S. A. Knill-Jones; 8. *Abraxas grossu-*  
*lariata* L., B. F. Skinner.



Photographs by David Walker, Photographic printing by Shell Research Ltd., Sittingbourne

9. *Papilio machaon* L., R. C. Revel; 10. *Arctia villica* L. ab. *wardi* Mab., Austin Richardson; 11. *Noctua pronuba* L. gynandromorph, B. G. Withers; 12. *Lysandra coridon* Poda ab. *ultrafowleri* B. & L., R. C. Revel; 13. *Eurrhynx hortulana* L., E. H. Wild; 14. *Calophasia lunula* Hufn., E. H. Wild; 15. *Luperina dumerilii* Dup., S. A. Knill-Jones.

from Monmouthshire, this being one of our rarest and most beautiful microlepidoptera. The Depressariinae were represented by the newly discovered *Depressaria silesiaca* Hein., bred by Mr. Agassiz from Aviemore and *Agonopterix enicella*. Treits. taken by Mr. H. E. Chipperfield on the Suffolk coast.

The Ethmiidae were represented by *Ethmia dodecea* Haw. (*decemguttella* Hübn. nec Fab.) captured by Dr. Neil Horton in Monmouthshire, while the only notable Gelechiid was *Monochroa hornigi* Staud. recorded by Dr. J. D. Bradley on the gardens of Buckingham Palace in 1970, this being the second British capture of this local European species.

The most interesting Tortricidae were specimens of *Acleris cristana* D. & S. selected by Messrs. R. and A. J. Fairclough from some 2,000 they have bred in the last two seasons. Rare and interesting forms included *vaughaniana* Webb, *clarkiana* Webb, *nigrocostana* Clark, *semistriana* Desv., *xanthovittana* Desv., *fulvana* Sheldon, *tolana* Desv. and two unnamed forms. The same exhibitors had specimens of *Sparganothis pilleriana* D. & S. from the New Forest and of *Cydia strobilella* L. bred from spruce cones collected in the spring of 1972. Mr. Chipperfield showed specimens of the very local *Cydia gemmiferana* Treits. from the Isle of Wight, while amongst Mr. R. F. Bretherton's moths of this family were bred examples of *Eucosma heringiana* Jäckh from Graveney marshes, Kent. Mr. Michaelis exhibited several local species from north Wales including *Cydia dorsana* Fab. and *Clepsis rurinana* L. He showed two other tortricids to illustrate how they have extended their range, namely *Clavigesta purdeyi* Dur., once apparently confined to Kent, and *Cacoecimorpha pronubana* Hübn. which was first found in Sussex in 1905.

The best represented family was the Pyralidae since several macrolepidopterists included specimens of the rarer species which had come to their light traps. Several migrants were on display, such as two specimens of *Diasemiopsis ramburialis* Dup. taken in 1967 and 1969 by Mr. L. W. Siggs at Minstead in the New Forest and *Uresephita limbalis* D. & S. (*polygonalis* sensu auct) captured in 1969 at Usk, Monmouthshire by Dr. Neil Horton.

Several interesting Crambinae were exhibited. Mr. Agassiz showed the local *Pediasia contaminella* Hübn. from Enfield, Middlesex. Dr. Neil Horton included the following species from Monmouthshire: *Agriphila latistria* Haw., *Catoptria falsella* D. & S. and *Crambus uliginosellus* Zell., the last being a new record for the county. He also showed specimens of *Catoptria margaritella* D. & S. from Breconshire and Carmarthenshire, this being the first record of this moth for the latter county. Mr. Chipperfield showed *Thisanotia chrysonuchella* Scop. from the Suffolk Breckland and *Agriphila latistria* Haw., *Pediasia fascelinella* Hübn., *P. aridella* Thunb. and *Platytes alpinella* Hübn. from the coastal area of Suffolk.

Other pyralids included *Evergestis extimalis* Scop. and *Margaritia sticticalis* L. from the Breck and *Melissoblyptus zelleri* Joan., *Anerastia lotella* Hübn., *Pima boisduvaliella* Guen., *Nyctegretis achatinella* Hübn. and *Euzophera cinerosella* Zell. from the neighbourhood of Walberswick, Suffolk, all shown by Mr. Chipperfield. Special mention must be made of his *Eurrhynx perlucidalis* Hübn. which he has discovered to be established at Walberswick. Mr. R. Dickson included *Nascia ciliaris* Hübn. in a group of marshland moths from Browndown, near Gosport, Hampshire, a fine entomological locality now threatened by tipping. Mr. Bretherton showed *Epischmia banksiella* Rich. from Portland and Mr. Agassiz a melanic form of *Dioryctria abietella* D. & S. from Enfield. Included in Mr. Bradford's diversified case was a specimen of *Agrotera nemoralis* Scop. from the Blean district of Kent, a rare species which until recently had been presumed to be extinct in Britain.

The Pterophoridae were represented by *Agdistis bennetii* Curt. from the Suffolk saltmarshes (Mr. Chipperfield), *Pterophorus spilodactylus* Curt. from the Isle of Wight (Mr. Chipperfield) and north Wales (Mr. Michaelis), and *Amblyptilia punctidactyla* Haw. taken by Mr. G. E. Hyde in Lincolnshire; the captor took the specimens flying amongst marsh gentian (*Gentiana pneumonanthe* L.) and was disappointed to learn that they were not the very rare and local *Stenoptilia pneumonanthes* Büttner.

A special exhibit, in part concerned with microlepidoptera, was presented by Messrs. C. R. B. Baker and P. R. Seymour of the Ministry of Agriculture, Fisheries and Food's Plant Pathology Laboratory at Harpenden. This covered the life-histories of several non-indigenous pests which have been or could be found in Britain as the result of accidental importation.

The microlepidoptera shown included *Anarsia lineatella* Zeller (*Tineidae*), whose larva bores into the twigs and fruits of almond, apricot, cherry, peach and plum; *Phthorimaea operculella* Zeller (*Gelechiidae*) which damages potatoes and tomatoes; *Grapholita packardi* Zeller, *G. prunivora* Walsh and *G. molesta* Busck (*Tortricidae*), which affect both hard and soft fruit; *Opogona sacchari* Bojer (*Lyonetiidae*) which is mainly a pest of bananas but could attack potatoes in this country; *Euzophera osseatella* Treits (*Pyrallidae*) which attacks potatoes and tomatoes; and finally *Epichorista ionephela* Meyn. and *Epichoristodes galeata* Meyr. (*Tortricidae*) which cause damage to roses and camelias as well as to fruit trees. None of these species is considered a serious threat at present to their host plants in Britain, but they could become established, especially in heated glasshouses.

As with previous Annual Exhibitions, those exhibits concerned with other Orders were not numerous. Two special exhibits of Coleoptera were mounted for the Society by the Curator, Mr. A. E. Gardner. These consisted of seven drawers of British Carabidae from the A. M. Massee collection, and a further four drawers of British Hydradephaga from the J. L. Henderson collection. Mr. Gardner also showed a selection of his interesting acquisitions during the past year. Among these was a small series of the weevil *Rhynchaenus decoratus* Germ. from Leckford in Hampshire and some *Hypocoelus oxelai* Palm., also from Hampshire, both of outstanding interest.

A fine case of Coleoptera from west Sussex was shown by Mr. J. Cooter, which included an example of *Platycis cosnardi* Chev. from Goodwood being the third British specimen the other two being captured in the Forest of Dean in 1944. A nice series of *Lycoperdina bovistae* L., which he had bred from larvae found in the puff ball *Lycoperdon pyriforme* Pers. in Houghton Forest, was included, as was *Quedius ventralis* (Arag.) from Wisborough, *Achenium depressum* (Grav.) from Pagham Harbour, *Elater cinnabarinus* Esch. from Goodwood and *Corymbites nigricornis* Panz. from Amberley.

Weevils from Hampshire and the Isle of Wight formed the exhibit presented by Mr. D. Appleton; this included such desirable species as *Cathormiocerus socius* Boh., taken at the roots of Ribwort Plantain on the Isle of Wight; *Pachytychius haematocephalus* Gyll. from the roots of Bird's-foot Trefoil at Gosport; *Phytonomus meles* F., swept in a marshy area in Meon Valley; and *Mononychus punctumalbum* Herbst on Stinking Iris on the Isle of Wight. In addition Mr. Appleton showed a pair of *Corymbites castaneus* L., larvae of which were found at the roots of grass tussocks on the Isle of Wight; previous British records, also from the island are very old and this record could be the first this century.

Mr. S. A. Williams showed some of the results of collecting with an 'autokatcher'

a large net fixed to the top of a car, a device with which he has been experimenting with during 1972. Most of his captures were very small species, but included *Tetratoma ancora* (F.), *Hallomenus biaotatus* (Quen.), *Lissodema cursor* (Gyll.) and *Aderus populnea* (Panz.), all scarce species.

Mr. A. E. Gardner's exhibit of Odonata were represented by seven drawers exhibiting all the British species, their larvae and their exuviae, and constituted the only exhibit in that Order.

Among the Diptera was an exhibit by Mr. K. W. Mardle on the genus *Drosophila* which included a remarkably fine model of *D. melanogaster* Weigen, in balsa wood, some four inches in length. Mr. C. O. Hammond showed some attractive syrphids including *Calliceva spinolae* Rond. from Houghton Hall Norfolk, 19.ix.72.

An exceptionally fine display was also put on by Mr. Hammond dealing with the British social wasps and included enlarged coloured drawings illustrating the points of identification. A small exhibit of European ants was prepared by Dr. P. A. Boswell, to show some of the variation in shape and size. Mr. G. R. Else showed a magnificent array of aculeate Hymenoptera which he divided into three parts: (1) a selection of Hampshire species associated with dead wood, plant stems and galls; (2) other Hampshire species, and; (3) two rare bees taken in Hampshire during 1972, *Ceratina cyanea* (Kirby) taken on chalk downland near Petersfield, 15th July on *Hieracium* and on 13th September and 7th October removed from dead bramble stem; also *Prosopis pectoralis* (Forst.) from Browdown, near Lee-on-Solent, on 26.vi.72 and 12.viii.72. The most significant species shown, apart from the two above mentioned were: *Sapyga clavicornis* (L.) taken near Freshwater, I.o.W. 22nd July; *Microdynerus exilis* (H.-S.) taken at Brook, I.o.W., 29th July; *Omalus violaceus* (Scop.) from Porchester, 11th June; *O. puncticollis* (Mocsary) from Denny Wood, New Forest, 11th July, and *Ectemnius rubicola* (Dufour & Perris) from Oxenbourne Down.

Living oriental rat fleas (*Xenopsylla cheopis* Roths.) were exhibited by Miriam Rothschild. They were shown through the microscope jumping from a perspex platform. Also shown was an apparatus for recording the number of jumps per minute. The morphology of the jumping mechanism was illustrated by coloured photographs and drawings.

Another live exhibit, that of mantids from various parts of the world was presented by Mr. G. Heath, and the Zoological Society showed their usual fascinating display of living arthropods.

Also an exhibit in the conservation of the fauna of dead wood attracted a great deal of attention, and was organised by Mr. A. E. Stubbs. It represented the combined work of nine specialist entomologists and resulted in a most effective, informative and professional display.

Other exhibits represented colourful and curious shells by Mr. G. H. Cox; photographs of the wildlife of the Isle of Purbeck by Mr. J. M. Breeds; and pests and colour variation by Mr. G. Morrison.

Mr. J. M. Chalmers-Hunt showed over 100 items from his 'Museum of Entomological Materials of Historic Interest'. Included in this exhibit was a great variety of early collecting appliances, many of which were most curious and interesting.

23rd NOVEMBER 1972

A Vice-President, Mr. J. M. Chalmers-Hunt, in the Chair

The following new members were declared elected: Miss C. H. Jackson and Messrs. N. D. Eastick, T. H. Ford and M. J. Head.

## EXHIBITS

Mr. J. M. CHALMERS-HUNT—Two examples of *Crambus pascuellus* L. ab. *obscurellus* Kuchlein (Lep., Pyralidae) taken at mercury vapour light at West Wickham, Kent, a typical example being included for comparison. This melanic form was first taken in Britain by Mr. A. Smith at Beckenham, Kent, in about 1960. The exhibitor said he had taken it annually in ones and twos at West Wickham since 1963. The form was originally described from Holland by Kuchlein in 1958 and had so far been observed only in Holland and a restricted area in West Kent.

Col. A. M. EMMET—A male specimen of *Monochroa quaestionella* H.-S. (Lep., Gelechiidae) taken at light at Wicken Fen, Cambs., 16.vii.72. Wicken Fen is the only known British locality for this species, but it does not seem to have been taken there, prior to the exhibited example, since about 1900. Its larva is reported to feed in *Lotus corniculatus* L. which is not included in the published list of the plants occurring on the Fen. Four specimens of *M. morosa* Mühl., a close relative, which is also a Wicken speciality, were shown for comparison.

Mr. R. J. DICKSON—Two handsome unidentified carabid beetles from Spain.

## COMMUNICATIONS

Mr. E. S. Bradford appealed for records of rare insects from the Arne Nature Reserve in Dorset. The area is threatened by proposed mineral development and the warden, Mr. B. P. Pickess of Arne, near Wareham, Dorset, is seeking evidence to support a campaign for the preservation of the reserve in its present state.

Mr. P. J. Baker read a letter from the secretary of the Hampstead Natural History Society asking for the help of an entomologist who could advise on the local insects for a new edition of 'The Natural History of Hampstead Heath'.

Dr. B. J. MacNulty gave a talk on Outline Life Histories of West African Lepidoptera: Part VI(a) (Noctuidae). He showed numerous transparencies of set specimens and living larvae in illustration. A discussion followed.

14th DECEMBER 1972

A Vice-President, Mr. J. M. Chalmers-Hunt, in the Chair

A welcome was extended to Dr. G. Bernardi, an overseas member and Miss Nguyen Thi Hong, both of whom were on a visit to this country from the Laboratoire d'Entomologie Museum, Paris.

The following new members were declared elected: Miss C. H. Jackson, Drs. G. F. Swann and C. S. Pike, and Messrs. C. S. Renshaw, A. S. M. Haselden, S. L. Meredith and G. P. S. Swann.

## EXHIBITS

Mr. E. S. BRADFORD—Bred examples of the following wood-feeding microlepidoptera: *Oecophora geoffrella* L. *Dasycera sulphurella* F. and *Batia lunaris* Haw. (Oecophoridae); and *Microscardia boleti* F., *Nemapogon parasitella* Hüb. and *N. cloacella* Haw. (Tineidae).

Mr. M. W. F. TWEEDIE—A copy of the September 1972 number of the *Malayan Nature Journal* on the cover of which was figured a new aberration of *Trogonoptera brookiana* Wallace, namely ab. *wongensis* H. S. Barlow. The green structural coloration was more extensively developed on both the forewings and hindwings than in the typical form. He mentioned that under the recent Malaysian Protection of Wild Life Act, *T. brookiana* was given protected status and might only be collected and sold under licence.

Mr. R. W. J. UFFEN—A sprig of *Ruscus aculeatus* L. (Butcher's Broom) which was flowering 14 months after being cut, having been standing in water in the intervening period. The stem had not rooted and had needed no further attention than having the algae wiped off it on two occasions.

#### COMMUNICATIONS

The mild December, reported Mr. E. H. Wild, had caused three pairs of frogs to mate in his local pond.

Mr. R. F. Bretherton said that *Poecilocampa populi* L. (Lasiocampidae) and *Operophtera brunata* L. and *O. fagata* Scharf. (Geometridae) had all been abnormally scarce in his light trap at Bramley, Surrey, this winter. Other members commented that winter moths had been in their usual numbers in their respective districts.

In reply to a question on his exhibit, Mr. Tweedie said that males of *Trogonoptera brookiana* were relatively easy to capture since they settled on the ground to imbibe saline exudations; the females on the other hand, kept to the canopy of the forest. A short discussion followed on the reasons for the differing behaviour of the two sexes.

Coloured transparencies of entomological subjects were shown by Mr. M. W. F. Tweedie, Mrs. F. M. Murphy, Miss Jean Matthews and Mr. K. G. W. Evans.

#### 11th JANUARY 1973

##### A Vice-President, Mr. J. M. CHALMERS-HUNT, in the Chair

The following new members were declared elected: Messrs. W. K. Brooker, D. M. Chappell, V. M. Howard, J. E. A. Simner and P. J. Torrie.

#### EXHIBITS

Mr. G. R. ELSE—Some uncommon aculeate Hymenoptera (including a crabronid wasp new to Britain) taken in Hampshire during 1972: *Prosopis pectoralis* (Först.), a male and female from Brownsdown (beside the river Alver) near Lee-on-Solent, 12.viii.72. This bee breeds in the vacated galls of the fly *Lipara lucens* Meig. which occur on the Common Reed, *Phragmites communis* Trin. The only other Hampshire record is of a female taken in August 1901 by Claude Morley at Matley Bog in the New Forest. The species is well established in a number of the East Anglian fens.

*Ceratina cyanea* (Kirby), a male and female removed from dead, hollow, bramble stems on the chalk downland of Cranbourne Down (a reserve of the Hampshire and Isle of Wight Naturalists' Trust), near Petersfield, 23.ix.72. This small carpenter bee is a rare and exceedingly local bee, apparently confined to calcareous surface soils, usually chalk downland, in south-east England. Both sexes overwinter in hollow stems (the female at least is able to excavate the pith) and it seems probable that such hibernacula are extended and used as

nesting galleries the following season. The bee is evidently very common and widely distributed on the reserve, but the exhibitor has so far failed to find it on the adjacent downland of Butser Hill. This is a species new to Hampshire.

*Ectemnius nigrifrons* (Cresson) (*planifrons* (Thoms.)), a male and female from Cranbourne Down, 22.vii.72. A rare wasp, the females of which provision their nest with Diptera, probably hover-flies, and nest in old timber.

*Ectemnius nigrinus* (H.-S.), a single male, 1.vii.72 and a female, 23.ix.72. A further female was taken on 22.vii.72, another female on 26.viii.72, and another male on 19.viii.72. This is an addition to the British list. Little appears to be known of the biology of this wasp, but the females probably prey on hover-flies and may nest in old timber, such as posts, or hollow stems, for example bramble. The range includes both Europe and Asia. Apparently uncommon on the European Continent, except in the Swiss Alps.

Mr. S. A. KNILL-JONES—*Dorcus parallelopedus* (L.) (Col., Lucanidae), imagines and a larva from an elm at Freshwater, I.O.W.

#### COMMUNICATIONS

Referring to the previous meeting, Mr. E. S. Bradford asked how *Ruscus aculeatus* L. (Butcher's Broom) becomes fertilised; and Mr. A. E. Gardner suggested it was effected by mites.

Mr. A. E. Gardner said, with regard to Mr. Knill-Jones exhibit, that he had found *Dorcus parallelopedus* (L.) in oak, beech, birch, alder, fruit trees and Scots pine. To which list Mr. J. M. Chalmers-Hunt added poplar.

A question was raised by Mr. E. S. Bradford on whether the larvae of solitary bees went over more than one year. He cited a case of bees laying in the screw holes of a window, these holes being closed by a cover of perforated zinc. On checking if the bee had emerged it was discovered that the larva was still present. Mr. G. R. Else suggested that the bee might well have been an *Osmia*, but in any case these small bees overwintered as an adult and the larval stage lasted only a short time.

The following members showed coloured transparencies of insects: Dr. P. A. Boswell and Messrs. E. S. Bradford, R. J. Dickson, S. L. Meredith and C. J. Rawlings.

## FIELD MEETINGS

OXFORD—2nd, 3rd &amp; 4th June 1972

*Leaders: Professor G. VARLEY & G. PRIOR*

This meeting, which extended over three days, was held jointly with the Ashmolean Society of Oxford and the Oxford University Entomological Society. Friday evening was intended primarily for the Ashmolean Society and was an indoor meeting held in the Inorganic Chemistry Laboratory. The speaker, Dr. B. J. MacNulty, was provided by our Society and his talk was on British Beetles illustrated with slides; seven of our own members attended.

The following morning the venue was the Oxford University Museum, where some ten of our members met at 10.30 a.m. They were shown over the Hope Department of Entomology by Professor Varley and his staff. Apart from seeing the department and its work our members were invited to avail themselves of the wonderful reference collection and library for any of their needs.

At 1 p.m. the party adjourned to The White Hart Hotel, Wytham, for lunch; then having been joined by two more members, went to the Oxford University Field Station at Wytham. Here Mr. C. Rivers showed the work being done breeding various insects, mostly Lepidoptera, which is used in some of the University research projects. Most of the members present were able to profit from the advice and practical demonstrations by Mr. Rivers to assist them in their own insect breeding.

In the evening a joint meeting with the Oxford University Entomological Society was held in the Senior Common Room of Jesus College. This took the form of exhibits and discussions enlivened by refreshments. Seven of our members were present.

On Sunday morning a joint meeting of the Society, the Ashmolean Society and the Oxford University Society was held in Wytham Woods. More than 25 members of the three societies gathered at The White Hart at 11 a.m., and proceeded to the woods under the leadership of Professor Varley. He explained not only the habitat but also something of the experimental work that he and his staff have been carrying out in this locality for several years. The weather during spring and early summer having been disastrous, the collecting was not great, and nothing exceptional was recorded. The search for any particular insect was, however, not the objective of this meeting, but rather to enable members to meet those of similar societies, and also to see some of the experimental work carried out in the field of entomology at Oxford. In this respect the meeting was a success and this was in large measure due to the help and kindness of Professor Varley and his staff, and also Mr. C. Rivers.

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 ISLE OF WIGHT, HANTS—10th–11th June 1972
*Leader: Mr. J. M. CHALMERS-HUNT*

This proved to be one of the most successful field meetings that the leader can recall. The main purpose was to look for a number of local Lepidoptera notably *Metzneria littorella* Dougl. which is found only on the Isle of Wight, *Coleophora inulae* Hein.-Wocke apparently now restricted to this island, *Gracillaria pyrenaecella* Chret. also found only on Wight, *Elachista paludum* Frey, *Laspeyresia*

*gemmaferana* Treits., *Sparganothis pilleriana* D. & S., *Alucita spilodactyla* Curt. and *Melitaea cinxia* L. another species peculiar to the Isle of Wight.

Accordingly, the small party set off after mid-day in cars from the venue at Ryde to some boggy woodland near Godshill. There, larvae of *Elachista paludum* Frey were taken in numbers mining the leaves of *Carex paniculata* L. and Mr. R. W. J. Uffen swept a fine imago of that exquisite moth *Mompha schrankella* Hübn. Thence we visited Luccombe Chine for *Laspeyresia gemmaferana* Treits. one of the very few localities for this dark little tortricoid, which occurred to us flying about and settling on the leaves and stems of its foodplant *Lathyrus sylvestris* L. After supper in Shanklin, a walk along the undercliff towards Ventnor produced the larva of *Oidematophorus lithodactylus* Treits. on *Pulicaria dysenterica* (L.) Bernh. and many larvae of *Depressaria nervosa* Haw. on *Oenanthe crocata* L.

At Reath Bay the following morning, the extremely local *Metzneria littorella* Dougl. was readily disturbed from grass amongst its foodplant *Plantago coronopus* L. only a few yards from the sea; also a single example of *Phalonia zephyrana* Treits. The weather had been dull till now, though fairly calm, but as we approached Freshwater the clouds began to clear to give several hours of sunshine and warmth, and with it the sight of *Melitaea cinxia* L. flying plentifully about the undercliff. It was a joy to see both sexes of this lovely little butterfly in such numbers and splendid condition—the males flying quite swiftly over the rough ground with on one occasion as many as five sporting together. A few miles beyond, close to the edge of the towering cliffs that rise sheer from the sea, are some plants of *Marrubium vulgare* L. These support a colony of the local plume *Alucita spilodactyla* Curt. and Mr. Chipperfield, who was present with his wife, secured a few of the larvae which were nearly full-grown.

Searching *Limonium vulgare* Mill. (*Statice limonium* L.) on the saltmarshes at Yarmouth revealed no sign of the larva of *Sparganothis pilleriana* D. & S. The Isle of Wight form of this moth is larger and more brightly coloured than the mainland insect, but as it is now many years since the species was last taken here, we hardly expected to find it anyway.

Moving on the Cranmore area after lunch, we found many plants of *Pulicaria dysenterica* (L.) Bernh. there that showed signs of having been mined, and soon we were delighted to see the curiously long case of *Coleophora inulae* Hein.-Wocke by searching the undersides of leaves, only about one in five of the cases found were, however, those of *C. inulae*, the rest being those of the common *C. troglodytella* Dup., with the occasional example of *C. conyzae* Zell. A distinctive characteristic is that the long straight case of *C. inulae* lies flat along the leaf owing to its orifice being nearly parallel to the axis, whereas the shorter, stumper case of *C. troglodytella* whose orifice is set at an angle, sticks out and is rather more conspicuous.

Our final port of call was St. Helens at the opposite corner of the island. There, *Gracillaria pyrenaella* Chret. occurs on some maples, and larvae which were taken in due course produced moths. On the adjoining saltmarsh, the local *Bucculatrix maritima* Staint. was flying, but by then it was getting late and time to return to Ryde for the return crossing to the mainland after what had been a most enjoyable and remarkably productive two days.

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## MEETINGS OF THE SOCIETY

are held regularly at the Society's Rooms, but the well-known ANNUAL EXHIBITION takes place in the autumn in external accommodation. 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.

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# PROCEEDINGS

25th JANUARY 1973

101st ANNUAL GENERAL MEETING  
(with which was combined the Ordinary Meeting)

The President, Prof. H. E. HINTON, in the Chair

The following new members were declared elected: Messrs. W. E. Collinson, W. O. Conney, R. Dyke, S. J. Hartland, M. J. Samways, P. S. Sperring and J. Williams.

## EXHIBITS

Dr. P. A. BOSWELL—An article from *World Medicine*, 'The Natural History of a Hospital Corridor'.

The Treasurer, Mr. R. F. Bretherton, presented his report and accounts and moved their adoption. These were seconded by Mr. B. Goater and carried.

The Council's Report was read by Mr. P. Baker who moved its adoption. Mr. E. H. Wild seconded the report which was also carried.

The Librarian's Report was presented and moved by Mr. S. A. Williams and seconded by Mr. J. M. Chalmers-Hunt; the Editor's Report by Mr. F. D. Buck and seconded by Mr. M. Shaffer; the Curator's Report by Mr. A. E. Gardner, and seconded by Mr. C. O. Hammond; the Hering Memorial Trust Report by Prof. H. E. Hinton and seconded by Mr. C. MacKechnie Jarvis. All were carried.

The President declared the following Officers and Ordinary Members of Council elected for the next year: *President*, J. M. Chalmers-Hunt, F.R.E.S.; *Vice Presidents*, Prof. H. E. Hinton, PH.D., B.SC., F.R.S., F.R.E.S.; C. MacKechnie Jarvis, F.L.S.; *Secretary*, G. Prior; *Treasurer*, R. F. Bretherton, C.B., M.A., F.R.E.S.; *Editor*, F. D. Buck, A.M.I.P.T.G.M., F.R.E.S.; *Curator*, A. E. Gardner, F.R.E.S.; *Librarian*, S. A. Williams, F.R.E.S.; *Lanternist*, M. Shaffer; *Ordinary Members of Council*, B. J. MacNulty, PH.D., B.SC., F.R.I.C., F.R.E.S., Rev. D. J. L. Agassiz, M.A., J. Roche, Cmdr. W. L. R. E. Gilchrist, R.N., G. S. E. Cross, Col. A. M. Emmet, M.B.E., T.D., M.A., F.R.E.S., B. F. Skinner, P. A. Boswell, M.B., CH.B., W. Parker, P. J. Baker, C.ENG., M.I.E.R.E.

There were no motions or questions under Bye-Law 25(b).

Professor Hinton then read his Presidential Address, taking Insect Coloration as his subject. He afterwards inducted Mr. J. M. Chalmers-Hunt into the Chair. Mr. Chalmers-Hunt thanked Prof. Hinton for his services and requested his permission to publish his Address. Prof. Hinton agreed.

A vote of thanks to the Officers and Council was moved by Dr. C. G. M. de Worms and carried by acclamation.

Mr. S. N. A. Jacobs moved a vote of thanks to the Auditors which was seconded by Mr. M. Shaffer and carried.

## COUNCIL'S REPORTS FOR 1972

The Society's Centenary Year of 1972 has been an exciting period for the Officers and Members of Council, and other members of the Society who helped to organize and who participated in a wide variety of activities.

Early in the year H.R.H. The Duke of Edinburgh, K.G., greatly honoured our Society by agreeing to become an Honorary Member.

Council is always concerned to increase our membership and this year all members were asked to do what they could to help in this matter by a notice

circulated early in 1972. All members who have assisted in the business of recruitment are to be congratulated in contributing towards a near 6 per cent increase in membership this year.

In spite of the usual attrition caused by death, resignation and cancellation of membership, which accounted for 31 members, there has been an expansion of our number from 607 at 31st December 1971 to 641 at 31st December 1972. At the end of 1972 the Society comprised: 8 Honorary, 1 Corporate, 4 Special Life, 17 Life, 260 Ordinary, 290 Country and 61 Junior Members.

In this period of rapidly escalating costs the continued health and even existence of our Society is greatly dependent on an expanding membership. Therefore all members are entreated to continue their efforts, either by adding to the numbers of Ordinary, Country or Junior Members, or by conveying to natural history societies and other organizations the advantages of Corporate Membership of our Society.

A new edition of the List of Members was circulated in June and it is intended to update this by the circulation of amendment sheets at suitable intervals.

As was to be expected, our Indoor Meetings Secretary, Mr. D. Carter, rose to the special occasion and provided a programme of exceptional interest which covered a very broad spectrum of subject matter. It was noted that many of the slides and other illustrative matter displayed at Indoor Meetings were of a very high standard. The Sherry Party, held in April, was enjoyed by participants and it was unfortunate that a rail strike at that time restricted the attendance. Once more the conviviality of our indoor meetings has been aided by refreshments organized by Mr. & Mrs. Howarth and Mr. & Mrs. Smiles. These refreshments have been of gustatory benefit to our members and of financial benefit to the Society.

Mr. Prior, as our Field Meetings Secretary, also set a high standard with the programme provided. As well as the fairly local field trips of one-day duration, an extended meeting was held at Oxford in conjunction with the Hope Department, the Ashmolean Society and the Oxford University Field Centre and a joint conversation was held with the Cambridge NHS. Other extended meetings were held in the Isle of Wight, in Perthshire and in France, the latter in association with *La Société d'Etudes des Sciences Naturelles et du Musée d'Elbeuf*. These extended field meetings will be continued, both in the U.K. and further afield, if adequate support is obtained from our members and if suitable leaders volunteer their services.

From this year Mr. Prior will be handing over the duties of Field Meetings Secretary to Mr. E. H. Wild, who we are sure will maintain the high standards set by the 1972 programme—provided that sufficient of our members co-operate with him. As a point of interest, you will have noticed that one of the 1972 field meetings was called the 'T. R. Eagles Memorial Meeting'. It is intended to hold one such meeting each year in lasting memory of this much respected late member.

The Annual Dinner, which was held at Imperial College, was attended by 186 members and guests. The Society took this opportunity of extending thanks from you all to those friends of the Society who have helped us in a variety of ways over the years. We were also honoured to have as our guests representatives from several other British Societies and Institutions and the distinguished European entomologists Dr. Lainé, Dr. Klimesch and Mr. Svensson, the first two being accompanied by their wives and the last by his daughter.

The Annual Exhibition was held at Holland Park School. This venue provided the space required to accommodate the large numbers of exhibits and allowed comfortable viewing conditions for the visitors. A number of special Centenary

exhibits, some of which were presented by the Society and its members and others by friends, provided a fascinating and wide range of study and were the results of much labour by those involved. Part of the success of the exhibition was due to the provision of refreshments. Our thanks are extended to those members' wives who gave up their time to serve these refreshments and especially to Mrs. J. Roche who supervised the operation.

In addition to our own exhibition the Society was well represented at the AES exhibition and the Schools' Natural Science Society Exhibition. This representation serves to advertise our activities to more people than would otherwise be reached and is agreeably profitable due to the new members attracted and the sale of Society publications and other items.

Over the years the Society has amassed a significant collection of photographic slides of various types. An attempt to fully collate and catalogue these items has failed due to the lack of a volunteer to undertake this task. This is unfortunate, as the disordered state of these slides minimizes their value to the Society and prevents members, who would like to borrow them for various reasons, from having the necessary access. Your Council wish to remedy this situation which can only be corrected if a volunteer is forthcoming. Would any member who is willing to take charge of this collection please contact one of the Council officials?

This year the Society gave formal notice of support to the 'Collectors' Code of Practice' as formulated by the joint Committee for the Preservation of British Insects. It is hoped that all our members will abide by this code, which should be regarded as encompassing all orders of insects and other wildlife. We have not published the appended list of Lepidoptera, which should be given special protection, for a number of reasons, as experienced field workers will be aware of the status of particular species encompassed by their interest.

The Christmas card for 1972 was an ambitious undertaking for Centenary year which has been well received, and our thanks are due to those responsible for its preparation.

Council has decided that the Society will publish a new edition of the 'Guide to the Smaller British Lepidoptera'. A team, headed by Col. A. M. Emmet and comprising experts in the various groups, has started work on this venture and it is hoped that the book will become available in 1975.

Mr. M. Kirby, who has been the Society's Recorder for a number of years, has resigned this position as he is carrying out further studies at Manchester University—with which we wish him every success. The duties of the Recorder are now being carried out by Mr. E. S. Bradford. The prime function of the Recorder is to look after members who have not previously attended a meeting at the Alpine Club and to welcome guests and speakers. Any member or guest attending a meeting at the Alpine Club for the first time should contact Mr. Bradford who will be pleased to answer any questions and carry out any required introductions.

#### TREASURER'S REPORT

I must begin with sadness. Mr. F. T. Vallins, who since 1967 had been Assistant Treasurer in charge of subscriptions, died early in May, to the Society's great loss. I was away in the U.S.A. at the time, and Mr. A. E. Gardner nobly filled the gap until Mr. L. J. D. Wakely, whom Council appointed to succeed Mr. Vallins, could take over at the end of June. The subscriptions work is basic to our finances, intricate, and full of small troubles. I am very grateful to them both.

The accounts for 1972 have been approved by our auditors, Mr. A. G. Stoughton-Harris and Mr. J. L. Messenger, and will be published in the Proceedings. A copy can be inspected now if desired.

A salient feature is that the Income and Expenditure Account shows a small deficit of £16, the first for many years, in place of the exceptionally large surplus of £217 in 1971. I will deal with this Account first. On the income side, subscriptions at £1,132 are up by £48, reflecting excellent growth in membership during the past two years. The total is, however, smaller than might be expected, partly because there are now relatively more Country and Junior members, but mainly, I regret to say, because there are arrears (not shown in the Accounts) of over £80 from nearly 30 members, half of them for more than one year, despite repeated reminders. Investment and bank interest together, at £442, is also up, and we have had welcome gifts to the general funds and to the Publications Account. Sales of ties also gave a larger profit. But in 1972 the Christmas Cards Account provided a profit of only £1·60, against £40 in 1971. This is no reflection on the energy of Mrs. Smiles and her helpers, who sold many more cards than before. But the new and certainly beautiful card designed for 1972 cost five times as much to produce as its predecessor. We are still a long way from recovering the cost of it, though we may do so in the end.

The main trouble has been expenditure. In 1972 we had normal, instead of nil, miscellaneous expenses, and officers' expenses on stationery and postage were sharply up, mostly because of inflation. But the most serious feature is the higher grant—£775 instead of £676—needed to balance the Publications Account. This is *after* drawing £217 from the remains of Mrs. Mere's donation for larva plates and after crediting a gift of £20 from Dr. de Worms and very good receipts from sales of the 'Guide to the Smaller British Lepidoptera'. The cost of materials for the new list of members is charged to the Publications Account, but most of its troubles are due to the further big rise in the costs of printing and distributing the Proceedings. In summary, expenditure on Income and Expenditure Account was up by £233 more than its income, thus more than offsetting the exceptional surplus of 1971.

Centenary expenses have so far as possible been charged to the Centenary Fund, to a total of £492. The main items were the cost of the Centenary Sherry Party in March—£44, a loss of £52 on the Centenary Dinner (mainly due to the cost of entertaining the Society's guests), £49 for the net cost of the Exhibition, and a provision of £315 for printing and distributing the 'History of the Society', which it is hoped will appear soon. The net result, shown in the Balance Sheet, is that the Centenary Fund still has a credit balance of £169.

Of the other Special Funds, the Housing, Library and Hering Memorial Research Funds have all increased their balances during the year. The Reserve Fund received £38 in interest but was reduced by the transfer to the Publications Account already mentioned: it now stands at £591. The General Fund is reduced by the deficit on the Income and Expenditure Account to £3,102.

On the assets side of the Balance Sheet, investments at cost have been increased by £826 to £6,876 by additions to our previous holdings of Standard Trust and Distillers' Ordinary shares, and our current and deposit balances at the bank have been reduced by a little more than that, to £743. The writing off of old stocks of Christmas cards and ties, started five years ago, has now been finished, so that none of the Society's physical assets are now valued. The market value of our investments of course fluctuates; at the end of December it was about 25 per cent above cost.

As a whole, this is a good record, given the difficult conditions of 1972. But the deficit on Income and Expenditure Account does mean that inflation has now caught up with us, as it was bound to do sometime; and a large deficit for 1973 seems very likely. The impact of Value Added Tax from next April is a further





# British Entomological and Natural History Society Statement of Accounts

## INCOME AND EXPENDITURE ACCOUNT

EXPENDITURE		INCOME	
1971	1972	1971	1972
£	£	£	£
Rent .. .. .	286 00	Subscriptions .. .. .	1131 84
Insurance .. .. .	11 13	Interest on Investments .. .. .	400 46
Secretarial expenses .. .. .	32 44	Interest on Bank Deposit Account .. .. .	41 98
Editorial expenses .. .. .	2 37	Donation .. .. .	15 00
Treasurer's and Assistant Treasurer's expenses .. .. .	18 41	Sale of Cabinets and Specimens .. .. .	55 50
Stationery .. .. .	49 65	Annual Dinner—profit .. .. .	—
Subscriptions to Societies .. .. .	19 05	Christmas Cards Account—profit .. .. .	1 60
Lectures and Exhibitions .. .. .	3 20	Ties Account—profit .. .. .	17 50
Cabinets and Collections .. .. .	4 16		
Miscellaneous expenses .. .. .	61 55		
Publications Account—charge .. .. .	675 59		
Housing Fund: interest transferred .. .. .	61 00		
Reserve Fund: interest transferred .. .. .	40 00		
Centenary Fund: interest transferred .. .. .	21 00		
Hering Memorial Research Fund: interest transferred .. .. .	140 11		
Bank charges .. .. .	3 50		
	<u>1347 66</u>		
	217 24		
	<u>1564 90</u>		
Excess of Income over Expenditure .. .. .	1679 93		
		Excess of Expenditure over Income .. .. .	1663 88
			<u>16 05</u>
			<u>1679 93</u>

We certify that the Balance Sheet and General 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.

R. F. BRETHERTON, Hon. Treasurer.

uncertainty, though on present advice it may not do us much harm. For 1974, I think it is clear that the subscription rates ought to be raised, but it is not yet clear by how much. A resolution about this will probably have to be put to a Special Meeting in September.

### REPORT ON THE PROFESSOR HERING MEMORIAL RESEARCH FUND, 1972

The Management Committee for the year consisted of the President (Prof. H. E. Hinton), the Hon. Treasurer (Mr. R. F. Bretherton), *ex officio*, and Dr. K. A. Spencer, Prof. T. R. E. Southwood, and Col. A. M. Emmet, appointed by Council.

Applications for awards were invited in the leading entomological journals for consideration by 31st March, but only three were received. The Committee felt that one of the applicants was not yet sufficiently qualified for the research which he proposed, but it made awards of £60 to Dr. C. G. D. Griffiths, of the Department of Entomology, Edmonton, Canada, to assist his travelling expenses to the Kluane Lake, Yukon, to collect material for further papers on 'Boreal Agromyzidae'; and of £25 to Mr. C. Pitakpaivan, now studying in the Department of Zoology, Reading University, to assist expenses on the collection of wild specimens and on museum study of the Tineid moth *Phyllonorycter messaniella* Zell.

Applications for further awards will be invited early in 1973.

### EDITOR'S REPORT

During the year we have published four parts of the Proceedings: volume 4, part 4, and volume 5, parts 1, 2 and 3; part 4 is expected to be published in February. The index for volume 4 was, of course, also produced during the year. This represents 154 pages of text, 18 pages of index, plus four coloured plates and four monochrome plates.

Included in this is part ten of Haggett's work on lepidopterous larvae not figured by Bucklet which was illustrated by two coloured plates. It just about exhausts the money we received from Mrs. Mere for the purpose of completing the work undertaken by Mr. Haggett in collaboration with the Society; and I am pleased to say it is about as complete as a work of this nature can ever be, though no doubt more material will become available in the future, which will raise financial problems for the Society to resolve. At this stage we have complied with the wishes of Mrs Margaret Mere whose intention was to provide a memorial to her husband which would be of permanent value to those who worked in the field of entomology that he so dearly loved. Those who knew Robin and worked with him, particularly those who served on Council with him, will, I am sure, agree that he would indeed have been a very happy man to have seen this particular project proceed to its present state. I therefore feel the greatest satisfaction, as indeed Mr. Haggett must, at our achievement. Our grateful thanks are due to Mrs. Margaret Mere; and we must not forget Bobby Messenger who represented the Society and acted as the catalyst.

The other two coloured plates which appeared in this year's publication illustrated further aberrations of *Callimorpha jacobaeae* L., which we were able to include in our publication through the good offices of Mr. S. N. A. Jacobs, a frequent benefactor of our Society.

Other important papers were on the genetics of *Pieris napi*, by Mr. S. R. Bowden, another on the distribution of snail-killing flies by Mr. P. J. Chandler, and on the microlepidoptera of Wicken Fen by Col. A. M. Emmet.

I was most concerned and disappointed to learn in July that the Royal Society

could make none of the Parliamentary Grant-in-aid available to us; a decision which augurs ill for the future, and indicates, I presume, our work is not up to the required standard. I shall, however, continue to make application whenever I think we have material that should qualify.

While I have been able to fill our publication this past year and am confident about volume 6, parts 1 & 2, we have room for good papers in parts 3 & 4, and we can always use short notes; a form of contribution that our members seem to ignore altogether.

Printing costs rise annually, and these being as they are, we must make the most of the space we have available for publication. Bearing this in mind the responsibility of the Society's publication personnel becomes more and more onerous; and I therefore thank most sincerely Mr. M. W. F. Tweedie, Mr. R. W. J. Uffen, Mr. A. E. Gardner and Professor T. R. E. Southwood for the help, advice and support they have given me throughout the year. Not always have I appeared to have heeded their advice, but it is invariably appreciated and carefully considered; and they do not always agree with each other; but I would be most unhappy to be without them. Centenary History has been subjected to a number of delays which were not directly caused by the Society, but the work is now in type and will be produced quite soon.

### LIBRARIAN'S REPORT 1972

I can report another successful year for the library in which a record number of books have been borrowed and many useful gifts presented by members. Mr. E. S. Bradford has kindly fixed the excellent black and white photographs of Lepidoptera taken and presented by Mr. P. H. Goddard into strong blue binders, this means that they can now be borrowed by members. The binders are individually titled and stored behind a plastic blind. The journals have now been sorted in order of country and year of publication by Mr. G. S. E. Cross, they will now be found behind a plastic blind which keeps them clean and free from dust. My thanks are due to Mr. Cross for his help during the year.

Additions to the library: Brown, F. Martin and Heineman, Bernard, *Jamaica and its Butterflies*, presented by Mr. S. N. A. Jacobs; Clark, G. C. and Dickson, *Life histories of the South African Lycaenid Butterflies*, presented by Mr. S. N. A. Jacobs; D'Abbrera, B., *Butterflies of the Australian Region*, presented by the Author and Mr. E. W. Classey; Side, A. G., *An Atlas of the Bryophytes found in Kent*, presented by the Author; McCubbin, Charles, *Australian Butterflies*, presented by Mr. S. N. A. Jacobs; Williams, J. G., *A Field Guide to the Butterflies of Africa*, presented by S. N. A. Jacobs; Higgins, L. G. and Riley, N. D., *A Field Guide to the Butterflies of Britain and Europe*, purchased and a second copy presented by Mr. E. W. Classey.

### CURATOR'S REPORT

Despite much time being spent on the Centenary Annual Exhibition satisfactory progress can be reported.

Twelve drawers of the Dr. A. M. Massee collection of British Coleoptera have been completed, these accommodating the Carabidae, Haliplidae, Hygrobiidae, Dytiscidae, Gyrinidae, and Hydrophilidae. With the boxes of Staphylinidae being returned from the British Museum (Nat. Hist.) it is hoped to make considerable progress with this collection during 1973.

Mr. R. J. Chandler has completed work on a number of drawers of the Andrews Collection of Diptera and has staged the smaller species on Polyporus strip. The

Microlepidoptera have received similar treatment by Mr. E. S. Bradford, thus enabling the specimens to be examined with a hand lens without having to remove the drawer lid.

Early in the year we received the A. H. Sperring bequest consisting of five cabinets of British Lepidoptera, storeboxes and a run of the Society's Proceedings. Work has started on transferring the many valuable additions to our main collection and Capt. R. A. Jackson's is nearly completed.

During the year material of several orders have been loaned to specialists for critical examination and a number of unidentified Hymenoptera have been named by Mrs. J. C. Felton to whom our best thanks are due.

In our collection of Diptera the Tipulidae, a large family of conspicuous flies, is only represented by a few species. We gratefully accepted Mr. R. M. Payne's generous offer of over a hundred species. A Hill unit has been reserved to receive these which will mark the commencement of a programme to expand and improve the display of the Diptera.

We have sold to members two small cabinets, several storeboxes and a number of cabinet drawers donated by the late Mr. F. T. Vallins. One Hill unit has been purchased and both Crouch microscopes are on loan.

The thanks of the Society are due to the following members for notable accessions: Mr. L. Christie (Lepidoptera), Mr. A. E. Gardner (Coleoptera and Orthoptera), Mr. B. Goater (Lepidoptera), Mr. C. O. Hammond (Diptera), Mr. G. Prior (Lepidoptera), and Mr. A. Wright (Palaeartic Rhopalocera).

I am grateful to our assistant curator Mr. E. S. Bradford for his continued help in so many ways.

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## PRESIDENTIAL ADDRESS

H. E. HINTON

With this meeting our Centenary Year officially closes; it has been an honour and a pleasure to have served the Society during such an auspicious year. A number of special events were organized by Council in celebration, the success of which has been adequately commented on by the Secretary in his report.

During my term of Office I have enjoyed the fullest support of the Officers and Council; all have worked tirelessly for the Society. But I must particularly thank Mr. J. M. Chalmers-Hunt who has so often stood in for me. I now wish him every success in his Presidential year which is about to commence.

I must now turn to those whom we lost during the year. During this period our Society received the sad news of the deaths of ten members.

F. T. Vallins, an Honorary Member of our Society since 1972, died in a tube train on the way home from a Council Meeting. He was our President for 1959. Besides having served on Council on many occasions, he was Secretary from 1952-6, and at various times Librarian, Assistant to the Curator, and Assistant to the Treasurer. His loss is a particularly hard one to bear. He was always a very active member and did a great many other things for the Society besides those connected with his official positions. He first joined the Society in 1922. Mr. Vallins was a lepidopterist whose speciality was the Lycaenidae.

A. M. Morley was over 90 when he died. He was a very active member of the Folkestone Natural History Society. He is well known for his notable success in breeding Lepidoptera.

R. J. Burton was President of our Society in 1943. He first joined in 1938, and during his time had served on Council. He was a dental surgeon, and was particularly interested in the Lepidoptera. In recent years we have seen little of him

because he moved away from the London area just after the war and was then unable to attend meetings.

T. B. Foster joined our Society in 1915. He was especially interested in the Lepidoptera.

A. H. Sperring joined the Society in 1947. He was especially interested in the Lepidoptera, and he attended our meetings regularly.

J. L. Atkinson died in his 86th year. He joined the Society in 1934. We did not see as much of him as we would have liked because he lived in Devon and could not attend our meetings regularly.

Miss B. A. Thorn joined the Society in 1952. Her chief interest was in the Lepidoptera.

R. E. Edwards joined the Society in 1945. He was interested in many different groups, as most of you well know.

E. S. A. Baynes joined our Society in 1933. He lived in Ireland and was a well-known authority on the Irish Lepidoptera.

Major A. E. Collier became a member in 1946 and worked on Lepidoptera.

### SOME RECENT WORK ON THE COLOURS OF INSECTS AND THEIR LIKELY SIGNIFICANCE

We might expect that if an animal is visible to others, even if only for short periods, the natural colour of its skin and hair will be subjected to selective pressure of one kind or another. This follows if we believe that every characteristic of an animal is on balance either to its advantage or disadvantage. Even when there is no positive selection for or against a particular character, it nevertheless requires energy for its production. The belief that there is no strict neutrality in nature is not as naive as it may seem: experience shows that it is a belief likely to direct attention along fruitful lines.

The colours of animals are selected for two rather different requirements. In most instances they assist in the deception of other animals, the signal receivers. However, the colours of some distasteful or poisonous animals are not concerned with deception but with advertising their bearers for what they are. Of course harmless animals with false warning (pseudaposematic) colours also advertise their presence, but the advertisement is a deception and they are trading on the reputation of a harmful animal.

During the last few years a number of striking discoveries have been made about the way insects produce colours. These are of interest to the laboratory physiologist, but their significance is even greater for the naturalist who with his wider background and understanding can with less inhibition than his laboratory colleague comprehend the selective value of colours because he is more able to place himself, as it were, inside the skin of the insect. In the following pages a brief account is given of a few little-known ways of producing colour. In each instance the biological significance of the colours produced is discussed, even if this is sometimes largely speculative.

### IRREVERSIBLE AND REVERSIBLE COLOUR CHANGE

The colours and colour patterns of most insects, especially endopterygotes, change dramatically during development so that there is little or no relation between the colour of the larva, pupa, and adult: the relations between the insect and the environment are different in each stage, and the differences in their colour are the result of quite different selective pressures. However, in any one stage the colour and colour pattern tend to be rather similar, and striking changes within a particular stage of the life history are relatively uncommon. Most will be familiar

with the sort of change undergone by certain caterpillars like that of the alder moth or that of many tropical species of *Papilio*. In these the first few instars may mimic a bird-dropping, but usually in the penultimate or last instar they appear in an entirely new garb and now have a pattern of bright warning colours. There may even be a dramatic change of habits with the change in colour: while they mimicked a bird-dropping they rested on the upper surface of a leaf, but now they rest on its lower surface or on a stem. Portschincky long ago drew attention to the significance of this particular kind of change. When the caterpillar is small it may, if appropriately coloured, deceive other animals that it is a bird-dropping, but when it becomes large this kind of deception is less likely to be successful because bird-droppings two or three inches long are not common on leaves. The selective pressure is now on for some different kind of protection, and the caterpillar may assume warning colours or cryptic ones.

The colour changes about which we have been speaking are irreversible and usually slow. Such colour changes are often called 'morphological' to distinguish them from reversible and relatively rapid colour changes, which are usually called 'physiological'. Reversible or physiological colour changes are mostly brought about in insects and vertebrates—fishes, amphibia, reptiles—by the concentration or dispersion of pigment granules within cells and not by contraction or expansion of the cells themselves, although the mosquito *Chaoborus* is a notable exception to the rule. The cells that contain pigment granules are called chromatophores. The individual chromatophores are highly branched and are often associated in groups called chromatosomes. Although most invertebrates, including crustacea, have chromatophores of the branched-cell type, this type is unknown among insects. Indeed, if the iris cells are excluded, very few insects are known to be capable of physiological colour change. A few Orthoptera and Dictyoptera, many stick insects, and some dragonflies have chromatophores. These are unbranched epidermal cells that contain pigment granules that can be dispersed or concentrated. The physiology of colour changes in the common stick insect, *Carausius morosus*, is now fairly well known and is adequately described in most textbooks, and some very interesting facts about colour changes in dragonflies have just been described (Veron, 1973). Only two groups of beetles are known to change their colour reversibly, scarabaeids of the genus *Dynastes* and tortoise beetles (Cassidinae). Brief accounts of both of these are given below.

#### *Reversible colour change in Dynastes*

In July 1971 I was collecting in the vicinity of Nirgua, Venezuela, with Dr. J. A. Nuñez. One evening a large male *Dynastes hercules* L. flew into the strip lighting by the petrol station and fell to the ground. I managed to collect it before anyone could kill it. The catch was very exciting: the only larger insect in the world is another dynastid, *Megasoma elaphus* (F.), which also occurs in Venezuela. I kept the beetle in a sock until my return to England. It always stuck one or both horns through the sock, and, as there was not enough room for it to back up and withdraw its horns, the sock proved to be a very satisfactory prison. At odd moments I used to take it out and play with it, and in due course I became aware that its elytra would change to greenish yellow and back again to black, a fact that had been recorded by Beebe (1947) but was then unknown to me. After my return to Bristol, morphological and experimental studies in collaboration with G. M. Jarman (Hinton & Jarman, 1972, 1973) made it possible to say something about how it managed to change the colour of its elytra. In these studies we were helped by friends in Venezuela and Guadeloupe, who sent us a number of live male and female hercules beetles.

A diagram of the structure of the upper part of the elytra of the hercules beetle is shown in Fig. 1. The outer layer or epicuticle of the elytra is transparent and about 3  $\mu\text{m}$  thick. Below this is a yellowish spongy layer about 5  $\mu\text{m}$  thick. The cuticle below the yellow sponge is black. When the yellow spongy layer is full of air, it is optically heterogeneous and reflects yellow light back through the transparent layer. However, when the yellow sponge is filled with liquid it becomes optically homogeneous and the light, instead of being reflected back, passes through it and is absorbed by the layer below so that the elytra now appear black. In experiments with museum specimens it was quite easy to change the colour of the elytra from yellowish to black by filling the yellow sponge with water or other liquids. As soon as these liquids evaporated, the elytra would become yellowish once again.

If a drop of liquid nitrogen is placed on the black elytra of a live beetle, a yellow spot immediately appears as the liquid in the spongy layer is frozen and the layer made optically heterogeneous. As soon as the nitrogen has evaporated, the yellow spot becomes black as the spongy layer once more becomes optically homogeneous. When a yellow elytron of a dead beetle is made black by soaking it in water, a drop of liquid nitrogen placed on the upper surface immediately produces a yellow spot that vanishes as soon as the nitrogen has evaporated.

We are not sure about the nature of the liquid used by the live beetle to flood the spongy layer, but it would seem to be largely or entirely water. The movement of liquid in and out of the yellow spongy layer of a live beetle must be under the direct control of the epidermal cells, which are a long way below the yellow sponge.

The colour of the elytra normally depends upon the ambient relative humidity: they are black when the humidity is high and become yellowish if the humidity falls sufficiently. Our laboratory experiments indicate that the elytra are normally black at night when the humidity is high and yellowish during the day when the humidity is low. The selective value of this appears to lie in the fact that at night there is usually enough light so that a beetle with yellow wing cases will be more easily seen by predators than one with black wing cases. During the day this is reversed: a beetle with yellow elytra, especially if it is feeding on fruit, will be less conspicuous than an entirely black one.

The colour of the elytra can change very rapidly. When a male beetle kept for a time at 100 per cent relative humidity is placed in a container at 80 per cent R.H. or less, yellow patches begin to appear on the elytra in 30 seconds to 2 minutes. Colour change can be local and autonomous. For instance, if one elytron is removed from a live beetle and kept with the live beetle, the changes in the colour of the attached and detached elytra are exactly the same for more than half a day. By attaching to the elytra glass cells containing silica gel or moist filter paper, it was possible to expose local areas of the elytra to quite different humidities from the rest of the elytra and to cause the local area beneath the cell to be black when the rest of the elytra was yellow or *vice versa* (Fig. 2). Occasionally, a beetle would become yellow when exposed to conditions that should have made it stay black and the conclusion seems to be inescapable that colour change, as in some dragonflies (Veron, 1973), is local and autonomous in some circumstances and under central nervous control in others.

None of the African or Oriental species of *Dynastes* appears to be able to change colour nor does one American species, *D. neptunus* Quenzel. In *D. granti* Horn the structure of the outer part of the cuticle of the pronotum is like that of the elytra, and this species is known to be able to change the colour of both elytra and pronotum. In two other American species, *D. hyllus* Chev. and *D. tityrus* L., the outer layers of the cuticle of the pronotum are similar in structure to those of

the elytra in having transparent and yellow spongy layers. I have no doubt that these species are able reversibly to change the colour of their elytra and pronotum, although I have never seen either alive.

#### *Reversible colour change in the Cassidinae*

In tropical and warm temperate regions tortoise beetles are often common on the upper surfaces of leaves. Many are very brightly coloured. Sometimes the colours are due to pigments in the cuticle, but many species combine pigmentary and interference colours, whereas still others rely exclusively upon thin-layer interference for the colour of their elytra and pronotum. Many are incapable of colour change, but a goodly few are able to alter their colour reversibly. This they do in a manner that so far as I know is quite unknown elsewhere in the animal kingdom. As first pointed out by Mason (1929), by hydrating and dehydrating their elytra they alter the thickness of the interference layers and so alter the colours produced.

On general grounds, and because there is no other tissue available for the role, I assume that it is the epidermal cells that are directly responsible for moving liquid in and out of the elytra. This part of the mechanism for reversible colour change is thus similar to that of the hercules beetle. However, in the tortoise beetles, so far as I know, the interference layers are in the inner part of the cuticle directly above the layer of epidermal cells (Fig. 3). This position seems much more suitable than the arrangement in the hercules beetle, in which the layer responsible for the colour is so far away from the epidermal cells that have to move liquid in and out of it. It should be noted that the usual position of interference layers in insects is near the outer surface of the body-wall cuticle, as illustrated by the cockroach shown in Fig. 4. The number of thin layers in some of the tortoise beetles is exceptionally large— $44 \times 2$  in *Aspidomorpha tecta* Boh. (Fig. 3) compared with only  $7 \times 2$  in the Australian cockroach, *Megazosteria patula* (Walk.) (Fig. 4). The colour of *Aspidomorpha*, like that of so many other tortoise beetles, changes surprisingly little with angle of incidence, from which it follows that the mean refractive index of the thin-layer system is very high.

In the tortoise beetles I have seen, a change in colour occurs only in response to a disturbance of some kind. The change requires two minutes or more. *Aspidomorpha tecta* at rest or while feeding is a bright gold colour but after having tobacco smoke blown at it, or being poked, its elytra and pronotum slowly become reddish copper. That these beetles should take two minutes or more to change colour is odd simply because if their change to red is a change to a warning colour, it seems much too slow to prevent serious damage or death from an impatient predator. Clearly more field work has to be done to discover not only the kinds of predators against which a change in colour is made but why such a slow change confers, as we must assume it does, some measure of protection. I have recently (Hinton, 1973) given my reasons for believing that the golden or pearly colour of some tortoise beetles when undisturbed enables them to pass off as drops of water on the leaves.

#### DIFFRACTION GRATINGS

In the early part of this century it was generally supposed that many of the iridescent colours of insects were produced by diffraction gratings. For instance, it was thought that the iridescence of butterfly wings resulted from diffraction by the ribs on the upper surfaces of the scales. However, Suffert (1924) and later writers showed conclusively that the iridescent colours of butterflies and other

insects are interference effects produced by thin films or lamellae separated by air or some other substance of a different refractive index. Reflected light is said to be coloured<sup>1</sup> by interference when a thin transparent film effects the cancellation of some of the components of white light emitted from two or more sources, e.g. two or more rays from the sun, in the same period and phase. Now the scales of moths and butterflies often have ribs of the right periodicity to produce diffraction colours. However, because the scales are too irregular in profile, the spectra produced by different parts of the same scale, or by adjacent scales, overlap and summate to white light.

Mason (1927) showed that all of the iridescence of scarabaeid beetles of the genus *Serica* was produced by a diffraction grating. *Serica* was generally supposed to be unique among insects until 1969 when, with D. F. Gibbs, I was able to show that the iridescence of many other beetles and mutillid wasps is due entirely to diffraction gratings (Hinton, 1969a, 1969b, 1970a, 1970b; Hinton & Gibbs, 1969a, 1969b, 1971; Hinton *et al.*, 1969). Brief accounts of the properties of plane (Hinton, 1970b) and convex systems (Hinton & Gibbs, 1971) have recently been given and need not be repeated here.

#### *Independent origin of diffraction gratings*

Diffraction gratings have been independently evolved in no less than 19 groups of beetles. The list given below excludes the stridulatory files of many beetles and other insects. The spacing of the ridges of these files is often such as to produce diffraction colours. But, because these files are normally not exposed to view even when being used for sound production, their attributes as diffraction gratings have no biological significance. The stridulatory file of the third visible abdominal tergite of mutillid wasps is an exception. It is exposed to view, and under certain circumstances seems to enhance the aposematic colours of these wasps (Hinton *et al.*, 1969).

#### Suborder Adephaga

1. Carabidae, Bembidiini (*Bembidium*, *Tachys*)
2. Carabidae, Trechini (*Trechus*)
3. Carabidae, Licinini (*Badister*)
4. Carabidae, Harpalini (*Acupalpus*, *Aztecaphalus*, *Coleoissus*, *Deaphoromerus*, *Selanophorus*, *Stenolophus*, *Trichotichnus*)
5. Carabidae, Pterostichinae (*Abacidus*, *Feronista*, *Loxandrus*, *Olisthopus*, *Poeciloides*, *Pristosia*, *Prosopogonus*, *Pterostichus*, *Sarticus*, *Synuchus*)
6. Carabidae, Agonini (*Iridagonum*)
7. Carabidae, Lebiini (*Eucaerus*)
8. Gyrinidae (*Orectochilus*)
9. Gyrinidae (*Orectogyrinus*)
10. Gyrinidae (*Gyretus*)

#### Suborder Myxophaga

11. Torrindicolidae (*Ptyopteryx*)

#### Suborder Polyphaga

12. Staphylinidae, Staphylininae (*Actinus*, *Algon*, *Astrapaeus*, *Brachydirus*, *Euryporus*, *Glenus*, *Heterothops*, *Leucitus*, *Mysolius*, *Ontholestes*, *Philonthopsis*, *Philonthus*, *Plociopterus*, *Quediomacrus*, *Quedius*, *Staphylinus*)

<sup>1</sup> Of course, the light rays are not themselves coloured but they elicit sensations of colour, and when we talk about light of different colours that is all that we mean.

13. Staphylinidae, Tachyporinae (*Bolitobius*, *Lordithon*, *Tachyporus*)
14. Scaphididae (*Cyparium*)
15. Solphidae (*Nicrophorus*)
16. Scarabaeidae, Sericini (*Aserica*, *Homaloplia*, *Microserica*, *Selaserica*, *Serica*)
17. Scarabaeidae, Scitalini (*Homaltropus*, *Scitala*)
18. Scarabaeidae, Melolonthini (*Phyllophaga*)
19. Phalacridae (*Acyломus*, *Eulitrus*, *Euphalacrus*, *Heterolitus*, *Liophalacrus*, *Litocrus*, *Litolibrus*, *Ochrolitus*, *Parasemus*, *Stilbomimus*, *Stilbus*)

Diffraction gratings have been evolved among adult beetles many more times than the 19 listed above. For instance, in the genus *Bembidium* there is good evidence that gratings have been independently evolved on more than five occasions (Lindroth & Hinton, in preparation). Several independent origins of gratings almost certainly occurred within many of the other large genera of Carabidae that have species with and those without diffraction gratings, e.g. *Loxandrus* and *Badister*. Similar considerations apply to the genus *Phyllophaga* of the Scarabaeidae. Most phalacrid genera examined of which several species were available included species with and those without diffraction gratings. This suggests that the gratings were independently evolved in each genus, unless we are to suppose that they were independently lost within each genus, which seems more unlikely.

In *Ptyopteryx* (Torrincolidae) the only diffraction lines are those of the plastron on the ventral surface of the abdomen (Hinton, 1969b), but, with this exception, it appears that if a diffraction grating is present anywhere on the body of a beetle with elytra of normal length, it is always present on the elytra. The grating may be confined to the elytra or may be present on other parts of the body, especially the pronotum. In the Staphylinidae with much shortened elytra, grating lines, if present, are always on the tergum and sternum of the abdomen but are sometimes also present on the pronotum, thoracic sterna, and parts of the legs. On the dorsal surface, grating lines are always more or less normal to the major axis of the body except on the elytra of some *Aepheidus* (Carabidae) and the pronotum of some *Gyretus* (Gyrinidae), where they are parallel to the major axis. The grating spacing of beetles, as determined from scanning electron micrographs, varies from 0.85 to 3.3  $\mu\text{m}$  (Hinton, 1970b).

With the exception of *Ptyopteryx*, the diffraction lines are simple grooves or ridges. In all Scarabaeidae that I have seen, microtrichia, sometimes in the form of flat triangles (e.g. *Homaltropus sericeus* Britton), are present on the grating lines (Fig. 6). The iridescent surfaces of these beetles are therefore more properly described as two-dimensional arrays of structures that scatter light. The microtrichia are often very regularly spaced along any particular grating line, but the spacing of the microtrichia on one line does not correspond well with the spacing on adjacent lines (Fig. 6). The effect of this irregularity is to degrade the resolution of the corresponding spectra, and in all species examined the resolution of spectra across the major axis was negligible. The microtrichia of the grating lines all point more or less posteriorly. Because of them there is a considerable difference in reflectivity according to whether the beetle is viewed from before or behind. This difference is similar to that produced when the rubbed pile of a carpet is viewed from a direction that traps the light as compared with one that reflects much of the light. The selective advantage in having a sheen when viewed from the front and not from the back is unknown. Perhaps in some circumstances it is better to have a sheen even if from only one direction rather than no sheen from any direction.

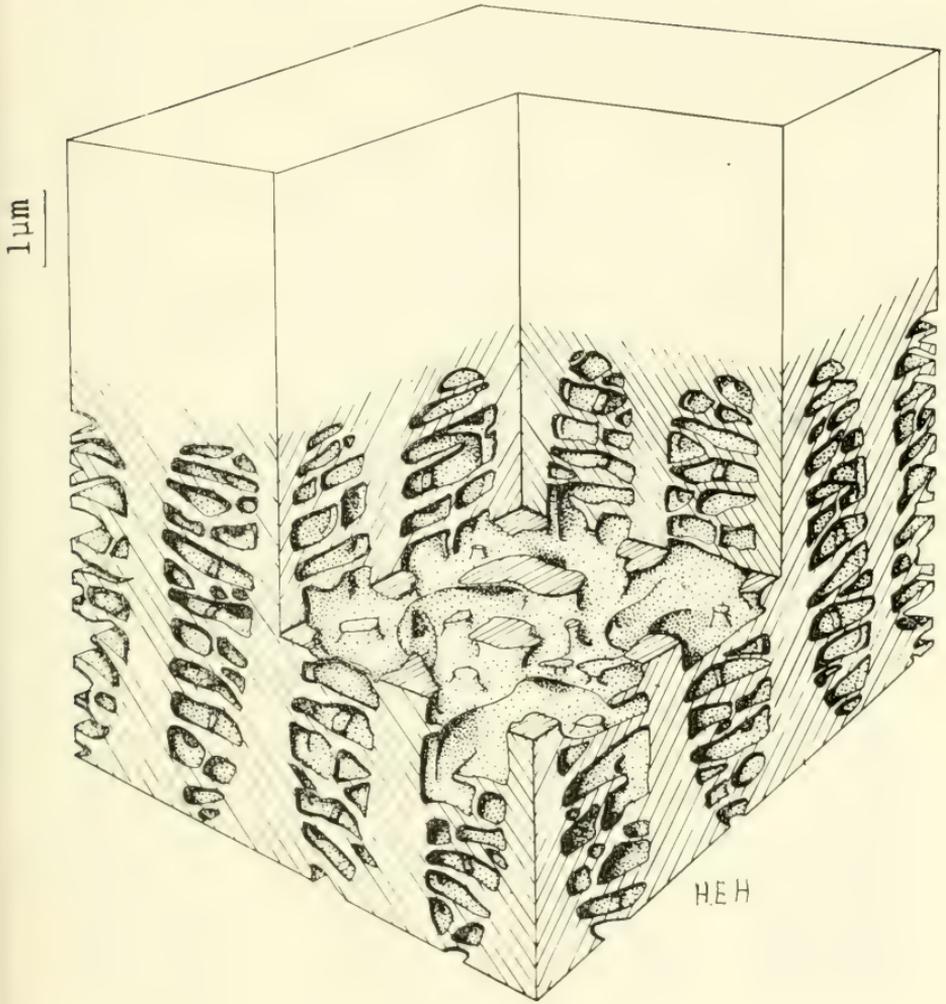


Fig. 1. Diagram of the structure of the outer part of the elytra of *Dynastes hercules*. The outer transparent layer is unshaded. (After Hinton & Jarman.)



Fig. 2. Glass tubes 20 mm in diameter containing silica gel or moist filter paper attached with chewing gum to the elytra of *Dynastes hercules*.

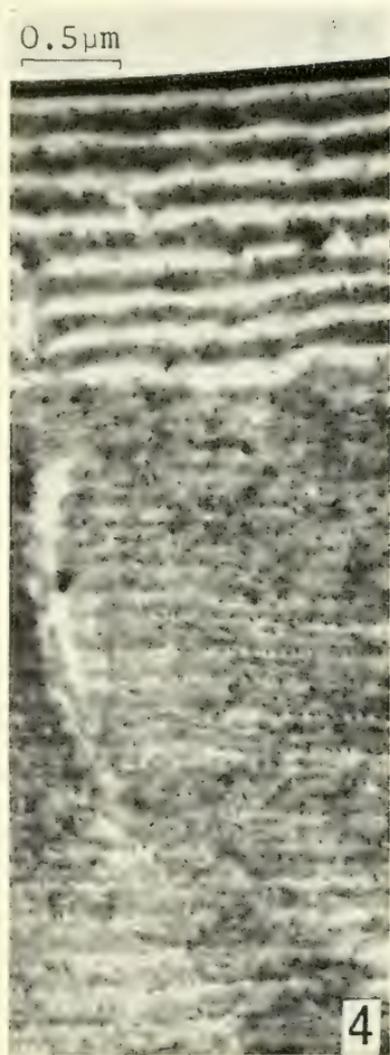
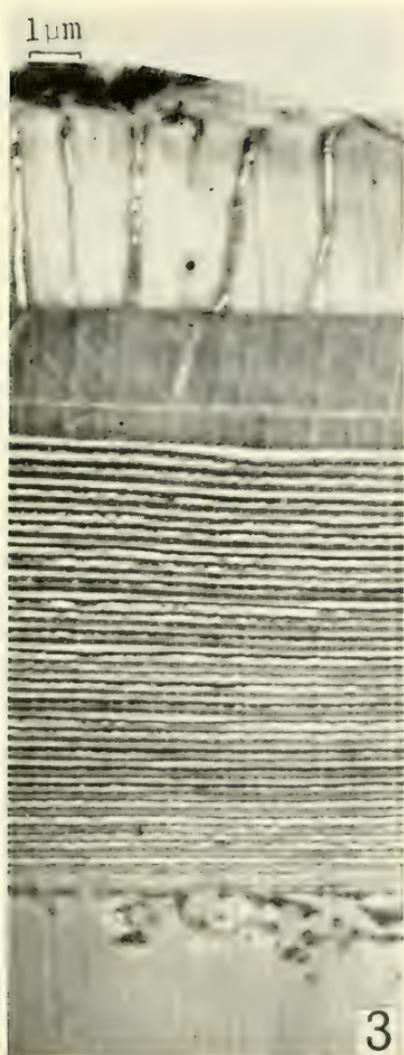


Fig. 3. Electron micrograph of the inner part of the elytra of the tortoise beetle, *Aspidomorpha tecta*, showing the  $44 \times 2$  interference layers immediately above the epidermis.

Fig. 4. Electron micrograph of the outer part of the hind margin of the metatergum of the cockroach, *Megazosteria patula*, showing the  $7 \times 2$  interference layers.



Fig. 5. Scanning electron micrograph of the diffraction grating of the first abdominal sternite of the scaphidid, *Cyparium sibiricum* Solsky.

Fig. 6. Scanning electron micrograph of the diffraction grating of the side of the first abdominal sternite of the scarabaeid, *Phyllostocus ruficollis* MacLeay.

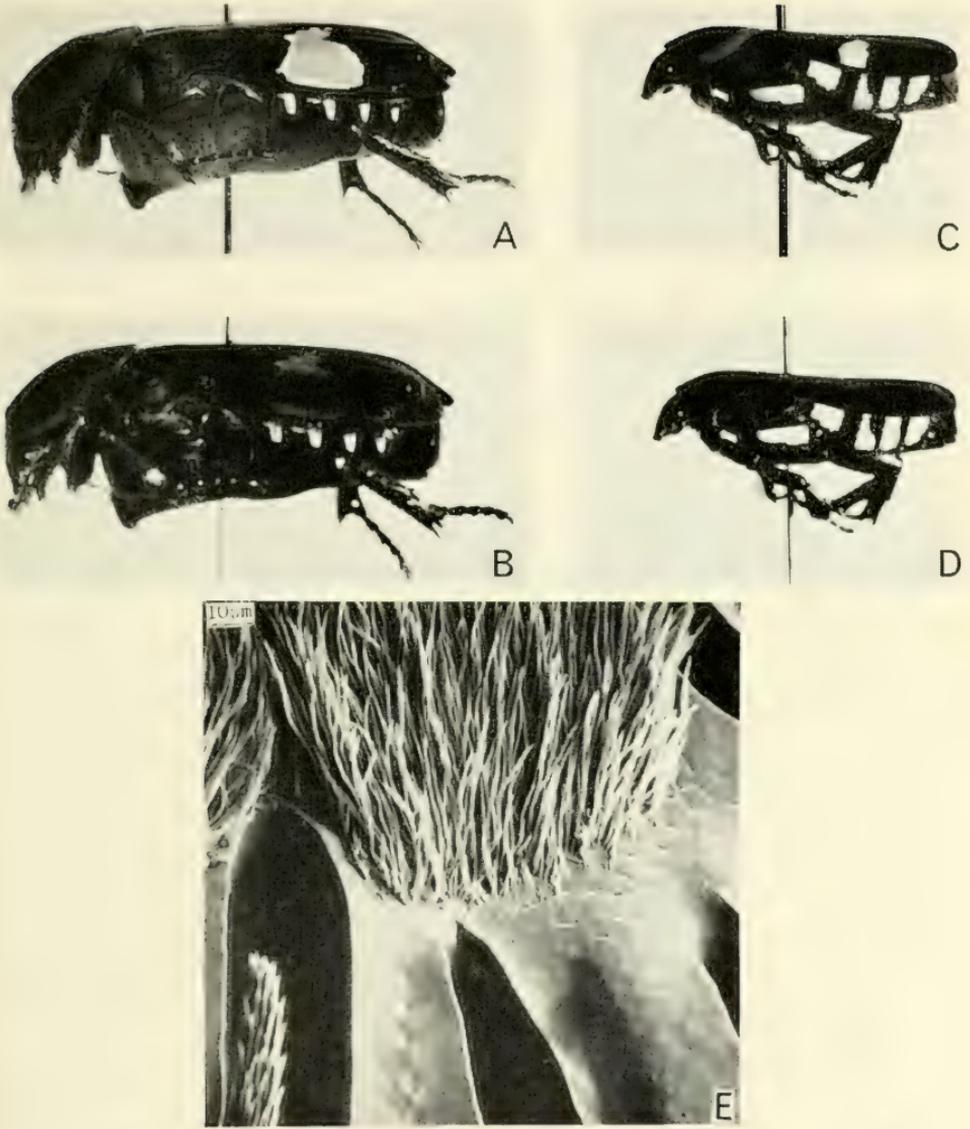


Fig. 7. (A-B) *Glycosia tricolor* photographed in the visible (above) and at 365 nm (below) in the ultraviolet. (C-D) Same of *Glycyphana binotata*. (E) Microtrichia of one of the white abdominal patches of *Glycyphana binotata* that reflect ultraviolet.

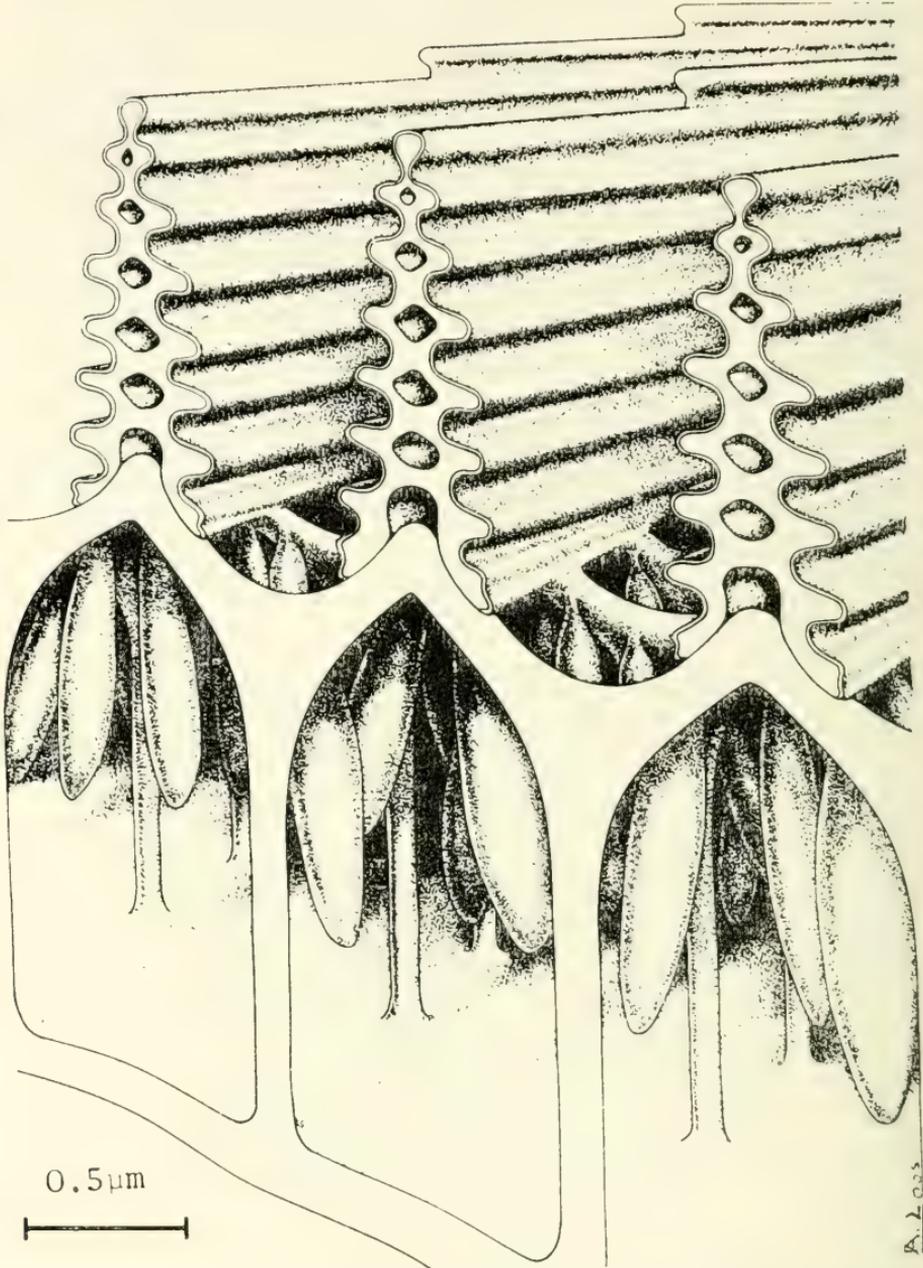


Fig. 8. Reconstruction of part of the wing scale of the male of the pierid butterfly, *Eurema lisa*. The laminate ridges projecting upwards are the interference films responsible for the ultraviolet reflection. The pigment granules responsible for the yellowish colour of the scale project downwards into the air space within the main body of the scale. (After Ghiradella *et al.*)

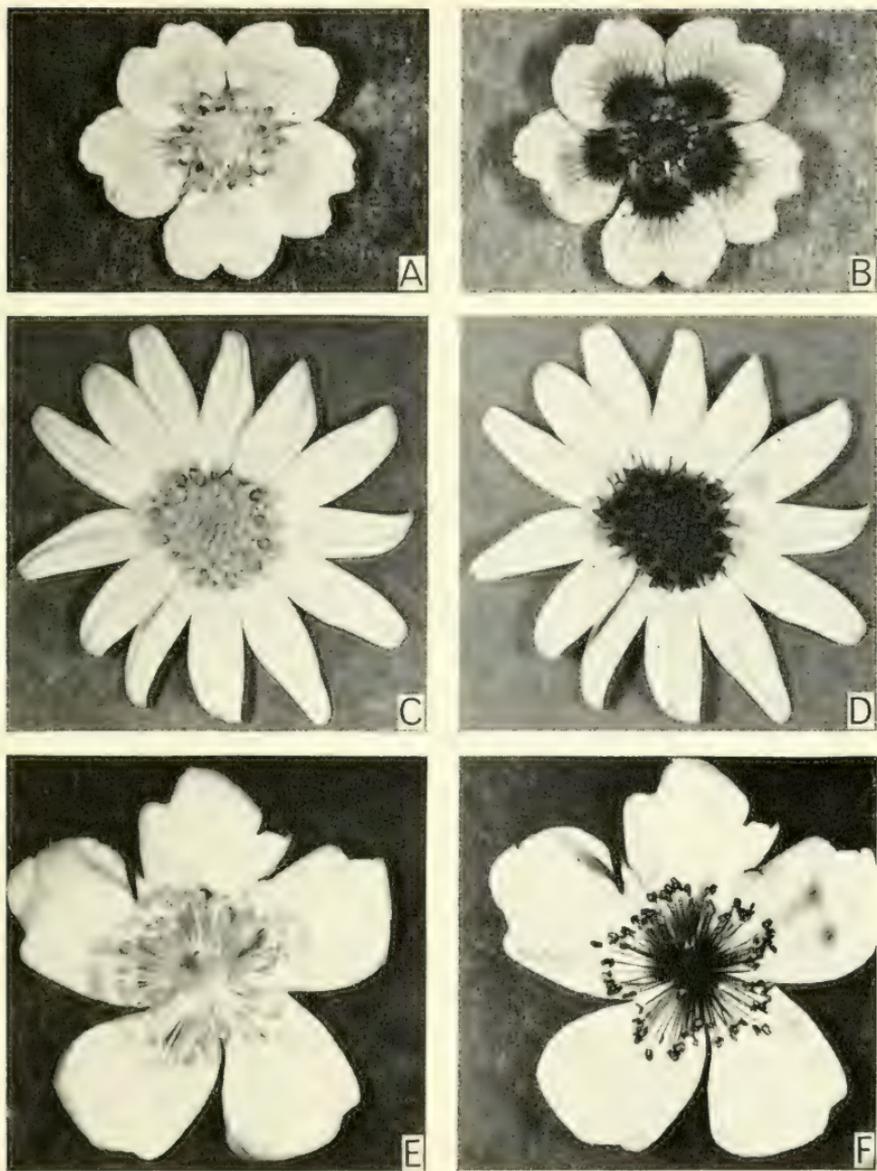


Fig. 9. Flowers photographed in the visible (left) and at 365 nm in the ultraviolet. (A-B) *Potentilla reptans*. (C-D) *Senecio greyii*. (E-F) *Hypericum calycinum*.



*Selective advantages of diffraction gratings*

A diffraction grating not only provides an insect with a warning colour, but also, as some light reflected from the grating is specularly reflected (zero order), with a reflectance that makes it more difficult for a predator to estimate distance and therefore the size of the insect. A diffraction grating thus produces an unusual combination: a warning colour that at the same time deceives about distance. I have previously (Hinton, 1969a) noted the fact that it becomes difficult to estimate the distance away of an object, and therefore its size, when the appearance of the object, i.e. its reflectance or both its reflectance and colour, change rapidly with the angle at which it is viewed. This difficulty arises irrespective of whether the predator is estimating distance by stereoscopic vision or by evoking parallax. One of the obvious reasons for this is that most natural objects—the earth, stones, bark, leaves, and so on, have a reflectance and colour that alters little with the angle to their surfaces from which they are viewed. Thus animals tend to lack experience in coping with objects the reflectance, or reflectance and colour, of which change greatly with the angle of viewing.

The more regular the periodicity of the grating lines, the sharper are the maxima and minima of reflectance of a particular colour. Therefore the more perfect the grating, the more the predator is likely to be confused provided that the angular separation between diffraction maxima is relatively small compared with the range of angles over which the predator views the insect. Now the fact is that the grating lines are much more irregular than we would expect them to be (Figs. 5–6). Not only this, but there are many dislocations (Figs. 5–6). Because we know that epidermal cells can make more or less perfectly parallel lines, as almost any stridulatory file is witness, the evident imperfections of all diffraction gratings (except the stridulatory file of mutillid wasps) demands an explanation. I have suggested (Hinton, 1969a) that a perfect grating has a slight selective disadvantage compared with a less perfect one in that a perfect grating might produce too sharp a peak reflectance when reinforcement occurs. A very bright reflectance could well act as a beacon and so outweigh the benefits of confusing distance and size. It would, of course, only act as a beacon to the kind of casual predator that was not repelled by the colour.

In the preceding paragraphs I have dwelt in general terms on the selective advantages of diffraction gratings. However, speculation upon the advantages of diffraction gratings in relation to the special habits of certain groups of beetles serves to direct attention to new features which require much more investigation before they can be accepted as anything but highly speculative. Such speculations have already been made about a number of different groups of beetles (Hinton, 1970a, b; Hinton & Gibbs, 1969a, 1971). Here only the special features of the Carabidae and Gyrinidae are briefly noted.

The Carabidae with diffraction gratings are nearly all either nocturnal or live on the ground among grass roots or concealed in other places. Most of the time they are in the shade where there is little or no parallel light, and the brown or black colour of their cuticle is procryptic. However, from time to time they cross open patches of ground where they are exposed to non-diffuse light, and it is at such times that their bright colours and specular reflectance are advantageous. An insect with a diffraction grating has an 'all or none' warning colour. In dim diffuse light the colour of the cuticle may harmonize with the background, but as soon as it is exposed to the sunlight warning colours appear. These beetles could not solve their particular problem so well by evolving interference colours because these would still be brilliant in diffuse light and so would make them conspicuous

even when they were not exposed to the sun. A pattern of warning colour formed by pigments in the cuticle would also render them conspicuous even in dim light. In short, the only way to solve the problem of being brown or black in order to harmonize with a dark background in dim light and at the same time to have brilliant warning colour if exposed to the sun is to evolve a diffraction grating.

Some neotropical gyrinids of the genus *Gyretes* are unique in having grating lines that are at right angles to each other. The lines on the pronotum are parallel to the major axis, whereas those on the elytra and head are normal to the major axis. These beetles live in aggregations on the surface of ponds and streams, where they swim in circles when hunting for food. Because the head, pronotum, and elytra are three convex parts, there will be three different highlights (zero order) when viewed from certain angles at any particular incidence. At some angles there will therefore be three streaks of spectra that are slightly differently orientated. However, because on the pronotum the grating is at right angles to those of the head and elytra, the orientation of the streak of spectra produced by the pronotum will be very different.

If we view a horizontal grating at grazing incidence and at the same time rotate it about a vertical axis, the apparent rotation is large when the lines appear vertical to the eye and small when they appear horizontal. Thus a predator viewing *Gyretes* from the side will see the spectra on the head and elytra rotate faster than the spectra on the pronotum. But when it views *Gyretes* from before or behind, the spectra on the pronotum will then appear to rotate faster. A beetle that is circling will thus present a predator from many angles with spectra that at least on part of its body are relatively rapidly shifting their position. In beetles that do not move in circles there would appear to be less advantage in having diffraction gratings on the dorsal surface normal to each other, and none are known to have a system of this kind. Other Gyrinidae sometimes have diffraction gratings on the elytra, pronotum and head, e.g. *Orectochilus spiniger* Reg., but in these species the grating lines of all three parts of the body are normal to the major axis (Hinton & Gibbs, 1971).

#### *Production and significance of ultraviolet patterns*

The wavelength of sunlight reaching the surface of the earth extends from the far infrared to about 300 nanometers ( $1\text{nm} = 10\text{\AA}$ ). Shorter waves are absorbed by the atmosphere, chiefly the ozone layer. The eye of man is only sensitive to waves from about 400 nm to 780 nm. The visible spectrum for other vertebrate, is very nearly the same. The visible spectrum for insects, on the other hands extends far into the ultraviolet and usually ceases at about 600 nm, although some butterflies and a few other insects are sensitive to red. The odd thing about insects is not only that they are sensitive to the shortest wavelengths reaching the surface of the earth, but they are sensitive to much shorter ones. Indeed, Lutz & Grise-wood (1934) were able to show that *Drosophila* was sensitive to light of 254 nm, a much shorter wavelength of light than either *Drosophila* or its ancestors can ever have experienced.

Most insects have a peak of spectral sensitivity at about 350 nm and another between 490 and 500 nm, although the peak in the visible (visible means what we can see, i.e. 400–780 nm) is as low as 450 for some and as high as 550 for others. The capacity of insects to see further into the ultraviolet side of the spectrum is exploited by them in a number of very interesting ways, but I only have space to refer to a few of these.

Entomologists and others are familiar with examples of aposematic assemblages in which quite different insects have similar warning colour and look more

or less like each other. The selective advantage of such assemblages is that any particular predator has fewer patterns to learn and so each species of the assemblage escapes with fewer casualties. It is possible for a group of related or unrelated insects to look exactly like each other in the visible part of the spectrum if they can use ultraviolet markings not only as a means of recognizing their own species but also as a means of recognizing the opposite sex.

In the Oriental Region day-flying scarabaeids of the genera *Glycosia* and *Glycyphana* belong to an aposematic assemblage. The species are black with a red margin to the pronotum and a large yellow spot on each elytron. The colour pattern of all is more or less identical from above. In *Glycosia tricolor* Oliv. (Fig. 7 A,B) and *Glycyphana binotata* G. & P. (Fig. 7 C,D) the two yellow patches on the elytra do not reflect ultraviolet, whereas in *Glycyphana horsfieldi* Hope, the two yellow patches on the elytra strongly reflect ultraviolet. Differences in the reflection of ultraviolet from the yellow patches on the elytra will enable some of the species to recognize their own kind, but the pattern of white patches on the ventral sides is different in each (Fig. 7). The white of these patches is both a vertebrate and an insect white, that is, it reflects all wavelengths in the visible spectrum of both vertebrates and insects. The white patches on the ventral sides consist of dense patches of microtrichia (Fig. 7 E) each of which contains an ultraviolet-reflecting pigment.

Many moths and butterflies have patterns on their wings which are made up of patches of scales that absorb ultraviolet and patches of scales that strongly reflect ultraviolet. The ultraviolet patterns of the family Pieridae have received most attention. In these, as in many other butterflies, the patterns of the two sexes are different. In the vast majority of the Lepidoptera scales that reflect ultraviolet do so because they contain an ultraviolet reflecting pigment, but the scales of some Pieridae are exceptional in that their ultraviolet reflection is an interference colour produced by many thin lamellae in the ribs of the scales (Fig. 8).

It has recently been shown (Ghiradella *et al.*, 1972) that in *Eurema* the ribs of the ultraviolet reflecting scales contain lamellae about 85 nm thick that alternate with layers of air of about the same thickness. The refractive index of the cuticular lamellae is about 1.6 and that of the air is 1.0, so that the mean refractive index is 1.3. Because of the low mean refractive index, the colour is very dependent upon the angle of viewing. We have previously noted that because of the high mean refractive index of tortoise beetles there is relatively little change in colour with changes in the angle of viewing or the angle of the incident light.

Many Pieridae thus produce brilliant iridescent colours exactly as do the species of *Morpho*, the essential difference being that the interference colours of *Morpho* are in the visible part of the spectrum whereas those of the Pieridae are in the ultraviolet part of the spectrum and therefore visible to other insects but not to us. When a butterfly with structural ultraviolet is flying, bright flashes will be continually emitted as the wings beat through the appropriate angle. It is well known that courtship in many butterflies is initiated by the male, which depends on visual signals from the wings of the female. In some Pieridae it has been shown that the visual signal is the ultraviolet pattern of the female. There is also some evidence for the view that the ultraviolet pattern of the male plays a part in successful courtship, but I know of no unambiguous experimental evidence for this.

Some pierid butterflies belong to aposematic assemblages, and these and the individuals in these, like the scarabaeids mentioned above, apparently recognize members of their species and of the opposite sex by means of visual signals to which vertebrates are completely blind. The Pieridae are particularly interesting

because ultraviolet reflection is sometimes structural in both sexes (*Hebomoia*), structural only in the male and pigmentary in the female (*Colias*, *Eurema*, *Gonepteryx*, *Dercas*, *Eronia*), or produced by pigments in both sexes (*Delias*, *Euchloe*, *Pieris*, *Aporia*). No instance is known in which the female has structural ultraviolet and the male depends upon a pigment (Silberglie<sup>d</sup> *in litt.*).

#### *Ultraviolet patterns of nocturnal insects*

The white spots and bands of such nocturnal insects as moths and mosquitoes strongly reflect ultraviolet. The selective significance of this is not clear to me. Mazokhin-Porshnyakov (1969) refers to work that claims that the light at night is very rich in ultraviolet, '... about 75 per cent, on account of the moon...'. He therefore suggests that the ultraviolet reflections of moths play a part in sex recognition. However, the ultraviolet component of the albedo of the moon is surprisingly small. Measured from space it is less than 2 per cent as compared with 7½ per cent in the visible and over 10 per cent in the infrared. Because much of the sun's ultraviolet reflected by the moon will be absorbed by the atmosphere, it seems safe to assume that there is some significance for the ultraviolet patterns of nocturnal insects other than that suggested by Mazokhin-Porshnyakov. We have to remember that all nocturnal insects have to be somewhere during the hours of daylight. It has been suggested (Hinton, 1970a) that the white patches and bands of *Aedes aegypti* and other mosquitoes which strongly reflect ultraviolet constitute a disruptive pattern. Because their white is also an insect white, and the black spots and bands absorb ultraviolet, the banding is a disruptive pattern for spiders and insects as well as for vertebrates. I do not of course mean to suggest that all ultraviolet patterns of nocturnal insects are concerned with disruptive patterns for protection against diurnal predators.

#### *Ultraviolet patterns of flowers*

All flowers pollinated by insects appear to have ultraviolet patterns (Fig. 9), usually concerned with nectar guides. In many kinds of flowers the nectar guides absorb both in the visible and ultraviolet. In other kinds the nectar guides are invisible to us but absorb ultraviolet more strongly than the other parts of the petals and so are recognizable to insects. In still other flowers the nectar guides reflect ultraviolet and the other parts of the petals absorb it, and thus it is the reflectance of ultraviolet rather than its absorption that distinguishes the nectar guides for the insect.

We have seen that in many aposematic assemblages of insects the individuals recognize other members of the same species by means of specific ultraviolet patterns. Sometimes groups of species of flowers provide an analogous situation. In the visible they resemble each other very closely (they may belong to an assemblage of warningly coloured forms—see next section), but the individual species are competing among themselves for pollinators. And it is this competition for pollinators that may sometimes account for the differences in their honey guides. Irrespective of any colours the flower may have in the visible part of the spectrum, they can exploit the ultraviolet part of the spectrum in order to attract pollinators.

#### *The bright colours of flowers*

The hypothesis that the bright colours of flowers are warning colours has been elaborated in some detail elsewhere (Hinton, 1973), and I will here only mention some of the chief arguments in its favour.

(1) The primitive method of pollination is by insects. Wind-, water-, bird-, and

bat-pollinated flowers are all derived from ancestors that were pollinated by insects. The basic problem confronting a flower is how to attract insects and at the same time prevent itself being eaten by other animals. It seems that rarely if ever does the success of a plant depend upon its flowers being eaten, although the adequate distribution of a number of species is contingent upon their seeds being eaten and passing undigested through the alimentary canal of an animal.

(2) If the bright colours of flowers are warning colours, it is essential to show that a 'reasonable' number of plants are poisonous or distasteful. We may consider two unrelated regions. By 1954 no less than 111 or 6 per cent of the flowering plants of the British Isles were known to be responsible for serious poisoning or death of livestock. In South Africa I know of records of 452 poisonous species, including those that are strong emetics or purgatives. These probably constitute more than 6 per cent of the species of flowering plants in the region because it seems unlikely that there are as many as 7,500 kinds of flowering plants in South Africa.

(3) Herbivores are important enemies of plants, but, like most mammals, they lack colour vision. However, flowering plants originated before the Cretaceous, and by the latter half of that period all of the principal groups of dicotyledons were already present. The dominant groups of herbivores in the Cretaceous were iguanodons and ceratopsian reptiles, and, so far as is known, all reptiles have good colour vision. It is therefore possible that one of the chief selective pressures for the evolution of brightly coloured flowers came from herbivorous reptiles with good colour vision. Mammals did not become dominant herbivores until after the Cretaceous with the appearance of the condylarths in the middle Paleocene, that is, long after the main evolutionary lines of flowering plants were already established. Throughout the Tertiary different groups of mammals succeeded each other as the dominant herbivores, but antelopes and their relatives did not become dominant until the Pliocene. Thus the lack of colour vision of modern herbivores is irrelevant when the origin of the bright colours of flowers is being considered. In any event, plants have other means of defence, e.g. odour, taste, poisonous hairs and spines, and lignification of the tissues. Modern herbivores do learn to recognize poisonous plants and leave them alone. Sometimes they even develop a craving for harmful species and effectively seek them out, which involves recognizing them.

(4) Birds are warm-blooded reptiles with excellent colour vision. Although they originated in the early Cretaceous or before, the kinds of birds that are associated with flowers did not evolve until sometime in the Tertiary, that is, long after the diversification of flowering plants. They are thus in no way involved with the early evolution of brightly coloured flowers.

(5) Nectar is an important part of the diet or even the chief food of a surprisingly large number of birds, about 1,600 species or about 19 per cent of all birds. It seems safe to assume that their first close association with flowers was because they found on them an abundant supply of insects. However, as they took over pollination from insects, not only did the birds themselves become modified but the flowers too: bird-pollinated flowers usually lack ultraviolet patterns and odour, their nectar has less sugar than that of insect-pollinated flowers, and the plants may evolve special landing stages for the birds, or their petals may become lignified, as in the species of eucalyptus pollinated by parrots. In many parts of the world, and especially in the American tropics, pure spectral reds are particularly common among bird-pollinated flowers. If the theory is correct, how is it that flower-pollinating birds are undoubtedly attracted to colours that are warning colours for other vertebrates? I do not think anyone will venture to deny that

wasps and bees are warningly coloured and that most animals behave towards them as if they were. Nevertheless, certain animals specialize in eating them. For instance, among birds, the Meropidae seek them out and are therefore attracted to patterns of yellow and black, red and black, and so on, that not only serve as warning colours for nearly all other vertebrates but also for most birds.

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*Xylena vetusta* Hübn. (Lep., Noctuidae) in Essex: a correction. During the course of our work on the compilation of the list of Essex Lepidoptera for the Essex Naturalists' Trust, Mr. G. A. Pyman queried with me the record of *Xylena vetusta* Hübn. extracted from the record of our meeting of 14th January 1971 (1971, *Proc. Brit. ent. nat. Hist. Soc.*, **4**:31). From the information received from Mr. Pyman it was *Xylena exsoleta* L. that Peter Wanstall took in the Brentwood area.—F. D. BUCK, 'Seirotana', New Road, Tiptree, Colchester, Essex, 29th May 1973.

8th FEBRUARY 1973

The President, Mr. J. M. CHALMERS-HUNT, in the Chair

The following new members were declared elected: Messrs. R. E. M. Pilcher and A. E. Glaser.

The President announced that the Council has appointed Dr. B. J. MacNulty an Honorary Member.

## EXHIBITS

The PRESIDENT—Two noctuid lepidopterous insects both of historical interest. (1) *Meliana flammea* Curt, a melanic aberration from Norfolk, ex. S. Stevens coll., a very old example of this normally constant species. (2) *Xanthea gilvago* D & S ab. *erythrago* Warren from E. Kent.

Mr. R. DICKSON—*Procus versicolor* Bork. (Noctuidae) from Over Compton, Dorset, and others from south Hants as follows: a female, Botley Wood 3.vii.70; a male, Catisfield, 26–27.vi.70; and a male, Catisfield, 4–5.vii.72; all these Hants examples were taken at mercury vapour light. Mr. Dickson suggested that the Hampshire examples were uniform in appearance and approached *P. strigilis* Clerk, whilst the Dorset specimens were diverse in appearance and were nearer *P. latruncula* Schiff. The species, he said, was common in western Dorset and uncommon in south Hampshire. Examples of *P. strigilis* Clerk and *P. latruncula* Schiff were shown for comparison.

Mrs. G. R. ELSE—*Volucella zonaria* Poda (Dipt., Syrphidae) taken in Hants during 1971–72: a female, Cherque Nature Reserve, near Lee-on-Solent, at mercury vapour light, 1971; a female, Porchester, near Fareham, at mercury vapour light, 24.vii.72; a female, Cosham (North Portsmouth), on flowers of an unidentified shrub, 19.viii.72. He also showed a number bred from larvae obtained from an underground nest of *Vespula vulgaris* (L.) (Hym., Vespidae) excavated in November 1971 at Porchester. The flies emerged between 1–14.vii.72.

## COMMUNICATIONS

Mr. J. M. Chalmers-Hunt asked for help on behalf of Mr. R. Wilson who was working on host plants and parasites of *Lithocolletis*. He had constructed a pupal key and needed pupal skins from sallow and maple species to complete his work. He would also like to see pupal skins of *L. klemanniella* and *L. corylifoliella*.

Referring to Mr. Dickson's exhibit, Mr. R. F. Bretherton said the Hampshire examples of *Procus versicolor* Bork were almost the same as those obtained from the Chilterns. He asked if the Hampshire localities were on chalk, but the exhibitor could not be sure of the geology.

Mr. A. E. Stubbs gave an interesting talk entitled 'Collecting Dipters' illustrated by transparencies; a discussion followed.

22nd FEBRUARY 1973

The President, Mr. J. M. CHALMERS-HUNT, in the Chair

The death was announced of Mr. G. Cole.

Dr. Kurasawa from Tokyo, now working at the British Museum (Nat. Hist.) was welcomed to the meeting.

The following new members were declared elected: Mrs. E. G. Campbell and Mr. H. G. Parker.

## EXHIBITS

The PRESIDENT—A female of the Indian mimetic butterfly *Papilio agestor* Gray ssp. *govindia* Moore and its model *Danaus sita* Koll., both of which he took in the mountain region between Dehra Dun and Mussoorie. He also exhibited an example of *Volucella zonaria* (Poda) (Dipt., Syrphidae) from Bromley, Kent, and *Lathysophthalmus aeneus* (Scop.) (Dipt., Syrphidae) from Aldeburgh, Suffolk, both from the collection of the late Rev. H. E. J. Biggs.

Mr. S. N. A. JACOBS—Microlepidoptera species from Zambia which, though widely different in family, showed a similar sooty coloration with yellow cilia. One is reminded of the European *Catastia ciliella* D. & S. which has similar coloration. Two specimens are of a ? psychid, one female tortricid *Cryptolebia leucotropa* Meyr, and an unnamed gelechiid.

Col. A. M. EMMET—Butterflies from India and Burma illustrating mimicry as follows:

*Group I*

- Models: *Tros hector* L. (S. India)  
*Tros aristolochiae aristolochiae* F. (S. India)
- Mimic: *Papilio polytes romulus* Cr. (*hector*)  
 var. *stichius* Hübn. (*aristolochiae*) } S. India  
 male shown for comparison

*Group II Euploea*

- Models: *Euploea core core* Cr. (S. India)  
*E. alcathaea doubledayi* Fd. (Arakan)
- Mimic: *Chilasa clytia clytia* L. (S. India) (*core*)  
*C. clytia* var. *janus* (Arakan) (*alcathoe*)  
*Hypolimnas bolina* female (S. India) (*core*)  
*Hypolimnas bolina* male shown for comparison

*Group III Danaus* (brown)

- Model: *Danaus chrysippus* L. (S. India)  
*D. chrysippus* var. *dorippus* Cr.
- Mimic: female *Hypolimnas misippus* L. (S. India) (*chrysippus*)  
 female *H. misippus* var. *inaria* Cr. (S. India) (*dorippus*)  
 male shown for comparison.  
*Cethosia metueri maliratta* M. (S. India)  
*Elymnias hyperneshe undularis* Drury (S. India) female  
*Argynnis hyperbius hybrida* Evans (S. India, Nilgeris)  
 male and female *A. hyperbius cafetsi* Ober. (S. India, Paluis) for comparison

*Group IV Danaus* (blue)

- Model: *Danaus laniace matura* Fruh (S. India)
- Mimic: *Chilasa clytia* var. *dissimilis* L. (S. India)  
*Pareronia valeria hippia* F. male and female (Arakan)  
*Elymnias nesaea triuandra* Wall (Arakan)  
*Euripus consimilis meridionalis* Wur. (S. India)

Mr. R. J. VANE-WRIGHT—Müllerian and Batesian mimicry to illustrate his talk; showing variation over the range of a certain heliconid from South America. Also other lepidopterous mimics from Madagascar, New Guinea and Malaya.

## COMMUNICATIONS

Mr. J. A. C. Greenwood reported that on a recent visit to Tasmania he had spent a day with Mr. L. E. Couchman who was elected a member of the Society in 1922 and who went to Australia in 1924 and he has not been back to this country since. Mr. Couchman has made a very large collection of Australian butterflies, having covered much of the mainland, and in the last 20 years has concentrated on Tasmania. He will be particularly well known for his work on the two satyrids: *Nesoxenica leprea* Hewitson and *Oreixenica ptunarra* Couchman.

Reporting on the current Lepidoptera Dr. C. G. M. de Worms said the last few nights had produced *Orthosia stabilis* Schiff. (Noctuidae) and *Dasycampa rubiginea* Schiff. (Noctuidae) at Woking, and *Chloroclysta miata* L. (Geometridae) at Juniper Hall, Surrey.

Mr. R. J. Vane-Wright read a paper on mimicry.

## 8th MARCH 1973

The President, Mr. J. M. CHALMERS-HUNT, in the Chair

The following new members were declared elected: Lt.-Cmdr. P. Poland, R.N. and Messrs B. G. Jackson, R. H. Carpenter, A. H. Dobson, G. M. Bathe and B. J. Potter.

## EXHIBITS

Col. A. M. EMMET—specimens from South India of *Virachola isocrates* F. (Lep., Lycaenidae) showing markings suggestive of a false head at the tornus of the hindwing. In one specimen the false head had been bitten off by a predator without vital injury to the insect. The exhibit had been suggested by a slide shown at the previous meeting by Mr. R. J. Vane-Wright of a bug with a similar protective device.

Mr. C. O. HAMMOND—A publication issued by the Central Electricity Generating Board which included a page of illustrations of Lepidoptera found at Dungeness, Kent. One species shown was *Hadena albimacula* Borkh. (Lep., Noctuidae) which, according to the writer of the pamphlet, was to be found in Britain only at Dungeness.

## COMMUNICATIONS

Commenting on Mr. Hammond's exhibit Dr. C. M. G. de Worms said that *Hadena albimacula* Borkh. also occurred in Hampshire and South Devon. He also stated that the warm weather was bringing out the spring moths earlier than usual.

Mr. R. H. Mays said that a specimen of *Endromis versicolora* L. (Lep., Endromidae) from the Aviemore stock distributed by Col. Emmet the previous June had already emerged.

Mr. L. H. Evans stated that he had taken *Anticlea badiata* D. & S. (Lep., Geometridae) at Limpsfield, Surrey, on 3rd March, and Mr. P. N. Crow that he had had *Eupithecia abbreviata* Steph. (Lep., Geometridae) at light in Merionethshire on 10th February. Mr. E. S. Bradford had found single specimens of *Tinea pelliionella* L. (Lep., Tineidae) at intervals throughout the winter.

The scheduled lecturer, Mr. J. D. Holloway, having been prevented from attending by industrial trouble in the railways, slides were exhibited by Mrs. F. Murphy depicting spiders and Mr. C. O. Hammond who took protective coloration as his theme.

22nd MARCH 1973

The President, Mr. J. M. CHALMERS-HUNT, in the Chair

## EXHIBITS

The PRESIDENT—A preserved full-grown larva of *Minucia lunaris* Schiff. (Lep., Plusiidae) together with several moths from Orlestone Woods, Kent, which he had caught and bred in 1948 and 1949. In the series were some striking aberrations including *olivescens* Warren, *chantiana* C.-H., *murina* Ober. and *centralis* C.-H. The exhibitor remarked on the apparent rarity nowadays of this fine moth; which, as far as he is aware, has not been taken since 1958.

## COMMUNICATIONS

Dr. C. G. M. de Worms gave an account of his visit to Australia and New Zealand for the 14th International Congress of Entomology.

12th APRIL 1973

A Vice-President, Mr. C. MACKECHNIE JARVIS, in the Chair

The death was announced of Comdr. G. Harper.

The following new members were declared elected: Messrs. K. R. Cambridge-Tuck, R. C. Claypole, R. Nash and G. E. Simmonds.

## EXHIBITS

Col. A. M. EMMET—The first recognized English example of *Trifurcula griseella* Wolf (Lep., Nepticulidae). A male at Trottscliffe, Kent, 25.vii.65. Until recently this specimen had been determined as *Levarechauma cryptella* Staint., specimens of which were also shown for comparison. The life history is at present unknown. The male of *T. griseella* can be told at once from *L. cryptella* by the presence of an orange-yellow patch of scales near the base on the underside of the forewing; *T. griseella* is also smaller and lacks the pale spot usually present at the tornus in *L. cryptella*.

Five other examples were previously known: one (the type) was taken by Mr. Neils Wolff at Asserto in Denmark in May 1954; the other four were taken by sweeping in flowery pasture in the Burren, Co. Clare, Ireland.

An examination of the material in the British Museum (Nat. Hist.) has revealed five more examples (determined as *L. cryptella*) in the Bankes collection. Four of these were taken at Dancing Lodge, 23.v.84 and the other at Portland, 24.vii.91, both in Dorset.

There are 40 examples of *L. cryptella* in the Ford collection, but no *T. griseella*.

Mr. C. MACKECHNIE JARVIS on behalf of Mr. P. J. BAKER, a male *Rhagium mordax* Deg. (Col., Cerambycidae) one of a pair taken under the bark of a rotten birch at Laggan Bridge, Inv., 7.iv.73.

## COMMUNICATIONS

Mr. S. N. A. Jacobs, referring to Mr. B. Goater's comment last year that *Lycia hirtaria* Clerck (Lep., Geometridae) was scarce, said that two had appeared on his gatepost. Mr. Jacobs also added that this moth had been noted to remain as a pupa for up to nine years.

Col. A. M. Emmet reported the emergence of three female *Endromis versicolora* L. (Lep., Bombycidae). Mr. E. H. Wild also reported the emergence of several of

both sexes, as did Mr. A. S. Wheeler who also said that he had bred out a *Lycia hirtaria* Clerck. Mr. R. F. Bretherton commented that he had failed to get a pairing when endeavouring to breed *Endromis versicolora* L.

There followed a lecture illustrated by colour slides, given by Mr. J. Muggleton on 'Aspects of the History and Ecology of certain Blue Butterflies in the Cotswolds', after which a discussion ensued.

26th APRIL 1973

The President, Mr. J. M. CHALMERS-HUNT, in the Chair

The death was announced of Lord Talbot de Malahide.

The following new members were declared elected: Messrs. J. N. Fells and J. E. Le Blond.

#### EXHIBITS

The PRESIDENT—A female *Poecilopsis lapponaria* Boisd. ssp. *scotica* Harrison (Lep., Geometridae), taken near Oban, Argyl., 14.iv.73, on *Myrica gale* L. He also showed the green ova laid in cracks in bark.

Mr. E. S. BRADFORD—A leaf with a nepticulid mine; he queried the species of tree from which the leaf came. It was suggested it might be *Sorbus torminalis* (L.) Crantz., the Wild Service Tree.

#### COMMUNICATIONS

Mr. B. Ridout reported seeing two *Anthocharis cardamines* L. (Lep., Pieridae) in Sussex that afternoon, and added that last year he had seen the first on 14th April. The Cuckoo, he said, had been back in that part of the country ten days; but the Nightingale had not yet been heard, though it usually starts about the 29th April.

The *Eupithecia tripunctaria* H.-S. (Lep., Geometridae) he had been breeding have been emerging over the past two weeks, reported Mr. G. Prior.

Referring to the reports of *Lycia hirtaria* Clerck (Lep., Geometridae) at the previous meeting (p. 58), Mr. E. H. Wild said the species had been coming to his light trap at Selsdon, Surrey, quite commonly. Mr. Jackson added that he had obtained three examples at Ilford, Essex.

Mr. R. W. J. Uffen said that on the 15th April he had seen both *Anthocharis cardamines* L. and *Gonepteryx rhanni* L. (Lep., Pieridae), but to date had noted no *Polygonia c-album* L. (Lep., Nymphalidae).

In one of the woods near Chiddingfold, Surrey, said Mr. R. F. Bretherton, he had seen *Pieris napi* L. (Lep., Pieridae), *Nymphalis io* L. (Lep., Nymphalidae), *Gonepteryx rhanni* L. and *Polygonia c-album* L.

Mr. P. W. Cribb, who was breeding *Apatura iris* L. (Lep., Nymphalidae) in his garden in Middx. reported that on 1st April the larvae had moved onto foliage.

A large number of *Syrphus torvus* (Osten-Sacken) (Dipt., Syrphidae) all of an extraordinary dark colour were, said Mr. Uffen, seen on 8th April in Plashett Wood, Sussex. He has also found this species abundantly in woods near Harlow, Essex.

'Montenegro; land of the Black Mountain' was the title of a talk given by Mr. P. W. Cribb, in which he described the collecting experiences of Mr. Bretherton and himself. The talk was illustrated by excellent coloured transparencies of insects and terrain.

## FIELD MEETINGS

THE BACKWARDEN, DANBURY COMMON, ESSEX

15th June 1972

*Leader:* Mr. R. TOMLINSON

Eleven members and friends assembled at the Backwarden on a fine sunny day to work this reserve of the Essex Naturalists' Trust. The reserve is a sloping area of 17 acres in the south-west corner of Danbury Common. It contains a number of ponds and bogs in old marl and gravel workings, a relict heath tract with a fair growth of heather, a small marsh on the edge of a tributary of the Sandon Brook, and coppiced and scrub woodland. Creeping Willow and other interesting plants, as well as mosses, including several kinds of *Sphagnum*, are present. There is also an extensive blackthorn thicket.

Only two species of butterfly were reported on the wing: *Aphantopus hyperantus* L. and *Lycaena phlaeas* L., and a single example of *Zygaena filipendulae* L. ssp. *anglicola* Trem. was taken.

Col. A. M. Emmet worked assiduously for microlepidoptera and recorded the following species: *Scoparia ambigua* Treits., *Crambus hortuella* Hübn., *Fumaria casta* Pall. cases from which a female has since emerged, *Pandemis cerasana* Schiff., *Archips hebenstreitella* Müll., *Batodes angustiorana* Haw., *Cnephasia interjectana* Haw. (genitalia checked), *Neosphaloptera nubilana* Hübn., *Tortrix viridana* L. which was abundant, *Acleris ferrugana* Schiff. (*fisurana* Pierce), *Apotomis pruinana* Hübn., *Olethreutes lacunana* Schiff., *Briotropha terrella* Schiff., *Batrachedra praeangusta* Haw., *Argyresthia brockeella* Hübn., *A. goedartella* L., *A. pygmaeella* Hübn., *A. retinella* Zell. which was very common, *A. nitidella* F., *A. albistria* Haw., *Coleophora siccifolia* Staint. cases on *Crataegus*, *C. gryphipennella* Bouch. larvae feeding on *Rosa*, *A. viminetella* Zell. larvae feeding on *Salix aurita* L. *C. alnifoliae* Barasch cases on *Betula*, *C. anatipennella* Hübn. cases on *Prunus spinosa* L., *Lithocolletis tenella* Zell. mines on *Carpinus betulus* L., *L. quercifoliella* Zell., *L. spinicolella* L. mines on *Prunus spinosa* L., *L. oxyacanthae* Frey mines on *Crataegus* and the imago was also out, *L. corylifoliella* Haw. mines on *Crataegus*, *Calisto torquilella* Zell. mines and spinings on *Prunus*, *Parornix angliella* Staint vacated spinings were common on *Crataegus*, *P. betulae* Staint. vacated mines on *Betula*, *Bucculatrix ulmella* Zell. vacated mines on *Quercus*, *Tischeria complanella* Hübn., *Phylloporia bistrigella* Haw. vacated mines on *Betula*, *Stigmella rosella* Schrank (*aromalella* Goeze) mines and pupae on *Rosa*, *S. hybnerella* Hübn. vacated mines on *Crataegus*, *S. crataegella* Klim. mines on *Crataegus*, *Nepticula pygmaeella* Haw. mines common on *Crataegus*, *N. lapponica* Wocke vacated mines on *Betula*, *N. salicis* Staint. vacated mines on *Salix aurita* L., *N. aurella* Staint. vacated mines on *Rubus*, *N. plagicolella* Staint. vacated mines on *Prunus spinosa* L.

*Sorhagenia janiszewskae* Reidl. vacated mines were found in shoots of *Frangula alnus* Mill., causing the terminal leaves to wither. This is a new county record, and so far as is known, has been recorded from only Kent, Sussex and Hants.

*Coleophora mgricella* Steph. cases found on *Crataegus*. Two species have been split from this insect, *C. coracipennella* Hübn. and *C. cerasivorella* Packard and until the imago has emerged comparisons cannot be made.

Col. Emmet also reported unidentified *Lithocolletis* mines on *Quercus*, *Salix* and *Betula*; and an unidentified *Stigmella* mine on *Quercus*.

Mines of other Orders which also came to Col. Emmet's attention were: *Rhynchaenus quercus* L. vacated mines on *Quercus* and *R. rusci* Herbst vacated mines on *Betula* (Coleoptera); *Pycnoglossa hystrix* Bri. on *Pteridium*, *Agromyza alnibetulae* Hendel on *Betula* and *A. albitarsis* Meig. on *Populus tremula* L. (Diptera); *Profenus pygmaea* (Klug.) on *Quercus* and *Messa nana* (Konow) on *Betula* (Hymenoptera).

The following Diptera were reported on the wing: *Chrysotoxum festivum* L., *Eristalis horticola* Deg. and *Helophilus frutetorum* F.

The damsel fly *Lestes sponsa* (Hanse.) was noted as was the beetle *Strangalia maculata* (Poda).

## PYRFORD, WISLEY AND OCKHAM COMMONS, SURREY

25th June 1972

Leader: Dr. P. A. BOSWELL

On a cloudy but dry day only one member met the leader at Woking Station. Two other members were unfortunately delayed and failed to find the rest of the party. The original intention of the meeting was to search for myrmecophilous species in the ants' nests of the area but, as the two present were interested in ants and had little knowledge of the other orders, the day was confined to a search for the ants themselves.

A short visit was first made to the sandy heath at Pyrford. A large colony of *Lasius fuliginosus* (Lat.) was found nesting in a bracken-covered area, although this species normally nests at the base of trees. Nearby were several nests of the slave-making species *Formica sanguinea* Lat. These nests were unusual in that there were no slaves of *Formica fusca* (L.) present; in fact this ant was surprisingly not found in the area. Workers of *Leptothorax acervorum* (F.) were found on one of the nests of *F. sanguinea*. Other species found were *Myrmica ruginodis* (Nyl.), *Myrmica lobicornis* (Nyl.), *Lasius niger* (L.) and *Lasius alienus* (Först.). The dolichoderine ant *Tapinoma erraticum* (Lat.) was not found, although the leader had found a single colony at this site earlier in the year. The wood ant *Formica rufa* (L.) was also absent. This would appear to confirm the already recorded disappearance of this species from this site.

The party then moved to the area of Wisley and Ockham Common to the east of the lake. Areas on both sides of the A3 road were examined. *Leptothorax nylanderii* (Först.) was found nesting in the bark of a conifer stump. *L. acervorum* and *L. niger* were common, frequently nesting side by side in birch stumps. *F. sanguinea* was present in the more open sandy places, this time with *F. fusca* as slaves. *M. ruginodis* was again common and a solitary worker of *M. lobicornis* was found. *L. alienus* was found in one dry area and a few hillock nests of *Lasius flavus* (F.) were found in a damper area near trees. Two flourishing colonies of *F. rufa* were found, one on either side of the main road. A fairly intensive search for the tree-inhabiting *Lasius brunneus* (Lat.) was made but none were found, although it is commonly present at Old Woking only a few miles away.

Both members enjoyed the day although no rare ants were found and it seemed a pity that collectors of other Orders had missed the opportunity of collecting those species associated with ants.

## COSFORD MILL, SURREY—28th June 1972

Leader: Mr. G. PRIOR

Fourteen members attended at the Mill which has been the venue for meetings for a number of years, all of which have been successful and have produced several interesting finds. The feature of this gathering was the abundance of *Limenitis camilla* L. The first of these was taken (and released) in the wood adjacent to the Mill by the wife of the leader. Thereafter it was to appear again and again. In the afternoon when the party went over to Thursley Common it proved to be the most numerous butterfly on the wing, exceeding by far *Plebejus argus* L., usually quite common hereabouts.

The moths, though not abundant, provided a good variety; the most interesting perhaps being *Apeira syringaria* L. beaten out of the bushes in the woodland area. About half the party were dipterists and they found their quarry numerous in the woods and near the pond by the Mill. A male *Hilara lurida* (Fall.) was swept near the spring below the Mill, a species not previously recorded from Surrey.

In the afternoon the dipterists working Thursley Common traversed the bog where the galls of the chloropid fly *Lipara lucens* Meig. were collected from the stems of the previous year of *Phragmites communis* Trin.; the fly was subsequently reared. The hover fly *Paraplenium flavitarsis* Meig. was taken on the bog, where a female of the solitary wasp *Crabro scutellatus* (Von Schev.) was also captured. A male was taken when alighting on drift wood at the edge of Moat Pond.

Later in the day the group, now accompanied by Mr. F. Reynolds of the Surrey Naturalists' Trust, continued to the Bagmore Pond area of the Common. Here females of the striking horse flies, *Therioplectes distinguendus* Verral and *Chrysops caecutiens* L., flew into Mr. Chandler's car, while a small area of sandhills was found to be rich in solitary wasps; here *Notozus constrictus* Foerst., *Mimesa equestris* (F.), *Oxybelus uniglumis* (L.), *Crabro peltarius* (von Schreb.), and the winged male of *Myrmosa atra* Panz. were all collected.

Two of the members present were interested in microlepidoptera and Mr. E. S. Bradford recorded: *Udea olivalis* Schiff., *Perinephela lancealis* Schiff., *Agriphila straminella* D. & S., *A. culmella* L., *Pterophorus pentadactylus* L., *Eucosma cana* Haw., *Epinotia immundana* F.R., *Olethreutes lacunana* Schiff., *Telphusa vulgella* Hübn., *Anthophila fabriciana* L. and *Argyresthia glaucinella* Zell.

Macrolepidoptera noted during the day included: *Pieris napi* L., *Pararge aegeria* L., *Maniola jurtina* L., *Coenonympha pamphilus* L., *Plebejus argus* L., *Limenitis camilla* L., *Ochlodes venata* Br. & Grey, *Callimorpha jacobaeae* L., *Spilosoma lutea* Hufn., *Ochropleura plecta* L., *Rivula sericealis* Scop., *Hypena proboscidalis* L., *Cosymbia linearis* Hübn., *Sterrhia aversata* L., *S. trigeminata* Haw., *Mesoleuca albiciliata* L., *Epirrhoe alternata* Müll., *Ortholitha plumbaria* F., *Euchoeca nebulata* Scop., *Deilinia pusaria* L., *D. exanthemata* Scop., *Apeira syringaria* L., *Pachycnemis hippocastanaria* Hübn., *Ematurga atomaria* L. and *Lithina chlorosata* Scop.

## BOOKHAM COMMON, SURREY—13th August 1972

Leader: Mr. ALAN E. STUBBS

This was the second meeting to be held under the title of 'An Introduction to the Study of Diptera in the Field'. A party of ten spent the day looking at

representatives of the various dipterous families. For unknown reasons the abundant flowers were less attractive to flies than the previous year and diptera were less plentiful. Though no further species were added to the list for the Common, the meeting was most successful in its objective.

---

SANDWICH, KENT—10th September 1972

Leader: Mr. S. A. WILLIAMS

This meeting, which was scheduled as a joint meeting with the Kent Field Club and the Amateur Entomologists' Society, turned out to be a disappointment as only the leader and Mr. A. E. Gardner together with his son attended. No doubt the bad weather of the previous day and the long drive from London influenced the attendance. However, the small party drove to the Deal end of the sea shore and worked the famous sandhills, where despite a rather cold and windy day several interesting beetles were noted. It was disappointing to find that the saline pond, well known to coleopterists, had dried up and none of the interesting beetles associated with it could be found. The party left at about 4 p.m.

Beetles noted included: *Apion sedi* Germ., on *Sedum*, *Trachyphloeus scabriculus* (L.) and *T. laticollis* Boh. at the roots of *Erodium*, *Atheta orbata* (Er.) and *Ousipalia caesula* Er. both by grubbing at the roots of various plants.

---

WICKEN FEN, CAMBRIDGESHIRE—23rd September 1972

Leader: Col. A. M. EMMET

The meeting was attended by thirteen members, comprising macrolepidopterists, microlepidopterists, arachnologists and a dipterist. The main interest for the macrolepidopterists was the unusual profusion of the larvae of *Eupithecia trisignaria* H.-S. feeding in the heads of *Angelica sylvestris* L., almost every seed-head seemed to contain larvae. Feeding with them were caterpillars of *E. tripunctaria* H.-S., but these were scarce by comparison. The microlepidopterists collected various larvae, including *Ethmia funerella* F. and *Acrocercops imperialella* Mann on *Symphytum officinale* L., *Cosmopteryx druryella* Zell. on *Phalaris arundinacea* L., and *Cheimophila salicella* Hübn. and *Nepticula ulmariae* Wocke on *Filipendula spiraea* (L.) Maxim. The last of these species was rather more plentiful than usual, but most of the mines were already vacated. The arachnologists recorded 29 species of spiders and harvestmen. The dipterist, Mr. P. H. Langton, concentrated on the aquatic larvae of the *Chironomidae*, though he also took sixteen species of midge in the adult stage. Two of these, are of special interest. One, *Parachironomus nigronitens* (Edw.) had apparently been recorded in Britain hitherto only from the type locality, Levenshulme, Manchester. The other appears to be a species new to Britain, but since it is still *sub judice* its name is withheld. Mr. Langton took many other chironomids in the juvenile stages which still await determination.

## ROWNEY WOOD, DEBDEN, ESSEX and MADINGLEY, CAMBS.

5th November 1972

Leader: Col. A. M. EMMET

The meeting was attended by eight members and guests, amongst whom were two distinguished continental entomologists, Dr. J. Klimesch from Austria who was accompanied by his wife, and Mr. I. Svensson from Sweden. After a delayed start caused by a misunderstanding over the rendezvous, the party spent a very interesting and productive day searching for leaf mines of the Nepticulidae.

Field work began at Rowney Wood where discussion centred on the identity of *Ectoedemia quercifoliae* Toll., whose larvae were found, together with its commoner relative *E. subbimaculella* Haw., mainly in fallen oak leaves where they feed in 'green islands'. The continental visitors were inclined to regard it as synonymous with *E. albifasciella* Hein. which it closely resembles in all stages. In England *albifasciella* feeds six weeks earlier than *quercifoliae*, whereas on the continent their larval periods overlap, causing *quercifoliae* to be treated as late examples of *albifasciella*. Differences in larval coloration and mine structure were adduced in the English side to support the view that the two were distinct species.

Besides these two *Ectoedemia*, the following larvae were also observed: One or two members of the *Stigmella atricapitella* group on oak; *S. luteella* Staint. on birch; *E. angulifasciella* Staint., *S. anomalella* Goeze and (possibly) *S. centifoliella* Zell. on rose; *Nepticula salicis* Staint. and *E. intimella* Zell. on willow; *N. neofasciella* H.-S., on agrimony; *N. splendidissimella* H.-S., *N. aurella* F. and *Dechtiria rubivora* Wocke on dewberry; *D. argyropeza* Zell. on aspen; and lastly *Nepticula floslactella* Haw. and *N. microtheriella* on hazel. Dr. Klimesch remarked that *N. microtheriella* appeared to be parthenogenetic on the continent, where only females have been found; on the other hand it seems that males do occur in Britain, since Bierné illustrates the male genitalia (*The Male Genitalia of the British Stigmellidae*, 1945).

A species which our foreign guests were anxious to obtain was *Ectoedemia quinquella* Bed. which has a range limited to the south-east of England, Belgium and north-west France; it is a rare species, occurring only in small, isolated colonies. One of these, which has been known for a century, is situated at Madingley, a few miles west of Cambridge. Accordingly in mid-afternoon the party drove to this locality which virtually confined to two large oak trees.

The species seemed to be present in fair numbers, but as the branches were high and few leaves had yet fallen larvae were hard to obtain. Nothing daunted, Mr. Svensson, who is a forestry officer, was soon thirty feet up one of the trees searching for mines and dancing on the branches to dislodge the leaves. After his safe return to earth and some flashlight photography in the gathering darkness, the party dispersed, our visitors taking with them an adequate supply of this rare and local species.

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*Centenary Exhibition: a correction.* As a result of incorrect copy being supplied the caption for fig 12, Plate II is erroneous. It should read '*Semiothisa clathrata* L. T. W. Harman'.—EDITOR, 31st July 1973.

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THE RELATIVE ABUNDANCE OF COLLEMBOLA AT  
FOUR SITES IN YORKSHIRE, ENGLAND

By B. BAYO LASEBIKAN  
Department of Biological Sciences  
University of Ife, Ile-Ife, Nigeria

## INTRODUCTION

The Collembolan fauna of different habitats in the British Isles has been studied by various soil zoologists including Macfadyen (1952), Sheals (1957), Davis (1963), Poole (1961) Dhillon and Gibson (1963), Hale (1966) and Wood (197) Most of these studies are, however, generally limited to one type of soil and, with the exception of the work of Poole (1961), carried out on a grassland habitat. This study presents the distribution of Collembola in four different soil types and habitats. One of the main objectives in view was to ascertain the degree of similarity between the four habitats and highlight those species with and those without ecological limitations with regard to their distribution.

## SAMPLING SITES

The soil samples were taken from the following sites:

*SITE I: Otley Chevin (Grid ref. 203443).* This is on the old Leeds-Otley Road, in the West Riding of Yorkshire and about 16 km west of Leeds. The site is situated on a ridge of millstone grit and about 275 m above sea level. The soil of the area is Coal Measure sandstone. Mechanical and chemical analysis of this soil is shown in Table 1.

The woody vegetation of this site is composed mainly of a plantation of silver birch, *Betula pendula* Roth. The vegetation is open and the litter cover rather sparse. *Agrostis tenuis* Sibth. and *Deschampsia flexuosa* Linn. are the dominant grass species and together form a thick and continuous grass carpet making the soil thickly matted with roots. *Juncus effusus* Linn. frequently fills any interspace not covered by the two dominant species.

*SITE II. Black Wood (Grid ref. 446442).* This is to the west of the Leeds University Experimental Farm (Headley Hall) which is situated on the Leeds-York road about 19 km east of Leeds. The calcareous loam soil overlies a parent rock of Magnesian Limestone ridge running from north to south and about 61 m above sea level. Table 1 contains a mechanical and chemical analysis of this soil.

Site II is a mixed wood in which the tree and shrub cover consisted of *Fraxinus excelsior* Linn., *Crataegus monogyna* Jacq., *Quercus robur* Linn., *Rosa canina* Linn. and *Sambucus nigra* Linn. The young and old trees and the shrubs together form a rather dense and continuous vegetation which protects the soil, to a certain extent, from direct influence of the elements. The litter layer, composed mainly of the leaves and twigs of the above trees and shrubs, is discontinuous and sparse, and often in an advanced degree of decomposition. In certain areas where the litter is absent there is sometimes a thin layer of moss. Within the vegetation are also scattered individuals of *Mercurialis perennis* Linn., *Endymion non-scriptus* (L.) Garcke and *Galeobdolon luteum* Huds. The dominant grass is *Dactylis glomerata* Linn. which is evenly scattered within the woody components of the vegetation.

*SITE III. Oglethorpe Whincovert (Grid ref. 444435).* This is a forest reserve situated close to Leeds-Boston Spa road and about 19 km east of Leeds. This clay loam soil, characteristic of the site, is derived from the local Permian Carboniferous drift. The site is about 31 m above sea level. A mechanical and chemical analysis of this soil may be found in Table 1.

Site III is also a mixed wood having a tree cover similar to that of Site II. The woody components of the vegetation are *Crataegus monogyna* Jacq., *Rosa canina* Linn. and *Acer pseudo-platanus* Linn. The herbs are *Endymion non-scriptus* Garcke, *Rubus fruticosus* agg., *Lonicera periclymenum* Linn. These, together with the trees, form a very vigorous and dense vegetation which offers to the soil considerable protection from the weather. The litter cover is very dense and continuous and can be divided into an upper layer of raw litter and a lower decomposing one. These two layers overlie a dark humus layer below. The ferns *Dryopteris filix-mas* (L.) Schott and *D. spinulosa* Watt are found scattered within the vegetation.

*SITE IV. Allerthorpe Common (Grid ref. 760480).* This is a stretch of grassland, 24 km east of York, in the East Riding of Yorkshire. The sandy loam soil overlies the parent rock of post-glacial sand. It is about 15 m above sea level. With respect to land use the site can be characterized as a wasteland, but evidence of grazing by sheep and cattle during summer months could, however, be seen. Table 1 contains a mechanical and chemical analysis of the soil of this site.

With respect to botanical features, Site IV is a predominantly grassland site. The vegetation is very open with scattered *Betula pendula* Roth as the main woody component. There is very little or no litter cover. The dominant grass species consist of *Dactylis glomerata* Linn., *Holcus lanatus* Linn., *Anthoxanthum odoratum* Linn. and *Agrostis tenuis* Sibth. These grasses form a rather dense and continuous cover and any interspaces between them are filled up with the composites *Cirsium palustre* (L.) Scop., *C. dissectum* (L.) Hill, *C. arvense* (L.) Scop. and *C. vulgare* (Savi) Ten., and the herbs *Valeriana dioica* Linn., *Plantago major* Linn., *Pedicularis* sp., *Polygalas* p., *Lotus pedunculatus* Cav. and *Chamaenerion angustifolium* (L.) Scop.

#### METHODS

The four sites were sampled on three different occasions: during the month of May in 1968, and during the months of January and February (winter samples) in 1969 and in November 1969. On each occasion sixteen cylindrical soil cores, each 11.20 cm diameter and 5 cm deep (approx. 100 cm<sup>2</sup> surface area) were taken at random from each site. The cores were extracted in the modified Macfadyen air-conditioned funnel (Macfadyen, 1961, 1962; Lasebikan, 1970) and the Collembola obtained sorted into taxonomic groups.

#### FAUNAL COMPOSITION AND DEGREE OF SIMILARITY BETWEEN SITES

Table 2 gives the collembolan species composition of the four sites. From the table it can be seen that Site IV has the highest number of species/genera of Collembola recorded per sample while Site I has the lowest. Five species—*Onychiuris* sp., *Tullbergia krausbaueri* Boener, *Friesca mirabilis* Tullberg, *Isotoma notabilis* Schafer and *Isotoma viridis* Bourlet—were common to all the four sites. Five species, *Hypogastrura scotica* Carpenter & Evans, *Folsomia candida* Willem, *Tomocerus minor* Lubbock, *Entomobrya* sp. and *Bourletiella* sp., were found only in Site IV. *Tullbergia callipygos* Boerner and *Folsomia spinosa* Kseneman were, on the other hand, confined to Sites I and II respectively.

Mountford's (1962) index of similarity (I) was used to ascertain the degree of faunal similarity between the sites. The results obtained by using this index are rather low but showed convincingly that only Sites II and III displayed some reasonable degree of faunal similarity and especially in the case of the generic composition of both sites (I=43 per cent for species and 59 per cent for genera).

## ABUNDANCE

Table 3 gives the mean numbers of each collembolan species in each of the four sites. These data show that Site III, which is a woodland habitat with clay soil, has the largest number of Collembola, this number being due to the presence of *F. quadrioculata*. The lowest number of Collembola occurs in Site II where all the species recorded, except *Folsomia spinosa* and *Lepidocyrtus* sp., were in very low densities.

*Sminthurides* spp. had their highest density in Sites I and IV, and it is interesting to note that there was a preponderance of *S. schoetti* in Site I but of *S. pumilis* in Site IV. This could, perhaps, relate to a number of factors: (i) Site IV is predominantly sandy and Site I hardly at all by comparison, (ii) Site IV has little cover from trees whereas Site I is quite well protected, (iii) Site I is very high in organic matter while Site IV is very low.

Site II had no *Sminthurides* present at all and except for the fact that this site tends to be more alkaline no other obvious ecological factor seems to explain this rather strange absence. *Friesea mirabilis* constituted the second most abundant species in Site IV and it was also found in almost the same density in Site III. Of three other species, which were found in all four sites, *Isotoma notabilis* reached its greatest density in Site I and *I. viridis* and *Tullbergia krausbaueri* in IV.

The following species, wherever found, occurred in very low densities: *Tullbergia denisi* Bagnall, *T. callipygos*, *Hypogastrura scotica*, *Tomocerus minor*, *Entomobrya* sp. and *Bourletiella* sp.

These six species could be regarded as relatively rare and must have contributed, to a certain extent, to the differences in species composition between the sites.

It can also be seen from Table 3 that for nearly all the species found in two or more sites there was considerable variation in the densities from site to site.

## DISCUSSION

The distribution of Collembola in the four sites under consideration shows two interesting features. First, of all the species of Collembola recorded, six species, namely *Onychiurus* sp., *Tullbergia krausbaueri*, *Friesea mirabilis*, *Isotoma notabilis*, *I. viridis* and *Sminthurinus* sp., were found in all the four sites. The constant occurrence of the last four species is not surprising as these species have been recorded by a number of workers (e.g. Ford, 1937; Gisin, 1943; Macfadyen, 1952; Sheals, 1957; Hearløv, 1957 and 1960; Davis, 1963; Hale, 1966 and Wood, 1967) from all sorts of habitats and soil types—moss, moorland, fen, pasture, tussocks, bare ground, litter, pondshore, peat soils and humus. The wide distribution of these four species therefore, shows their remarkable ecological plasticity which fits them to varying types of habitats.

The second interesting aspect of the collembolan distribution is the confinement of the following species to certain habitats: *Tullbergia callipygos* to Site I, *Folsomia spinosa* to Site II, and *Hypogastrura scotica*, *Folsomia candida*, *Tomocerus minor*, *Entomobrya* sp. and the *Bourletiella* sp. to Site IV.

*Tullbergia callipygos* has been recorded from a Douglas fir plantation with a complete canopy and no ground flora (Poole, 1961) and from a number of places in Italy, Madeira, Switzerland and Germany (Gisin, 1960). The occurrence of this species in Site I in the present investigation suggests that it prefers a rather moist habitat.

The record of distribution of *Folsomia spinosa* in the British Isles is rather scanty. Dhillon and Gibson (1962) recorded the species from an old calcareous meadow, a site similar, except in botanical features, only to Site II (which was

calcareous) where *F. spinosa* is found in this investigation. It appears, therefore, that *F. spinosa* prefers calcareous soils, a view supported by the several records of this species in the Alps (Gisin, 1960) where the soil is essentially calcareous.

Hale (1966) found *Hypogastrura scotica* to be restricted to peat soils and also preferring drier *Cladonia*-covered areas to the *Sphagnum* patches. This species, however, has also been recorded from moor and swamp (Goto, 1957). Lawrence (personal communication) has remarked that *H. scotica* is generally found in acid soils. This remark was confirmed by Hale (1966) who reported a pH range of 4.5 to 4.9 in the area he investigated and by the present investigation in which the pH in Site IV ranged from 4.98 to 5.41. *Hypogastrura scotica* may, therefore, be an indicator of acid soils but its complete absence in Site I where a similar pH (4.80 to 5.00) to that in Site IV was obtained suggests other limiting factors which need to be further investigated.

*Folsomia candida*, which was also found only in Site IV in this work, has been found under bracken (Milne, 1961), Gisin (1960) reported that it is found in fairly large numbers under decomposing organic substances and also in caves. Site IV is characterized, among other things, by the faeces of grazing cattle and sheep and the patchy distribution of the species in this site appeared to be correlated with the decomposing sheep and cattle dung.

*Tomocerus minor* has been recorded under coniferous forest (Poole, 1961) from peat soils covered by heather litter (Hale, 1966) and from gleyed podsol brown earth under *Nardus* grassland frequently subjected to waterlogging (Wood, 1967). Gisin (1960) found *T. minor* in very moist habitats, under woods and in caves. The absence of the species from Site I which is a very wet habitat and frequently waterlogged is therefore surprising and a much more detailed investigation is required to elicit the other limiting factors in the distribution of *Tomocerus minor*.

Although the five species discussed above could be useful indicators of certain ecological and pedological features, it appears that only a much more accurate analysis of the botanical and pedological features of each sampling unit and the limiting influence or otherwise of other species present in the community can throw light on their real physiological requirements and ecological preferences.

The densities of total Collembola obtained in each site appear much lower than that reported by other workers (e.g. Macfadyen, 1952; Poole, 1961; Davis, 1963; Hale, 1966 and Wood, 1967). This could be due to the fact that each of the sampling units comprised a large amount of litter and very little depth of soil with the result that many of the true soil-living species were not completely sampled. It could also be that the litter was deficient in essential foods for Collembola.

## SUMMARY

Records are presented of the Collembola collected from four sites in Yorkshire, England, namely, a silver birch plantation with coal measure sandstone soil (Site I), a mixed woodland with calcareous loam soil (Site II), a woodland soil with clay loam soil (Site III), and a grassland site with sandy loam soil (Site IV).

Site IV has the highest number of species/genera of Collembola recorded per site while Site I has the lowest. Four species were common to all the four sites while a number of species were confined to certain sites. The two woodland sites were shown to have some degree of faunal similarity.

Site III supported the largest population of Collembola while Site II had the smallest density.

The species confined to certain sites were highlighted and the sort of ecological features they might prefer discussed.

## ACKNOWLEDGEMENTS

I should like to thank Drs. N. H. E. Gibson, W. Belfield and S. L. Sutton of the Department of Pure and Applied Zoology, Leeds University, for criticism of the manuscript. The field work was carried out during the tenure of the Western State of Nigeria and University of Ife, Nigeria Studentship.

TABLE 1

## ANALYSIS OF THE SOIL SAMPLES FROM THE FOUR SITES

The first figure of each group (of three for each part of the analysis) is from 0-7.5 cm in depth, the second, 7.5-15 cm depth and the third 15-22.5 cm depth.

	<i>Site I</i>	<i>Site II</i>	<i>Site III</i>	<i>Site IV</i>
Coarse sand	5.43	23.05	23.87	81.82
	20.62	21.36	25.43	87.79
	32.16	25.84	26.15	82.40
Fine sand	4.64	30.66	20.61	9.89
	20.09	31.28	22.11	7.57
	29.07	31.75	22.81	11.68
Silt	11.40	11.00	17.65	2.55
	16.55	12.90	17.55	2.25
	17.15	13.50	17.40	2.05
Clay	9.05	10.35	29.30	3.05
	16.55	11.30	28.50	1.25
	16.05	4.70	28.40	1.75
Fine earth	69.48	24.94	8.57	2.69
	26.19	23.16	6.41	1.14
	5.57	24.21	5.24	2.12
Carbon	26.60	2.89	3.27	1.10
	15.10	2.22	2.12	0.71
	3.65	1.93	1.32	1.35
Nitrogen	2.00	0.35	0.34	0.10
	0.87	0.30	0.26	0.05
	0.23	0.26	0.18	0.08
pH	5.00	6.78	5.40	5.24
	3.72	6.88	5.20	5.78
	3.90	7.22	5.50	5.92
Citric soluble P	0.0036	0.003	0.003	0.003
	0.006	0.002	0.004	0.002
	0.002	0.005	0.001	0.002

TABLE 2  
THE COLLEMBOLA SPECIES/GENERA COMPOSITION OF THE  
FOUR SAMPLING SITES

<i>Species/genera</i>	<i>Sites</i>			
	<i>I</i>	<i>II</i>	<i>III</i>	<i>IV</i>
<i>Onychiurus sp.</i>	+	+	+	+
<i>Tullbergia krausbaueri</i>	+	+	+	+
<i>T. denisi</i>	-	+	+	+
<i>T. callipygos</i>	+	-	-	-
<i>Friesea mirabilis</i>	+	+	+	+
<i>Hypogastrura denticulata</i>	+	+	+	+
<i>H. scotica</i>	-	-	-	+
<i>Isotoma notabilis</i>	+	+	+	+
<i>I. viridis</i>	+	+	+	+
<i>I. olivacea</i>	+	+	+	+
<i>I. (Pseudoisotoma) sensibilis</i>	+	-	-	+
<i>Isotomurus palustris</i>	-	+	+	+
<i>Isotomiella minor</i>	-	+	+	-
<i>Folsomia quadrioculata</i>	-	+	+	+
<i>F. spinosa</i>	-	+	-	-
<i>F. candida</i>	-	-	-	+
<i>Pseudosinella alba</i>	-	+	+	-
<i>Tomocerus minor</i>	-	-	-	+
<i>Lepidocyrtus sp.</i>	-	-	+	+
<i>Entomobryia sp.</i>	-	-	-	+
<i>Sminthurides pumilis</i>	+	-	+	+
<i>S. schoetti</i>	+	-	+	-
<i>Dicyrtoma sp.</i>	+	+	+	-
<i>Neelus sp.</i>	+	+	-	-
<i>Sminthurinus sp.</i>	+	+	+	+
<i>Bourletiella sp.</i>	-	-	-	+
Total number of species/genera	14	16	17	19

TABLE 3  
 MEAN NUMBERS AND STANDARD ERROR OF THE MEAN  
 PER SAMPLING UNIT (100 cm<sup>2</sup>) OF THE COLLEMBOLA  
 IN THE FOUR SITES (Data from 16 Replicates)

Species/Genera	Sites			
	I	II	III	IV
<i>Onychiurus</i> sp.	1.75 ± 0.79	2.00 ± 0.55	13.38 ± 3.45	0.25 ± 0.19
<i>Tullbergia krausbaueri</i>	1.44 ± 0.65	1.69 ± 0.53	4.00 ± 1.34	16.00 ± 5.91
<i>T. denisi</i>	—	0.81 ± 0.63	0.38 ± 0.38	1.13 ± 0.48
<i>T. callipygos</i>	0.63 ± 0.51	—	—	—
<i>Friesea mirabilis</i>	2.31 ± 0.87	1.94 ± 1.55	23.63 ± 6.81	24.88 ± 5.32
<i>Hypogastrura denticulata</i>	0.19 ± 0.14	—	0.50 ± 0.26	4.00 ± 1.72
<i>H. scotica</i>	—	—	—	0.13 ± 0.13
<i>Isotoma notabilis</i>	15.75 ± 6.50	9.63 ± 1.61	2.63 ± 0.67	7.63 ± 2.34
<i>I. viridis</i>	1.31 ± 0.55	0.75 ± 0.57	0.44 ± 0.24	4.31 ± 1.27
<i>I. olivacea</i>	11.63 ± 2.69	0.31 ± 0.25	2.44 ± 1.52	—
<i>I. (Pseudoisotoma) sensibilis</i>	2.56 ± 1.09	—	—	0.38 ± 0.27
<i>Isotomurus palustris</i>	—	2.94 ± 1.31	22.31 ± 9.05	11.63 ± 3.32
<i>Isotomiella minor</i>	—	0.88 ± 0.75	2.19 ± 0.78	—
<i>Folsomia quadrioculata</i>	—	4.38 ± 1.11	53.63 ± 9.41	2.25 ± 0.79
<i>F. spinosa</i>	—	11.00 ± 5.13	—	—
<i>F. candida</i>	—	—	—	10.63 ± 8.93
<i>Pseudosinella alba</i>	—	1.06 ± 0.48	1.38 ± 0.47	—
<i>Tomocerus minor</i>	—	—	—	0.31 ± 0.15
<i>Lepidocyrtus</i> sp.	—	15.94 ± 4.87	2.06 ± 1.41	1.38 ± 0.48
<i>Entomobrya</i> sp.	—	—	—	0.25 ± 0.17
<i>Sminthurides pumilis</i>	0.88 ± 0.63	—	1.94 ± 0.80	38.63 ± 11.07
<i>S. schoetti</i>	44.38 ± 21.96	—	5.00 ± 1.66	2.19 ± 0.73
<i>Dicyrtoma</i> sp.	3.44 ± 1.11	4.56 ± 1.27	10.56 ± 2.26	—
<i>Neelus</i> sp.	0.25 ± 0.14	3.44 ± 1.19	—	—
<i>Sminthurinus</i> sp.	2.88 ± 2.01	0.13 ± 0.13	1.94 ± 1.74	1.44 ± 1.37
<i>Bourletiella</i> sp.	—	—	—	0.38 ± 0.26
Total Collembola	89.40 ± 24.25	61.46 ± 10.69	148.41 ± 18.08	127.80 ± 14.95

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 AN APPEAL FROM THE HON. SECRETARY.

I am at present engaged in sorting, collating and arranging in files the Society's correspondence. It is rather a formidable task but a pleasant one. I am however disturbed to find that there appears to be no correspondence before 1941 and that almost all that there is refers to the various Secretaries' activities. I would like to appeal to all former officers and council members of the Society who still have the correspondence relating to the activities of the Society to let me have this so that I can incorporate this in the records that I am assembling. If any other members of the Society have any correspondence relating to the Society that they think is relevant I should be happy to receive this also.—G. PRIOR.

RHAMPHOMYIA (PARARHAMPHOMYIA) MARGINATA  
FABRICIUS (DIPT., EMPIDIDAE), A REMARKABLE ADDITION  
TO THE BRITISH LIST

By P. J. CHANDLER

At the meeting of the British Entomological & Natural History Society held on 14th June 1973, I was greatly surprised when Mr. L. K. Evans showed me four specimens of an empid fly he had captured at a mercury vapour lamp being run by Mr. E. H. Wild. These insects had appeared at about midnight on 28th May when he and Mr. Wild were operating their light in a ride in Longrope Wood, Orlestone Forest, near Ham Street in East Kent. The specimens comprised one male and three females and the most striking feature was the pronounced sexual difference in the shape and colour of the wings, although there was no doubt that they belonged to the same species; indeed Mr. Evans affirmed that he had seen them attempting to copulate.

During the same evening that I was first shown these flies, Mr. Wild told me that he had observed the insect in the same ride in Longrope Wood each year from 1971 to 1973. They first put in an appearance during May but the flight period continued into the first week of June when he believed the peak emergence to take place. He had seen many individuals at his light between the hours of 10 p.m. and midnight although they had never been exceptionally numerous. Mr. Evans commented that his capture was on a very cold night when very few moths were attracted to the light.

I realised that this must be an empid species new to the fauna of the British Isles and on referring to Collin's (1961) standard work on the British species of this family the flies ran down to the large genus *Rhamphomyia*, of which 51 species arranged in seven subgenera are dealt with by Collin, no additions having been published since that date. They fitted most readily into the subgenus *Pararhamphomyia* but were obviously different from any of the fourteen species on our list. Consequently I took the first opportunity to show the specimens to Mr. K. G. V. Smith of the British Museum (Nat. Hist.) who immediately pronounced them to be *R. (Pararhamphomyia) marginata* Fabricius, otherwise known as *R. (P.) platyptera* Panzer. Frey (1955), dealing with the Palaearctic species, uses the name *marginata* which appears to have priority, having been proposed in 1787, while *platyptera* is given as a synonym and is said to have been proposed in 1794. Collin (*op. cit.*), however, appears to consider *platyptera* to be the correct name although he made no comment on the synonymy. According to Frey (*op. cit.*) the distribution of the insect on the continent includes both Central Europe and southern Sweden. Mr. Smith drew my attention to several females of continental origin included in the national collection under the name *marginata* and these agreed very well with Mr. Evans's specimens.

In view of its known distribution it is perhaps not surprising that this fly should occur in the British Isles but it is truly remarkable if it is indeed indigenous that such a distinctive insect as the female of this species should have passed unnoticed here till now. As it is still known from this one locality, a haunt of a number of other insects which have been found in few places in this country, it is difficult to speculate on what its true range here might be. Collin (*op. cit.*) mentioned the species in passing (on page 328) as having been reared according to Kleine, 1909, from decaying stubs of fir. The developmental stages of most *Rhamphomyia* species are unknown but at least one other species, i.e. *R. (Pararhamphomyia) dentipes* Zetterstedt, has been reared from rotten wood, in that case from birch. Other species live in vegetable debris or soil and it is practically

certain that all species are carnivorous, feeding on other insects or larvae inhabiting the same medium. It is therefore difficult to say whether *R. marginata* habitually develops in rotten coniferous wood without further confirmatory evidence but according to Mr. Wild there are a number of decaying pine stumps in the area worked by Mr. Evans and himself which might be the larval habitat. If this theory proves correct it must be stressed that conifers are not native to the woodland concerned but have been extensively planted there in recent decades by the Forestry Commission and there is a strong possibility that the fly is a comparatively recent introduction from elsewhere, perhaps directly from abroad. This is further suggested by Mr. Wild's experience as he has regularly visited the locality over the past 27 years and did not observe the fly until two years ago. Indeed this wood is a favourite collecting ground for lepidopterists and had the fly always been present there it would surely have been noticed previously, even though its nocturnal habits reduce the chances of it falling into the net of a dipterist.

The nocturnal flight of *R. marginata* also calls for some comments. Empids are normally very active by day, visiting flowers of many plants to suck nectar, and most species supplement their diet by predation on other insects which they catch on the wing. The only published account of empids visiting light traps of which I am aware is by Parmenter (1951), who mentions four species, although Mr. A. E. Stubbs tells me that he has seen some unspecified empids amongst material removed from light traps and sent to him for identification of the Tipulidae contained therein. The pronounced sexual dimorphism found in this insect, which is described below, is a feature normally found only in diurnal insects, as such differences are utilised in courtship displays, being of a highly specific nature (admittedly such unusual characters are more commonly found in the male sex when used for this purpose). It is difficult to explain why this species should have evolved the curious form and colour of the female wings if it is a purely nocturnal insect, but Mr. Stubbs has suggested to me that it may be involved in some form of camouflage necessary when the fly is inactive by day. Brown wing markings are frequently found in flies which habitually rest on tree trunks and there seems little doubt that their purpose is to provide a disruptive pattern against this background; I am not aware of another case where this is confined to one sex only but it is possible that there may be a difference in behaviour which could account for it. Without further visits to the locality at the right time of year we cannot yet say if the flight is confined to the hours of darkness and can only therefore speculate on the significance of the insect's visual appearance. I made a preliminary visit to the locality on 17th June and investigated the area from 4.30 p.m. until 7.30 p.m. but cannot say whether the absence of the species on that occasion was due to the time of day or to its flight period having come to an end, the latter being more likely. At the time of my visit I was not aware of the identity of the species so was not then able to follow up the possibilities regarding the larval habitat. Incidentally several very good species were taken during this brief visit, belonging to other families of Diptera and they will be recorded elsewhere.

#### THE SALIENT STRUCTURAL FEATURES OF THE SPECIES

*Rhamphomyia marginata* should not be difficult to identify. The rather slender body is predominantly light grey with three distinct longitudinal brown stripes on the dorsum of the thorax, which run along the lines of the dorsocentral and acrostichal rows, the acrostichal stripe being narrower. The dorsocentral bristles are irregularly biserial so that the flies run to couplet 48 in Collin's (*op. cit.*) key.

The nine species of this group of the genus are then keyed out separately according to sex. The key to the males is based on the hypopygial structure, which is easily used as its important features are external in the dried specimen and visible without preparation. The genitalia of these species are illustrated in all cases and *R. marginata* resembles most closely in this respect *albipennis* Fallén and *murina* Collin. The narrow side lamellae and the slender gently curved penis (not nearly as thick at the base in the British specimen as described and illustrated by Engel for this species) are rather similar but there are obvious differences, especially in the shape of the upper lamellae (see fig. 1 for hypopygial details). The two latter species are also much smaller, their body length being 2.5 to 3 mm., whereas in *R. marginata* the body is little less than 5 mm. (fully 5 mm. in the female).

The male wing is normally shaped for this genus and is colourless except for a faint brownish yellow shading of the basal third and the similarly coloured stigma. In the female, however, the wing membrane is greatly broadened, being more or less triangular in shape with the anterior margin distinctly concave immediately before a bulging outer corner (fig. 2). The basal third of the wing is faintly brownish, this coloration being continued in progressively increasing intensity as a broad well-defined border around the posterior and external margins of the wing, culminating in the costal bulge and so leaving a clear white central area extending to the middle third of the costa; the illustration of the wing given by Frey omits the basal shading. Many species of the genus including *R. murina* mentioned above have the wings more intensely marked and sometimes slightly broader in the female and the three British species included in the sub-genus *Megacyttarus* each have different abnormalities in the female wing, usually in the venation, but no other British species has such a remarkable difference in wing shape.

The venation of female *marginata* is surprisingly normal but the direction of curvature of the veins of necessity differs from that found in the male and the discal cell covers a larger proportion of the wing membrane in that sex. The wingspan of both sexes is about 11.5–12 mm.; in the male the maximum (median) width of the wing is slightly over 2 mm. while in the female the maximum (apical)

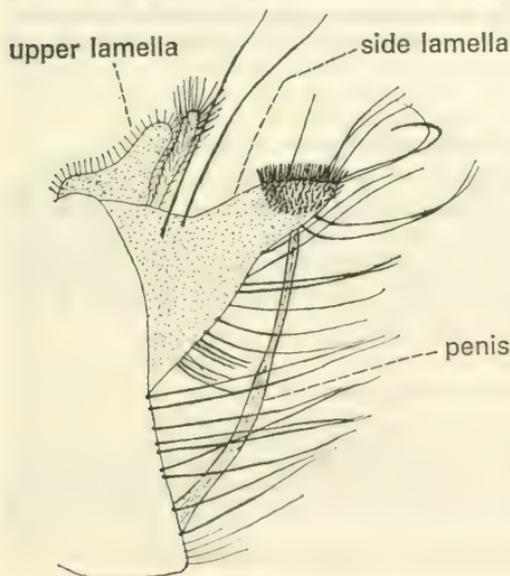


Fig. 1. — *Rhamphomyia marginata* F.  
hypopygial details

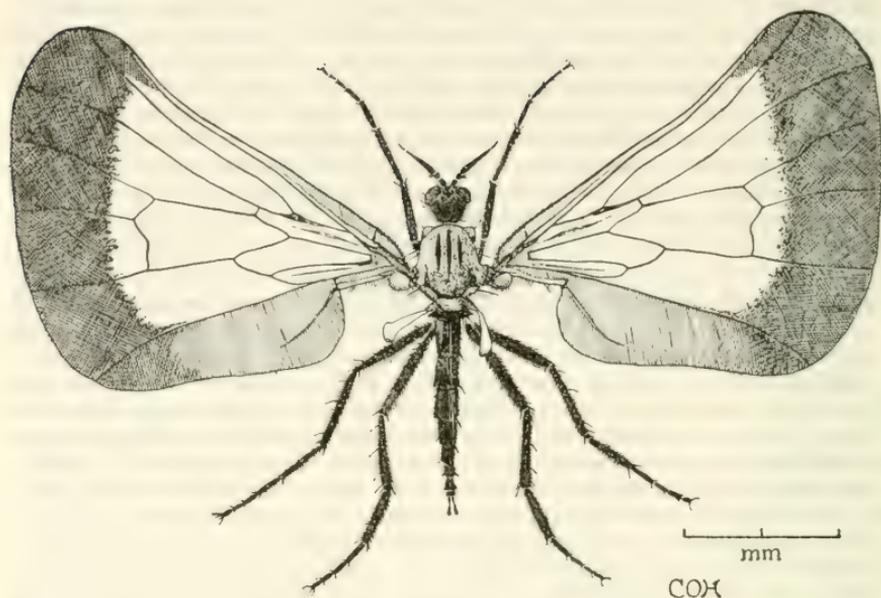


Fig. 2. - *Rhamphomyia marginata* F.

width of the wing is 5 mm., equal to the body length. In Collin's key the female cannot be confused with any of the species except *R. simplex* Zetterstedt if its large size and uniformly dark legs, lacking any distinct pennate ciliations, are taken into account. *R. simplex* is of a slightly smaller build with much smaller normally shaped clear wings.

#### ACKNOWLEDGEMENTS

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SOME ASPECTS OF THE HISTORY AND ECOLOGY OF  
BLUE BUTTERFLIES IN THE COTSWOLDS

By J. MUGGLETON

Between 1969 and 1971 I carried out a survey of the breeding sites of certain lycaenid butterflies in Gloucestershire on behalf of the county trust and the following paper outlines the results of this survey. The aim of the survey was to discover the status of four species of lycaenid butterfly in the county and to ascertain how the future survival of the butterflies and their habitat may be ensured. The four species involved were *Lysandra coridon* Poda (Chalkhill Blue), *Lysandra bellargus* Rott. (Adonis Blue), *Maculinea arion* L. (Large Blue) and *Cupido minimus* Fuess. (Small Blue). Although the remarks I will make refer to the situation in Gloucestershire, I believe that much may be learnt from the history of these butterflies that is relevant both to other plant and animal communities and to other parts of the country.

To understand the history and ecology of the four species it is first necessary to examine their life histories. *Lysandra coridon* is on the wing from July until September and during these months the eggs are laid on a wide variety of low-growing plants. The egg is the over-wintering stage and the larvae hatch in April and seek out plants of *Hippocrepis comosa* L. (Horseshoe Vetch) on whose leaves and flowers they feed. Throughout their life the larvae are attended by ants of the genus *Lasius*. The larvae possess a gland on the seventh abdominal segment which is known as the 'honey gland', and this gland secretes a sweet liquid which is 'milked' by the ants. This association between ants and the larvae is very noticeable and the ants have even been known to move the larvae to plants nearer to their nests (Donisthorpe 1927). It is probable that the ants give the butterfly larvae some protection against attack by parasites. The larvae pupate on the surface of the ground in June and produce adults during the summer months.

Of the four species *Lysandra bellargus* is unique in that it is regularly double brooded in Gloucestershire. The adults of the first brood fly in late May and early June and lay their eggs on the leaves of the larval foodplant, *Hippocrepis comosa*. The larvae hatch within a few days and quickly feed up, producing pupae in July. These pupae give rise to the second brood of adults which are on the wing in August and September. These butterflies also lay their eggs on the leaves of *H. comosa* and the larvae hatch in seven to fourteen days and start feeding. However while still in their first instar the larvae spin a silk web on the underside of a *H. comosa* leaf and remain in this position throughout the winter. In the spring they recommence feeding and produce pupae in May. The larvae of *L. bellargus* are also attended by ants of the genus *Lasius*.

This association of the lycaenid larvae and ants is most highly developed in the next species, *Maculinea arion*. In the Cotswolds *M. arion* used to fly from the end of May to early July depending on the season; in Devon and Cornwall it does not appear until mid-June. The adults lay their eggs on the flowerbuds of *Thymus drucei* Ronn. (Wild Thyme) and the larvae hatch in seven to nine days and start feeding on the flowers and flowerbuds of *T. drucei*. At this stage the larvae are reported to be cannibals. The larvae feed on *T. drucei* until they reach their third instar when they leave the foodplant and crawl about on the ground until they meet an ant of the genus *Myrmica*. In the Cotswolds the ants involved appear to be *Myrmica scabrinodis* Nyl. The ant first 'milks' the larva and then picks it up and carries it back to the ants' nest. Once in the ants' nest the larva may either feed on the ant larvae or is fed by the ants in the same way as they

would feed their own larvae. Either way the larva continues to grow and is 'milked' by the ants. The larva remains underground in the ants' nest throughout the winter and feeds again in the spring before pupating. Pupation takes place in the ants' nest in May and within three weeks the adult butterfly emerges from its pupa and crawls up through the nest to the surface where its wings expand and harden.

*Maculinea arion* shows the greatest development in the British Isles of the association between lycaenid larvae and ants and this is in contrast to the last species I am going to deal with, *Cupido minimus*. In this species the association has either never developed or has been lost. Although double brooded in south-east England *C. minimus* is single brooded in Gloucestershire and is on the wing in May, June and early July. The females lay their eggs on the florets of *Anthyllis vulneraria* L. (Kidney Vetch). The larva hatches in about fourteen days and makes its way into the floret where it feeds on the developing seed. The larva moves from floret to floret within the flowerhead and becomes fully grown in the autumn. At this time it spins together some of the florets and hibernates within them. In the meantime the flowerheads drop to the ground where they form part of the litter. The larva becomes active in the spring and pupates without feeding again.

In Gloucestershire these four butterflies are more or less restricted to areas of limestone grassland and only rarely occur off the limestone, for example where limestone ballast has been used on railway tracks. This restriction to limestone follows the distribution of their foodplants which in Gloucestershire all behave as calcicoles, that is to say they are only found in areas where calcareous rocks outcrop. The two principal types of limestone outcropping in Gloucestershire are Oolitic limestone and Carboniferous limestone. The Oolitic limestone forms the Cotswolds which run for about sixty miles from the south-west to the north-east of the county. The Cotswolds are in the form of an escarpment rising steeply from the River Severn and the Vale of Gloucester to a height of 1083 feet above Cheltenham with a plateau extending eastwards and sloping gradually down to the River Thames. A large part of this plateau is above 500 feet. The Carboniferous limestone outcrops around Bristol where it forms the Avon Gorge and also in the Forest of Dean where it outcrops as a narrow band around the rim of the Forest of Dean coalfield basin. There are few if any reliable records of these four butterflies from the limestone in the Forest of Dean, probably because the limestone areas are very small and also because the area is largely given over to forestry. However, it is possible that *M. arion* may have occurred there at one time. There are more records of these butterflies from around Bristol, but most of these date from the last century and now only *L. coridon* maintains a precarious foothold in the Avon Gorge—almost in the centre of the city.

Thus the principal area of interest is the Cotswolds, where the butterflies are characteristic of one type of habitat, the semi-natural limestone grassland which is itself typical of the Cotswolds. This is grassland which has remained unploughed, and escaped improvement by the addition of fertilisers or reseeded, for many hundreds of years. It probably represents the remnants of the grassland that from the Middle Ages until the mid-eighteenth century covered the entire area. During these times the majority of the Cotswolds would have been open downland over which large flocks of sheep were grazed. After about 1750 most of this land was enclosed and ploughed up.

The areas of grassland which remain and provide habitats for the butterflies can be classified into five types of site. Firstly there are the escarpment sites which

occur along the western edge of the Cotswolds. Secondly there are the valley sites which may be either on the sides of large valleys, where they are very similar to the scarp sites, or in small valleys in the heart of the Cotswolds. Thirdly there are quarry sites where the grassland has developed on the spoil heaps of old quarries and fourthly there are hill-top sites where grassland has developed on more or less flat areas where the soil is very shallow. Finally there were sites in clearings in the beechwoods and in these *M. arion* used to occur in the last century and at the beginning of the present century. However, as the beechwoods matured these have now all but disappeared although one example may be found in the woods near Birdlip. Within these sites the butterflies' breeding areas are restricted by degree of slope and aspect. Thus most breeding sites are on ground with a slope of 15°–30°. *L. coridon*, *L. bellargus* and *C. minimus* are usually found on slopes with aspects between south and west. *M. arion* is found on south-east and south-west facing slopes with few sites on south facing slopes. It is interesting to note that *M. arion* is reputed to fly only between 10 a.m. and 12 noon and again at 4 p.m. These are the times when the sun will be shining on either the south-east or the south-west facing sites. Thus it may be that the choice of sites is determined by the flight times or alternatively that the choice of aspects determines the flight times.

The vegetation at all the breeding sites appears to be similar and indeed it is possible to define these Cotswold breeding sites very precisely in terms of vegetation. There are 11 plant species that can be considered characteristic of the breeding sites and these are, *Brachypodium pinnatum* (L.) Beauv., *Bromus erectus* Huds., *Festuca ovina* L., *Carex flacca* Schreb., *Lotus corniculatus* L., *Cirsium acaulon* (L.) Scop., *Hieracium pilosella* L., *Poterium sanguisorba* L., *Helianthemum chamaecistus* Mill., *Plantago lanceolata* L. and *Thymus drucei*. Of course at *L. bellargus*, *L. coridon* and *C. minimus* sites the larval foodplants *H. comosa* and *A. vulneraria* will also be present. Thus it is possible to recognise immediately a potential site for the butterflies in terms of vegetation. This is important when considering suitable areas for conserving the butterflies as there are types of improved grassland developed on the limestone which do not contain these plant species and are completely unsuitable for the butterflies.

One additional feature often typical of *M. arion* sites in the Cotswolds is the presence of anthills of *Lasius flavus* (Yellow Meadow Ant) which are often covered with *Thymus drucei* and these provide a suitable habitat for the young *M. arion* larvae. The presence of *M. arion* larvae on these anthills has given rise to the mistaken belief that *L. flavus* rears the *M. arion* larvae—a mistake which is compounded by the fact that *Myrmica* ants often live in the sides of *L. flavus* anthills.

Having dealt briefly with the ecology of these butterflies it is now time to move on to the history, or more properly the recent history. Records of these four species from the Cotswolds do not appear until the 1850s. This relative lateness in the appearance of records is probably due to a variety of causes: for example, the Cotswolds were rather isolated and were not really opened up until the coming of the railways. There was not even a stage coach route direct from London to the spa at Cheltenham. In the days of the stage coach the last part of this journey from London to Cheltenham, over the escarpment, had to be completed by post-chaise. However the coming of the railways, the formation of the Cotswold Naturalists Field Club in the 1840s and the appearance of entomological periodicals in the 1840s and 1850s probably all played their part in getting these four species recorded from the Cotswolds.

The species for which there is the most complete record is *M. arion*. This was first recorded from the Cotswolds by three gentlemen, Trye, Comyn and Merrin

in 1858; although much later the Rev. J. Greene reported that he had taken it in 1850 and 1851 together with *Cyaniris semiargus* Rott. (Greene 1902). From 1866–1928 there are only nine years from which there are no Cotswold records of *M. arion*. Thus we have a continuous record of the butterfly's fortunes for over sixty years and continuing with gaps until 1960. The species appears to have had its best year in 1870, and Herbert Marsden (1884) describes the 1870 season for *M. arion* in the following passage:

'The year 1870 is the one to be marked with a white stone by the lover of the Lycaenidae, and *arion* was much more widely distributed than before or since. It would have been possible for a collector to have taken 1000 specimens—I secured about 150, though not netting half I saw, and turning many loose again.'

1876 and 1877 were again good years but following this there was a crash in numbers with *M. arion* virtually disappearing for ten years from most of its Cotswold sites. The numbers started to increase again in the 1890s when *M. arion* reappeared at some of its old habitats and a number of new localities were discovered. The situation remained more or less static through the first 30 years of this century; there was a decline in the 1930s but in the 1940s *M. arion* was discovered at a number of new sites in the central Cotswolds where there are many small valleys. However, all this time *M. arion* was disappearing from its older sites so that by the 1950s it was known from only six sites and by 1960 it was definitely recorded from only a single site which was ploughed up three years later. Thus *M. arion* disappeared from the Cotswolds where in the past it had been recorded from 33 sites and where at one time it must have been a very common butterfly.

The history of the other three species is by no means so well recorded. *Lysandra coridon* was first recorded from Gloucestershire in 1856 and the first record of *Cupido minimus* appears the following year. From the 1850s to 1971 *L. coridon* has been recorded from 50 sites of which it now remains at only 28. *Cupido minimus* has been recorded from 55 sites but in 1971 it was to be found at only 34 of these. *L. bellargus* was first recorded from Gloucestershire in 1857 but it has never been common in the county and from then until its disappearance from the county in 1963 it was recorded from only 24 sites. The disappearance of *L. bellargus* from Gloucestershire coincided with a great reduction in numbers of this species throughout southern England. This happened suddenly in the early 1950s and has never been properly explained. At this point it is enough to say that it is not surprising that it disappeared from Gloucestershire where it was on the north-western edge of its European range. *L. bellargus* is still to be found very close by in Wiltshire, so it could stage a return if conditions were suitable. However, it may be that *L. bellargus* is following the same path to extinction in this country as *Cyaniris semiargus* and *M. arion*. *C. semiargus* disappeared in the 1870s and *M. arion* appears to be on the verge of extinction in the 1970s—could it be that by 2070 *L. bellargus* will no longer be a member of the British fauna?

It can be seen that all four species have undergone a considerable decline in the last 100 years. So considerable in fact that two of these species have disappeared completely from the county. Why did this happen, why did these butterflies disappear? Probably the first thing that springs to mind, when considering the factors responsible for the disappearance of butterflies, is collecting. In this respect *M. arion* has suffered the most, for it is very difficult to breed in captivity and any specimens for the collection must be caught in the field. In fact one collector was found to have amassed 770 specimens of this species by the time his collection was sold in 1939. The other three species have been collected little as far as the Cotswolds are concerned. *L. bellargus* and *L. coridon*, which are often

collected for their varieties, can be found in large numbers and more easily elsewhere. *C. minimus* is a small, drab butterfly which is not prized by collectors. But at least for *M. arion* the explanation for its decline appears to be simple—collecting—and to support this we must look for two types of evidence. Firstly decline at a site caused solely by collecting and secondly persistence at sites where there has been little or no collecting. The first is hard to prove and it is found that *M. arion* has often persisted at sites in spite of heavy collecting. At one Cotswold site, the details of which were published in 1858, it was continuously collected but was still present there nearly 100 years later in 1954. There are also many examples of its disappearance from sites where there was little or no collecting. Thus the evidence suggests that collecting cannot have been the sole cause of the decline of *M. arion*. And it has already been ruled out as a cause of decline in the other three species.

Therefore we must look elsewhere. What about the abundance of the larval foodplants, this is obviously a major factor so is there any evidence to suggest that they have decreased in the butterflies' localities? Undoubtedly the answer is yes. All three foodplants, *T. drucei*, *H. comosa* and *A. vulneraria*, are species of open habitats and are intolerant of competition from tall growing plants. *T. drucei* in particular is an early coloniser of unstable habitats, hence its abundance on the disturbed soil of anthills. However, many of the butterfly breeding sites in the Cotswolds are now overgrown or being invaded by coarse grasses, particularly *Brachypodium pinnatum* (L.) Beauv. (Tor Grass) and *Bromus erectus* Huds. (Upright Brome Grass). Sites such as this show the effects of the lack of grazing, in a large part due to the disappearance of the rabbit following the myxomatosis epidemic of 1954. Similar effects are produced when domestic grazing animals are removed. In fact the cessation of grazing allows the natural succession of vegetation to take place and in the Cotswolds this leads from limestone grassland to *Crataegus monogyna* Jacq. (Hawthorn) scrub and eventually to the climax vegetation, beechwood. In the course of this succession the butterflies' foodplants disappear.

There are also other, more destructive, forces at work and afforestation, improvement of pasture, ploughing, burning and building have all played their part in the disappearance of these butterflies from one or more Cotswold sites. The effects of afforestation, building and ploughing need no description. The results of the large-scale ploughing which took place following the Enclosure Acts of 1750–1850 must be emphasised. Nearly all the old-established grassland was broken up during this period and the process continued after 1850, so that of 3373 acres of rough pasture known to have existed about 1880, 1408 acres have since disappeared. A contemporary account by William Cobbett of the early ploughing (Cobbett 1830) shows that even the poorest land was ploughed up but this was often abandoned at a later date. Cobbett remarked that even when cultivation is discontinued then for the next 20 years the land will only produce weeds instead of the grassland that had previously occurred there. We know now from studies of disturbed grassland (Cornish 1954, Hope-Simpson 1965 and Wells 1967) that it takes at least 100 years before a vegetation recognisable as mature limestone grassland reappears on formerly ploughed sites. Indeed *Hippocrepis comosa* is one of the last to reappear (Cornish 1954, Hope-Simpson 1965). It is perhaps significant that *M. arion* was already on the decline when records began and very quickly disappeared from those counties where agriculture was most intensive. Indeed perhaps *Cyaniris semiargus* was an early victim of the ploughing of grasslands. This lycaenid disappeared from the Cotswolds in the 1870s.

The improvement of pasture involves the addition of fertilisers to the pasture and this results in an increase in the nutrient status of the soil and allows the herbs and grasses of meadowland to grow. The typical plants of rough pasture and calcareous grassland disappear, among them *T. drucei*, *H. comosa*, and *A. vulneraria*.

Burning of grassland is carried out in the Cotswolds in order to control coarse grasses or more precisely to remove the accumulation of grass litter. This burning is known as swaling and is carried out in February and March. Swaling invariably results in the destruction of herbs and annual grasses whereas the coarse grasses which spread by underground rhizomes are unaffected. Thus burning encourages the growth of coarse grasses to the detriment of other species. It does remove the grass litter, but leaves a species poor community with bare ground instead of litter between the coarse grasses.

The factors I have just mentioned are all responsible directly or indirectly for the destruction of the habitat. Nevertheless there are a number of sites which still appear suitable for the butterflies but from which they have disappeared. It is possible that climatic changes have been responsible for the disappearance of the butterflies from some sites. The records show that *M. arion* was sensitive to periods of adverse weather. There were declines in numbers following bad weather in the early 1860s, between 1871 and 1874, in the late 1870s, in 1927, and more recently following the severe winter of 1946/47. However, at least in the nineteenth century, *M. arion* showed an ability to recover from these reverses. Thus the bad years of the 1860s and 1871-4 were followed by good years in 1870 and 1875. The sensitivity of *M. arion* to climatic changes is also shown by the dates of its first emergence in the year and of its peak emergence period which during seasons of adverse weather occur one to two weeks later than during periods of favourable weather. Thus *M. arion* shows an ability to adjust to changing climatic conditions as indeed it must in order to have survived here during the centuries following the submergence of the land bridge to the Continent. We may conclude that climatic change is a contributory factor to the decline of *M. arion*, and may also be a decisive factor in certain circumstances.

There is no evidence that climate has had any lasting effect on populations of *L. coridon* or *C. minimus*. The situation regarding *L. bellargus* is rather different. The decline of this species was a rapid affair which occurred simultaneously throughout southern England. That this coincided with the start of a period of poor weather which we are still experiencing, and which has probably still to reach its peak, is without doubt. *L. bellargus* with its double-brooded habit is more vulnerable than the other species. In particular it requires a warm, sunny period in late May/early June as well as a similar period later in the year. Unlike *M. arion* it cannot survive by delaying its emergence for a few weeks as this would push the appearance of the second brood into October. In fact the length of time available for its development has declined since 1950. The period with daily mean temperatures of 6°C or above (the growing season for plants) was one to two weeks longer in the 1930s and 1940s than after 1950 (Lamb 1966). If the present cycle of weather follows that of one hundred years ago it will continue to be typified by cool, damp Junes giving *L. bellargus* no chance. In earlier days we might have expected *L. bellargus* to return to its old habitats when the weather ameliorates and starts its upward swing, probably at the end of this century. However, the question will then be one of whether any suitable habitats remain.

It seems possible that isolation of colonies may have played a crucial part in the decline of *M. arion*. There is evidence from Gloucestershire and more recently from Devon and Cornwall of the inexplicable disappearance of the butterfly

from apparently suitable but isolated colonies. It is a feature of *M. arion* that its distribution was more or less continuous on both a local and a national scale. Thus with the exception of its absence from Oxfordshire, its recorded distribution extended from the limestone of Northamptonshire south-westwards to Cornwall and from Kent westwards to Devon although it was not recorded from Sussex. The two gaps in this continuous distribution, Oxfordshire and Sussex, are both counties with potentially suitable habitats for *M. arion* and it is possible that *M. arion* did occur in these counties but that it had disappeared by the time records started. Evidence of a continuous distribution is provided by the existence of a cline in wing coloration from Northamptonshire to Cornwall, indicating gene flow between the two counties. That the local distribution of *M. arion* was also continuous can be seen in the Cotswolds where the colonies extended along the edge of the escarpment and up the river valleys which penetrate the Cotswold plateau. The disruption of this continuous distribution and resulting isolation of colonies could have two effects. Firstly it may be that the species has a requirement for outbreeding and that the forced inbreeding resulting from isolation may have deleterious effects and lead to the extinction of a colony. Alternatively it may simply be that the adults have a tendency to fly away from the breeding site, which often occupies a very small area, and that they do not or cannot return. Previously they would have flown along the valley or escarpment until they came to the next suitable area. Today the reduction of the areas of suitable habitat has made this impossible. There is a well-documented example of isolation from two sites in the central Cotswolds. The two sites were separated by 300–400 yards of level and unsuitable habitat and in 1956 *M. arion* was present at both sites. Early in 1957 one of the sites was burnt and levelled in preparation for the planting of conifers. The second site remained unaltered and yet after 1957 *M. arion* was never again seen at this site. The conclusion to be drawn is that these two colonies were interdependent and the loss of one led directly to the failure of the other—an example in miniature of what may have happened at other colonies throughout the range of *M. arion* in England. As far as is known all the remaining colonies of *M. arion* are now isolated from one another and so the fate of these colonies may soon support or refute the theory of decline as a result of isolation. This could incidentally have a serious bearing on any attempts to reintroduce *M. arion* to its former haunts.

Of insecticides as a cause of decline I have said nothing, it is superfluous to say that their application will, if the manufacturer's claims are to be believed, kill butterflies. Fortunately the habitats of these four butterflies are unlikely to be treated with insecticides. There may have been occasional accidental spraying of these species but there is no evidence of it.

To conclude, the main point I wish to make is this, that collecting, climatic changes and insecticides are only secondary factors in the decline of these butterflies. Their results are normally reversible whereas those of the primary cause of the decline are not and the primary cause of the decline is the destruction of habitats.

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I should like to thank all those entomologists, many of whom are members of this society, who freely gave the information without which the history of these butterflies could not have been compiled. It is impossible to mention all their names here: they will be acknowledged individually elsewhere.

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the degree of M.Sc. of the University of Bristol and I should like to give my special thanks to my supervisor Dr. M. H. Martin for his advice and encouragement. My thanks must also go to Professor E. W. Yemm for providing facilities for this work in the Botany Department at Bristol University.

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Dept of Zoology,  
 University of Manchester,  
 Manchester, M13 9PL.

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#### BOOK REVIEW

**The World of Butterflies** by Michael Dickens and Eric Storey. 8 $\frac{3}{4}$ "  $\times$  5 $\frac{3}{4}$ ", 127 pp., 108 colour figs. Osprey Publishing Ltd, Reading, 1972. £1.95.

The reproductions of colour photographs of butterflies from various parts of the world are good, and they are accompanied by admirably concise notes on their distribution, habitats, food-plants, sex differences, subspecies and similar species. There is also a preface and an introduction which contains information on the classification, life history, structure, and methods of rearing butterflies in general.

Unfortunately, the purpose of the book is not very clear. The authors say that it is intended to fire interest in natural history and in conservation all over the world, and to encourage collecting by purchase or by breeding in captivity rather than by the capture of wild specimens. But all the illustrations are of set specimens, and the opportunity so well offered by colour photography of depicting larvae and of showing adults in their natural attitudes has been missed. Moreover, the selection of species appears to be random, except perhaps for their aesthetic qualities. Few of those illustrated could be easily bred by amateurs in the United Kingdom, nor are they for the most part species which are particularly in need of protection anywhere. Finally, so few are shown for any one country that the book is not likely to be of much help to students of its fauna.

This is an attractive book, which might have been much better if the authors and publishers had given more thought to what they were really trying to do.

CERODONTHA ORNATA (MEIG.) (DIPT., AGROMYZIDAE),  
A LEAF-MINER OF THE FLOWERING RUSH (*BUTOMUS*  
*UMBELLATUS* L.) NEW TO THE BRITISH ISLES

By P. J. CHANDLER

On 26th July 1971 while collecting Diptera around the pond at Runnymede Meadow, Surrey, I swept up two females of a moderate sized yellow and black agromyzid fly, superficially similar to the rather local marsh species *Napomyza elegans* (Meig.), which I had previously collected at Gomshall, Surrey (Chandler, 1966). On closer examination, however, these flies were found to differ in details of coloration, i.e. in the absence of black markings on the legs and antennae and obviously in wing venation, e.g. in the central position of the second cross-vein (close to the base of the wing in *Napomyza*).

In the Handbook by Spencer (1972) my specimens ran down in the generic key to couplet 16, i.e. the genera *Lemurimyza* and *Liriomyza*, on account of the mainly yellow scutellum and frons. Because of the difficulty of separating these two genera except on characters of the male genitalia the three *Lemurimyza* species are also included in the *Liriomyza* key. The Runnymede flies had a solidly black mesonotal disc except for a large yellow prescutellar area and a rounded third antennal segment; they therefore ran to *Lemurimyza pectoralis* (Becker) but on turning to the *Lemurimyza* key it was found that *pectoralis* had the palps and third antennal segment largely black, whereas these organs were yellow in the insects in question. I therefore submitted them to Dr. K. A. Spencer, who later informed me that they were *Cerodontha ornata* (Meig.), which had not previously been recorded from the British Isles. Its subgeneric position in this large genus is apparently uncertain at present but in the British Fauna it is closest to *Icteromyza* of which the species are, however, much darker in coloration.

*C. ornata* was formerly included on grounds of coloration in the genus *Liriomyza* but it was transferred to *Cerodontha* by von Tschirnhaus (1971) because of similarity in the structure of the male genitalia. The yellow scutellum and prescutellar area will suffice to distinguish the species from any British member of *Cerodontha* although the overall coloration and general facies are reminiscent of species of the subgenus *Cerodontha* (s.s.), especially *C. hennigi* Now. which is of the same build. They are easy to distinguish because *Cerodontha* (s.s.) has only two scutellar bristles and the scutellum and third antennal joint are entirely dark, furthermore the third antennal joint is angular or spined in contrast to the evenly rounded joint of *C. ornata*.

According to the standard work on the European leaf-miners by Hering (1957) *C. ornata* is specific to the Flowering Rush (*Butomus umbellatus* L.) and it is the only agromyzid known to mine this plant. The Flowering Rush has a strong colony around the pond at Runnymede but I know of no other localities in the area. It is a very local plant in the British Isles and is characteristic of extensive marshy and fenny districts, although widely distributed in England at least as far north as the Scottish border; it is scarce in Wales and the south-west and extremely local in Ireland, where it is apparently more common around Lough Neagh than elsewhere (information from the Atlas of the British Flora, 1962).

This year I have paid regular visits to Runnymede at almost weekly intervals. On 29th June and 8th July a few plants of *Butomus* were coming into flower but no flies were found; then on 13th July, when the flowers were much in evidence around the pond, I succeeded in obtaining two further females, which were swept off mixed marsh vegetation including *Butomus* at one end of the pond. Not being satisfied without finding males I returned again on 19th July, when sweeping the

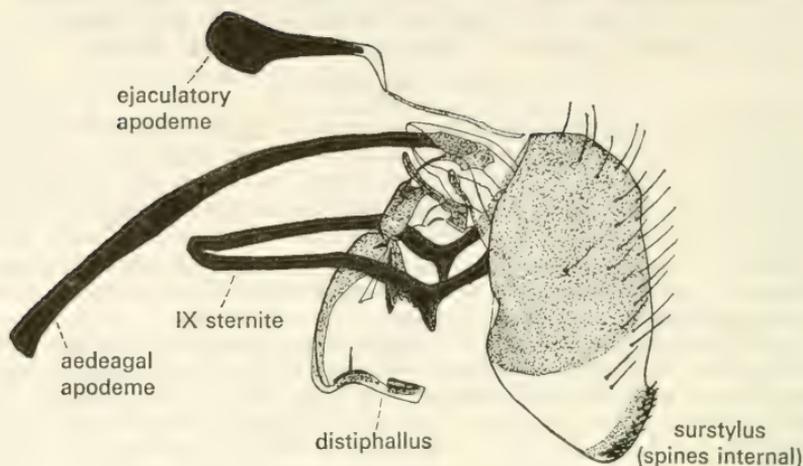


Fig. 1. — *Cerodontha ornata* (Meig.) aedeagus

taller plants of *Butomus* all around the pond produced none of the fly. When just about to leave at nearly 9 p.m. I finally swept some low plants of *Butomus* still in bud on a bare patch of mud and obtained two males in the same sweep; further diligent sweeping around these plants produced three further males and two more females. *C. ornata* seems to be well established at Runnymede and will no doubt be found to occur in other places where the foodplant is plentiful. As may be seen from Spencer's Handbook, many Agromyzidae are still known from but a few British localities and far more collecting is needed before their distribution can be completely known. Phytophagous insects, which are specific to a given plant from which they do not disperse very readily, are easily overlooked unless special effort is made to investigate the foodplant for their presence.

*C. ornata* is a very distinct species in the British Fauna and its recognition should be relatively simple. The following brief description may help to characterise it:

*Fly* predominantly yellow and black with all bristles of head, body and legs black. ♂ slender bodied, 3.5 mm. long; ♀ more stoutly built and up to 4 mm. in length.

*Head* dull yellow apart from the dully shining black occiput, vertex and more or less distinct narrow eye-margins on the orbits. Anterior half of frons greyish tinted on a yellow ground. Eyes shining green in life but dulling red after death. Antennae orange, slightly brownish externally, with broadly rounded third joint bearing short white pubescence; arista dorsal, black with short pale pubescence. Palpi and proboscis yellow. Four lower orbitals incurved, two upper orbitals reclinate. Orbital setulae reclinate.

*Thorax* with dorsum uniformly dully shining black on disc except for large roughly rectangular anteriorly narrowed central yellow prescutellar area, continued on the posterior margin as a narrow band to the wing base and joining the large yellow notopleural area. Humeri have a discrete black central spot ringed with yellow merging into the notopleural area. Pleural sclerites each have the upper part yellow but only on the mesopleura does the yellow colour predominate, being continuous with the notopleural area. 1 presutural and 3 postsutural dorso-centrals, rather variable in development and position; acrostichals short, in 4-6

very irregular rows. Scutellum mainly yellow with a pair of black lateral spots towards the base; 4 strong black scutellars, the basal pair on the upper margins of the lateral spots. Halteres yellow.

*Abdomen* predominantly black but tergites and sternites broadly yellow laterally (especially the tergites) and on the apical  $\frac{1}{4}$  to  $\frac{1}{3}$  abdomen more yellow towards the tip in the male. Ovipositor short and thick with large oval aperture, entirely shining black. Male hypopygium paler but surstyli broadly darkened basally and narrowly at tip (fig. 1).

*Legs* with coxae darkened externally, femora entirely pale yellow. Tibiae and tarsi brownish orange with hind tibiae a little darker and tarsi darkened towards apex.

*Wing* venation similar to that illustrated for *Cerodontha (Icteromyza) capitata* Zett. in fig. 354 of Spencer's Handbook, except that both cross-veins are more distal in position; the first cross-vein is below the outer edge of the tip of R1 and the second cross-vein is central in position.

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## PROCEEDINGS

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10th MAY 1973

The President, Mr. J. M. CHALMERS-HUNT, in the Chair

The following new member was declared elected: Mr. R. H. I. Jewell.

#### EXHIBITS

Col. A. M. EMMET—Twigs of *Sarrothamnus scoparius* (L.) Wimmer (Broom) to illustrate the mines of three species of microlepidoptera found in the bark: (1) *Phyllonorycter scopariella* Zell. (Lithocolletidae), a short mine lined with silk, and both swollen and wrinkled. (2) *Leucoptera spartifoliella* Hüb. (Lyonetiidae), a narrow mine, slightly tortuous, yellow-brown, close to the surface, always progressing in the first instance upwards from the egg which is not visible. (3) *Trifurcula immundella* Zell. (Nepticulidae), a deeper, sooty-brown, broader mine, always progressing in the first instance downwards from the egg, which is large and conspicuous. Vacated mines were also shown, in the bark of *Genista tinctoria* L. (Dyer's Greenweed), from which larvae had emerged to spin *Leucoptera*-type cocoons. These might be *L. spartifoliella* Hüb. in a new foodplant, *L. wailesella*

Staint, hitherto recorded as mining only the leaves of *Genista*, or a new species.

Mr. STEWART R. BONDI—Coleoptera taken at Cliffe Marshes, 14.iv.73: *Hydrous piceus* (L.) (Hydrophilidae) and *Dytiscus circumflexus* F. (Dytiscidae).

Mr. R. F. BRETHERTON—Two forms of the tortricid *Acleris cristana* D. & S., taken at light at Bramley, Surrey, 20.ii & 18.iii.73. The first, f. *desfontainana* F., having a bright orange subcostal streak, has not previously been seen at Bramley by the exhibitor; the second, golden brown with the buttons black but joined to black streak pointing to the apex of the wing, is frequent at Bramley.

Comdr. W. L. R. E. GILCHRIST—*Papilio machaon* L. ssp. *britannicus* Seitz (Lep., Papilionidae), bred from larvae taken from the Norfolk Broads, September 1937. The specimens came from the collection of W. A. L. Addison and were presented to the Society by the exhibitor.

Mr. G. PRIOR—The larva of *Lespeyria flexula* D. & S. (Lep., Plusiidae) taken at Newlands Corner, Surrey, 4.v.73 when it was beaten out of *Prunus spinosa* L.

Mr. A. E. STUBBS—A leaflet concerning nature conservation on the other side of the Atlantic, where the Xerces Society, an organisation for the conservation of North American butterflies, was calling a world conference on conservation.

The PRESIDENT—(1) *Scrobipalpa clintoni* Povolny (Lep., Gelechiidae), a living example bred 6.v.73 from a stem of *Rumex crispus* L. (Curled Dock), the food-plant of this species and collected in the Lochgilphead district, Argyllshire. The species was first detected in this county in 1966 and described as new to science in 1968 (*Ent. Gaz.*, 19: 113). (2) *Poecilopsis lapponaria* Esp., young larvae, about one week old, from ova deposited by a female taken near Oban, Argyllshire in April 1973.

#### COMMUNICATIONS

Referring to Mr. E. S. Bradford's exhibit at the previous meeting (p. 59), Col. A. M. Emmet confirmed the leaf as *Sorbus torminalis* (L.) Crantz, and said the mine in it was that of *Nepticula torminalis* J. H. W. (Lep., Nepticulidae). East Blean Wood, Kent, from which the leaf came was only the second British locality for the insect; the other was in Herefordshire.

The *Eupithecia tripunctaria* H.-S. (Lep., Geometridae) which Mr. G. Prior mentioned at the previous meeting (p. 59) were, he said, still emerging singly. One of these, however, was very dark with no white spots at all.

Mr. Prior also said he had recently taken the larva of *Chloroclystis chloerata* Mab. (Lep., Geometridae) and also that of *C. rectangulata* L. and had compared them with published figures. There were distinct differences in the anal markings.

Mr. R. F. Bretherton said he was not satisfied with the colour criteria which indicated pinkish larvae were *C. chloerata*. He did in fact find, when breeding the moth last year, that some *C. chloerata* had quite a greenish tinge.

A talk was given by Mr. H. M. Wilks, Chairman of the Kent Naturalists' Trust, on 'The General Problems of Nature Conservation'. He illustrated his talk with coloured transparencies and the talk was followed by a discussion.

24th MAY 1973

The President, Mr. J. M. CHALMERS-HUNT, in the Chair.

The following new member was declared elected: Mr. R. D. Weal.

#### EXHIBITS

Mr. A. E. Stubbs—(1) Diptera taken at Hawkhurst, Sussex, 12.v.73: A female *Chaetostoma giraudi* Fauf. (Trypetidae). The species is not unlike *Rhagoletis*, but

has a row of long bristles round the mouth. It is not in Kloet & Hincks (*Check List of Brit. Insects*, 1945), but there is a male in the British Museum (Nat. Hist.) taken in Devon by Yerbury in 1895. A male *Norellisoma* (*Norellia*) *spinipes* Meig. (Scatophagidae) taken by daffodils, its host plant. The species was added to the British list by Chandler & Stubbs (1969, *Proc. Brit. ent. nat Hist. Soc.*, 2(4); 120-4 and 1970, *loc. cit.*, 3(1):12). The fly is also recorded from Buckinghamshire. *Syrphus vitripennis* Meig. (Syrphidae), a typical example and two abnormalities. One of the abnormalities has very narrow bands on the abdomen and the other has tergite two malformed on one side, so that one of the paired spots is missing. This last named condition is not infrequent in *Syrphus* sensu Coe.

(2) Two uncommon tipulids (Dipt.) from Upton Bridge, near Sulhamsted, Berks., 18.v.73: *Limmophila* (*Elocophila*) *trimaculata* Meig. and *Molophilus niger* Goet. swept from the edge of a peaty ditch. Both are believed to constitute new county records, and the former is new to the exhibitor's extensive Newbury district list under preparation.

(3) Live Tipulidae (Dipt.): *Limonia nigropunctata* Schum, a male from Hannington, Hants., 22.v.73, a local species mainly associated with the chalk downs; and *Tipula lunata* L. a male from Newbury, Berks., 24.v.73, a common spring species of woods and hedgerows.

Mr. R. F. BRETHERTON—(1) Adult male *Chloroclysta chloerata* Mab. (Lep. Geometridae) which emerged 23.v.73 ex larva beaten from blackthorn blossom on Bookham Common 27.iv.73. Previous emergences ex larvae found on the same date were on 18.v.73 (two examples) and 20.v.73 (a single example). All had been kept indoors and therefore somewhat forced. Emergences last year, 13 in number, were between 18.v.72 and 29.v.72, both dates inclusive. (2) *Acasis viretata* Hübn. (Lep., Geometridae) taken at light at Bramley, Surrey, 23.v.73.

The PRESIDENT—half-grown larvae of *Dasycampa rubiginea* Schiff. from ova laid by a female taken by Dr. C. G. M. de Worms at Horsell, Surrey.

Mr. G. PRIOR—Cases of an unidentified species of Psychidae (Lep.) from lichen on a wooden fence and cases of an unidentified species of Psychidae from lichen on a brick wall; also an unidentified species of caddis larva, all from Lydd, Kent, 20.v.73. A specimen of *Eupithecia centaureata* Schiff. (Lep., Geometridae) bred from ragwort in central Harrow, during October 1972, was also shown; this was very strongly marked, almost like *E. succenturiata* L.

Mr. C. O. HAMMOND—The tachinid fly *Gymnocheta viridis* Fall., female, taken at Inverary, Argyll, 28.iv.73. Males were found resting on tree trunks while the females were amongst long grass. The fly is parasitic on several species of moths.

#### COMMUNICATIONS

The cases exhibited by Mr. Prior were identified by Rev. D. Agassiz as probably those of *Luffia ferchaultella* Steph. and the President agreed. This is a parthenogenetic species in the British Isles with wingless females only, except in the Channel Isles where winged males occur. A discussion on related species followed.

Mr. T. G. Howarth suggested that *Chloroclystis chloerata* Mab. should be known as Pelham-Clinton's Pug and recorded as such. The meeting assented.

*Clossiana euphrosyne* L. (Lep., Nymphalidae) was reported by Dr. C. G. M. de Worms to have been seen 20.v.73 and added that it was reported to have been out in Devon two weeks earlier.

*Cucullia chamomillae* Schiff. (Lep., Noctuidae) was reported by Mr. E. H. Wild to have been taken in his garden at Selsdon, Surrey, 22.v.73.

A talk was given on 'Moths and Melanesia' by Mr. G. S. Robinson which he illustrated with coloured transparencies.

14th JUNE 1973

The President, Mr. J. M. Chalmers-Hunt, in the Chair

The death was announced of Mr. S. F. P. Blyth and of Mr. F. A. Swain.

The President welcomed Dr. B. P. Moore to the meeting. He is a member from Australia and a Past President.

## EXHIBITS

The PRESIDENT—Cases of *Coleophora conspicuella* Zell. (Lep., Coleophoridae) from Benfleet, Essex. The moth feeds on *Centaurea nigra* L.

Mr. G. A. BRETT—A selection of insects from poultry houses to illustrate his talk.

Mr. E. S. BRADFORD—Larval cases of *Incurvaria pectinea* (Lep., Lamproliidae) from East Blean, Kent, 4.iv.73. This species makes a little round hole in hazel and birch leaves. Cocoons of *Pammene regiana* Zell. (Lep., Olethreutidae) taken under the bark of Sycamore at Enfield Town, Middx. Solitary bees from Chestfield, Kent, from screwholes in a window frame (see report of meeting of 11th January 1973, 5:30). An example of *Dermestes lardarius* L. (Col., Dermestidae) taken that evening in Curzon Street, London, W.1.

Mr. G. PRIOR—An example of *Eupithecia linariata* Schiff. (Lep., Geometridae) bred from larva taken on *Linaria vulgaris* Mill. in Harrow Middx. Also examples of preserving botanical specimens by use of transparent adhesive plastic sheeting.

Mr. C. O. HAMMOND—Two unique colour forms of the tachinid fly *Gymnocheta viridis* Fall. which is normally bright metallic green. In older specimens the green gives place to a copper hue as is also seen in the genus *Lucilia* and in females of *Lestes dryas* Kirby and *L. sponsa* (Hanse.) in the Odonata. (1) A deep prussian-blue male taken at Bloxworth, Hants., 19.iv.49. (2) A deep crimson male taken at Ranmore Common, 25.v.73, which must represent the ultimate in colour change.

Mr. JACKSON—Larvae of what was believed to be *Chloroclystis coronata* Hübner. (Lep., Geometridae) on hawthorn; and two examples of *Eupithecia insigniata* Hübner. (Lep., Geometridae) bred from larvae taken at Huntingdon, 19.v.73.

## COMMUNICATIONS

The Leucoptera-like mines in *Genista* which Col. A. M. Emmet exhibited on 10th May (pp. 87-8) were now producing imagines and, Col. Emmet said, these looked very much like *Leucoptera spartifoliella* Zell. (Lep., Lyonetiidae). They were definitely not *L. walesella* Stainton.

Last year, said Mr. E. H. Wild, Mr. Laurie Evans had obtained an example of *Nephoteryx similella* Zinn. (Lep., Pyralidae). This year Mr. Wild had searched for it and obtained three examples at Camber, Sussex.

Mr. D. Stimpson said he also had experience of solitary bees nesting in screw holes in window frames.

Mr. G. A. Brett gave an interesting talk on 'The Insect Fauna of Poultry Houses' which he illustrated with coloured transparencies. The talk was followed by a discussion.

28th JUNE 1973

A Vice-President, Mr. C. Mackechnie-Jarvis, in the Chair.

The following new member was declared elected: Mr. S. J. Peet.

## EXHIBITS

Col. A. M. EMMET—*Coleophora fuscicornis* Zell. (Lep., Coleophoridae) from

Essex, new to Britain. It belongs to the *deauratella* group characterised by their shining brassy-green forewings. Other members of the group: *C. spissicornis* Haw., *C. deauratella* Zell. and *C. trifolii* Curt. (*frischella* sensu auct.) were shown for comparison.

*Coleophora fuscicornis* Zell. comes closest to *C. trifolii* Curt. in size and general appearance, but differs in the following respects: (1) the antennae lack the white apex and in the female the basal segments are more roughly scaled. (2) The labial palpi are slightly larger and the second segment has larger scales. (3) There is a fringe of orange scales behind and below the eyes. (4) The forewings are greener, and male specimens almost completely lack the coppery reflection present in *C. trifolii* though these reflections are more evident in the female of *C. fuscicornis*. (5) The male appears to be slightly larger than male *C. trifolii*, but the female is significantly smaller. (6) The time of appearance of the adult (late May to early June) is a month earlier than that of *C. trifolii*. (7) The foodplant and biology are unknown but *C. trifolii* feeds on *Melilotus officinalis* L. This plant was not present in the locality where the new species was captured. The other members of the group feed on Papilionaceae; plants of that family over which females were seen flying were: *Vicia angustifolia* L. and *Lotus corniculatus* L. (8) The male genitalia correspond with those of *C. fuscicornis* Zell. at the British Museum (Nat. Hist.).

Mr. A. E. GARDNER—*Conopalpus testaceus* (Ol.) (Col., Serropalpidae) bred from a pupa found in an old beech on the Wisborough Green, Sussex, field meeting, 12.v.73; the beetle emerged 14.vi.73. He also showed a series of *Cercyon bifenestratus* Küst. (Col., Hydrophilidae) found on damp sand in a pit at Rye, Sussex, 23.vi.73. A single example recorded from Deal, Kent, by Newbery about 70 years ago was the only exponent until August 1969 when A. A. Allen took a female at Rye (1970, *Ent. mon. Mag.*, 106:5). In the pit visited on 23rd July the insect was confined to one small area.

Mr. S. A. KNILL-JONES—*Hedya atropunctana* Zett. (Lep., Olethreutidae) reared from larvae taken at Port Appin, Argyll.

Mr. C. O. HAMMOND—*Rhingia rostrata* L. a female from Windsor Forest, 3.vi.73, a new county record for Berkshire. This rare syrphid is distinguished from the very common *Rhingia campestris* Meig. by the absence of black markings at the margins of the abdomen and by the completely orange tibiae. *Rhingia campestris* Meig., also shown, has a conspicuous black band on the hind tibiae.

Mr. A. E. STUBBS—Diptera from Ashted Common, Surrey, 28.v.73; *Odinia boletina* Zett. (Odiniidae), a new species to the London area and a new family to Surrey; and *Oedalia apicalis* Loew (Empidae).

#### COMMUNICATIONS

Dr. C. G. M. de Worms reported a great many butterflies in Devon the previous weekend and particularly mentioned *Fabriciana cydippe* L. and *Argynnis paphia* L. (Nymphalidae).

*Harpyia bicuspis* Borkh. (Lep., Notodontidae) was reported from Limpsfield Chart, Surrey, by Mr. E. H. Wild.

Once more, said Mr. E. S. Bradford, *Pyralis farinalis* L. (Lep., Pyralidae) was making its appearance in his sister's bungalow. (See 1972, *Proc. Brit. ent. nat. Hist. Soc.*, 5(4):140).

*Acherontia atropos* L. (Lep., Sphingidae) was reported from the Teignmouth area of Devon 20.vi.73, and Col. A. M. Emmet had a dead example brought to him in Essex about ten days previously.

Referring to Col. Emmet's exhibit, Mr. E. S. Bradford said he had a couple of *Coleophora trifolii* Curt. from Dorset. Col. Emmet thought the larvae of this

species quite common at the end of August and not September as recorded in the literature.

Prof. E. R. Laithwaite gave a talk on 'Moths and Electromagnetism', which was followed by a lengthy discussion.

12th JULY 1973

The President, Mr. J. M. CHALMERS-HUNT, in the Chair.

EXHIBITS

Mr. E. S. BRADFORD—(1) Examples of *Pyralis farinalis* L. (Lep., Pyralidae) from a number found in a bungalow near Whitstable, Kent, 7.vii.73 (see also meetings of 27th July 1972 and 28th June 1973 (*Proceedings* 5(4):140 and 6(3):93). (2) Examples of *Hypsopygia costalis* F. (Lep., Pyralidae) bred from larvae found in a stable near Whitstable, Kent, during 1973.

Mr. J. M. CHALMERS-HUNT—Two full-grown larvae of *Eriogaster lanestrus* L. (Lep., Lymantriidae) from a pair of nests taken in the Burren, Co. Clare, Ireland. Also *Coleophora pappiferella* Hoff. (Lep. Coleophoridae) from the seed heads of *Antennaria dioica* (L.) Gaertn. from the same locality.

Mr. R. W. J. UFFEN—The pupa of *Eumenis semele* L. (Lep., Satyridae) from a larva taken in the Burren, Co. Clare, Ireland; larval damage of *Kessleria saxifragae* Staint. (Lep., Yponomeutidae) on *Saxifraga spathularis* Brot. from the Connor Pass, Co. Kerry, Ireland; *Chorthippus albomarginatus* (Deg.) (Salt., Acrididae) from the Isle of Sheppey, Kent.

Mr. G. PRIOR—Three examples of *Syntomis phegea* L. (Lep., Syntomidae) and two male and two female lampyrid beetles; all from Italy.

COMMUNICATIONS

*Orgyia antiqua* L. (Lep., Lymantriidae) larvae were reported by Mr. J. M. Chalmers-Hunt to be swarming on the railings behind Somerset House in the Strand, London. The larvae, he said, feed on Plane trees and were doing great damage to the foliage. Dr. P. A. Boswell added that last year a similar situation arose in the vicinity of St. Bartholomew's Hospital, Smithfield, when larvae were falling off trees onto people.

A colour transparency was shown by Dr. J. D. Holloway illustrating the courtship of *Leptidea sinapis* L. (Lep., Pieridae), taken in woods near Plaistow, Surrey. The two insects encountered each other whilst flying along a shallow ditch. Without preamble they settled facing each other on a leaf and spent several minutes in courtship ritual. The male, with forelegs pressing down the antennae of the female, moved his proboscis back and forth across her head and forewings; the female nodded her head rapidly up and down. They separated without consummation of the union.

Mr. Chalmers-Hunt said that the Irish race of *L. sinapis* L. was common in the Burren of Clare.

A male *Lithosia quadra* L. (Lep., Arctiidae) was reported by Mr. E. H. Wild to have been taken when he and Laurie Evans recently visited Dungeness, Kent.

Dr. J. D. Holloway gave a talk on 'The Lepidoptera of New Caledonia' which he illustrated with slides.

26th JULY 1973

The President, Mr. J. M. CHALMERS-HUNT, in the Chair.

The following new members were declared elected: Messrs. A. C. B. Kendall and R. M. Palmer.

## EXHIBITS

Mr. E. S. BRADFORD—A nest of larvae found on hawthorn at East Blean, Kent, 22.vii.73, which he believed to be a sawfly\*.

Mr. P. J. CHANDLER—Two species of Diptera new to the British Isles. (1) *Rhamphomyia marginata* F. (Empididae). A male and three females collected by Mr. L. K. Evans and Mr. E. H. Wild at mercury vapour light in Longrope Wood, Ham Street, Kent, 28.v.73. Mr. Wild had noticed the species visiting his light at the same period in 1971 and 1972, but not before though he had worked the wood for many years. The female has a remarkable abnormality in the wings, which are triangular with a broad brown border, while the male wings are normal for this group. The insect may be a recent introduction as it has been reared from rotten stumps in Sweden and conifers have been extensively planted in the area by the Forestry Commission.

(2) *Cerodontha ornata* Meig. (Agromyzidae), a leaf-miner of *Butomus umbellatus* L. which has been found to be well established at Runnymede, Surrey. It is moderately large and distinctively coloured for an agromyzid, but has no doubt been overlooked because of the localisation of its foodplant. The flies occur in July, the leaf-mines later in the year.

Mr. C. O. HAMMOND—A line illustration  $\times 26$  of *Rhamphomyia marginata* F. exhibited by Mr. Chandler.

Mr. M. G. VENTOM—Several examples of African butterflies wire stapled into transparent covers as sold in the street markets in the Cameroons.

Mr. E. H. WILD—Aberrations of British Lepidoptera: *Nymphula nympeata* L. (Pyrilidae), a smoky female with copper band on hindwings from Chobham, Surrey, 15.vii.73; *Cosymbia linearia* (Hübner) (Geometridae), a broadly banded form from Gusset Wood, Bucks., 23.vi.73; *Eupithecia nanata* Hübner ab. *angusta* Prout (Geometridae), a melanic example with white subterminal line.

Mr. P. A. SOKOLOFF—An example of *Arctia villica* L. ssp. *britannica* Oberth. (Lep., Arctiidae) from Higham Canal, Kent, showing reduced markings on the left forewing. He also showed a wingless ichneumon, possibly *Pezomachus* sp., bred from a cocoon of *Zygaena trifolii* Esp. taken at Dungeness in July 1973. For comparison a living example of the 'typical' winged ichneumon associated with this colony was shown.

Mr. ROBERT D. WEAL—Living examples of *Aromia moschata* (L.) (Col., Cerambycidae) taken in an old willow at Chingford, E. London, on 22.vii.73.

Mr. G. S. E. Cross reported having an example of *Idea lineata* Scop. (Lep., Geometridae) which had been taken at Potters Bar, Middx.

## COMMUNICATIONS

A large display of *Lysandra coridon* Poda (Lep., Lycaenidae) was reported from a down near Guildford, Surrey, by Mr. R. F. Bretherton. It was, he said, the largest he had seen except for that at Portsmouth.

The occurrence of *Apatura iris* L. (Lep., Nymphalidae) was raised by the President and Mr. E. H. Wild said that Mr. P. J. Baker had taken two recently and that they were plentiful.

Mrs. E. S. Bradford said that an example of *Vanessa atalanta* L. (Lep., Nymphalidae) had been given him but he had seen none himself. Dr. B. J. MacNulty reported the species from Waltham Abbey, Essex, freshly emerged; and Mr. R. D. Weal said it had been out in Chingford for the past week together with *Polygona*

\* These larvae were subsequently determined by Mr. R. W. J. Uffen as *Neurotoma saltuum* (L.) (Pamphiliidae), which appears to be the only gregarious sawfly that spins silk webs in Britain.

*c-album* L. and *Vanessa io* L. (Lep., Nymphalidae). Dr. J. L. Newton added that he had noted one at Pentonville, N. London.

*Gonepteryx rhamni* L. (Lep., Pieridae) was seen near Guildford by Mr. Bretherton which he thought was early. Mr. J. M. Chalmers-Hunt added that he had seen a worn male in Ireland on 26.vi.73.

Several *Colias croceus* Fourc. (Lep., Pieridae) said Mr. Wild had been reported by his son on the cliffs in Dorset.

Some members suggested that the larvae exhibited by Mr. Bradford as sawfly might be coleopterous; Mr. F. D. Buck said he knew of no beetle larvae of that size and colour that fed in webs on hawthorn. (See footnote p. 93.)

#### COLLECTING HINTS AND PREPARATION TIPS

The discussion was opened by Mr. G. Prior who after a few introductory remarks said that when killing and setting Pugs, Waves and Carpets he uses a six-inch screw-top jar with felt bedded into the bottom with plaster of paris. He puts in some six or so moths which he stuns with ethyl acetate and then roughly sets the wings in position. He then returns them to the jar and completes the kill. Finished setting was effected by pinning into prepared polystyrene with grooves for the bodies. As the wings are set he covers them with paper and weights them down with a microscope slide.

He also proffered the suggestion that when breeding the larvae of the smaller species the containers in which medical sutures are supplied could be used with good effect. These are plastic with a transparent slide lid and are approximately  $1\frac{1}{2} \times 2 \times 4$ ", with another twice that size.

Mr. S. N. A. Jacobs said he used a variation of Mr. Prior's setting technique. He anaesthetised, fully set and then killed.

The use of ethyl acetate provoked some discussion as several lepidopterists were using 0.880 ammonia which is liable to blister the operator. Mr. Chalmers-Hunt, who uses ammonia, said that when killing specimens that are reddish-brown, yellow or green he uses chloroform because ammonia damages these colours.

The difficulty of obtaining ethyl acetate was discussed; some chemists were willing to supply it while others were concerned about the duty problem. It was pointed out by Mr. F. D. Buck that the killing and relaxing fluid sold by the equipment suppliers was in fact ethyl acetate.

Mr. E. H. Wild said that ammonia had the great advantage of killing Lepidoptera with the wings open; but Mr. Chalmers-Hunt said apart from the fact that it affects certain colours adversely, it also caused a dullness in all insects.

Referring to the tendency to cause fading by the use of certain killing agents, Dr. MacNulty said that if moths are killed in a refrigerator, literally frozen to death, colours will remain as in life. Mr. Chalmers-Hunt added that when one has a lot of material to handle the best way to keep moths alive was in the refrigerator, but not of course in the freezing compartment. It was pointed out however that the refrigerator does cause dehydration.

The use of carbon tetrachloride compounds was raised but condemned as dangerous to the operator and not really satisfactory because of the rigor caused.

When working in the tropics it was found that most butterflies tend to batter themselves to pieces in the pillbox; the most satisfactory way to kill these is by 'pinching' the thorax. This also applies to European collecting.

The technique of injecting the thorax of large species was raised, with some scepticism. But a member with tropical experience said that large hawk moths

could be satisfactorily treated in no other way in the field, and an injection of oxalic acid was instantaneous.

Arising out of the difficulty of obtaining ethyl acetate the difficulty of obtaining Thymol crystals, an anti-mould agent, was also mentioned, and Mr. Buck suggested that Phenol crystals be substituted. It was however pointed out that the great advantage of Thymol was that it lasted much longer.

Dr. MacNulty said he used a Thymol crystal in his gum tragacanth which has a distinct advantage over clove oil of not dissolving into the gum.

In spite of the above-mentioned advantage of Thymol, there was a benefit derived from Phenol in the shape of protection from mites. For this purpose vapona strip had been proved very satisfactory in the case of a live reptile infested with blood-sucking mites, and an adaptation of this might be found advantageous.

Mr. Bretherton, speaking on the subject of relaxing dried specimens, said there appeared to be no really satisfactory method; even when the insects came off the board apparently properly set they subsequently either sprung or drooped. It was assumed there must be a satisfactory method because a great deal of the material arriving at museums were quite dry in paper, but doubt was expressed if museum standards of setting for these specimens corresponded with Mr. Bretherton's concept of being properly set. It was suggested that when setting dried material wing muscles must be broken to achieve good results, but this, it was thought, would give rise to drooping.

Wood naphtha was put forward as a relaxant for Lepidoptera, but it was suggested that a preventative for both springing and drooping was to expose the set specimen to formalin vapour before taking it off the setting board.

When dealing with the microlepidoptera Mr. Bradford thought the formally set specimen was disadvantageous, he set only one or two in this manner for the cabinet. Those he uses for research work he blows out the wings and pins on polyzoate. Mr. S. N. A. Jacobs, who also blows out the wings of micros, pins them against  $\frac{3}{4}$ " plush ribbon, the plush satisfactorily holding the wings in position.

For those butterflies and geometers which die with the wings folded downwards it was suggested that forceps with long, curved points be inserted between the wings and then wiped over the costa; the wings then snap back.

Cranefly setting presented a problem to the dipterist with regard to their legs. Mr. A. E. Stubbs said the legs should be folded beneath the insect's body and the fly mounted on its side.

The question of preserving colours in dragonflies was raised and attention was drawn to the two techniques of High Vacuum Drying (see Moore, B. P., 1951, *Proc. S. Lond. ent. nat. Hist Soc.*, 1949-50: 179-86) and Freeze Drying. It was also suggested that if specimens are eviscerated it will help to preserve their colours, and it was further advised that these insects should not be killed with ammonia. Another suggestion was to kill with a desiccant and raise the temperature.

Though most lepidopterists preserve larvae by blowing them in some cases it is preferable to preserve in spirit; particularly the microlepidoptera. The question posed was how to kill larvae to be preserved in this way. One method put forward was to immerse the larva in very hot, but not boiling water, and then place in alcohol by running through an alcohol series as is done in microscopy. Another suggestion was to kill in spirits of wine.

Some insects such as chrysid wasps and female mutillids could cause uncomfortable stings when being collected. This could be avoided if they were 'shot' with methylated spirit from a child's water pistol.

## FIELD MEETING

NEWLANDS CORNER, SURREY—5th May 1973

Leader: Mr. R. F. BRETHERTON

Seven members met at the car park at 10.30 a.m., in a deluge. Since search for the rare tortrix *Pammene agnotana* Rag. was obviously useless in these conditions, the morning was spent at the leader's house at Bramley for talk and refreshment. After lunch, in slightly better weather, the party returned to the slopes above the Silent Pool. No adult Lepidoptera were seen, but larvae of *Mompha conturbatella* Hübn. were taken from spun shoots of *Epilobium*, and of *Laspeyria flexula* D. & S. and other species from *Prunus*; old workings of *Aegeria andrenaeformis* Lasp. were found in stems of *Viburnum lantana* L. Lace-wings and crane-flies disturbed from yew trees or found at rest included the tipulids *Limonia chorea* (Meig.), *L. nubeculosa* Meig., *Cheilotrichia cinerascens* (Meig.), *Erioptera lutea* Meig. var. *taenionota* Meig.; and in the Anisophidae *Sylvicola punctata* F. and in the Syrphidae *Syrphus vitripennis* Meig. The weather conditions were propitious for the Edible Snail, *Helix pomatia* Meig., of which many fine examples were seen in motion; owing to lack of culinary knowledge, these were not collected. The party dispersed at 4.30 p.m., but later two members who visited Bookham Common secured a few larvae of the Pug moth *Chloroclystis chloerata* Mabille from *Prunus*, some of which was there still in blossom.

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## OBSERVATIONS ON GROUND BEETLES (COL. CARABIDAE) IN A PERTSHIRE GARDEN

by BRIAN MORRISON

(D.A.F.S. Freshwater Fisheries Laboratory, Pitlochry, Perthshire.)

Pitfall traps have been used by a number of entomologists in connection with studies on the distribution of insects, their behaviour, and their life-histories. Greenslade, Williams and others have produced data based on an examination of pitfall trap catches which have contributed greatly to our knowledge of the biology of Carabid beetles. During 1971 and 1972 I undertook a study of the Carabids in my own garden using pitfall traps as a method of capture.

### MATERIAL AND METHODS

The site: Up until 1967 the experimental site had formed part of a wooded hillside with birch and oak trees growing on a grassy, bracken-covered slope. A section was then cleared for building, and at the time of the experiment it was possible to divide the area into two distinct regions: a cultivated region, which had been set out as a garden with vegetables and flowering shrubs, and an uncultivated (bracken) region, which differed from the original in that the trees had been cut down. The stumps were allowed to sprout, however, and in the autumn large quantities of leaves fell on to the site from these and from mature trees nearby.

### RESULTS

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
<i>Abax ater</i>				2	16	24	30	23	2	1		
<i>Amara lunicollis</i>				2	4	4	7	3				
<i>Amara familiaris</i>					1	1						
<i>Bembidion lampros</i>			1	39	46	42	1		1			
<i>B. tetracolum</i>		3	21	25	11	9		2	2			
<i>Bradycellus harpalinus</i>	3	3	3	1		1						11
<i>Calathus flavipes</i>	1					6	1	4				
<i>C. fuscipes</i>							8	4	1		3	
<i>C. melanocephalus</i>							1					
<i>C. micropterus</i>					2	3	1					
<i>C. piceus</i>					2							
<i>Carabus violaceus</i>							1	3	4			
<i>Cychnus caraboides</i>							1	3	2			
<i>Leistus rufescens</i>					1	1						
<i>Loricera pilicornis</i>					1	1	1	1				
<i>Nebria brevicollis</i>			1		23	39		52	83	42	5	1
<i>Notiophilus biguttatus</i>	2		2	2	2		1	1				
<i>Notiophilus substriatus</i>					2							
<i>Pterostichus madidus</i>					1	1	6	8	1			
<i>P. oblongopunctatus</i>			1	1								
<i>P. nigra</i>							1					
<i>P. nigrita</i>								7				
<i>P. strenuus</i>			3	6		1						

Table 1: Total monthly catch for each species of Carabid beetle (adults) 1971

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
<i>Abax ater</i>				4	8	9	11	15	9			
<i>Amara lunicollis</i>				4	2	4	9	4	3		1	
<i>Amara familiaris</i>					1	1	3					
<i>Asaphidion pallipes</i>						1	1					
<i>Bembidion lampros</i>			3	28	37	7	2	1				
<i>B. tetracolum</i>		1	10	19	7	1		4				
<i>Bradycellus harpalinus</i>	4	1	7	5							1	5
<i>Calathus flavipes</i>								9	7	1		
<i>C. fuscipes</i>								4				
<i>C. melanocephalus</i>							7	7	1	1		
<i>C. piceus</i>					1	2	1	12	4			
<i>Carabus glabratus</i>							1					
<i>C. nemoralis</i>				1								
<i>C. violaceus</i>					1		1	3	6			
<i>Cychrus caraboides</i>								4	5	1		
<i>Cyrtonotus apricarius</i>								2	2	2		
<i>Leistus rufescens</i>								6	1	2	1	
<i>L. fulvibarbis</i>										1		
<i>Loricera pilicornis</i>						1	1	2	2			
<i>Nebria brevicollis</i>	1		1	1	49	73	5	43	61	9	3	1
<i>Notiophilus biguttatus</i>			2	8	1		1					
<i>Pterostichus madidus</i>						2	4	21	2			
<i>P. niger</i>							1					
<i>P. nigrita</i>							1	1				
<i>P. strenuus</i>	1		4	7	6	4						

Table 2: Total monthly catch for each species of Carabid beetle (adults) 1972

The pitfall traps were one pound jam jars set in the soil so that the mouth was level with the surrounding earth. An area of about 30cm. radius round each jar was regularly cleared of fallen leaves and other material. In 1971, nine traps were used, three being in the cultivated region. In 1972, the number was increased to twelve, two more being put in the cultivated region and one in the bracken zone. The reason for the greater number of traps in the bracken zone was because it was originally thought that two different habitats could be distinguished there. Both the area of the site and the number of traps were probably too small to allow any significant difference to show in the catches, however.

During the summer months the traps were inspected every three days whenever possible, but at other times weekly visits were more usual. A maximum-minimum thermometer was used to give details of the daily range in temperature.

The information contained in tables 1 and 2 is in general agreement with the data given by Greenslade for Silwood in southern England. Since the total for each species collected in the Pitlochry traps was often very much less, it is not always possible to make a direct comparison with his figures, but even where numbers for a given species were small, the beetles tended to appear during the peak period recorded for that species at Silwood.

The pattern of results for 1971 and 1972 is similar, and with very few exceptions the same species were collected in the traps each year.

The following notes refer to the beetles most frequently found in the experimental site.

*Abax ater* Vill. The adults were found in the traps from April until October

with no distinct peak period. They were taken in the bracken zone more frequently than in the cultivated zone as the table below indicates.

Year	Cultivated	Bracken
1971	5	14
1972	2	6

Table 3: Average number of *Abax* adults per trap in the two zones.

During the winter months adults were occasionally found in rotting tree stumps. The three females collected during April, May, and the early part of June 1972, had immature ovaries, and females with fully formed ova first appeared in the latter part of June that year.

*Amara* spp. *A. lunicollis* Schiff. appeared in small numbers from April till September. Females with mature ovaries were first obtained in May. *A. familiaris* Dufts. on the other hand, was much less common and was rarely seen during observations at the site.

*Bembidion* spp. Despite their small size, *B. tetracolum* Say and *B. lampros* were the beetles most frequently seen in the experimental area, particularly in warm sunny weather. Mitchell (1963) states that *B. lampros* is inactive at temperatures less than 9–10°C, and since this was reached on many days in February, some explanation must be sought for their absence from the traps during that month. A further observation by Mitchell might provide this. He noted that in the colder months of the year *B. lampros* adults were photo-negative, and burrowed down into the soil. It is probable that at that time of year the heat from the sun's rays is unable to penetrate far enough into the earth to stimulate the beetles, and since the warmer day temperatures are very quickly reduced to below freezing point at night, the soil does not retain heat for any length of time.

The appearance of *B. tetracolum* in February, and its earlier peak period of activity (March–April compared with April–May) suggests that this species is more tolerant of lower temperatures. Further evidence in support of this is afforded by the time of maturation of the ovaries. Fully developed eggs were found in *B. tetracolum* in the third week of March, while *B. lampros* ova did not reach this stage until mid-April. If both species inhabit a similar ecological niche there is an obvious advantage to the adults in this separation of peak activity periods. However, it may have the reverse effect on the larvae, since those which hatched earlier would always be larger and perhaps more successful in obtaining food. The relationship between these two species of *Bembidion* deserves further investigation.

Both species were caught almost exclusively in the cultivated zone, and it is interesting to note that Greenslade describes *B. lampros* as an insect of arable land.

Species	Year	Cultivated	Bracken
<i>B. tetracolum</i>	1971	23	0.6
	1972	8	—
<i>B. lampros</i>	1971	42	0.8
	1972	14.4	0.8

Table 4: Average number of adult *Bembidion* per trap in the two zones.

*Bradycellus harpalinus* Serv. Apart from one specimen taken in June 1971, this insect was only found in the traps during the winter and early spring and was never present in large numbers at any one time. This corresponds with Evans's observations of *B. verbasci* Dufts. in Ernocroft Wood.

*Calathus* spp. Beetles of this genus were collected regularly during the summer months but no one species was particularly common. They were found in both zones of the experimental site. There was a considerable increase in the numbers of *C. piceus* Marsham caught in 1972 compared with 1971, but the reason for this is not known.

*Cychnus caraboides* L. Larvae of this species were not found in the traps during the winter of 1971-72 but occurred regularly from the beginning of November until the end of December 1972 (i.e. until collecting stopped). In both 1971 and 1972 the adults were taken in the traps from July to September.

*Pterostichus* spp. *Pterostichus madidus* F. and *P. strenuus* Panz. were the two most common species. The former, which overwinters as a larva, was found from May until September with a peak period (1972) in August. The variety in which the legs are entirely black was seen only occasionally. *P. strenuus* was caught during the first half of the year and it is likely that many of these would be have been overwintering adults. Although none of the insects collected in March was dissected, females obtained in April had mature ovaries.

*Leistus* spp. Only one specimen of *Leistus fulvibarbus* Dej. was taken in the traps but adults of this species were sometimes seen on turning over stones. *L. rufescens* F. was obtained much more readily both as an adult and as a larva. As an adult it frequented areas covered by long grass and was fairly common among roots several inches below the soil surface. With one exception all those trapped were in the bracken zone. During the winter of 1971-72, the total number of larvae taken in the traps each month was: December (13), January (19), and February (4). No larvae were obtained during December 1972.

*Nebria brevicollis* F. As reported by other workers, this insect has a definite summer diapause. There were two periods of peak activity, one in early June, and the other in late August and early September. Catches in July were very small in 1972, and no beetles were taken in the traps in July 1971. Prior to diapause, the ovaries showed no sign of maturing, but from August until November, beetles with fully formed eggs were found. (Later insects were not dissected.)

The causes and effects of diapause have been discussed by several authors. It has been suggested that summer diapause is a device to enable the beetle to survive periods of low humidity, and it is certainly the case that during the two years of the present study, the relative humidity of the atmosphere was significantly lower in June than during the late autumn and early spring months.

	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
1971	94	85	79	74	71	67	74	78	82	86	86	84
1972	90	91	82	71	74	67	73	78	88	87	86	90

Table 5: Average of the daily Relative Humidity readings for each month during 1971 and 1972.

If low humidity were particularly harmful to *Nebria*, however, it is surprising that the majority were collected from the cultivated zone whose micro-environment would have had a far lower relative humidity and greater temperature range than the soil surface under long grass and bracken.

Year	Cultivated	Bracken
1971	38	3
1972	27	9

Table 6: Average number of *Nebria* adults per trap in the two zones.

In the woodland environment, Penney found that the relative humidity of the

litter in which the beetles lived was consistently high throughout the hot summer months and this led her to reject the idea of low humidity as a reason for the diapause period. In the present work, the traps in the cultivated zone were situated in areas planted with shrubs and fruit bushes, and the soil surface was regularly cleared of weeds and leaves. There was therefore nothing resembling litter in the woodland sense. Since *N. brevicollis* is mainly nocturnal, however, it could avoid low humidity periods during the day by resting under stones or at the base of plants where the relative humidity of the air is often much greater than in a more open environment.

Penney concluded that the immediate cause of entry into the diapause state was an increase in the fat content of the beetle and that the purpose of this was to enable it to survive at a time when its food, Collembola and other small soil arthropods, was rather scarce. She found that diapause could be prevented experimentally by starving the beetles so that they did not have the opportunity to build up fat reserves within the body.

The larvae were fairly abundant during the winter of 1971-72 and the catch figures are shown below.

Month	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
Total	5	46	66	30	12	7

Table 7: Total number of *N. brevicollis* larvae caught in the traps each month during the winter of 1971-72.

Only 2 larvae were trapped in November and December 1972.

#### DISCUSSION

The relatively small size of the catches makes it difficult to draw many conclusions, but the general pattern of the activity periods appears similar to that reported from other localities in Britain. As to whether greater numbers might have been caught had more traps been employed, the figures for *Abax* suggest that this would not necessarily have been the case, since the total for nine traps in 1971 is greater than that for twelve traps in 1972. Also, the difference in catches of *Nebria* larvae, 46 in December 1971 and 2 in December 1972, is not what would be expected if the number of traps had been the only factor to consider. It is possible that these differences are not really significant, but there is a consistency in the results for each year suggesting that the impression given of an abundance of some species and a scarcity of others is broadly speaking correct.

In considering the figures given in tables 1 and 2, the limitations of the sampling technique must be borne in mind. When samples are collected using a quadrat or a corer, the animals might be said to play a passive role in the collecting process, but in pitfall trapping success depends on the animals being active, and anything which could prevent or reduce this activity has to be taken into account when the results are being interpreted. Apart from the two stationary phases of the life cycle, the egg and the pupa, reduced mobility is also found in the diapause state undergone by some beetle larvae and adults. In the present study the mid-summer diapause of *Nebria brevicollis* adults is an example of this. Other insects, while not always showing such dramatic changes in their activity patterns, may be caught less frequently because they are naturally rather slow-moving. e.g. *Bradycellus* spp. A third factor which can influence the activity of beetles, and other small animals, is the change in local climatic conditions which in turn affects the micro-environment. These changes may be considerable, not only from month to month, but large differences may occur in the same month in two

successive years. This is illustrated in the following table which gives the rainfall for each month in 1971 and 1972, at Pitlochry.

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
1971	108.9	45.6	29.4	47.7	57.9	58.6	115.7	50.9	28.9	92.1	50.7	65.9
1972	149.2	62.7	62.7	49.2	94.4	64.7	35.8	65.1	5.1	26.5	67.9	129.5

Table 8: Total rainfall in millimetres for each month during 1971 and 1972.

One consequence of a long period of dry weather such as was experienced in the autumn of 1972, is that the moisture content of the upper layer of the soil becomes very much reduced. This affects the predatory surface-dwelling beetles in two ways: (a) many of the soil animals on which the beetles feed tend to burrow more deeply in search of a moist environment thus making it more difficult for the predator to reach its prey, and (b) there is a tendency for the beetles themselves to remain in areas with as near optimum humidity as possible. In both cases the result is reduced surface activity and the beetles are less easily caught in pitfall traps.

Because pitfall traps depend on the insects capturing themselves, it follows that the commoner species will be caught more frequently—within the limits outlined in the preceding paragraph. Although the purpose of the present investigation was to discover which species occurred on the experimental site, having done so, it is worthwhile considering why certain of them should be more abundant than others. The abundance of an animal is closely related to the suitability of its environment and this may be regarded as a complex of different factors, the absence of any one of which may limit population numbers. The most obvious of these is the food supply, and it is probable that the scarcity of the beetle *Cychnus caraboides* is due, at least partly, to the low snail population on the site. *Cychnus* is a specialised predator of these animals. As well as food scarcity, competition for food between predators with similar diets can also serve as a limiting factor. According to Davies (1953) many of the beetles listed share the same food items and it may be because of their ability to make use of a wide variety of plant and animal material that so many are able to co-exist on the experimental site. Nevertheless, the populations of individual species are apparently fairly low, and it is possible that competition for food is one reason for this. Another contributing factor could be shortage of suitable micro-habitats. Where predators have the same food preferences, they may be able to co-exist in the same environment if each one confines itself largely to a particular type of habitat. In the present study, this is best illustrated by the two most abundant of the larger beetles, *Abax ater* and *Nebria brevicollis*. The former insect was caught more frequently among the long grass and bracken (Table 3) while the latter preferred more open ground (Table 6). This makes the position of the two species of *Bembidion* particularly interesting, since at first sight they appear to fill the same ecological niche. However, when more detailed observations are made, differences are found, e.g. in the period of peak activity and in the time of maturation of the ovaries. I hope to continue studies on these insects and obtain a more complete picture of the situation.

Many of the comments which have been made here are necessarily speculative because of the small scale of the present investigation, but the evidence that is available does provide a basis for further research.

#### ACKNOWLEDGEMENTS

I should like to thank my colleague Mr. L. Caines of the Freshwater Fisheries

Laboratory for providing me with the meteorological data I have used, and Dr. R. A. Crowson of the Zoology Department, University of Glasgow, for verifying the identity of several of the beetles.

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## PROCEEDINGS

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13th SEPTEMBER 1973

The President, Mr. J. M. CHALMERS-HUNT, in the Chair

The death was announced of Mr. G. J. Ashby.

The following new member was declared elected: Dr. Ove Høegh Guldberg.

#### EXHIBITS

Mr. J. M. CHALMERS-HUNT—A living example of *Conistra rubiginea* D. & S. (Lep., Noctuidae) bred from ovum laid by a female taken at Horsell, Surrey by Dr. C. G. M. de Worms.

Mr. C. O. HAMMOND—*Conocephalus dorsalis* Lat. (Salt., Tettigoniidae); *Brosicus cephalotes* L. (Col., Carabidae); and *Chorosoma schillingi* Schummel (Hem., Coreidae). These species, normally of coastal distribution, were taken at Wangford Fen, Suffolk, one of the isolated fens far inland, on 8.ix.73.

Col. A. M. EMMET—(1) Larval cases of *Coleophora ahenella* Hein. (Lep., Coleophoridae). The species was taken at Chilbolton and Leckford, Hants, and also at Bulford, Wilts., feeding on *Rhamnus catharticus* L. (2) Leaves of hornbeam mined by a species of *Coleophora* taken at Stotfold, Bedfordshire. Hering records that such mines have been found on hornbeam, but the species responsible has never been identified. He considers that *C. lutipennella* Zell. or *C. flavipennella* Dup. (both normally oak feeders) may be responsible.

Mr. P. A. SOKOLOFF—An example of *Xanthorhoe fluctuata* L. (Lep., Geometridae) from South Norwood, S.E. London, with indistinct markings.

## COMMUNICATIONS

Commenting on the exceptionally large numbers of Lepidoptera about at the moment Dr. C. G. M. de Worms made special reference to Portland the previous week-end when at West Bay he saw some 70 or more *Aglais urticae* L. (Nymphalidae) and many *Vanessa atalanta* L. (Nymphalidae) in a small garden. At Bexington he saw an example of *Colias croceus* Fourc. (Pieridae) and on the Sunday night he had colossal numbers of *Plusia gamma* L. (Plusiidae) at his mercury vapour light. He also noted *Aporophylla australis* Boisd. (Pieridae), *Eumichtis lichenea* Hübn. (Noctuidae), *Leucania l-album* L. (Noctuidae) and said that specimens of *Lysandra coridon* Poda (Lycaenidae) were on the wing.

Also commenting on the week-end at Portland, Mr. E. H. Wild said he had as many as 1200 *Plusia gamma* L. in one of his four light traps, and this insect was just as numerous in the other three. He had noted a female *Rhodomestra sacraria* L. (Geometridae) and a number of *Vanessa cardui* L. larvae.

Near Croydon, Surrey, he continued, he had seen a single *Colias croceus* Fourc. on 5th September.

*Acherontia atropos* L. (Lep., Sphingidae) was reported by Mr. R. L. Smiles to have been seen at Enfield, Middx. on 7th September. Mr. T. J. G. Homer added a record of two larvae at Reading, Berks.

Mr. G. Prior said he had been getting *Noctua pronuba* L. (Noctuidae) in exceptional numbers.

Ivybridge, Devon, had yielded to Mr. Kennard on 26.viii.73 an interesting aberration of *Eublemma ostrina* Hübn., while from the same locality he had obtained *Rhodomestra sacraria* L. (Geometridae), *Nycterosia obstipata* F. (Geometridae), *Leucania vitellina* Hübn. (Noctuidae), *Acherontia atropos* L. (Sphingidae) and *Herse convolvuli* L. (Sphingidae).

Whilst working beehives at Petham, Kent, said Mr. E. S. Bradford, he obtained what he thought to be *Galleria mellonella* L. (Lep., Galeriidae), but on examination on his return home he found them to be *Amphipyra tragopogonis* Clerck (Noctuidae). He thought they may have entered the hives to hibernate, but he did not think of this species as a hibernator in the usual sense, though he had seen examples under loose bark. Mr. A. E. Gardner, who had also been working beehives at Kentisbury, N. Devon, had also found two examples. It was suggested by Mr. R. F. Bretherton that they may have entered the hives for honey and not to hibernate.

Mr. Gardner also reported *Rhodomestra sacraria* L. from Pendleton Marsh near Lymington, Hants, and from the Staines area, *Aglais urticae* L. *Vanessa cardui* L. and *V. atalanta* L.

The dipteran *Volucella zonaria* (Poda) (Syrphidae) was reported from Ruskin Park, S. London, by Dr. P. A. Boswell. Mr. C. O. Hammond said it was still at Wood Green, N. London and Mr. F. D. Buck reported *V. bombylans* (L.) to be common at Great Bromley, N. Essex on 30.vi.73.

*Lycaena phlaeas* L. (Lycaenidae) and *Polygonia c-album* L. (Nymphalidae) were reported from Bournemouth, Hants, by Mr. Bradford.

Slides were shown by Mr. W. F. Tweedie, Mrs. F. Murphy and Dr. P. A. Boswell.

27th SEPTEMBER 1973

The President, Mr. J. M. CHALMERS-HUNT, in the Chair

The following new members were declared elected: Messrs. G. J. James, R. J. James and C. R. Pratt.

## EXHIBITS

Col. A. M. EMMET—(1) A spray of *Salix fragilis* L. showing a leaf mined on the upperside by a larva of *Phyllocnistis saligna* Zell. (Lep., Lithocolletidae) as well as on the underside, as is usual for this species. The larva at first mines the leaf, then the bark and later progresses, via the petiole, into a second leaf, where it completes its growth. In this instance it is probable that the larva, mining the upper side was forced to do so on finding the under side already mined by another larva.

(2) A vice-county map of England showing the number of Nepticulidae recorded from each vice-county, this number ranging from 0-67. An appeal was made for mined leaves from the under-recorded counties so that the distribution maps required for the forthcoming handbook on British butterflies and moths could be made more comprehensive.

Mr. R. F. BRETHERTON—A larva of *Harpyia furcula* Clerck (Lep., Notodontidae) from West Sussex.

Mr. G. PRIOR—*Chrysolina menthastri* (Suff.) (Col., Chrysomelidae) and larva from Cosford Mill; also *Eupithecia tripunctaria* H.-S. (Lep., Geometridae) taken on Yarrow at Cosford Mill. Both on 15.ix.73.

Mr. C. RIVERS—*Arctia caja* L. (Lep., Arctiidae) larvae feeding on an artificial diet which contained no leaves whatever. The larvae were second generation this year. This diet is of some importance in disease study as it can be sterilized.

Mr. R. D. WEAL—Living examples of *Helops coeruleus* (L.) (Col., Tenebrionidae) bred from a portion of an old willow log found at Benfleet, Essex, in March 1973.

Mr. M. G. VENTOM—A large tick which had been removed from a toad, *Bufo marinus*, imported from Florida.

## COMMUNICATIONS

In response to a question by Col. A. M. Emmet, Mr. J. M. Chalmers-Hunt said that he and Mr. Uffen had visited Bulford, Wilts., and had found some 20 cases of *Coleophora ahenella* Hein. (Lep., Coleophoridae). The majority were full-grown, but some were quite small. All were on *Rhamnus catharticus* L., and though both *Viburnum lantana* L. and *Cornus*, both reputed foodplants, were present, no cases were found on these plants. One batch of seven cases found by Mr. Uffen were on a single sprig low down near the ground, and generally they appeared to prefer a lower position. Mr. Chalmers-Hunt also reported *Asilus crabroniformis* L. (Dipt., Asilidae) from the same locality.

Referring to reports of *Acherontia atropos* L. (Lep., Sphingidae) at the previous meeting, Mr. E. S. Bradford said a larva had been dug up at Shenley, Herts.

Mr. S. N. A. Jacobs said that in the Staines area someone had been breeding *Heliconus* species and turning them loose. He also said that he had received reports of *Danaus plexippus* L. (Lep., Daniidae) being plentiful on the other side of the Atlantic, so being a good migration year we may, perhaps, see an example or so.

Concerning lepidopterous migrants, Mr. R. F. Bretherton reported the following from Bramley, Surrey: *Herse convolvuli* L. (Sphingidae) on 15.ix.73 and *Rhodometra sacraria* L. (Geometridae) on 25.ix.73. He added that Mr. Messenger had obtained *Acherontia atropos* L. about 20th September, and on 24th Sep-

tember he had obtained a worn second brood *Comibaena pustulata* Hufn. (Geometridae).

Dr. C. G. M. de Worms reported *Aglais urticae* L. (Nymphalidae) larvae to be feeding well on nettles in the West Country; he suggested we might get another brood.

Mr. Jackson asked if anyone had bred *C. pustulata* Hufn. through the winter but nobody present had. Mr. Bretherton said that this moth does sometimes produce a second brood.

*Macroglossum stellatarum* L. (Sphingidae) was reported from Bridgeport, Dorset, by Mr. G. S. E. Cross and Mr. S. N. A. Jacobs added that in the first two weeks of September the species was very common in Portugal.

Referring to the *Helops coeruleus* L. which Mr. Weal exhibited, Mr. L. Evans asked if this was the same species which used to occur in the posts at Dungeness, as it looked very much like it. Mr. F. D. Buck replied that the habitat was right and had seen the beetle in similar circumstances at Fingringhoe Wick, Essex.

Mr. C. River gave a talk on 'Insect Diseases and Population Regulation', illustrated by slides. An interesting discussion followed in which Mr. Rivers said the best way to ensure all nuclear polyhedral viruses were killed in breeding cages was immersion in a hyperchlorite solution, and Mr. S. R. Bowden suggested Ajax or any other bleach would be effective; Mr. Rivers agreed. Mr. Rivers also said that fungus on food plants, mildew, etc., would not give rise to fungal disease in larvae.

#### SPECIAL MEETING

Held in the rooms of the Alpine Club, 74 South Audley Street, London, W.1, on Thursday 11th October 1973.

The President, Mr. J. M. CHALMERS-HUNT, in the Chair

The President opened the meeting called under Bye-law 26 and asked the Secretary to explain the procedure.

The following scrutineers were appointed: Mr. S. N. A. Jacobs for the members and Mr. P. J. Baker for the Council.

The President read the following motion which had previously been circulated to all members according to our Bye-laws.

'All members shall pay an entrance fee of 50p. The Annual subscription shall be as follows:

Ordinary Member	£4.00
Country Member	£2.25
Junior Member	£1.25
Corporate Member	£4.00

'Provided that any member who is aged 65 or over on 1st January 1974 may, on application to the Assistant Treasurer, continue to subscribe at the rate previously applicable to his category of membership.

'The Composition for Life Membership in lieu of entrance fee (unless already paid) and future annual subscriptions shall be £50.00. Delete the remainder of this paragraph (which provides for the payment of subscriptions in two instalments if this is done by Banker's orders—it has never been used).

'Appendix B. (Nomination Form). The last sentence shall now read:

'A Country Member must reside more than thirty miles from the Society's rooms and not attend regularly a place of business in the London Postal area.

The entrance fee is 50p. and the annual subscription of an Ordinary Member is £4.00, of a Country Member £2.25p., of a Junior Member (21 yrs) £1.25p., of a Corporate Member £4.00, the Composition fee for Life Membership is £50.00. The rights and privileges of all members except Corporate Members are the same.'

The Treasurer, Mr. R. F. Bretherton, gave the background which made it necessary for the subscriptions to be raised.

The ballot being taken the President reported the result: For 42, against 2; and declared the motion carried.

11th OCTOBER 1973

The President, Mr. J. M. CHALMERS-HUNT, in the Chair

The following new member was declared elected: Mr. D. W. Barnett.

#### EXHIBITS

Mr. J. M. CHALMERS-HUNT—A curious old circular mahogany pin box with swivel top and exit holes. By swivelling the top one may select pins from four different sizes; the size of the pin required being indicated by the name of the species of butterfly shown on the side: i.e., *icarus*, *tithonus*, *janira* and *atalanta*.

Mr. S. A. KNILL-JONES—*Agriphila tristella* Schiff. (Lep., Pyralidae) and *Eupithecia phoeniceata* Ramb. (Lep., Geometridae), both species being taken at Freshwater, I.O.W., between 18 and 20.viii.73.

Mr. R. DYKE—An aberration of *Argynnis aglaia* L. (Lep., Nymphalidae) taken on Bolnerry Down, S. Devon, July 1973.

Mr. C. F. DEWHURST—The following insects: *Mogoplistes squamiger* Fischer (Salt., Mogoplistidae), 14.ix.73 from Chesil Beach; a male and a female *Rhodometra sacraria* L. (Lep., Geometridae), part of an influx of 26 examples taken at light between 4 and 6.ix.73 and *Heliothis armigera* Hübn. (Lep., Noctuidae), Yelverton, S. Devon; also larvae of *Selenia dentaria* F. (*bilunaria* Esp.) bred from a female taken at light, these hatched on 25.viii.73 and some have just started to pupate.

Mr. B. S. JACKSON—*Bena fagana* F. (Lep., Noctuidae) taken at mercury vapour light at Thetford, Norfolk, 14.vii.73; *Comibaena pustulata* Hufn. (Lep., Geometridae) taken at mercury vapour light at Ashford, Kent, 30.vi.73; *Pseudopsis prasinana* L. (Lep., Noctuidae) taken at mercury vapour light at Thetford, 14.vi.73

#### COMMUNICATIONS

*Danaus plexippus* L. (Lep., Danaidae) was reported by Dr. C. G. M. de Worms to have been photographed by a schoolboy from a specimen he had found at Fowey, Cornwall, on 20th September. He also reported an example of *Eunnictis lichenia* Hübn. (Lep., Noctuidae) taken by Mr. R. I. Lorimer at Totteridge, Herts, and he asked for records from the London area as he believed this insect to have occurred last year. Mr. L. Evans said he had one at his mercury vapour light in Croydon, Surrey, in October 1969.

Mr. S. A. Knill-Jones said he had seen the migrants *Rhodometra sacraria* (Lep., Geometridae) and *Leucania vitellina* Hübn. (Lep., Noctuidae) on the Isle of Wight during September.

At Dungeness, Kent, the previous Sunday, 7.x.73, Mr. J. M. Chalmers-Hunt said he had sugared 75 posts on which he had seen no more than 10 moths, while at the mercury vapour light only three came. The conditions had all the

appearances of being productive, but unfortunately they were quite the reverse. Mr. R. F. Bretherton said he and Mr. Peter Baker had the same experience in Durfold Woods on the same night.

Mr. R. Scott had showed Mr. Chalmers-Hunt a dead example of *Acherontia atropos* L. (Lep., Sphingidae) which he had found at Dungeness on 1st October.

In his mercury vapour light trap Mr. Bretherton had obtained a number of second brood moths: *Amphipyra tragopogonis* Clerck (Noctuidae), a very fresh male indeed, *Agrotis exclamationis* L. (Noctuidae) and *Leucania comma* L. (Noctuidae), a fresh male; also an *Agrotis puta* Hübn. he believed to be a third brood example. *Noctua pronuba* L. (Noctuidae) was still occurring and was all the same brood.

A fresh male *Comibaena pustulata* Hufn. had been taken by Mr. P. J. Baker in Pamber Forest on 5.x.73 which he believed to be a second brood.

Dr. F. Rose gave a talk on 'Some Interesting Kent Plants' which he illustrated with slides.

25th OCTOBER 1973

The President, Mr. J. M. CHALMERS-HUNT, in the Chair

The following new members were declared elected: Messrs. A. M. Buchan, M. Carpenter, T. Chapman, G. E. Clark, G. Espin, M. Fogarty, L. Levy, P. E. Linsley, J. R. Ockenden, M. J. Parsons, M. Payne, F. J. Pink, F. W. Skilman and J. R. Spaul.

#### EXHIBITS

Mr. J. M. CHALMERS-HUNT—(1) A copy of *British Tortricoid Moths*, to be published shortly. (2) A series of *Lycaena dispar* Haw. ssp. *batavus* Oberth. (Lep., Lycaenidae) which he had bred from pupae given him by Capt. E. B. Purefoy many years ago. Capt. Purefoy had been responsible for establishing the species in Wood Walton Fen, and extracts from his letters to the exhibitor were read.

Col. A. M. EMMET—Tenanted mines of a species of Nepticulidae new to Britain, *Ectoedemia erythrogenella* Joannis (Lep., Nepticulidae). The larva mines the leaves of *Rubus* spp. (in this instance, *R. fruticosus* agg.), causing the mined area to turn crimson-purple. The mines were found to be locally plentiful at Portland, Dorset, 21.x.73. Abroad the moth has been found in France, Switzerland and Austria.

Rev. D. AGASSIZ—Leaves of an unrecognized tree in a disused cemetery in Chingford. Some of the leaves contained *Phyllonorycter* mines.

Mr. E. S. BRADFORD—*Nepticula* mines, both vacated and tenanted, in *Rubus* leaves from a locality near Elstree, Herts. He queried which species the *Rubus* was.

#### COMMUNICATIONS

The *Rubus* leaves exhibited by Mr. Bradford were, said Mr. Jacobs, known to him as Canadian Blackberry.

Dr. J. D. Pye gave a talk on 'Insects and Ultrasound' which he illustrated with slides, photographs and recordings. The talk was followed by an interesting discussion.

8th NOVEMBER 1973

The President, Mr. J. M. CHALMERS-HUNT, in the Chair

The following new member was declared elected: Mr. C. W. Jeffrey.

## EXHIBITS

Mr. A. E. GARDNER—The following Coleoptera taken in 1973: (1) *Hydrochara caraboides* (L.) (Hydrophilidae) from Shapwick, N. Somerset, 17.v.73 (2) *Agabus melanarius* Sturm (Dytiscidae) taken by Mr. E. S. Bradford from a pond in Childs Forstal Wood, Blean, Kent, 8.v.73. (3) *Cionus longicollis* Bris. (Curculionidae) taken on *Verbascum thapsus* L., Tuddenham, Suffolk, 8.ix.73.

The PRESIDENT—(1) A catalogue of the sale in 1920 of the Sydney Webb Collection of British Lepidoptera. (2) *Xestia trianguleum* (Hufn.) ab. *unimaculata* C.-H. (Lep., Noctuidae), holotype female bred by F. M. Stallman from a parent from Ranmore Common, Surrey, which specimen emerged 17.vi.1913 (*Entomologist*, 94:281).

Mr. C. O. HAMMOND—A leaf of *Acer platanoides* L. ab. *cucullatum* Carrière from Chingford Mount Cemetery, 1.xi.73. This leaf is separated from the Norway Maple (*A. platanoides* L. s.s.) and its other varieties by the unique fan-shaped venation, usually with nine veins meeting at the base.

Mr. R. J. JAMES—(1) Ova of *Thecla betulae* (L.) (Lep., Lycaenidae) from Germany. On a ten-yard stretch of hedgerow which contained four large (ten to twelve feet high) and a dozen or so smaller (two to five feet high) bushes of *Prunus spinosa* L. 76 ova were found. This hedge ran in a north-south direction and only the east side was searched. Most ova were found at a height of 18 inches to four feet, but one was found at nine inches and another at twelve feet. In a number of instances ova were found quite close to each other, some even touching. The 76 ova were situated thus: on top of a bud, 15, underneath a bud, one; on a stem or twig, 18; in or near a fork, 31; under a fork, 11. (2) Recently emerged, living imagines of *Syntomis phegea* (L.) (Lep., Amatidae), which had been reared on dandelion (*Taraxacum* sp.) from Italian livestock.

## COMMUNICATIONS

Mr. S. N. A. Jacobs reported finding larvae of *Blastobasis decolorella* Woll. (Lep., Blastobasidae) attacking the skins of stored apples, although it was usually known as a rubbish feeder. Mr. E. S. Bradford added that he had reared this species from moss collected at Folkestone, Kent.

Mr. Bradford said he had seen *Vanessa atalanta* (L.) in flight on 28.x.73. Mr. R. F. Bretherton had seen it on the same day, and Mr. M. G. Ventom observed five examples in S. Dorset on 2.xi.73.

Mr. G. S. E. Cross thought that there had been a small third brood of *Pieris rapae* (L.) having seen the butterfly in Eype, Dorset. Mr. Bretherton thought that this had also occurred in West Surrey, whilst Mr. Jacobs had seen two specimens in Ashdown Forest on 22.x.73.

Mr. F. J. Pink said that *Quercusia quercus* (L.) had been abundant on Wimbledon Common in July 1973, when he had seen approximately 60.

Dr. Høegh-Guldberg from Denmark gave a talk on 'Experiments on the causation of forms of *Aricia agestis* (Schiff.) and *A. artaxerxes* (F.)', which was illustrated with many slides and followed by a discussion.

Commenting on the 1973 Annual Exhibition Dr. C. G. M. de Worms thought that, though there were less exhibits than last year, the quality had been high.

The marked lack of non-lepidopterous exhibits was commented upon. The President said that 212 people had signed the Attendance Book, compared with 310 in 1972 (Centenary Year) and 280 in 1971. In view of this fall in numbers he thought efforts should be made in 1974 to increase the numbers of members and visitors attending.

22nd NOVEMBER 1973

The President, Mr. J. M. CHALMERS-HUNT, in the Chair

The death was announced of Mr. Frank Lees and Mr. James Moffat.  
The following new member was declared elected: C. H. J. Pruett.

#### EXHIBITS

Mr. J. M. CHALMERS-HUNT—A piece of jade in its natural state from S.E. Austria.

Rev. D. AGASSIZ—A trap for wingless females of winter species of moth.

#### COMMUNICATIONS

The President announced that the Ray Society had donated a copy of *British Tortricoid Moths* to the Society.

Referring to his exhibit on 25th October (page 108), Col. A. M. Emmet said that Mr. Scarsdale Brown had found further examples of *Ectoedemia erythrogenella* Joannis (Lep., Nepticulidae) at Swanage, Dorset. The moth may therefore be widespread, and examination of *Rubus* leaves may well be rewarding.

He then referred to Mr. S. N. A. Jacobs' comments on 8th November (page 109) and said the larvae of *Blastobasis decolorella* Woll. (Lep., Blastobasidae) had been found at Thorpeness, Suffolk, in the pods of Tree Lupin and had been bred by D. W. H. fennel. It was also reported from the seed heads of the Scarlet Garden Poppy in Bromley, Kent.

Mr. S. N. A. Jacobs reported an example of *Herse convolvuli* L. (Lep., Spingiidae) taken at West Wickham, Kent, 14.xi.73, by Mr. Little.

On Stanmore Common, Middlesex, 17.xi.73, said Mr. G. Prior, moths had been plentiful, particularly *Operophtera fagata* Scharf. (Lep., Geometridae) and *Erannis aurantiaria* Schiff. (Lep., Geometridae). On 18.xi.73 he had seen *Aglais urticae* L. (Lep., Nyphalidae) in his garden at Harrow, Middlesex.

Mr. K. G. W. Evans reported on the Croydon Natural History Society's visit to White Down, 10.xi.73 to look for *Ptilophora plumigera* Schiff. (Lep., Notodontidae) on a night which did not look promising; it was cold and with a bright moon. However 62 males came to the light between 6 and 7 p.m., and three females at about 10.30 p.m. On this occasion a member investigating a war-time bunker found a great many hibernating moths. Some six examples of *Scoliopteryx libatrix* L. (Plusiidae) were found together with their wings one on top of the other. Col. Emmet said that some seven years ago he had a similar experience when he found 50 to 60 *Vanessa io* L. (Nymphalidae) in a bunker. By February they had all disappeared. The following year he had found about 30, and again they had disappeared by February. He believed this was due to condensation making the situation untenable. In a similar situation at Ottershaw Mr. R. F. Bretherton said he used to get *Scoliopteryx libatrix* L. congregating just as described by Mr. Evans. He went on to say that the late Mr. G. A. Cole had a similar experience with *Ptilophora plumigera* Schiff., but he had not been so fortunate himself.

Mr. Bretherton gave the following details from a letter from Mr. A. Kennard:

larvae of *Herse convolvuli* L. had been found at Ivybridge, Devon, in September and one imago had so far emerged on 11th November; two *Nycterosia obstipata* F. (Geometridae) had been obtained on 4th November at Ivybridge; and a *Cosymbia pupillaria* Hübn. (Geometridae) were found in the same locality on 6th October. From the same letter he gave details of the following 'out of season' occurrences: *Sphinx ligustri* L. (Sphingidae), a fresh example at Yealmpton, Devon, 3.ix.73; *Arctia caja* L. (Arctiidae) a fresh example at Ermington, Devon, 3.x.73; *Diacrisia sannio* L. (Arctiidae) at St. Kew, Devon, 9.ix.73; *Ochropleura plecta* L. (Noctuidae) a worn example, 9.x.73; *Hydraecia micacea* Esp. (Noctuidae), an example in fair condition, 31.x.73; and *Schrankia costaestrigalis* Hübn. (Plusiidae), 2.xi.73.

Using an actinic tube trap in a Herts locality, Rev. D. Agassiz said he had obtained approximately 100 *Brachionycha sphinx* Hufn. (Lep., Noctuidae) and a single male *Exapate congelatella* Clerck (Lep., Tortricidae).

Mr. E. H. Wild said he had been told of an *Apatura iris* L. (Lep., Nymphalidae) larva being taken on Ranmore Common, Surrey, this past spring.

Replying to a query about the President's exhibit Mr. M. W. F. Tweedie said there are two kinds of Jade; Jadeite and Nephrite. Jadeite is the jeweller's jade and the exhibited piece was Nephrite; both are composed mainly of silicates.

Mr. M. W. F. Tweedie gave a talk on 'Dinosaurs' which he illustrated with slides.

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## FIELD MEETINGS

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### DUNCTON CHALKPIT NATURE RESERVE, SUSSEX—3rd March 1973

*Leader: Mr. J. COOTER*

Despite the fine sunny day no members bothered to attend this the first meeting of the year. After waiting for one hour at the venue the leader decided to abandon the meeting.

Thanks are extended to the Sussex Trust for Nature Conservation for granting permission to take a party to collect insects from the reserve.

### CLIFFE MARSHES, KENT—14th April 1973

*Leader: Mr. T. WILKINSON*

This trip was attended by five members and seven visitors. Most of the day was spent studying the aquatic life and larvae of microlepidoptera, but many other interesting finds were made. The day was very enjoyable and despite a threatening sky the weather remained dry.

One interesting fact was the scarcity of *Notonecta* sp. (Hemiptera) in the locality this year in comparison to the same time in previous years. This may be related to a big drop in the salinity of the ditches in the area following the digging of freshwater wells on the marsh. The genus seems to be in normal numbers elsewhere on the marsh.

The area we visited is threatened with a possible oil refinery at present and in consequence most of the visitors (and nearly all the members) present were camping in the area for five days while carrying out surveys on the wildlife of the area on behalf of the North Kent Wildlife Preservation Society.

After suitable refreshment in one of the local pubs, several hours were spent at two moth traps. One member, Stewart Bondi, had a cassette tape recorder on which he had recorded some bird calls taken from a record. We were trying to identify these when a Little Owl (*Athene noctua*) started answering the taped call of that species which we were playing. Several subsequent nights of study provided us with some excellent recordings of several types of call which we could relate to different aspects of the bird's behaviour.

The following insects were recorded:

ODONATA *Ischnura elegans* (van der Lind) larvae, *Enallagma cyathigerum* (Charp.) larvae.

HEMIPTERA *Corixa punctata* (Illig.), *C. concinna* (Fieb.), *Cymatria coleoprata* (Fieb.), *Plea leachi* MacGreg., *Ilyocoris cimicoides* (L.).

COLEOPTERA *Dytiscus circumflexus* Ahrens, *Colymbetes fuscus* L., *Haliplus fluviatilis* Aubé, *H. lineatocollis* Marsh., *Noterus capricornis* Herbst, *Agabus conspersus* Marsh., *Gyrinus caspius* Mené., *Hydrous piceus* L., *Gyrinus marinus* Gyll., *Necrophorus investigator* Zett.

LEPIDOPTERA *Pieris rapae* L., *Aglais urticae* L., *Nymphalis io* L., *Gonepteryx rhamni* L., *Notodonta dromedarius* L., *Philudoria potatoria* L. (larvae), *Arctia villica* L., *Orthosia gothica* L., *O. stabilis* Schiff., *O. incerta* Hufn., *O. cruda* Schiff., *Conistra vaccinii* L., *Noctua pronuba* L., *Biston strataria* Hufn., *Selenia tetralunaria* Hufn., *Alsophila aescularia* Schiff., *Earophila badiata* Schiff., *Phlogophora meticulosa* L., *Diurnea fagella* F., *Agonopteryx ocellana* F., *Myelois cribrumella* Hübn., *Endothenia gentianaeanana* Hübn., *Coleophora glaucicolella* Wood., *C. lineolea* Staint., *Limnecia phragmitella* Staint., *Buccalatrix maritima* Staint., *Ostrinia nubilalis* Hübn.

HAWKHURST COURT, WISBOROUGH GREEN, SUSSEX  
12th May 1973

T. R. EAGLES' MEMORIAL MEETING

Leader: Mr. E. H. WILD

Twenty-two members and guests attended. Five members travelled down on Friday evening and ran three static Robinson traps, three traps from generators, and two Heath traps, on a half-mile circuit. After a cloudy start at 54°F, the sky cleared at midnight and the temperature fell to 40°F. by dawn. In all 167 moths comprising 38 species were observed. Two heathland species had established themselves on the cultivated *Ericas* in the gardens. At 10.30 a.m. the rest of the party began to arrive and after viewing the beautiful gardens with their fine show of Azaleas and Rhododendrons, they all dispersed to the old woodlands surrounding the school grounds. Because of the lateness of this season butterflies were few in number, but many larvae were beaten while the President was soon busy among the micros. Mr. A. E. Stubbs and his fellow dipterists recorded good captures while Mr. A. E. Gardner and Mr. R. D. Weal assaulted old beech trunks with vigour.

The whole party gathered for lunch round the ornamental ponds in the garden. After further work in the afternoon tea was served in the school hall and the members dispersed after a very pleasant day.

Special thanks are due to Mr. Pickering for making all the arrangements with the school. The following insects were recorded:

## LEPIDOPTERA

At light: *Chaonia ruficornis* Hufn., *Stauropus fagi* L., *Lophopteryx capucina* L., *Pterostoma palpina* Clerck., *Notodonta trepida* Esp., *N. ziczac* L., *Pheosia gnoma* F., *P. tremula* Clerck., *Cerura vinula* L., *Drepana binaria* Hufn., *D. lacertinaria* L., *Dasychira pudibunda* L., *Cyenia mendica* F., *Calocasis coryli* L., *Orthosia gothica* L., *O. stabilis* Schiff., *O. cruda* Schiff., *Conistrata vaccinii* L., *Polyploca ridens* F., *Xylocampa areola* Esp., *Plusia gamma* L., *Selenia tetralunaria* Hufn., *S. bilunaris* Esp., *Opisthograptis luteolata* L., *Eupithicea abbreviata* Steph., *E. exigua* Hübn., *E. nanata* Hübn., *Ectropis crepuscularia* Schiff., *Bapta bimaculata* F., *Menophora abruptaria* Thunb., *Ecliptoptera silaceata* Schiff., *Pachynemina hippocastanaria* Hübn., *Lycia hirtaria* Clerck., *Gonodontis bidentata* Clerck., *Biston strataria* Hufn., *Trichopteryx carpinata* Borkh., *Chimnache fagella* F., *Adela cuprella* Thunb.

By day: *Pieris rapae* L., *P. napi* L., *Anthocharis cardamines* L., *Gonepteryx rhamni* L., *Inachis io* L., *Aglais urticae* L., *Lycæna phleas* F., *Pararge aegeria* L., *Semiothis clathrata* L., *Ectropis consonaria* Hübn., *Lithina chlorosata* Scop., *Adela viridella* Scop.

## LARVAE

*Allophyes oxycanthae* L., *Xylocampa areola* Esp., *Cosmia trapezina* L., *Eupsilia transversa* Hufn., *Episema caeruleocephala* L., *Erannis marginaria* F., *E. defoliaria* Clerck., *E. aurtiaria* Hübn., *Theria rupicapra* Schiff., *Operoptera brumata* L., *O. fagata* Scharf., *Campaea margaritata* L., *Hydromena furcata* Thunb., *Deuteronomos erosaria* Schiff.

## COLEOPTERA

*Pediacus dermestoides* F., *Sinodendron cylindricum* L., *Melanotus rufipes* Herbst., *R. agium bifasciatum* F., *Curculio nucum* L., *Tripodendron domesticum* L.

## DIPTERA

*Syrphus ribesii* L., *S. vitripennis* Meig., *Dasysyrphus tricolor* Fall., *D. arcuatus* Fall., *Melanostoma mellinum* L., *Platycheirus albimanus* Fall., *Eristalis terax* L., \**Brachyopa scutellaris* R.D., \**Sphegina clunipes* Fall., *Macrocera stigma* Curt., *Achemia nitidicollis* Meig., *Neuratelia nemoralis* Meig., *Boletina trivittata* Meig., *B. basalis* Meig., *B. gripha* Dz., \**Mycomia circumdata* Staeg. (previously known only from a few old forests including Wyre, Sherwood and Savernake), *Phronia forcipula* Winn., *P. basalis* Winn., *Bibio reticulatus* Lw., *B. varipes* Meig., *Dilophus febrilis* Lw., *Hydrotaea occulta* Meig., *Norellia spinipes* Meig. (on daffodils, new county record), *Nanna fasciata* Meig., *Lonchaea vaginalis* Fall., *Piophilha vulgaris* Fall., *Neoleria inscripta* Meig., *Linonia nebulosa* Meig., *L. decemmaculata* Lw., *Dicranomyia fusca* Meig., *Lipsothrix remota* Walker, *Sepedon spinipes*. An unfamiliar female subsequently determined as *Chaetostoma giraudi* Frfld. may prove to be only the second British record and will be the subject of a separate note.

\* Good species characteristic of old woodlands.

ASHTHEAD COMMON, SURREY—26th May 1973

Leader: Mr. K. G. W. EVANS

This was a joint meeting with the Croydon Natural History and Scientific Society, and no less than 36 members and friends attended. Some members examined the contents of a Robinson mercury vapour light trap and a Heath

ultra violet light trap, which had been set up the night before, but no remarkable finds were made.

In such a large party it was not surprising that there were specialists in many Orders. The day was sunny and with the temperature in the seventies and for most of the time the more energetic activities soon gave way to more leisurely searching and collecting. It is a great pity that once again large tracts of this fine area had been devastated by fire. Nevertheless the area is very large and members found a great deal of interest and many insects of several Orders were examined and discussed; the beating of oaks proved most rewarding.

Two larvae of *Dicycla oo* L., one of the chief quarries, were beaten from the growth on the trunks of oak about head height.

Mr. Alan Stubbs reported two specially interesting Diptera. A female *Oedalia apicalis* Loew, a small empid, was pootered while hovering by the end of a log. This species was previously known from only the New Forest where it was also found associated with dead wood (Collin, *British Flies* VI). The British Museum (Nat. Hist.) has but two specimens. The second find was an *Odinia boletina* Zett. which was taken sitting on a hard young bracket fungus on the trunk of a poplar. This appears to be the first record of the family in Surrey and has not been taken before in the London area (Parmenter's Index for the London Natural History Society).

Mr. C. O. Hammond was pleased to find the large deep metallic blue-green calliphorid *Cynomya mortuorum* L., while Mr. Peter Chandler found the interesting tachinid *Trixa caerulescens* Meig.

Other Diptera reported were: *Tipula oleracea* L., *T. varipennis* Meig. (common), *Limonia nubeculosa* Meig., *L. tripunctata* F., *Erioptera trivialis* Meig. (common in marshy spots), *Cheilosia albitarsis* Meig., *C. bergenstammi* Berk., *C. fraterna* Meig., *C. paganus* Meig., *C. variabilis* Meig., *Helophilus pendulus* L., *Leucozona lucorum* L., *Syrphus albostrigatus* Fall., *S. elegans* Har., *S. venustus* Meig., *Eristalis pertinax* Scop., *Platychirus scutatus* Meig., *Melanostoma mellinum* L., *Thricops hirsutulus* Zett., *Pogonomyia decolor* Fall., *Fannia sociella* Zett., *Morellia hortorum* Fall., *Sarcophaga clathrata* Meig., *Bibio leucopterus* Meig., *Palloptera quinquemaculata* Macq.

The Lepidoptera included: *Pararge aegeria* L., *Coenonympha pamphilus* L., *Aglais urticae* L., *Nymphalis io* L., *Thecla quercus* L., *Pieris brassicae* L., *P. rapae* L., *P. napi* L., *Anthocharis cardamines* L., *Gonepteryx rhamni* L., *Erynnis tages* L., *Cyenia mendica* Clerck, *Allophyes oxyacanthae* L., *Amphipyra pyramidea* L., *A. berbera* Rungs, *Cosmia trapezina* L., *Operophtera brumata* L., *Abraxas grossulariata* L., *Bapta bimaculata* F., *Deilinia exanthemata* Scop., *Opisthograptis luteolata* L., *Biston strataria* Hufn., *Aethalura punctulata* Schiff., *Lithinia chlorosata* Scop., *Cacoecia lecheana* L., *Pandemis heparana* Schiff., *Aleimma loeflingiana* L., *Gyponoma dealbana* Fröl., *Adela viridella* Scop., *Nemophora swammerdamella* L., *Grapholita jungiella* Clerck.

The Coleoptera were represented by: *Anaspis rufilabris* Gyll., *Anthonomus pedicularis* L., *Apion ulicis* Forst., *Atomaria atricapilla* Steph., *Balanobius pyrroceras* Marsh., *B. salicivorus* Payk., *Bruchus loti* Payk., *Byturus aestivus* Thoms., *Chalcoides aurata* Marsh., *Corticaria pubescens* Gyll., *Lathridius nodifer* Westw., *Lochmaea crataegi* Forst., *Meligethes lumbaris* Sturm., *M. umbrosus* Sturm., *Orchestes rusci* Herbst, *Rhynchites aquatus* L., and *R. betulae* L.

Also the neuropteran *Chrysopa perla* (L.) and the mecopteran *Panorpa communis* L.

It must also be recorded that a Grasshopper Warbler was noted 'singing' during the day.

## ISLE OF COLONSAY, ARGYLL—27th May–3rd June 1973

Leader: T. C. DUNN.

For this full week field expedition, only two members were present. We met on the pier at Oban, as previously arranged.

Few insects were captured on the wing during daylight because of the rather strong, cold winds, but beating, sweeping and searching for specimens was quite rewarding. The main purpose of the week's work was to collect and list all Orders of insects, since only a few Lepidoptera had been noted previously. We also wanted to collect larvae of *Thecla quercus* L. from the wood, Choile Mhor, where it had been taken in 1964. In this we were unsuccessful, although we spent a day in the area and found many other insects. Portable mercury vapour light equipment was set up on most evenings but after the first three nothing appeared at all, because of a sharp drop in temperature. A full list of captures and sightings will be published later when larvae have had time to feed up and produce their imagines.

Botany and ornithology were not neglected. Many plants were seen, the ferns being particularly abundant. It was quite surprising to see the Royal Fern growing in such profusion and *Scilla verna* Huds. was at its best. Of the birds, the most interesting was the Corncrake. On Colonsay this species is still as common as it was on the mainland of Britain in the 1930's. Each evening their peculiar cry went on into the night and I was lucky enough to see one for several minutes. It walked across the road in front of the car which was promptly stopped. The bird then very kindly did a left turn and marched along the roadside by the side of the car, with all the occupants staring silently through the side windows. Other interesting species were the many cliff-nesting birds such as Razorbill, Guillemot, Kittiwake, Fulmar and Shag. A pair of Red-throated Divers were seen on an inland loch. In nearly all the bays we came across pairs of breeding Shelducks and, overhead, buzzards were quite a frequent sight.

## DARWIN'S ORCHID BANK, DOWNE, KENT—3rd June 1973

Leader: MR. J. M. CHALMERS-HUNT

This locality, so well known for its association with Charles Darwin, consists of two adjacent areas of chalk down surrounded by woodland. The party which assembled there enjoyed a dry, rather warm, day with long spells of sun. This is a reserve owned by the Kent Trust for Nature Conservation, and we were particularly fortunate to have had with us Mr. Peter Hogg the warden, whose knowledge of the locality added much to the interest of the meeting.

Among the Lepidoptera noted were: *Coleophora paripennella* Zell. (*alcyonipennella* sensu P. & M.) cases on *Centaurea nigra* L., *C. discordella* Zell., *Elachista albifrontella* Hübn., *E. argentella* Clerck, *Adela fibulella* D. & S. several imagines at flowers of *Veronica*, *Caloptilia syringella* F., *Pyrausta aurata* Scop., *Capua vulgans* Fröl., *Dichrorampha alpinana* Treits., *D. aeratana* P. & M. one taken by Mr. S. Whitebread, *Pancalia leuwenhoekella* L., *Lomographa bimaculata* F.; also several butterflies including *Callophrys rubi* L., *Lycæna phlaeas* L. *Pararge aegeria* L. and *Anthocharis cardamines* L. of both sexes.

Among the Diptera noted were *Volucella bombylans* L. and *Bombylius major* L., while the coleopterists reported *Cantharis rustica* Fall., *C. livida* L., *Phyllopertha horticola* L. and *Pyrochroa coccinea* L.

Several species of orchid were seen included *Ophrys insectifera* L. (Fly Orchid), *Gymnadenia conopsea* L. (Sweet-scented Orchid), *Dactylorhiza maculata* L.

(Spotted Orchid), *Listera ovata* L. (Twayblade) and *Cephalanthera damasonium* Mill. (White Helleborine), all of which were in bloom. Also, *Anacamptis pyramidalis* L. (Pyramidal Orchid) and other interesting plants including *Lathraea squamaria* L. (Toothwort) and *Ophioglossum vulgatum* L. (Adder's Tongue).

About 4 p.m. the party left by car for Downe House, Darwin's home for many years, to inspect the museum there and to listen to a most interesting talk by Professor Sir Hedley Atkins on the author of the *Origin of Species*. There followed an excellent tea after which the party dispersed. In conclusion we should like to take this opportunity of thanking Mr. Peter Hogg and the KTC for kindly permitting the Society to visit Downe Bank, as well as Sir Hedley for his fascinating talk.

#### LYMPNE, KENT—17th June 1973

Leader: Mr. J. C. FELTON

The main purpose of the day was to record the plants of the little worked tetrads on the lower greensand scarp, TR/13 C and H. The morning was spent along the footpath running east from Shepway Cross in TR/13 H. About 150 were recorded. A feature was the number of chalk grassland species found. For instance, both species of *Helictotrichon* were found growing within a metre of each other. The spring lines along the scarp introduced a number of species, notably *Iris foetidissima* L. More flowers of this normally 'shy' species were seen together than any of us had ever seen before.

In the afternoon the walk from Lympne Castle down to the Royal Military Canal proved equally interesting, about 130 species being found. The abundance of *Rumex pulcher* L. in the open grassland was notable but of even more interest was the relict coastal grassland flora at the foot of the hill. *Erodium* was particularly abundant. Interest was maintained at the canal itself with three species of *Lemma* and one of *Utricularia*.

Few insects were recorded. *Myrmica ruginodis* Nyl. (*rubra* (L.)) was the only species in the genus found in the morning, when *M. scabrinodis* Nyl. (*sabuleti* (Mein.)) could well have been expected. *Leptothorax acervorum* (F.) was found in a fallen tree trunk.

In the afternoon an adult of the sawfly *Selandria serva* (F.) was taken on leaves of *Glyceria maxima* (Hartm.) Holmb. which showed feeding damage, suggesting it as the larval foodplant, additional to the list in the 'Handbook'.

A valuable and interesting day.

#### HOTHFIELD COMMON, KENT—8th July 1973

Leader: Mr. J. C. FELTON

The morning task was to continue a bracken-pulling project that had previously been run entirely under the aegis of the Hothfield Management Committee. Six 20m squares were marked out in Compartment 5 where bracken is invading into heather. The bracken had been pulled from four of these squares a month previously and regrowth was strong. The party pulled and counted the bracken fronds from two squares that had been pulled previously and from two fresh squares. Subsequent observation in August showed that regrowth was marked not only in the early pulled squares but also in those pulled twice. Regrowth was negligible in the remaining two squares that had been pulled late and once only. Whether this has long-term significance will only be known in 1974.

After lunch the salient features of the LNR were demonstrated. A considerable

extension of the *Polygonum cuspidatum* Sieb. & Zucc. colony towards the top of Bog 2 in Compartment 9 was noted. The well-worn path between Compartments 5 and 7 again proved rich in ground-nesting aculeates, both wasps and bees. *Oxybelus uniglumis* (L.) was abundant. Eleven examples of other species were taken and nine species were represented, a very high diversity. Five species of sphecid wasp were new to the Hothfield list; *Mimesa equestris* (F.), *Lindenius panzeri* (v. d. Lind.), *Cerceris arenaria* (L.) and *C. rybyensis* (L.), all scarce in East Kent, and *Crossocerus varus* Lep. & Brullé, a more common species. Three bees were taken, all of which confirmed records made in 1902/3: *Halictus rubicundus* (Christ), *Sphecodes gibbus* (L.) and *Andraena bimaculata* (Kirby).

Altogether a most valuable day, proving the importance of being in the right place at the right time.

## WALBERSWICK AREA, SUFFOLK—28th/29th July 1973

Leader: Mr. H. E. CHIPPERFIELD

Eleven members were present at this meeting which was divided between Walberswick marshes and Southwold sand-dunes. Walberswick has suffered flooding by the sea during the past two years and this has adversely affected the species which inhabit the sand-dunes, hence the decision to visit Southwold for them.

The following Lepidoptera were recorded:

### WALBERSWICK MARSHES

*Lophopteryx capucina* L., *Phalera bucephala* L., *Habrosyne pyritoides* Hufn., *Euproctis similis* Fuessl., *Malacosoma neustria* L., *Philudoria potatoria* L., *Comacla senex* Hübn., *Eilema griseola* Hübn., *E. lurideola* Zinck, *E. complana* L., *Phragmatobia fuliginosa* L., *Arctia caja* L., *Euoxa nigricans* L., *E. tritici* L., *Agrotis puta* Hübn., *Lycophotia varia* Vill., *Diarsia brunnea* Schiff., *Amathes baja* Schiff., *A. ditrapezium* Schiff., *A. triangulum* Hufn., *Axylia putris* L., *Noctua comes* Hubn., *N. janthina* Schiff., *N. interjecta* Hübn., *Noctua pronuba* L., *Mamestra brassicae* L., *Diataraxia oleracea* L., *Scotogramma trifolii* Hufn., *Hadena suasa* Schiff., *Sideridis albicolon* Hübn., *Leucania pallens* L., *L. impura* Hübn., *L. straminea* Treit., *L. lythargyria* Esp., *Mythimna conigera* Schiff., *Arenostola brevilinea* Fenn., *A. phragmitidis* Hübn., *Nonagria dissoluta* Treits., *N. neurica* Hübn., *Chilodes maritima* Tausch., *Caradrina morpheus* Hufn., *C. alsines* Brahm., *C. blanda* Schiff., *C. clavipalpis* Scop., *Apamea lithoxylea* Schiff., *A. monoglypha* Hufn., *A. oblonga* Haw., *A. secalis* L., *Eremobia ochroleuca* Schiff., *Procus latruncula* Schiff., *P. literosa* Haw., *P. furuncula* Schiff., *Euplexia lucipara* L., *Thalophila matura* Hufn., *Celaena leucostigma* Hübn., *Hydraecia oculea* L., *H. paludis* Tutt., *Amphipyra tragopogonis* Clerck., *Cucullia asteris* Schiff., *Plusia iota* L., *P. gamma* L., *Hypena proboscidalis* L., *Pseudopterna pruinata* Hufn., *Hemitehea aestivaria* Hübn., *Scopula imitaria* Hübn., *Sterrhia dimidiata* Hufn., *S. straminata* Borkh., *S. aversata* L., *Xanthorhoe ferrugata* Clerck., *Ecliptoptera silaceata* Schiff., *Pelurga comitata* L., *Gymnoscelis pumilata* Hübn., *Deilinia pusaria* L., *Selenia bilunaria* Esp., *Crocallis elinguaris* L., *Alcis repandata* L., *Eurrhynx hortulana* L., *Udea nivealis* F., *Endotricha flammealis* Schiff., *Hypopygia costalis* F., *Catoptria pinellus* L., *Agriphila culmellus* L., *A. tristellus* Schiff., *Chilo phragmitellus* Hübn., and *Celypha striana* Schiff.

## SOUTHWOLD SAND-DUNES

*Euxoa cursoria* Hufn., *E. tritici* L., *Ochroleuca plecta* L., *Amathes triangulum* Hübn., *Noctua comes* Hübn., *N. pronuba* L., *Diataraxia oleracea* L., *Leucania impura* Hübn., *L. litoralis* Curt., *L. lythargyria* Esp., *Arenostola elymi* Treits., *Apamea monoglypha* Hufn., *A. secalis* L., *Procus furuncula* Schiff., *Sterrhia dimidiata* Hufn., *S. aversata* L., *Euphyia bilineata* L., *Ortholitha chenopodiata* Schiff., *Catoptria pinellus* L., *Platytes alpinellus* Hübn.

## BROWNDOWN, HANTS—23rd June 1973

Leader: Mr. R. DICKSON

This interesting area was visited by entomologists with a view to increasing our knowledge of the part threatened by tipping. The warm sunny afternoon's collecting was rather marred by the distressing sight and nauseating smell of the tip. Browndown contains an estuary (the threatened area) but is mainly a shingle beach merging into shingle with littoral flora, this in turn merging into heath on shingle, and finally becoming stunted oak woodland. Records typical of each zone will be found below. In addition to the British Entomological and Natural Society, the Gilkicker Group, Portsmouth and District Natural History Society, Hampshire and Isle of Wight Naturalists' Trust and the Amateur Entomologists' Society were represented. Lepidoptera, Hymenoptera Aculeata, Coleoptera and Diptera were covered.

## LEPIDOPTERA

During the day the following species were noted: *Maniola jurtina* L., *Coenonympha pamphilus* L., *Aglais urticae* L., *Ochlodes venata* Br. & Grey, *Macrotylacia rubi* L., two or more males flying wildly, *Callimorpha jacobaeae* L., *Agrotis exclamationis* L., *Peridroma porphyrea* D. & S., *Noctua pronuba* L., *Anarta myrtilli* L., *Sterrhia dimidiata* Hufn., *S. seriata* Schrank, *S. subseriata* Haw., *Epirrhoe alternata* Müll., *Euphyia bilineata* L., *Eupithecia subfuscata* Haw., *E. nanata* Hübn., *Gymnoscelis fulvifasciata* Haw., *Petrophora chlorosata* Scop., *Cabera exanthemata* Scop., *Zygaena trifolii* Scop., *Nemapogon ruricolella* Staint., *Phyllonorycter quercifoliella* Zell., *Argyresthia curvella* L., *Phaulernis fulviguttella* Zell., *Coleophora alticolella* Zell. determined by genitalia, *C. caespititiella* Zell., determined by genitalia, *C. albicosta* Haw., *Elachista albifrontella* Hübn., *Syncopaema cinetella* Clerck, *Scythris grandipennis* Haw., *Cydia succedana* D. & S., *Pammene fasciana* L., *Epilemma uddmanniana* L., *Orthotaenia undulana* D. & S., *Hedya pruinana* Hübn., *Olethreutes lacunana* D. & S., *Tortrix viridana* L., *Agapeta hamana* L., *Chrysoteuchia culmella* L., *Scoparia arundinata* Thunb., *Eudonia angustea* Curt., *Anania verbascalis* D. & S. one male, *Oncocera palumbella* D. & S., *Pyla fusca* Haw., *Pterophorus pentadactyla* L., *Adaina microdactyla* Hübn. By sweeping Scentless Mayweed more than a dozen *Cucullia chamomillae* D. & S. larvae were found, whilst heather produced larvae of *Anarta myrtilli* L. and *Eupithecia nanata* Hübn.; aspen and birch produced larvae of *Eligmodonta ziczac* L. and *Falcaria lacertinaria* L. respectively. Mines of *Phyllonorycter messaniella* Zell. smothered the holm oaks, but *Stigmella suberivora* Staint., which occurs less than two miles away at Gilkicker Point, was not in evidence.

Whilst laying the sugar at late dusk a fine *Acrionicta leporina* L. female was taken from a birch trunk. The sugar produced *Dypterygia scabriuscula* L., *Acrionicta aceris* L., *Agrotis exclamationis* D. & S., *Noctua pronuba* L., *Rusina ferruginea* Esp., *Euplexia lucipara* L., *Phlogophora meticulosa* L., *Mythimna*

*pallens* L., *Apamea monoglypha* Hufn., *A. lithoxylea* D. & S., *A. caracterea* Hübn., *A. remissa* Hübn., *Oligia strigilis* L., *O. fasciuncula* Haw. A *Timandra griseata* Peterson flew in without stopping.

At the mercury vapour lamp 75 species were recorded: *Arctia villica* L., *Mythimna straminea* Treits., *M. obsoleta* Hübn. and *Chilo phragmitella* Hübn. were most typical of the area. The others were *Smerinthus ocellata* L., *Deilephila elpenor* L., *D. porcellus* L., *Notodonta dromedarius* L., *Habrosyne pyritoides* Hufn., *Tethea ocularis* L., *Philudoria potatoria* L., *Eilema lurideola* Zinck., *Spilosoma luteum* Hufn., *Agrotis exclamationis* D. & S., *Axylia putris* L., *Noctua pronuba* L., *Lycophotia porphyrea* D. & S., *Diarsia mendica* F., *D. rubi* View., *Xestia c-nigrum* L., *Dicestra trifolii* Hufn., *Mamestra brassicae* L., *Lacanobia oleracea* L., *Ceramica psi* L., *Mythimna impura* Hübn., *M. pallens* L., *M. comma* L., *Acronicta psi* L. one male determined by genitalia, *Rusina ferruginea* Esp., *Euplexia lucipara* L., *Phlogophora meticulosa* L., *Apamea monoglypha* Hufn., *A. caracterea* Hübn., *A. remissa* Hübn., *Oligia strigilis* L., *O. latruncula* D. & S., *O. fasciuncula* Haw., *Mesapamea secalis* L., *Hoplodrina alsines* Brähm., *H. ambigua* D. & S., *Caradrina morpheus* Hufn., *Autographa gamma* L., *Hypena proboscidalis* L., *Idaea biselata* Hufn., *I. seriata* Schrank, *I. trigeminata* Haw., *I. aversata* L., *Epirrhoe alternata* Mull., *Eulithis pyraliata* D. & S., *Chloroclysta truncata* Hufn., *Eupithecia centaureata* D. & S., *Lomaspilus marginata* L., *Pterophora chlorosata* Scop., *Biston betularia* L., *Peribatodes rhomboidaria* *Cabera exanthemata* Scop., *Hepialus lupulinus* L., *Chrysoteuchia culmella* L., *Eudonia angustea* Curt., *Aphomia sociella* L., *Ephestia elutella* Hübn., *Pammene fasciana* L., *Epiblema uddmanniana* L., *Epinotia subocellana* Don., *Pandemis cerasana* Hübn., *Clepsis spectrana* Treits., *Cnephasia interjectana* Haw. four determined by genitalia, *C. insertana* Treits. one male determined by genitalia, *Tortrix viridana* L., *Agapeta hamana* L., *Nematopogon metaxella* Hübn., *Glyphipterix fuscoviridella* Haw., *Rhynchopacha mouffetella* L. and *Neofaculta ericetella* Hübn. I am grateful to Eric Bradford for some identifications.

#### HYMENOPTERA

George Else's notes read: '*Prosopis pectoralis* (Först.), several males on *Rubus* and flying; one female examining an old lucens gall; *Nomada hillana* (Kirby), one female, new to me; *Bombus lucorum* (L.) one female on *Erica* flowers; *B. lapidarius* (L.), several workers on *Erica*; *B. pratorum* (L.), two males on *Rubus* flowers; *B. jonellus* (Kirkby), 12+ females and two workers on *Erica* flowers; *B. pascuorum* (Scop.) (= *agrorum* (F.)), one or more workers; *Psithyrus campestris* (Panz.), one female; *Apis mellifera* L., females abundant; *Ammophila sabulosa* (L.), one male on *Rubus fruticosus* agg. flowers; three *Ammophila* spp. ? *sabulosa* flying; *Oxybelus uniglumis* (L.), two males.'

Also taken by Mr. P. Chandler, determined by Mr. G. Else: *Crossocerus varus* Lep. & Br., a male; *Passaloecus gracilis* (Curtis), a male; *Hedychridium ardens* Lat., a single example; *Omalus auratus* (L.), a single example; *Trypoxylon attenuatum* Smith, a male and a female; *Psenulus pallipes* (Panz.), a male; *Passaloecus singularis* Dahl., one male and three females; *Prosopis brevicornis* (Nyl.), two males.

#### DIPTERA

Peter Chandler's notes read: '*Lipara lucens* Meig. and *L. rufitarsis* Loew (Chloropidae); both develop in galls on *Phragmites*. The second species is rather restricted to fens. *Cerodontha hennigi* Now. (Agromyzidae), a leaf miner of *Calamagrostis epigejos* (L.) Roth., only recorded from several fens in Britain. It

was numerous at Browndown but I had previously collected it only in France. *Tipula nigra* L. (Tipulidae), a rather sturdy black crane-fly, restricted to banks of ponds and rivers and very local. One was seen flying along the canal. *Tephritis cometa* Loew (Trypetidae), a very local pictured-wing fly, which has been reared from flowerheads of the Creeping Thistle, but probably feeds more usually in some less common composite. Several other Agromyzidae (leaf-miners) may be interesting but these have not yet been identified. George Else also records two examples of *Volucella pellucens* (L.); two of the yellow form of *V. bombylans* (L.); and a further male example of *Tipula nigra* (L.).

#### HEMIPTERA

A nymph of *Alydus calcaratus* (L.).

#### COLEOPTERA

David Appleton's notes read: 'Coleoptera included: *Harpalus affinis* (Schrank), several at roots of plants; *Gyrophynus laeviusculus* (Steph.), one swept; *Tachyporus chrysomelinus* (L.), *T. hypnorum* (F.) and *T. obtusus* (L.), several of each swept; *Tychus niger* (Payk.), one swept; *Reichenbachia juncorum* (Leach), one swept; *Rhagonycha testacea* (L.), several noted; *R. lignosa* (Mull.), several noted; *Athous hirtus* (Herbst), one swept and one in flight; *A. haemorrhoidalis* (F.), several swept; *Agriotes lineatus* (L.), one swept; *Anisosticta novemdecempunctata* (L.), several noted; *Coccidula rufa* (Herbst), several swept; *Anaspis maculata* Geoff., several swept; *A. regimbarti* Schil., several swept; *Cylindronotus laevioctostriatus* (Goeze), several swept after dark; *Strangalia maculata* (Poda), several on blossom; *Zeugophora subspinosa* (F.), two off aspen; *Lochmaea suturalis* (Thoms.), several, and many larvae, swept from "heathland"; *Luperus circumfusus* (Marsh.), several off gorse; *L. longicornis* (F.), in very great profusion on bushes; *Aphthona coerulea* (Geoff.), several on *Iris*; *Haltica lythri* Aubé, several on *Epilobium*; *Lythrarina salicariae* (Payk.), frequent on Yellow Loosestrife; *Chaetocnema concinna* (Marsh.), several swept; *Apion ulicis* (Först.), a few on gorse; *A. scutellare* Kirby, about 12 on dwarf gorse; *A. viciae* (Payk.), several swept; *Phyllobius pyri* (L.), several beating; *Polydrusus confluens* Steph., several on gorse; *Strophosomus sus* Steph., several swept from "heathland" after dark; *Smicronyx jungermanniae* (Reich), *Micrelus ericae* (Gyll.), frequent, swept "heathland"; and *Nanophyes marmoratus* (Goeze), common on Purple Loosestrife.'

'At mercury vapour light the following species were recorded: *Acupalpus dubius* Schils, one; *Amara apricaria* (Payk.), one; *A. convexiuscula* (Marsh), 12+; *Enochrus melanocephalus* Ol., three; *Melanotus rufipes* (Herbst), one.'

ELBEUF, FRANCE—23rd–24th June 1973

Leader: Mr. L. F. CRICK

This was the second meeting of its kind with the Société d'Etudes des Sciences Naturelles et du Musée d'Elbeuf, following the first joint meeting on 21–22.v.72. The later date for 1973 had been chosen as being more likely to be suitable for finding *Apatura ilia* Schiff. with the *clytie* Schiff. form.

Mr. W. H. Tams joined the leader and his wife, crossing to Boulogne on 22nd June, meeting Mr. and Mrs. E. P. Wiltshire at Caudebec-en-Caux; while Mr. C. L. Nissen, at present living near Paris, came direct to the joint meeting on the following two days.

The weather was good, but the season had been delayed by poor conditions in

May and early June. The Elbeuf Society had chosen various sites where *A. ilia* was found, in the Forêt de la Londe, near Elbeuf. However on 23rd June only one was seen, perched out of reach and refusing to be tempted to earth by a variety of household and agricultural bait. That day *Philea irrorella* Clerck was taken and *Limenitis camilla* L. and *Ochlodes venata* Br. & Grey were seen.

In the morning of 24th June, a further attempt was made to find *A. ilia*, but without success. However a fine specimen of *Limenitis reducta* Staud. was secured. The rest of the day was spent on the west-facing slopes of Le Hamet in the lower Eure valley (as on the second day of the 1972 meeting). The following were taken: *Melitaea athalia* Rott., *Coenonympha arcania* L., *Cupido minimus* Fuessl., *Aphantopus hyperanthus* L., *Argynnis paphia* L., *Limenitis camilla* L. (seen in numbers at end of afternoon), *Melanargyia galathea* L. A larva of *Eilema complana* L. was beaten from Juniper.

The meeting was most ably and pleasantly run by the President of the Elbeuf Society, Dr. M. Lainé and his wife, who sacrificed much of their professional time for the purpose. Picnic lunches were laid on by Mme. Lainé and Mme. Picard; while Dr. and Mme. Lainé were extremely hospitable to the British contingent. It is to be hoped that similar meetings can be arranged in future years, as the Eure valley, particularly in its upper reaches, with many south-west facing slopes, will repay further study.

#### CHOBHAM COMMON, SURREY—15th July 1973

Leader: Mr. P. J. BAKER

This meeting coincided with heavy rain, which was the first for four weeks and the last for a further three weeks. In spite of this seven members and two guests joined the leader for a very wet excursion to the Albury Bottom area of the common. Due to the generally dry conditions even the normally boggiest areas were easily accessible, but it was pleasant to note that the common had suffered only slightly from the spate of fires.

Insects of all Orders were generally scarce, but one feature was the abundance of *Idaea muricata* Hufn. Possibly due to the low ambient light level these were easily flushed and several dozen were soon recorded. This insect was accompanied less commonly by its two regular pyralid companions in this area; *Endotricha flammealis* D. & S. and *Hypsopygia costalis* F. *Plebejus argus* L. was very common sitting on the vegetation and occasionally making half-hearted attempts at flight. Other Lepidoptera noted were: *Thymelicus sylvestris* Poda, *Maniola jurtina* L., *Pseudoterpna pruinata* Hufn., *Eupithecia nanata* Prout, *Lomaspilus marinata* L., *Ematurga atomaria* L., *Noctua pronuba* L., *Autographa gamma* Hübn., *Phytometra viridaria* Clerck and *Hypenodes turfosatis* Wocke.

The dipterists present were somewhat unimpressed by the results of their searches. The following list was submitted by Mr. P. Chandler: *Dioctria baumhaueri* (Meig.), *D. atricapilla* (Meig.), *Dolichopus vitripennis* (Meig.), *Hydrophorus nebulosus* (Fall.), *Episyrphus balteatus* (Deg.), *Limnaemya vulpina* (Fall.), *Opomyza germinationis* (L.), *Tephritis vespertina* (Loew), *Helina ciliatocosta* (Zett.) and *Alloeostylus diaphanus* (Weid.).

#### HORSELL COMMON, SURREY—22nd July 1973

Leader: Mr. A. GRAY

After a showery start, the party of 11 enjoyed a reasonably warm day with good periods of sunshine. From the Anthonys Bleak House rendezvous the

party moved along the Sandy Road, noting several *Quercusia quercus* L. on the small oaks bordering the track. In addition *Maniola jurtina* L., *M. tithonus* L., *Thymelicus sylvestris* Poda and *Ochlodes venata* Br. & Grey were abundant on flowers and several *Aphantopus hyperantus* L. were seen.

In the sandpit which was favourably commented upon by all present, there were several *Aglais urticae* L. and *Zygaena filipendulae* L., and one *Polygonia c-album* L. and a *Gonepteryx rhamni* L. were also noted.

Several dead honeybees were found in inflorescences; closer examination revealing a substantial larva occupying the abdomen of the insects.

A few *Plusia gamma* L. were on the heather and *Eumenis semele* L. and *Plebejus argus* L. were seen near the Danewell Gutter. In the gutter *Crambus uliginosellus* Zell. was abundant. Due to the excessive dryness of the summer, there was no standing water and no Odonata were seen. During the walk through heathland a single example of the green tiger beetle, *Cicindela campestris* L., was observed.

Four grasshoppers were identified; firstly *Metrioptera brachyptera* (L.) and *Chorthippus paralellus* (Zett.) were found in the gutter and secondly, *Gomphoceros rufus* (L.) and *Myrmeleotettix maculata* (Thunb.) were obtained on the heath.

Additional Lepidoptera recorded were as follows: *Nymphalis io* L., *Pieris napi* L., *Drepana lacertinaria* L., *Pseudopterna pruinaria* Hufn., *Thera obeliscata* Hübn., *Deilinia pusaria* L., *D. exanthemata* Scop., *Ematurga atomaria* L., *Bupalus piniaria* L., and *Semiothisa liturata* Clerck. Among the larvae the following were identified: *Drepana falcataria* L., *Episema caeruleocephala* L., *Apatele leporina* L., *Biston betularia* L. and *Leucania comma* L.

The most useful Diptera record was *Micropeza lateralis* Meig. which has few British records and was previously known in Surrey from Thursley Bog. Several specimens were found by sweeping around bushes growing on the floor of the sandpit close to the shallow brook. The flowers in the sandpit were very attractive to Diptera and on this exceptional occasion six *Echinomyza grossa* L. were seen on thistle, a large bumble-bee-like tachinid with infrequent Surrey records.

### COSFORD MILL, SURREY—15th September 1973

Leader: Mr. P. J. BAKER

At various times of the day ten members and two guests attended this meeting, which started cloudy with spots of rain. Later the sun appeared and it became quite warm and the following Lepidoptera were seen in flight or settled on flowers: *Polygonia c-album* L., *Aglais urticae* L., *Vanessa atalanta* L., *Pieris rapae* L., *Parage aegeria* L., *Autographa gamma* L. and *Orgyia antiqua* L.

Searching for larvae showed these to be none too plentiful, but after some time those of *Eupithecia tripunctaria* H.-S. were found on the seed heads of *Angelica sylvestris* L., *Bupalus piniaria* L., on *Pinus sylvestris* L. and a mixed assortment on *Alnus glutinosa* L.

An excellent tea was provided by Mr. and Mrs. Loaridge, but those partaking had to beat a hurried retreat to the mill as a heavy downpour set in. Probably this rain was the reason for the somewhat indifferent results from dusking and running light traps in the area that night, the only Lepidoptera noted being: *Hepialus sylvina* L., *Xestia c-nigrum* L., *Noctua comes* Hübn., *Hypena proboscidalis* L., *Atethmia xerampelina* Hübn., *Paradiarsia glareosa* Esp., *Xanthia aurago* D. & S., *Amphipyra tragopogonis* Clerk., *Diachrysis chrysitis* L., *Mythimna pallens* L., *Xestia xanthographa* D. & S., *Noctua pronuba* L., *Chloroclysta truncata*

Hufn., *Caradrina clavipalpis* Scop., *Plusia gamma*, *Ochropleura plecta* L., *Ennomos fuscantiaria* Haw. and *Colostygia pectinataria* Knoch.

Mr. P. Chandler reported that the most interesting dipteron captured in the swampy wood behind the mill was the Deer Ked, *Lipoptena cervi* (L.), of which two winged specimens were swept from low herbage. This may be the first record of this insect from this part of Surrey, although it is common in the New Forest and has been found at Knole Park in Kent.

The swampy woodland also produced thirty species of fungus gnats, Mycetophilidae, while none could be found on the adjacent dry heath.

*The diurnal flight of the female of Rhamphomyia (Pararhamphomyia) marginata F. (Diptera: Empididae).* With reference to Mr. Chandler's interesting article on this species (*Proc. Brit. ent. nat. Hist. Soc.*, 1973:73-6) based on the appearance of females taken at light, it may be worth noting that I took a female *R. marginata* flying actively in brilliant sunshine in a mixed woodland clearing at Haltinne (Prov. de Namur), Belgium, 27.v.70. Its flight was rapid and difficult to follow especially in bright sunlight, but the pronounced contrast in the wing markings of the female of this curiously attractive insect was particularly noticeable while on the wing. Mr. K. G. V. Smith, British Museum (Nat. Hist.) kindly determined the specimen for me.—J. M. CHALMERS-HUNT, 1 Hardcourts Close, West Wickham, Kent, BR4 9LG, 9th November 1973.

*Nephopteryx similella* Zin. (*Lep., Pyralidae*); a correction. This species was recorded during the meeting of 14th June 1973 (Vol. 6, page 90) when the locality was given in error as Camber, Sussex. The correct locality is Pamber, Hants.—*Editor.*

*Late appearance of Micropteryx aruncella* Scop. On 26th August 1973 I collected a female of this species from *Senecio jacobaea* L. (Ragwort) which was growing by the roadside near Pitlochry, Perthshire. Both Stainton, H. T. (1859, *Manual of British Butterflies and Moths*) and Meyrick, E. (1928, *Revised Handbook of British Lepidoptera*) state that *M. aruncella* flies in June, and this corresponds with my own observations at Sighthill, Edinburgh, where I often saw it among *Urtica dioica* L. (Stinging Nettles) on the banks of the Union Canal. According to Heath, J. (1958, *Proc. S. Lond. ent. nat. Hist. Soc.*, 1957:115-25) the flight period extends until July and this is the latest date I have seen quoted in the literature.—BRIAN MORRISON, Freshwater Fisheries Laboratories, Pitlochry, Perthshire, 23rd October 1973.

## OBITUARY

FREDERICK THOMAS VALLINS, A.C.I.I., F.R.E.S.  
(1900-1972)

Tom Vallins, one of a family of four, was born in north-east London and even at an early age shared his sister and brothers' love of nature. Much of their spare time was spent with their mother picnicking in Epping Forest where his interest in entomology was aroused, which was to develop and remain for the rest of his life.

After a Grammar School education he went into Insurance and reached the rank of Inspector prior to his retirement in 1962. During the First World War he joined the Army as an instructor and served with the Army of Occupation in Germany and joined the Home Guard during the last conflict.

Early in his entomological career he became interested in the Coleoptera and gained a good working knowledge, as he had with most insect Orders. But it was to be the Lepidoptera which claimed his prior attention and he became a world authority especially with the Palaearctic Lycaenidae.

Unfortunately he rarely published except for short notes, but his knowledge was unstintingly given to all who sought his advice. Vallins collected over a wide area not only in Britain but in many countries in Europe; Switzerland, birth place of his charming wife, probably being his favourite collecting ground. Many members must remember with gratitude his ready acceptance to look for some special species of any Order—rarely were we disappointed.

During his lifetime he gave generously to the National Collection and to this Society. Shortly before his death he sold his outstanding collection of Palaearctic Lycaenidae to the Smithsonian Institute of Washington where it will remain a memorial to his arduous in the field and his meticulous setting. Although many rare species came his way one outstanding discovery was his finding *Amathes alpicola* (Zett.) on the top of Skiddaw in July, 1950.

Joining the Royal Entomological Society of London in 1948, he was elected Vice-President in 1954, served on Council 1954-6, and for many years was a member of the Conservation (Insect Preservation) Committee. He joined the South London Entomological and Natural History Society in 1922 and served on Council many times. He was elected Honorary Secretary 1952-6, Honorary Librarian 1962 and Assistant for a number of years when he played a major role in assisting his great friend the late T. R. Eagles compile 'A Catalogue of Books in the Library of the South London Entomological and Natural History Society', published in October, 1960.

He was elected President in 1959 and gave an outstanding Presidential Address on 'The Mechanism of Speciation in Animals' and later presented our library with 42 books on Evolution. Versatile and capable in any office he was elected Honorary Treasurer for 1965-6 and then acted as Assistant until his death. During 1970 he rendered valuable assistance in transferring the Society's collection of microlepidoptera into 25 Hill unit drawers, a difficult and painstaking task he accomplished with speed and efficiency. In 1972 he was elected an Honorary Member, an honour, alas, to be short-lived.

Such are the bare facts of his outstanding devotion to the Society as gleaned from the published records, but his ready and capable assistance in all fields can only be judged by those who had the privilege to work with him.

Despite many commitments after his retirement he worked in the Entomologi-



F. T. VALLINS, A.C.I.I., F.R.E.S.



cal Department of the British Museum (Nat. Hist.) one day a week and assisted with the arrangement of the microlepidoptera.

As a regular attender to our Field Meetings and Fungus Forays he will be remembered as a naturalist of the old school, a lover of all nature, and ready to pass on his knowledge to the younger generation.

Probably less known of his activities were his love of gardening, photography, carpentry, his knowledge of porcelain, art, and in later years philately. In earlier years he was a keen athlete excelling at hockey.

On 4th May, 1972, he attended a Council Meeting and died of a heart attack in the train when returning home. His passing has made our Society and the entomological world the poorer and we extend to his wife and daughter our deepest sympathy.

A. E. Gardner.







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## MEETINGS OF THE SOCIETY

are held regularly at the Society's Rooms, but the well-known ANNUAL EXHIBITION takes place in the autumn in external accommodation. 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.

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